Trade and Foreign Direct Investment Patterns: the Case of Dutch Agribusiness

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Trade and Foreign Direct Investment Patterns: the Case of Dutch Agribusiness

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Preface

Completing a PhD has been my personal desire for a very long time. However, soon after I finished my Masters in Economics in 1987, I found myself an attractive job. When a little time later I started a family, I had in fact too many excuses and too little time left to even think about completing a PhD.

Fortunately, I got another chance. In the second half of the 1990s, LEI adopted a strategy to encourage its researchers to write a PhD thesis. This new LEI policy offered me the opportunity to spend time on gaining more in-depth scientific knowledge as well as the experience I was aiming for. Having worked mainly on trade and competitiveness issues in my everyday life at the Institute, it was obvious to me that my PhD research had to be in the field of the internationalisation of agribusiness.

Writing a PhD thesis in itself is quite a challenge, however I greatly benefited from the help of quite a few people who made this task much more gratifying.

I am especially grateful to my supervisor Prof. Catrinus Jepma. I thank him for being an enthusiastic and very knowledgeable coach. He provided me with an excellent mix of freedom and focus. His suggestions were always very helpful and his constructive criticism is gratefully acknowledged. Next, I would like to express a special thanks to my colleague Dr. Hans van Meijl. As co-author of chapter 2, 3 and 5, he played an important role in the development of this thesis, especially in the first stages of the project. I appreciate his valuable inputs, his comments and his friendship very much.

This thesis was funded by LEI. I am very grateful to Vinus Zachariassee and Jaap Post for their efforts to arrange the funding and for the confidence they had in completing the task.

I would also like to thank other people at LEI. Many colleagues showed interest in my work and encouraged me during the whole project. I find this typically for the people working at LEI; to me it makes work a pleasure. However there are a few people who I would like to mention separately as they have been really important to me. I would like to express a special thanks to Henk Kelholt in providing me with trade data and data on foreign direct investments. Further, I want to thank Frank van Tongeren, Derek Eaton, Ida Terluin and Jos Bijman for valuable comments on earlier versions of the manuscript. Ton van Lierop is kindly acknowledged for drawing the figures in this thesis, while Brigitte and Reshma were very helpful in preparing the layout of the book.

I would like to thank the people at multinationals I visited and interviewed, for receiving me and answering the questions I asked. Without their help this PhD would not have been realised. Their co-operation is gratefully acknowledged.

Many thanks also to Gail Hoogervorst for her very punctual corrections and editing of the English language.
And last but definitely not least, I would like to mention the women at the home front (Geartsje, Anna, Baukje en Wietske) for distracting my mind occasionally and showing me that there are more valuable things in life than doing a PhD.

Siemen van Berkum
Noordwijkerhout, April 2002
Summary

In this study patterns of agricultural trade and agrifood related foreign direct investment are investigated. An important question is how the interaction between trade and foreign direct investment can be explained. Trade and foreign direct investment (FDI) are two important vehicles for firms to internationalise their activities. Mainstream theories consider the two largely as substitutes. Yet, empirical observations suggest that a complementary relationship exists between trade and FDI rather than a substitutinal one. This thesis aims to find explanations for the patterns in agricultural trade and in agrifood related FDI, and for their interaction.

Empirical investigations focus on Dutch agricultural trade flows and on Dutch agrifood multinationals. The Dutch agribusiness is an interesting case since it has an important trade position in the world. At the same time, the Netherlands is an important source and destination of FDI in the agrifood sector.

Trade theories and applications to agricultural trade analyses
A survey of the main schools of thought in trade theory and the literature on the trade implications of growth theory in chapter 2 indicates that there is a broad range of theoretical concepts available to explain international trade in agricultural and food products. Theories differ in their assumptions, trade determinants, and consequences. Traditional theories suggest that trade is determined by country differing in their natural resources, technology levels and factor endowments. These theories assume homogeneous products and predict inter-industry trade between countries. Modern trade theories and the trade implications of new growth theories identify imperfect competition, economies of scale, product differentiation, and process and product innovations as the main determinants of trade patterns. Based on these theories, intra-industry trade and specialisation in differentiated products can be explained. However, modern trade theories practically ignore the possibility of multi-plant and geographically-dispersed firms.

Observations indicate the increasing importance of intra-industry trade (IIT) and multinationals in the agriculture and food industry. This suggests that concepts from modern trade and growth theories are increasingly relevant to agricultural trade analysts. Chapter 3 presents a survey of recent empirical work explaining and projecting agricultural trade patterns. This overview demonstrates that many opportunities were taken in applying these new theories to the modern food economy. However, empirical work on explaining IIT shows mixed results. Further, there are hardly any empirical studies that have tested the link between knowledge creation and innovation on the one hand and trade in agricultural and food products on the other. And the impact of multinational firms’ behaviour is never explicitly taken into account in agricultural trade analyses. This dissertation attempts to fill-in these omissions by applying existing theoretical concepts in explaining trade and FDI patterns of the Dutch agribusiness.
Agricultural trade flows of the Netherlands
Details of the trade positions of the Dutch agribusiness are presented in chapter 4. Analyses of trade flows indicate that Dutch trade relations are mainly with other EU countries, whereas trade in processed products dominates both imports and exports. Furthermore, the degree of trade overlap (intra-industry trade) in Dutch agricultural trade flows is considerable.

Explanations of intra industry trade
In chapter 5 an explanatory model is designed to investigate determinants of IIT in agricultural products between the Netherlands and EU countries. Two questions in particular are addressed. The first one is whether it is relevant to disentangle empirically horizontal and vertical IIT? Most empirical studies do not make this distinction, although theoretical models identify different explanatory factors for horizontal and vertical IIT. The distinctive feature between horizontal and vertical differentiated products is that the latter differ in quality while the former products are similar in quality. Yet, what causes quality differences? The second question is, therefore, what source of quality differentiation affects the level of vertical intra-industry trade? Model estimates indicate that investment in technology (measured as patents in hands of the food industry) is only a determinant of vertical IIT. Therefore, it is worthwhile separating horizontal IIT from vertical IIT. In addition to the technology variable, human capital contributes to the explanation of vertical IIT. Further, industry-specific variables used as approximations for differentiated and processed products are taken into account. Model results indicate that these variable also add to the explanation of IIT in agricultural and food products in the EU, and thereby, support the theory that product differentiation is an important determinant of IIT.

Markusen’s knowledge capital model
Research into the relation between trade and FDI suffers from a rather limited theoretical framework to test hypotheses. The theory of multinationals concentrates on firm characteristics that lead to multinationality without taking trade effects into account. The most recent theoretical attempt to understand the interaction between FDI and trade is Markusen’s ‘knowledge capital model’. That model is discussed extensively in chapter 6. In his model, Markusen connects Dunning’s OLI-paradigm with firm (technology) and country characteristics. The key elements in this framework are firm-level economies of scale, plant-level economies of scale and trade costs. A firm’s decision to go multinational reflects a trade-off between the loss of economies of scale associated with multiple plants and the reduction in transport costs it can achieve by producing locally for each market (i.e. a trade-off between scale and proximity). Market size, skilled labour differences and the interplay between the two are the major determinants of the type of FDI and, consequently, of the trade effects of FDI. Markusen makes a distinction between vertical and horizontal FDI: vertical FDI is driven by differences between countries in relative abundance of skilled labour, while horizontal FDI is motivated by high trade costs. Markusen’s conceptual model seems to be the only consistent analytical framework available to study
empirically the systematic effects of FDI on trade. However, the model has hardly been tested.

**Application of Markusen’s model**

In chapter 7 the knowledge capital model is used to explain Dutch agrifood FDI and subsequently, the trade impacts of FDI. Model estimates based on Markusen’s approach indicate that FDI can be explained by market size, similarity in market size and the interplay between market size and relative factor endowment. This implies that FDI is expected between the Netherlands and another country if:

1. The common market of the two countries is large;
2. Both countries are similar in terms of market size, and;
3. Both countries are similar in terms of market size and relative abundance of skilled labour.

This implies that, different from what Markusen’s model assumes, skilled-labour abundance is no important explanatory factor of the Dutch agrifood related FDI in itself. It means that Dutch FDI lacks the key motivation for vertical multinational enterprises. Moreover, the most important reason for horizontal FDI (namely to circumvent trade costs) seems absent according to the model estimations. The model results, therefore, appears to be weak in explaining every day practice, which is that many if not all Dutch multinationals invest in EU countries despite zero (or low) trade costs. The counterintuitive results of the empirical testing suggest that the model applied is not able to fully capture the complexities of the real world.

**Company case studies**

Firm-level analysis allows us to enlarge our understanding of the trade-off between agrifood FDI and trade. In chapter 8, the profiles, international activities and internationalisation strategies of a selection of Dutch agrifood multinationals are investigated. As the companies do not report whether the companies’ turnover in foreign markets was realised through exports from the Netherlands or by foreign affiliates, the link between trade and FDI can only be deduced through interviews and/or indirectly through combining relevant firm features. The companies were questioned about their motivations to invest in foreign countries and how foreign affiliate sales affect exports from the Netherlands. The outcomes of the interviews indicate how divers the Dutch agribusiness internationalises. Firms differ in geographical focus and in their main reasons to invest abroad. Firms also show different patterns in acquisition. Some seem to focus on a re-organisation of their product portfolio while others emphasise geographical expansion. Verbal information suggests that the former strategy may result in more trade, so that FDI and trade are complementary, while the latter strategy may imply that FDI substitutes trade. Many times company representatives emphasised specific firm assets, such as knowledge of process, brands, and other advantages that the company might possess. For the Dutch agribusiness there might be a positive relationship between the ownership of knowledge-based assets and a presence in international markets through FDI: the most innovative companies operate most internationally. This finding is one of the basic assumptions of Markusen’s knowledge-capital model. Some examples indicate that knowledge offers a considerable competitive advantage, providing a company with a powerful tool to rapidly expand in international markets through FDI.
Markusen’s theoretical approach in explaining FDI and trade seems appropriate in understanding Dutch FDI especially when firms have distinctive knowledge-based assets. These assets, which allow a company to benefit from firm-level economies of scale, are becoming increasingly important in the food industry. To hold control over these assets is an important reason for FDI for some Dutch companies. Those Dutch companies that lack such assets would invest abroad only if they can circumvent trade costs, according to Markusen’s model. Markusen therefore cannot explain investments through these companies in the EU. A model designed by Baldwin and Ottaviano probably could. That model assumes that most multinationals produce more than one single product. FDI would predominantly be determined by product differentiation, and driven by the effort to minimise a cannibalisation effect from introducing new varieties on the market. The Baldwin-Ottaviano model is not estimated in this study as it requires very specific firm-level data, which are not available.

Conclusions: what is the relationship between trade and FDI for the Dutch agribusiness?
This thesis shows that the relation between Dutch agrifood related FDI and trade largely depends on a firm’s knowledge-based assets. These assets lead to (product and process) innovation and product differentiation. Companies that possess these assets, invest abroad to benefit from differences between countries factor endowments, the latter interpreted as differences in knowledge assets or skilled-labour abundance. When an innovative firm invests abroad, we expect a complementary trade effect: trade are based on a comparative advantage. For the less innovative firms we expect a trade substitution effect. However, the extent of substitution depends on the reason for investing abroad. When most important is to circumvent trade costs, than the investment is expected to fully substitute trade. Yet, when the main reason is taking advantage of product differentiation and scale economies, FDI is expected to substitute trade but to a smaller extent than indicated in the former case. The export of one variety against the imports of another variety implies that trade is of an intra-industry nature.
1. Introduction

1.1 Background

Increased openness of economies has accelerated the process of internationalisation of firms, also in the agribusiness. Trade and foreign direct investment (FDI) are two important vehicles for firms to internationalise their activities. Mainstay theory on internationalisation considers the two as substitutes (Markusen, 1995). Yet, empirical observations indicate parallelism in trade and FDI patterns: over the last decades both have grown substantially and both are largely between developed countries (UNCTAD, 1999). These trends suggest a complementary rather than a substitutional relation between trade and FDI.

Research on internationalisation suffers from a rather limited theoretical framework to test hypotheses on the relation between trade and FDI. The theory of multinationals concentrates on firm characteristics that lead to multinationality (Dunning, 1977, 1993; Caves, 1996) without taking trade effects into account. Recently developed theories on trade impacts of multinational firms emphasise country and firm specific features (e.g. Markusen, 1998; Markusen and Venables, 1998). Yet, the latter concepts distinguish factors that either largely favour exports or FDI, implying a trade-off between the two. Discussing the relation between trade and FDI, several authors (e.g. McCorriston, 1999; Blonigen, 2001) point out the importance of an appropriate level of aggregation in data used in the analysis. They argue that country or sector level studies may hide important features of the trade and FDI relation that can only be picked up with firm level data. The objective of this study is to explain agricultural trade and food-related FDI and to explore whether the two phenomena are substitutes or complementary to each other, and whether the nature of the relation between the two can be better understood when firm-specific characteristics are taken into account. In the empirical investigation we focus on the Dutch food sector.

The Dutch agribusiness is a particularly interesting case to investigate, which also illustrates the complex relation between trade and FDI. Although at first sight the Netherlands seems to have comparative disadvantages in producing agricultural products (due to expensive land and labour), Dutch agribusiness does have an important international position. For many years, the Netherlands has been one of the major exporters of agricultural products in the world, with exports valued around Euro 45 billion in recent years. Trade statistics show a long-term increasing trend of exports since the 1950s (Silvis and Van Bruchem, 2000:46). Imports increased, too, but less than exports, indicating an ever-growing net trade position of the sector over time. Concurrently, the Netherlands is an important source of foreign direct investment: at the end of 1998 the Dutch agrifood industry had assets valued at ECU 20 billion, against ECU 5 billion in foreign production facilities in the mid-eighties.
Over the same period, foreign food-related investment in the Dutch agribusiness grew from ECU 2 billion to ECU 10 billion. Aggregate data suggests a number of things. First, the expansion of multinationals abroad does not reduce exports, nor does increasing inward-FDI reduce imports. Second, Dutch agricultural trade is mainly with other EU-countries and significantly of an intra-industry nature, which means the simultaneous import and export of rather similar products. Third, there is a great deal of two-way agribusiness-related foreign direct investment between the Netherlands and a limited number of (mainly EU-) countries. How can this simultaneous occurrence of intra-industry trade (IIT) and intra-industry FDI be understood and how do these phenomena interact?

Economists’ understanding of the issue of intra-industry trade has been enriched by theoretical developments called the ‘new trade theory’. In the new trade theory, trade and gains from trade can arise independently of any pattern of comparative advantage (as traditionally understood) as firms exploit economies of scale and pursue product differentiation strategies in an imperfect competitive market structure. Empirical literature shows that IIT varies with country and product characteristics across industries. Yet, the results of these studies do not deliver complete consensus regarding the determinants of IIT. In an attempt to enhance the understanding of IIT, more recent literature makes a distinction between IIT in horizontally and vertically differentiated products, suggesting that the two types of IIT have different determinants (Greenaway and Torstensson, 1997). Yet, so far the empirical literature in which this approach has been adopted did not (fully) support the theory (Greenaway et al., 1994, 1995; De Frahan and Tharakan, 1998, 1999). The question is whether these findings are a consequence of the way IIT and/or explanatory variables was measured, or reflect a deficiency with the underlying theory.

Whereas by now the amount of theoretical and empirical literature on the explanation of IIT is substantial, there is much less on trade effects of multinational enterprises. Concurrently, trade theories that integrate the role of multinationals are in fact not yet well developed. Yet, in view of a growing importance of multinationals engaged in world trade, a full explanation of present trade structures can not be provided without taking the role and behaviour of these firms into account. Except for recent work by Markusen (1995; 1998), Markusen and Venables (1998) and the very recent contribution by Baldwin and Ottaviano (2001), remarkable little theoretical effort has been taken to formally conceptualise the relation between trade and FDI. Consequently, empirical testing of these concepts has not appeared yet, except for Markusen’s model in Carr et al. (2001). The latter study shows estimation results that seem closely consistent with the theory.

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1 Since 1 January 1999, the Euro has replaced the ECU, with a fixed exchange rate against the Dutch guilder. In this study, trade values for years before 1999 are expressed in ECU, and trade values for years from 1999 are in Euro.
1.2 Objectives

The general objective of this research is to investigate whether agricultural trade and food-related FDI are substitutes or complement to each other, and whether the nature of the relation between the two can be better understood if firm-specific characteristics are taken into account. The study’s main focus is on an empirical investigation of the patterns of trade and FDI and how both affect each other; it does not intend to design new theory.

In aiming to contribute to a better understanding of trade and FDI patterns in the agricultural and processed food sector, concepts from recently developed trade theories will be applied, while explicitly including the behaviour of multinational enterprises. The importance of IIT will be assessed in bilateral agricultural trade relations of the Netherlands and some other EU countries, as well as the two-way trade phenomenon on the European food markets. The explanation of IIT will be linked up with recent literature on trade and growth (e.g. Grossman and Helpman, 1991b) suggesting that investments in technology can be an important determinant of trade. It will be investigated whether and how differences in technology affect IIT in agricultural products.

Given the importance of FDI as a mode of internationalisation of the Dutch agribusiness, an empirical analysis of its trends and possible explanatory factors could contribute to a better understanding of the trade patterns in agrifood products. It will be investigated empirically whether Markusen’s theoretical concept is an appropriate framework for understanding patterns in agricultural trade and FDI as observed in the Dutch agribusiness. The question whether firm specific features could add to the explanation of the similar pattern of trade and FDI is addressed by including case studies of Dutch-based multinational companies. These case studies focus on a firms’ behaviour (strategic, tactic and operational decisions) and the resulting choices on trade and foreign direct investments.

1.3 Research questions

This study centres on the following question:

How can patterns of intra-industry trade in agricultural and food products and foreign direct investment in the agrifood sector be explained, and how can the interaction of trade and FDI be better understood?

More specifically, the following research questions are addressed:
1) what are the main theoretical concepts to explain international trade and how have these concepts been used in agricultural trade analyses?;
2) to what extent are Dutch trade flows in agricultural and food products of an intra-industry trade nature?;
3) how can intra-industry trade in agricultural and food products be explained?;
4) what is the theoretical base for understanding the relation between FDI and trade?;
5) what are the major trends in Dutch agrifood FDI, how can these trends be explained and how does FDI affect trade?;
6) how do Dutch agrifood MNEs internationalise and how do their strategies affect trade flows?

The structure of the study follows the sequence of these research questions. As a consequence, the first part of the study emphasises trade theories and IIT explanation (chapter 2-5). The second part discusses the theory of multinationals and the systematic effect of FDI on trade (chapter 6-8).

1.4 Outline and approach of the thesis

Trade and specialisation patterns observed can be explained by using concepts from trade theories. A survey of trade theories – supplemented with trade implications of new growth theories – shows that there is a broad range of theoretical concepts available to explain international trade in agricultural and food products (chapter 2). Observations of agricultural trade characteristics suggest that, while traditional theories may suit very well when explaining trade in undifferentiated products, analyses of trade in differentiated and processed food products may be enhanced by applying elements from recently developed theories (chapter 3).

In line with this conclusion, and encouraged by the few efforts done so far, this study tests a set of hypotheses on causal relationships linked to the theoretical assumptions of various modern theories that can explain intra-industry trade and FDI on EU food markets. The empirical work will especially focus on the relation between innovation and trade, as recently developed theoretical literature suggests an increasing importance of technology levels and progress as a determinant of trade and FDI.

To start-off the empirical part on international trade, the Dutch agricultural trade position is presented. The degree of trade overlap (intra-industry trade) is measured to determine its importance in the Dutch agricultural trade flows. Trends in intra-industry trade are described and discussed (chapter 4).

A model is developed to investigate determinants of bilateral IIT among EU countries (chapter 5). Existing empirical literature showed some poor results, which may be due to the use of variables inappropriate to measure quality differences among products. Recent theoretical developments suggest that quality differences are caused by differences in investments in technology (e.g. Grossman and Helpman, 1991b). For this reason, the analysis in chapter 5 focuses on the role of differences in innovative capacity among countries.

Chapter 6 reviews the main theoretical developments allowing for an integration of MNEs in trade analysis. There are several reasons why firms decide to become multinational, being either firm-specific, industry-specific, or location-specific advantages. The work by Dunning (1977, 1993) on determinants of MNEs has been of much influence. However, Dunning’s taxonomy falls short in addressing the impact of FDI on trade. In general, empirical investigations have suffered from the lack of a theoretical framework through which researchers could formally develop testable hypotheses on the relation between trade and FDI. Recent theoretical developments in this field by Helpman and Krugman (1985), Markusen (1995; 1998),
Markusen and Venables (1998), and Baldwin and Ottaviano (2001) are reviewed. A brief overview of empirical studies shows a wide variety of approaches and theoretical constructs applied, obviously resulting in different outcomes.

Chapter 7 starts with a presentation of trends in FDI data related to the Dutch food industry. Next, in an effort to explain the trends, Markusen’s conceptual framework is being applied. The Netherlands serves both as headquarters country for firms producing abroad and as affiliate country for foreign firms producing in the Netherlands. Model estimates are supplemented with a number of case studies of Dutch-based multinational companies, focusing on firms’ behaviour (strategic, tactic and operational decision-making process) and the resulting choices on trade and foreign direct investments (chapter 8). This case study approach adds significantly to the conclusions based on the analysis at the industry level, by focusing on the relation between firm-specific issues, the decision to export and/or invest abroad, and the impact of FDI on trade. The concluding chapter 9 summarises the findings of the study and addresses some implications of the results for research and policy analysis.
2. A Survey of Trade and Growth Theories*

2.1 Introduction

Many different answers have been offered for the questions, why do countries trade and what are the gains from trade. Differences between countries, for instance in factor endowments and technology, may lead to trade. Countries trade in order to take advantage of these differences. This concept of trade is based on the theory of comparative advantage, first introduced by Ricardo (1817). More recent theories state that countries may also trade because there are inherent advantages in specialisation arising from the existence of economies of scale (Helpman and Krugman, 1985). Some models in modern trade theories emphasise imperfect competition, product differentiation and technology gaps (innovation) among firms and countries as major sources of international trade. Lastly, the ‘new’ growth theories emphasise the endogenous generation of technological change, which can be interpreted as having important implications for international trade (Grossman and Helpman, 1991b).

This chapter surveys the recent contribution of trade theories and growth theories in evaluating and explaining agricultural specialisation and trade patterns. The purpose of this chapter is, first, to review the main determinants of international trade as identified by the major trade theories, and secondly, to identify the empirical relevance of various theories of trade or growth for explaining trade in agricultural and food products.

We conclude that recent developments in trade theory and growth theory have enlarged the toolbox of agricultural economists studying trade and growth issues, and have significantly increased opportunities to link empirical agricultural trade observations with explanatory theoretical concepts. There no longer exists one general theory of international trade. Instead, an eclectic approach based on a match of the most important characteristics of agricultural and food products with various trade theories, seems more appropriate.

The next section gives a brief overview of international trade theories, supplemented by a review of the trade implications of new growth theories. Section 2.3 summarises the key issues of the theories presented.

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* This chapter has been published as part one of an article by Siemen van Berkum and Hans van Meijl in the *Australian Journal of Agricultural and Resource Economics*, 2000, vol. 44(4): 505-542. Reprinted with permission of Blackwell Publishers.
2.2 An overview of international trade theory and growth theory

An overview of the main theories addressing international trade is presented in figure 2.1. Three major streams (depicted as the three columns in figure 2.1) are identified. First, there are the classical and neoclassical theories of international trade, referred to as "Traditional Trade Theories". The most prominent model of this stream is the neoclassical Heckscher-Ohlin model. Despite its theoretical dominance in the field for more than a half-century, some of its implications were not supported by empirical evidence. This prompted economists to search for other, more appropriate theories to explain trade. These approaches were developed primarily in the late seventies and early eighties, and draw on developments in industrial organisation and game theory (Krugman, 1995). These more recent theoretical frameworks are presented as a second major stream, the "Modern Trade Theories" in figure 2.1. In the late eighties the so-called “New Growth” theory emerged from progress in the fields of industrial organisation and economic dynamics, which had previously been the preoccupation of macroeconomists (Blanchard and Fisher, 1989). Growth theorists set the modern trade theories in a dynamic context and shed light upon the evolution of comparative advantage. The trade implications of these growth theories are also taken into account and captured in the third main stream, referred to as, "Trade Implications of Growth Theories".

Within each major stream, a further classification of schools of thought is illustrated in figure 2.1 according to key assumptions and the main mechanism of trade emphasised. An important aspect differentiating the various approaches is whether or not technology differs between countries, with the horizontal line in the middle of figure 2.1 representing this distinction. Following Smith and Ricardo, differences in technology are the main reason for international trade. However, beginning with Heckscher-Ohlin mainstream trade theory, including the new trade theories that focused on economies of scale and imperfect competition, assumed identical technologies across countries. The focus on dynamics and the endogenous generation of technical change within the new growth theories restored technological differences between countries as a rationale for trade within mainstream trade theory in the late eighties. The revival of interest in differences in technology among countries induced some important advances in empirical work on factor content theory in the late nineties. This latter work combines, in fact, ingredients from both the Heckscher-Ohlin and the Ricardian models of trade, by assuming that trade is driven by differences both in technology and in relative factor endowments. We include these recent empirical advances in the overview of the theoretical developments.

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3 Because in both of the schools based on the new growth theories technology can be either different or identical across countries, we identified two directions within these schools. Each direction is illustrated as a white box in figure 2.1.
Figure 2.1 Main trade theories
2.2.1 Traditional theories

As do many other theories, trade theories find some of their roots in Adam Smith's "The Wealth of Nations" (1776). Smith showed that trade is possible when there are absolute cost differences between countries. This means that trade may occur when one country can produce a certain good with less labour than the other country, while this second country can produce another good more efficiently. Ricardo (1817) also showed that trade is possible, and beneficial, to both countries when one country produces all goods more efficiently than the other country, as long as the relative costs of production of goods differ between countries. In that case each country has a comparative advantage in the good for which the highest efficiency gap holds. This 'principle of comparative advantage' is still one of the most important concepts in trade theory. In the Ricardian model, labour is the only factor of production, and differences in labour productivity are the main explanation for trade, under the assumption of differences in technology level and/or natural circumstances between countries (natural resources, climate, soil, geographical position). However, this model does not explain what causes technology levels, and thus labour productivity, to differ between countries.

Differences in the use of capital per worker are an important explanation of differences in labour productivity. Therefore, the Heckscher-Ohlin-Samuelson (H-O-S) model elaborated on the theory of Ricardo by introducing another factor of production (capital), but then assumed identical production techniques across countries (Ohlin, 1933, Samuelson, 1948). Furthermore, the standard, neoclassical H-O-S model assumes homogeneous goods, constant returns-to-scale in production, identical, homothetic consumer preferences across countries, and perfect competition in markets. These assumptions imply that differences in factor endowments (leading to different factor prices and prices of goods between countries) are the only determinant of trade patterns between countries. Because of its theoretical dominance in the field, we elaborate on the main mechanisms and principles of the H-O-S model with the following illustration. Assume a standard H-O-S model with two goods (X and Y) and two countries (H, for home, and F, for foreign). Country H is relatively capital-abundant while Country F is relatively labour-abundant. Production of good Y is capital-intensive while that of good X is labour-intensive. The production possibility curves for H and F and their indifference curves are depicted in figure 2.2.

With autarky, factor prices differ between the two countries. The rental rate of capital relative to the wage rate is lower in the capital-abundant country H, which will, therefore, use more capital per worker than country F for the production of both goods. This implies that the relative price of the capital-intensive good Y is lower in H than in F (Lerner, 1952). This is reflected in the steeper price line of good X relative to Y for H ($P_h^x$) than for F ($P_f^x$) in figure 2.2. Under trade, H will export good Y, and F will export good X, following the principle of comparative advantage. When trade expands, each country's exporting sector grows and its import-competing sector contracts. Factors of production move accordingly resulting in income distribution

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4 Given these relative prices, country H produces and consumes $Y_{ha}$ and $X_{ha}$, while F produces and consumes $Y_{fa}$ and $X_{fa}$. 
effects. Because the export sector uses relatively more of the abundant factor of production, the relative price of this factor increases and the relative price of the export good increases. This process continues until the relative prices in both countries are the same (world price $P_w$ in figure 2.2).

**Figure 2.2 Production possibility curves and indifference curves for H and F**

In equilibrium, H produces $Y_{hp}$ and consumes $Y_{hc}$ and, therefore, exports $Y_{hp} - Y_{hc}$ to F. F produces $Y_{fp}$ and consumes $Y_{fc}$, importing $Y_{fc} - Y_{fp}$. For good X, the situation is reversed. It is important to note that trade enables each country to reach a higher indifference curve ($I_1$ instead of $I_0$).

From the above illustration of the H-O-S model several conclusions can be drawn.

1. The Heckscher-Ohlin theorem: Given the assumptions of the model, each country exports the good that uses most intensively its relatively abundant factor of production. In our example, the capital-(labour-)abundant country H (F), will export the capital-(labour-)intensive good Y (X), and will import the labour-(capital-)intensive good X (Y).

2. The factor price-equalisation theorem: Given a certain set of assumptions, the equalisation of commodity prices through trade will result in the equalisation of relative factor returns\(^5\). In our example, the equilibrium relative prices between goods are the same in both countries. With the same production technology and constant returns to scale, this is only possible when factor prices are identical.

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\(^5\) In addition to the assumptions of the standard Heckscher-Ohlin model, there may be no distortions and no impediments to trade, such as tariffs, quotas or transportation costs. Furthermore, both commodities have to be produced in both countries in the equilibrium and there may be no factor intensity reversals.
3. The Stolper-Samuelson theorem: An increase in the relative price of a good increases the real reward to the factor of production that is used intensively, and decreases the real reward to the other factor (Stolper and Samuelson, 1941).

4. A combination of the Heckscher-Ohlin theorem and the Stolper-Samuelson theorem implies that the scarce production factor in a country will lose from trade and the abundant production factor will gain from trade.

5. The Rybczynski theorem: An exogenous increase in the supply of one factor of production leads to an increase in the production of the good that uses this factor intensively, and to a decrease in the production of the other good. If the increase is in the abundant factor this will cause more trade, while an increase in the scarce factor will diminish trade.

6. Trade results in an increase in welfare for both countries: In our example, both countries reach a higher indifference curve in the trade equilibrium. This is caused by a more rational allocation of productive resources and lower relative prices for the import-competing product. Trade is beneficial and occurs due to differences between countries. The larger the differences are, the more trade occurs between countries, with all this trade consisting of inter-industry trade. Furthermore, policies that impede trade will decrease welfare. Free trade is therefore the best policy. But, as the Stolper-Samuelson theorem indicates, the gains will not accrue to everyone; income distribution effects may be large.

With respect to the effects of trade on income distribution, it is important to recognise that the standard H-O model assumes that all production factors can move freely between sectors, which is clearly a long-run assumption. The specific factor (short-term Heckscher-Ohlin or so-called Ricardo-Viner) model assumes that one factor is specific to the production of one good. Trade patterns and income distribution implications are both different from the standard H-O-S model, depending on the allocation of the specific factors across sectors (Jones 1971, Samuelson, 1971). Trade is beneficial to the specific factor that is necessary to produce the export good, and reduces the return to the factor specific to the import good, while having an ambiguous effect on the real return to the mobile factor.

The trade implications of the H-O-S-model were not always supported by empirical evidence. The most famous example of a result that contradicts the expected model outcomes is the one by Leontief (1953), who found that the imports of the USA - a capital-abundant country - were more capital-intensive than its exports. Not surprisingly, a major stream of research has been concerned with the explanation, within the factor-proportions framework, of the ‘Leontief paradox’. The difficulty is that the generalisation of the simple H-O model beyond two factors and two goods does not generalise the Heckscher-Ohlin theorem. For example, it is not the case that

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6 Under the condition that the terms of trade remains the same.

7 According to the H-O theory, trade in goods produced in similar industries should not exist. Davis (1995) has proposed, however, that small differences in individual product-related technologies can produce such overlaps even in a Heckscher-Ohlin framework.

8 With trade, the mobile factor labour moves into the export sector. The marginal product of (=real return to) labour falls in the export sector while real returns to labour increase in the import sector. The welfare effect to labour depends on the consumers' preferences between the export good (whose price has increased) and the import good (whose price has declined). See Ruffin and Jones (1977) for a more details.
the most labour-abundant country will export the most labour intensive good. Furthermore, when there are more goods than factors, production levels are indeterminate, so obviously the theory cannot predict the commodity composition of trade. This point was made by Leamer and Bowen (1981) and led to a shift in the empirical work from explaining the commodity composition of trade to explaining the factor content of trade. Recent empirical work on international trade revitalised the factor content model of trade, and some of its major contributions are briefly reviewed below.

The simplest version of the factor content theory is the Heckscher-Ohlin-Vanek model with factor price equalisation (Vanek, 1968). Important assumptions are similar technologies and identical homothetic preferences across countries. The model predicts that countries are net exporters of the services of their abundant factors. In the Vanek model, the measure of factor content of net exports should be equal to the country’s measure of factor abundance. The factor content of net exports is calculated by multiplying the quantity of net exports of each good with the factor input coefficient and summing over all goods. The assumptions of identical technologies and factor prices across countries imply that these input coefficients are identical across countries. Factor abundance is calculated as the economy’s factor endowment minus the factor content of consumption. The latter is equal to the country’s share of world spending multiplied by the world’s factor endowment because identical homothetic preferences across countries imply that the composition of consumption is the same everywhere.

Bowen et al. (1987) tested this model for 12 inputs and 27 countries. The US technology matrix was used to calculate the factor content of net exports for all countries. They found no correlation between factor contents and factor abundance. Studies by Trefler (1993) and Davis and Weinstein (1998) confirmed this dismal result, suggesting that Leontief was right: trade just does not run in the direction that the Heckscher-Ohlin theory predicts (Krugman and Obstfeld, 1994).

But Trefler (1995) took a step forward by documenting not just that the H-O-V model performed poorly, but also how it performed poorly. First, he found that the volume of the factor content of net exports is smaller than the size of the factor endowment differences across countries. He called this ‘the mystery of the missing trade’. Second, Trefler calculated that poor countries export too little of their abundant factors while rich countries export too much. Trefler (1995) addressed the latter observation by assuming that absolute levels of technology differ between rich and poor countries. Absolute differences in technology influence national incomes, and hence the volume of trade, but as comparative advantage does not change, they do not affect the pattern of trade in factor services. Trefler's amended H-O-V model fits the data much better than the simple H-O-V model: the correlation between predicted and actual factor content of trade is 0.67, with the sign of factor abundance predicting the sign of factor services trade 93% of the time. However, the predicted size of the

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9 Regarding ‘the missing trade’, Trefler introduced a home-bias in consumption, which amounts to a prediction that countries prefer to consume services of their own factors. Helpman (1999) finds this amendment less appealing because there is plenty of evidence that technologies differ across countries (for example, Harrigan 1997) while there is no such evidence for demand patterns (except for biases that are related to income levels).
factor content of trade was still an order of magnitude larger than the actual level of the factor content of trade, leaving the mystery of the missing trade unsolved.

Very recently, some work has been done to unravel this mystery. Davis and Weinstein (1998) looked very carefully at the trade data as collected and categorised by statistical agencies and observed that goods grouped in the same (SIC) classification almost certainly include goods produced with varying technology and factor intensities. Capital-abundant countries will produce the capital-intensive goods within a category, while labour-abundant countries will produce the labour-intensive ones. Therefore, if the capital-abundant country’s measured average input coefficients are used to calculate the factor content of trade, the capital intensity of its exports will be understated and the capital intensity of its imports will also be overstated. Davis and Weinstein estimate their model empirically and find that a part of the mystery disappears. They conclude that factor content of trade is drastically underestimated when average factor intensities are used, which indicates that trade is not truly missing but is under-recorded.

Next, the gap between theory and data can be closed by modelling cross-country differences in techniques of production that are driven by both technological differences and differences in factor rewards (Helpman, 1999). Hakura (1997) and Davis and Weinstein (1998) show that the fit of the factor content equations improves significantly when each country’s production technology is used instead of a common technology.

It may be said that recent studies have revitalised the factor content theory of trade by allowing technology levels to differ across countries. However, the same difficulty remains as with the Ricardian theory: why technology levels differ across countries is not explained. This is where the new theories of trade and growth seem more accommodating.

2.2.2 Modern trade theories

In the seventies and eighties, prior to the recent empirical advances on the factor content of trade discussed above, economists searched for new explanations for international trade in order to find answers for the poor empirical evidence of the factor proportions theory. Empirical studies showed that - contrary to what would be expected according to the standard H-O theory - a major part of trade between industrial countries is of an intra-industry nature, and that the income distribution effects of trade are small. The ‘new’ trade theories that emerged in the eighties elaborated on the neoclassical framework by relaxing the assumptions of constant returns-to-scale and perfect competition, and emphasised economies of scale and product differentiation. A second stream, the ‘neotechnology theories’, stressed the central role of technology as had the classical theories and thus proposed a radical departure from the neoclassical framework.

Where there are economies of scale, doubling the inputs to an industry will more than double the industry’s production. Imagine a world with many goods subject

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10 Following some ‘documentary work’ in the sixties by other authors, the publication by Grubel and Lloyd (1975) was the first providing detailed evidence of intra-industry trade at the SITC 3-digit level.
to economies of scale. If each country produces only a limited number of goods, each good can be produced on a larger scale than would be the case if each country tried to produce all goods, and the world economy can therefore produce more of each good. International trade plays a crucial role: it makes it possible for each country to produce a restricted range of goods and to take advantage of economies of scale, while consumption of all goods is possible through trade.

The new trade theories assume increasing returns to scale, which implies imperfect competition unless economies of scale are assumed to be entirely external to individual firms. An industry where economies of scale are purely external (that is, where there are no advantages to large firms) will typically consist of many small firms and be perfectly competitive (Éthier, 1979, 1982). Economies of scale at the industry level may arise because a larger industry enables a greater variety of specialised services that support the industry’s operations or support a larger and more flexible market for specialised kinds of labour. But when external economies are significant, a country starting with large production in a particular industry has a cost advantage in that industry, which induces further specialisation in that industry and leads to inter-industry trade. The process is self-reinforcing and a country may retain an advantage even if another country could potentially produce the same goods more cheaply. In these theories, history and economies of scale explain trade patterns. Furthermore, countries may lose from trade when external economies of scale in their specialisation pattern are relatively small and/or the income elasticity of the products in which they specialise is low. Trade policy (subsidies/tariffs) can be used to reverse the trade and specialisation pattern.

A second approach assumes internal economies of scale, which lead to imperfect competition. Within this approach two directions are identified. The first direction concentrates on modelling economies of scale and treats market imperfections as simply as possible by assuming monopolistic competition (Helpman and Krugman, 1985). A second direction characterises market structure as oligopolistic, by modelling ‘Cournot’ or ‘Bertrand’ competition (Brander and Spencer, 1985; Helpman and Krugman, 1989).

Under monopolistic competition, an industry contains a sufficiently large number of ‘similar’ firms producing differentiated ‘unique’ products. In the market equilibrium, there are zero-profits for all firms, while the number of firms depends on the size of the market, the amount of fixed costs and the degree of product differentiation. Underlying the application of this model to trade is the idea that trade increases market size, which may expand the scale of production and may enlarge the variety of goods available to consumers. The main mechanisms of trade are (internal) economies of scale and product differentiation, which cause the production of each product variety to be concentrated in a particular country. Each country produces a different set of varieties of a certain product. Because consumers display a ‘love of variety’, all varieties are in demand which implies that a country imports each of the varieties produced in other countries and exports each of the varieties domestically produced. So, there will be intra-industry trade. However, it is ambiguous which

for all major industrialised countries.
country produces which variety. Again the exact specialisation pattern is dependent on history and accidental factors.

In an oligopolistic market, firms are mutually dependent on each other's decisions. If trade is opened, each firm will become part of a larger, more competitive market. Each firm will find itself facing a higher elasticity of demand, leading it to expand output, and as the industry's output expands, the price will fall. This is the so-called pro-competitive effect. However, if market segmentation and price discrimination are possible, there can be trade even without economies of scale and comparative advantage (Brander, 1981; Brander and Krugman, 1983). Trade occurs, because oligopolists perceive a higher elasticity of demand on exports than on domestic sales - they have a smaller share on the foreign than on the domestic market - and interpenetrate each other's market (reciprocal dumping).

Gains from trade in the new trade theories appear in the form of the pro-competitive effect, the exit of firms, which are unable to cover their fixed costs, and lower average costs if the production scale of a firm increases. The welfare and trade implications of trade policies depend on the assumption of perfect or imperfect market competition (Helpman and Krugman, 1989). For example, the equivalence of a tariff and a quota disappears when markets are imperfect because a quota creates more monopoly power than a tariff. Furthermore, export subsidies may seem attractive for shifting profits from foreign to domestic firms in a situation where an oligopolistic industry can earn excessive profits. In the simplest case, a subsidy to domestic firms, by deterring investment and production by foreign competitors, can raise profits of domestic firms by more than the subsidy. This is the so-called ‘strategic’ trade policy argument, which emerged from the separate role of industrial organisation in the strategic trade literature (Brander, 1995). An argument that justifies export subsidies is in contradiction with the traditional theories and extremely useful for lobbyists. However, all justifications for an active trade policy are dependent on very specific assumptions (for instance, Cournot competition) and disappear with foreign retaliation. Therefore, Krugman (1987) concludes that although free trade is almost never optimal under imperfect competition, it is a good rule of thumb.

While these new trade theories assume identical production technologies across countries, the neotechnology trade theories emphasise (endogenous) technological innovation and technology gaps across firms and countries as a major reason for international trade (Kravis, 1956; Posner, 1961). In these theories, trade patterns are explained in terms of technological progress. Technological differences or gaps across countries are an endogenous outcome of firm-level product and process innovation that reduces costs of production and generates new products. The flow of

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11 Assuming economies of scale causing the oligopolistic market structure, the effect of opening of trade in a Cournot market structure is a world industry with larger firms, but fewer in number than the sum of the firms in the national industries before trade. Competition nonetheless increases and lowers price levels. Thus, the opening of trade leads not only to a reduction in the monopoly distortion, but also to increased efficiency.

12 When monopolistic industries are protected by tariffs, domestic firms know that if they raise their prices too high, they may still be undercut by imports. An import quota, on the other hand, provides absolute protection: no matter how high the domestic price, imports cannot exceed the quota level (See Helpman and Krugman, 1989).

13 Strategic, because it is not profitable when viewed in isolation but it alters competition in the future.
technological developments and innovation is assumed to be not free and instantaneous, implying that a firm/country has at least a temporary comparative advantage in production and exports. The difference with the Ricardian trade models is that in the latter, differences in technology (productivity) for some given goods cause trade, whereas in the neotechnology trade models trade is induced because the innovating country generates some new products that other countries are unable to produce, at least temporarily.

2.2.3 Trade implications of growth theories

While all trade theories are mainly static in nature and focus on allocation issues, an interesting development has taken place in the growth literature. The ‘new’ growth theories, which emerged from progress in economic dynamics and industrial organisation, build on the static ‘new’ trade models by putting them in a dynamic context. Like the neotechnology theories, the new growth theories stress the role of technological change. By emphasising dynamics, growth theories deal with the evolution of comparative advantage. Trade implications of new growth theories are that trade and trade policy can influence the long-run growth rate of a country.

The new growth theories found several ways to endogenise technological change in a general equilibrium model. Two approaches can be distinguished. The first approach assumes that externalities (like knowledge spillovers) or ‘learning-by-doing’ effects, which are both by-products of other activities, cause growth. The external economies of scale approach is used to model these effects (Romer, 1986; Lucas, 1988). The second approach assumes that technological change is the intended outcome of economic behaviour and firms have to ‘invest’ in knowledge creation to obtain technological change (Romer, 1990; Grossman and Helpman, 1991b; Aghion and Howitt, 1998). Investments in knowledge can be seen as fixed costs and monopolistic competition makes it possible to cover these fixed costs. Most studies that follow the second approach also assume that knowledge generates some externalities and are thus a mixture of both approaches.

In models in which external economies of scale determine the evolution of the specialisation pattern (the first approach), the central mechanism is that a firm creates knowledge as a by-product of other activities. This knowledge flows directly to all other firms, where it increases the productivity level of the production factor that can be accumulated. In principle the initial specialisation and trade pattern is determined by comparative advantage (initial factor endowments, see the second model in Lucas (1988)) or the initial knowledge stock (technological capabilities, see Young (1991)). The dynamic implications of these growth theories based on external economies of scale are that a country will build up knowledge or expertise in goods in which it specialises, therefore reinforcing its comparative advantage in these goods. Because the technological opportunities differ between goods, the specialisation pattern determines the welfare level and long-term growth of a country. Trade or trade policy can influence the specialisation pattern and, subsequently, the long-term growth rate of an economy.

Models that concentrate on investment in knowledge (human capital) combine imperfect competition with externalities. Through investments in R&D, an explicit
R&D sector produces new goods by expanding product variety (Romer, 1990) or improving product quality (Grossman and Helpman, 1991a). Furthermore, there are also some spillovers on the aggregate stock of knowledge. A larger stock of knowledge, in turn, reduces the costs of producing blueprints for new intermediate or final products (i.e. stimulates technological progress). This leads to a constant incentive to invest in R&D and, therefore, to a growth in the knowledge stock. The general knowledge stock also increases the productivity of inputs in other sectors or the quality of consumer products. The economy will therefore also be growing at a constant rate. The growth performance dynamics of a country depend on the amount of resources devoted to R&D investments. The R&D investments are dependent on the specialisation pattern, which is determined by the principle of comparative advantage (factor endowments), history, the initial stock of knowledge, the scale of a country’s market, and the demand structure. These factors determine the amount of resources devoted to the R&D sector relative to other sectors.

Opening up to trade can, therefore, also influence the growth rate in these endogenous growth models. For instance Rivera-Batiz and Romer (1991a; 1991b) identify three effects of trade on growth. First, there is the redundancy effect; by eliminating duplication of innovation activities in different countries, trade increases the efficiency of R&D investments and boosts growth. Second, there is the integration effect; if the R&D sector is subject to external economies of scale and spillovers are international in scope, trade can boost productivity by increasing the extent of the market. Third, there is the reallocation effect; as usual, opening to trade alters the equilibrium allocation of resources across sectors. The growth rate increases (diminishes) if the trading equilibrium involves more (less) resources in R&D investments. The first two effects are essentially a shift in the efficiency of investment spending. The third effect reflects the amount of resources devoted to R&D investments, which is the result of all kinds of effects that change the allocation of resources. The welfare and growth implications of trade are therefore dependent on the specialisation pattern and on shifts in the efficiency of investment spending. Furthermore, whether knowledge spillovers are national or international in scope is important (Grossman and Helpman, 1991b).

When there are international knowledge spillovers, all innovators will have the same knowledge and national advantages in R&D arise only from differences in relative factor prices (which are dependent on resource endowments). Factors such as the size of a country’s market and the history of its production play no role in long-term trade patterns; the only thing that matters is factor endowments.

With only national knowledge spillovers, the initial conditions govern long-run outcomes. In many situations the country with the greater initial stock of knowledge has an advantage in R&D and accumulates knowledge more quickly than its trading partner. This sustains and adds to its productivity lead. History alone

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14 Many of the new products that arise due to innovation are intermediate goods. Crucial in modelling the different varieties of intermediate goods is the Ethier (1982) specification, which implies that an increase in the number of varieties increases productivity of all production factors. The intuition behind this result is that more specialised intermediate goods increase the productivity level of all factors.
determines long-run trade patterns and growth rates. Government policy aimed at changing the amount of resources devoted to the R&D sector may have long-lasting effects.

Evolutionary growth theories assume that technology plays the fundamental role in economic life (Dosi et al., 1988; 1990). Technological change and innovation is a cumulative, specific and irreversible process. The main trade mechanism is the absolute technological differences that determine the world market position of all sectors. Relative technological gaps play a minor role. They determine the specialisation pattern between sectors according to the mechanism of comparative advantage. Future growth and technological developments are determined by the current specialisation pattern. The current specialisation pattern of a country has, therefore, a dynamic effect because this pattern determines in which sectors technical skills will be accumulated, innovations will be done, economies of scale will be realised, etc. Sectors differ in their growth opportunities such that the present specialisation pattern is extremely important for the countries’ future economic performance. A specialisation pattern according to the traditional mechanism of comparative advantage can lead a country to specialise in those industries (sectors) and activities in which the opportunities for growth and technological development are least. A specialisation pattern, which is statically efficient can therefore be dynamically inefficient and vice versa. If this trade-off occurs, a country can try to change the specialisation pattern and future growth path through industrial or trade policy.

15 In the old neoclassical growth models the long-term growth rate was assumed to be exogenous. Trade had therefore no influence on the long-run growth rate of an economy (see Smith (1984) for a survey).
<table>
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- technology differs between countries  
- homogeneous goods, perfect competition, constant returns to scale | - countries differ in labour productivity (caused by different levels of natural resources and technology) | - trade patterns determined by comparative advantage  
- inter-industry trade  
- the more countries differ, the more they trade  
- severe income distribution effects |
| Heckscher-Ohlin-Samuelson | - initial labour and capital endowments differ  
- technology identical across countries  
- homogeneous goods, perfect competition, constant returns to scale | - countries differ in factor endowments | |
| **Modern trade theories and trade implications of new growth theories** | | | |
| New trade theories | - (internal or external) economies of scale  
- imperfect competition  
- differentiated goods  
- technology identical across countries | - economies of scale and product differentiation  
- market segmentation and price discrimination | - history and chance factors determine trade patterns  
- precise patterns of trade indeterminate  
- inter-industry and/or intra-industry trade  
- income distribution effects small |
| Trade implications of new growth theories | - growth by knowledge creation  
- A) factor endowments (human capital, unskilled) differ between countries or  
- B) initial technological level differs between countries  
- homogeneous, unskilled labour-intensive, low tech goods and differentiated, human capital-intensive, high tech goods. Technological opportunities are higher for differentiated high tech goods.  
- national or international knowledge spillovers | - initial specialisation pattern determined by initial factor endowments (A) or technological level (B). This specialisation pattern determines growth rate and the specialisation pattern in future because technological opportunities differ between sectors. | - inter-industry specialisation for homogeneous goods  
- intra-industry specialisation for differentiated goods (precise pattern of trade indeterminate)  
- countries may lose from trade especially when knowledge spillovers are national in scale. However, most models assume international knowledge spillovers. |
| Neotechnology trade theories and trade implications of evolutionary growth theories | - technological level differs between countries (i.e. there are technology gaps)  
- newly developed knowledge does not flow immediately between countries as it is country and firm-specific  
- newly developed knowledge is cumulative and path dependent  
- product differentiation by product innovation | - technology gaps, which grow with process and/or product innovation and close with imitation, give countries at least a temporary comparative advantage | - trade patterns determined by technology gaps  
- inter-industry and/or intra-industry trade  
- leading countries have to innovate to maintain income levels  
- countries may lose from trade (if trade-off exists between static and dynamic efficiency). Chances of this occurring are higher because knowledge is cumulative and firm/country specific. |
2.3 Summarising the key issues

The key issues of the theories described above are summarised in figure 2.3 in which a condensed overview of their most important assumptions, determinants and consequences is presented. Traditional theories suggest that trade is determined by country differences in natural resources, technology levels and factor endowments. These theories assume homogeneous products and predict inter-industry trade between countries. Modern trade theories and the trade implications of new growth theories identify imperfect competition, economies of scale, product differentiation, and process and product innovations as the main determinants of trade patterns. Based on these theories, intra-industry trade and specialisation in differentiated products can be explained. Overall, recent theoretical and empirical developments point to an increasing role for technology in explaining trade patterns.

Regarding governmental interventions, the new trade theories have shown that the expected trade and welfare implications of a certain policy are dependent on the underlying assumptions, such as imperfect competition and economies of scale. Furthermore, these theories provide, in principle and under very strict conditions, some justification for interventionist policies, calling into question any blanket rejection of government interventions by the traditional trade theories. The use of the ‘right’ theory under the ‘right’ description of the circumstances is, therefore, very important to assess the impact of government intervention.
3. Application of New Trade and Growth Theories to Agricultural Trade Analyses

3.1 Characteristics of international agricultural markets

We now ask to what extent these theories are applicable for explaining trade patterns in the agrifood sector. In so doing, it is important to note the major characteristics of agrifood products, market structures and trade. These characteristics can then be matched to appropriate features of the various theories of international trade to help determine the best theoretical approach to explaining trade patterns. Several general and interrelated observations of agricultural trade characteristics are presented below.

1) A large part of agricultural and food trade is between similar countries.
A large share of the trade of developed countries in agricultural and food products (69% and 76%, respectively) is with other developed countries. Further, trade among developing countries is becoming more important too (Hertel et al., 1999). Intra-developing country trade increased from 23% to 36% for agricultural products and from 24% to 46% for food processing products in the 1965-1995 period. These percentages indicate that the amount of trade among countries that may be considered similar in terms of their relative factor endowments is substantial.

2) The importance of trade in processed agricultural products increases at the expense of trade in basic agricultural products.
McCorriston and Sheldon (1991) reported on the development of trade in bulk and processed products since 1960. They show that since the mid-1970s the value of world trade in processed products has been growing at a faster rate than that of bulk commodities. This trend continued in the 1980s. In 1988 - the last year considered by the authors - processed products accounted for 60% of world agricultural trade with bulk and intermediate products accounting for equal shares of the remainder. Traill (1996) recorded a 9.4% annual growth rate for trade in processed products between 1961 and 1990 compared with 2.1% growth for agricultural bulk commodities over the same period. Traill also noted a striking difference between the EU and USA in this respect: the processed ‘high-value’ products account for 85% of EU food and agricultural exports but only 60% of American exports. Coyle et al. (1998) reported a continuation of the trends towards increased trade in processed food products through the nineties.

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3) Trade in processed food products is concentrated among a few countries
Dayton and Henderson (1992) claim that 30 developed and newly-industrialised countries (NICs) account for 90% of processed food imports, of which the NICs’ share was only 6%. McCorriston and Sheldon (1998) emphasise the dominance of the EU as a trader of processed food products in the world trade in food and agricultural products. Referring to 1990 data from ERS/USDA the authors report that the EU countries are among the leading exporters of processed food products, with France and the Netherlands together accounting for around 20% of total world trade in manufactured foods.

4) Trade in processed products between developed countries is increasingly intra-industry trade (IIT).
Even at more disaggregated product levels, countries simultaneously export and import processed products that are close substitutes for each other. Trail (1996) refers to a study by Gomes da Silva who found that levels of intra-industry trade, as measured by the Grubel and Lloyed index, in the EU food, drinks and tobacco industries increased between 1980 and 1992 from 0.38 to 0.45 on average. Based on 1994 four-digit SIC data, Henderson et al. (1998) report an average IIT level of 0.57 for the US processed food sector, suggesting a significantly higher level of trade overlap than McCorriston and Sheldon (1991) calculated for the US food industries for 1986.

5) Market concentration in food processing industries and retailing is increasing.
There is a general tendency towards increased concentration in the US and EU food processing sectors (Oustapassides et al. 1995; Henderson et al., 1998; McCorriston and Sheldon, 1998). This indicates that these industries seek to exploit the gains from economies of scale, and possibly may be able to influence supply and prices on the markets. McCorriston and Sheldon (1998) observed a relatively high concentration in each of the sub-sectors of food manufacturing and retailing across the EU.

6) Food industries increasingly internationalise through foreign production
Even more so than through trade, the international character of the processed food sector is reflected in foreign production activities through foreign direct investments, the vehicle of this mode of internationalisation. Henderson et al. (1996) claim that in 1994 sales by foreign affiliates, as an indicator of FDI, of US processed food firms were more than four times the total value of US exports of processed foods. At the same time, affiliates of foreign companies located in the USA sold more than twice the level of US imports. While in aggregate foreign affiliate sales appear to be significantly more important than food exports, firm-level data for leading food manufacturers with foreign sales show that their relative importance varies widely

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17 The common measure of intra-industry trade is the Grubel and Lloyd index (see Greenaway and Milner, 1986) for a review of pros and cons of this measurement). This index measures the degree of the absolute amount of commodity exports that is offset by commodity imports of the same grouping, and expresses this intra-industry trade as a proportion of the total trade in this commodity group. In formula: GL = 1 - |X-M|/(X+M), where X is exports and M is imports. The index ranges between zero (no IIT) and one (where exports equal imports for each sub-sector of the industry in question).
The observations indicate that agricultural trade is concentrated mainly among countries having more or less similar factor endowments and that products traded are increasingly of a processed (highly differentiated) and intra-industry nature. These observations have important implications for the application of trade theories in analysing international trade in agricultural and food products. The observations suggest that 1) the standard Heckscher-Ohlin-Samuelson model is not always suitable to explain agricultural trade and 2) the relevance of modern trade and growth theories increases relative to traditional theories in the area of agricultural trade. The study by Coyle et al. (1998) underlines these points as it found that the factors stressed by the traditional trade theories, such as increasing income per capita, factor endowments, transport costs and policies, only partly explain the shift in the composition of food trade towards more processed food products. According to the authors the large, unexplained residual is due to variety effects and differential rates of technology growth among various food and agricultural sectors, thereby presenting a case for the application of elements from the new trade and growth theories in agricultural trade analyses. Furthermore, the increasing concentration in the food processing industries indicates that food markets can be characterised rather as imperfectly than as perfectly competitive. This makes a case for trade analyses explicitly including the impact of large enterprises’ behaviour. As multinational firms increasingly account for food production activities, trade analyses would benefit from counting the impact of FDI on trade.

3.2 New trade and growth theories and their application to agriculture

For many years, the mainstream of empirical agricultural trade analysis has been based on the traditional theory of comparative advantage following the neoclassical approach. For instance, empirical research on the impact of trade liberalisation due to the recent GATT round was largely based on this theoretical framework, although the limitations of the most commonly used trade models are recognised (see Peterson et al., 1994). Yet agricultural trade research has progressed to include trade determinants identified by the more recently developed theories. In the following sections, empirical work is reviewed to illustrate the contribution of those studies from applying the recent theoretical developments to gain a better understanding of trade in agricultural commodities and food products.

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18 For overviews of traditional agricultural trade models, see Sarris (1981) and MacLaren (1990). McCalla (1966) introduced imperfect competition in agricultural modelling. In his analysis of price formation in the international wheat market, he suggested that grain trade may be oligopolistic. Several researchers followed McCalla in his approach. These models were, however, criticised as being essentially theoretical models, providing no empirical support and trying to model dynamic price competition in a static framework. A more acceptable inclusion of strategic interaction in modelling requires the introduction of game theoretic analysis. This approach is covered in section 3.2.3 on strategic trade theory.

19 Studies that have used elements of the new trade theory in analyses of the Uruguay Round are described by Martin and Winters (1996).
3.2.1 Measuring and explaining intra-industry trade

In general, differences in countries lead to inter-industry trade and cannot explain intra-industry trade, while economies of scale can explain intra-industry trade. The study of intra-industry trade in agricultural and food products can, therefore, be seen as a way of testing the importance of scale economies in agricultural trade.20

Empirical studies of intra-industry trade (IIT) can be classified into three groups. The first group measures levels of IIT to obtain an indication of the importance of non-comparative advantage specialisation. The second group examines whether levels measured confirm predictions of the theory. The third group investigates whether industries for which IIT is measured have the characteristics assumed by the models.

Levels of intra-industry trade

Early studies that measured the level of IIT in agriculture found that agricultural trade was largely of an inter-industry nature (see, for example, Greenaway and Milner, 1986). However, as agricultural production was defined as generally as ‘food and live animals’, it was suggested that these outcomes were mainly due to the high levels of product aggregation in the data. McCorriston and Sheldon (1991) examined IIT levels in a sample of ten high-value processed food and agricultural products for the USA and the EU. The results indicate that in 1986 a large part of this trade was of an intra-industry trade nature and this part was in a similar order of magnitude to other industrial goods. Furthermore, the EU exhibited more intra-industry trade across the sample than the USA, although much of this was due to trade among EU countries. The high levels of IIT for the EU (with values of the Grubel and Lloyd index exceeding 0.70) appear to be influenced by its integrated nature. Focusing on external trade of the EU, the results showed lower levels of IIT for all product groups, while for seven product groups trade tended to be of an inter-industry, rather than of an intra-industry nature. The results indicated that changes in EU specialisation were largely intra-industry in nature, particularly with respect to intra-EU trade and trade with other European countries, while for the USA it was predominantly inter-industry in nature (with the exception of exports to Canada which indicated a trend to intra-industry specialisation).

Testing hypotheses on intra-industry trade and factor endowments

Hirschberg et al. (1994) investigated some predictions of the basic intra-industry trade model of Helpman and Krugman (1985). They studied three hypotheses with respect to the relation between IIT and factor endowments. Firstly, the level of IIT will be higher (lower), the smaller (greater) the difference in relative factor endowments between the countries. Secondly, the level of IIT will be higher (lower), the smaller

20 However, the concept of intra-industry trade is an imperfect measure for economies of scale. On the one hand, it may overstate the importance of economies of scale because industries within one industrial classification group may have different factor proportions, and trade within one group is still due to factor proportions. On the other hand, an intra-industry measure may understate the importance of economies of scale because economies of scale may lead to inter-industry trade when there are not many differentiated products within an industry (e.g. air planes).
(greater) the size of the capital-rich country relative to the capital-poor country. And thirdly, the degree of IIT for a specific country will be positively associated with endowments of capital per worker. The study covered the food-processing sector for a sample of 30 countries over the period 1964-1985. The results of the analysis of Hirschberg et al. provide support for two predictions of the Helpman-Krugman model, indicating that IIT in food processing is a positive function of a country’s GDP per capita and relates positively to equality of GDP per capita between countries. In addition, it was found that such trade is strongly influenced by distance between trading partners, membership in customs unions and free trade blocs. Distance between countries has a negative impact on IIT (indicating that the larger the distance between two countries, the lower the IIT-level) while membership in either customs union or free trade area has a positive effect on intra-industry trade.

Determinants of intra-industry trade

The third group of studies on IIT does not test a specific model, but instead tests a set of hypotheses on causal relationships linked to the theoretical assumptions of the various new trade theories that can explain IIT. Christodoulou (1992), examining red meat markets in the European Union, found that product differentiation, taste overlap and market proximity have a positive influence on IIT. Scale economies had a negative influence on IIT. Pieri et al. (1996) examined the determinants of IIT in the EU dairy industry for the period 1988-1992, and also found a positive influence of product differentiation, taste overlap and market proximity on the level of IIT. In contradiction to the findings of Christodoulou, market concentration and economies of scale also had a positive influence on IIT. Furthermore, Pieri et al. found that more concentrated retailing structures contribute to IIT by reinforcing the taste for variety among final consumers and by reducing the transaction costs in international trade.

One important distinction in the theoretical literature is between horizontal and vertical product differentiation (e.g. Greenaway and Torstensson, 1997). Horizontal differentiation is associated with preference diversity (‘love of variety’ approach (Dixit and Stiglitz, 1977) or the ‘favourite variety’ approach (Lancaster, 1979)) and decreasing costs (Helpman and Krugman, 1985). Vertical differentiation is represented as differences in quality between similar products and may be related more to comparative advantage, as IIT in vertically differentiated products may be driven by differences in relative factor endowments (Falvey, 1981 and Falvey and Kierzkowski, 1987) or in R&D investments (Shaked and Sutton, 1984). Since theoretical models point to different determinants of the two types of IIT with different adjustment implications for a trade expansion, empirical investigations attempt to separate trade flows in horizontally differentiated products (horizontal IIT) and vertically differentiated products (vertical IIT). For the food and agricultural

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21 Theories assume that economies of scale (together with product differentiation) induce intra-industry trade (a low, minimum efficient size relative to the size of the total market would favour product differentiation). However, when economies of scale are high, production may be located in a few locations, which may lead to inter-industry trade. The relation between economies of scale and intra-industry trade may therefore be positive or negative (Greenaway et al., 1995).

22 Examples may clarify the distinction between horizontal and vertical differentiation: red wine versus white wine is an example of horizontally differentiated products, while red wine of different qualities is an example of vertically differentiated products.
sector, such attempts are to-date quite scarce. Following some studies that focus on non-agricultural products\textsuperscript{23}, De Frahan and Tharakan (1998) were among the first to analyse horizontal IIT and vertical IIT in the processed food sector. The authors separated total IIT into horizontal and vertical IIT to test separately the importance of country-\textsuperscript{24} (e.g. differences in per capita income, GDP-levels) and industry-specific (e.g. minimum efficient plant size reflecting scale economies) determinants. The empirical investigation was applied to the bilateral trade of EU countries with their major partner countries for 18 food, drink and tobacco sub-sectors for 1980 and 1990. The study used unit values as an indicator for product quality to identify trade flows of products that are vertically differentiated versus products that are horizontally differentiated. The econometric results confirmed most country- and industry-specific determinants as proposed by the theoretical models for explaining horizontal and vertical IIT\textsuperscript{24}, with the exception of per capita income differences taken as a proxy variable for relative capital endowments in explaining vertical IIT. The latter implies that the authors found no support for either the hypothesis that IIT in vertically differentiated products results from differences in factor endowments, or that vertical IIT is driven by scale economies. The authors suggested that the definition and measurement of proxy variables could be an important reason for these (unexpected) results. De Frahan and Tharakan conclude from their attempt that “although the need to test separately determinants of horizontal and vertical IIT is well justified in the new trade theory, this is yet to be confirmed empirically” (1998:13).

3.2.2 External economies of scale

The review of the literature indicates that there are two main approaches within the new trade theories for dealing with increasing returns to scale. One approach assumes internal economies of scale, which may explain intra-industry trade. The empirical evidence on intra-industry trade is therefore mostly linked to this approach. The other approach assumes external economies of scale at the industry or regional level (i.e. agglomeration externalities). In a recent article Morrison-Paul and Siegel (1999) estimated internal economies of scale and agglomeration externalities with a dynamic cost function approach. For overall US manufacturing they find that both internal economies of scale and agglomeration externalities are important for the 1959-1989 period. The long-run scale elasticity is equal to 0.77; 6% of the difference from an elasticity of 1.00 (implying constant returns to scale) can be attributed to internal economies of scale and 17% to agglomeration externalities. For food and related products they also found evidence for economies of scale (the long run scale elasticity is equal to 0.90). However, in contrast with overall manufacturing, most of

\textsuperscript{23} For example, Abd-el-Rahman (1991); Greenaway, Hine and Milner (1994; 1995).

\textsuperscript{24} The authors’ results are consistent with the theoretical models explaining horizontal IIT. They found that the average market size and the average level of economic development of the two partner countries, trade preferences, location advantage and horizontal differentiation of the sub-sector all have a significant positive effect on the level of horizontal IIT. Further, factor endowment and market size differences between pairs of countries and scale economies of sub-sectors have a significant negative effect. With respect to vertical IIT, the authors show a positive effect on its level for the average size of the two partner countries, their location advantage and vertical product differentiation of the sub-sector, while scale economies of the sub-sector has a negative effect.
the scale effects can be attributed to agglomeration externalities. This indicates that external economies of scale are important for the food and agricultural sector (for empirical evidence on dynamic externalities in knowledge development in agriculture, see section 3.2.4).

3.2.3 Imperfect competition

*Price discrimination and market segmentation*

Next to comparative advantage and increasing returns to scale, a combination of price discrimination and market segmentation could be a third, but minor cause of trade (see Brander, 1981; Brander and Krugman, 1983). An example of this approach to trade in agricultural commodities is the study by Pick and Park (1991). Exporters may exercise market power by adjusting prices to different export destinations, resulting in a form of price discrimination. Pick and Park apply a pricing-to-market model to US exports of wheat, corn, cotton, soybean, and soybean meal and oil. In the 1970s and 1980s, the USA was a major exporter of these commodities. The results of this analysis reject the hypothesis that the export pricing decisions by US firms are consistent with price discrimination across destination markets, except for international trade in wheat, where the USA is a major exporter discriminating heavily across destination markets. However, China and the Former Soviet Union, the two largest importers of wheat, obtain lower prices for their imports, which suggests both countries exercise some mono- or oligopsony power in international wheat trade or it may be an example of dumping.

*Strategic trade policy*

A third direction within the new trade theories focuses on oligopolistic market structures and deals with the strategic interactions of firms and governments. In such models, ‘strategic’ trade policy may improve the welfare of countries. It is true that production in agriculture may comprise a larger number of similar farmers, but international marketing of agricultural and food products may occur through a small number of private firms, or even through a monopoly marketing board or state trading agency. Given the increasing concentration in food processing and retailing, and the presence of agricultural marketing boards or state trading agencies in several countries, it may be important to consider strategic interaction between a small number of buyers/sellers in agricultural and food products

Strategic trade arguments in this strand of the literature are based on rent-shifting from foreign to domestic firms through government intervention. Much of the literature on strategic trade theory shows how details of market and trade policy regimes affect outcomes. Some papers are briefly summarised to illustrate this.

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25 Some notable studies that applied strategic trade analysis to agriculture are those of Thursby (1988), Thursby and Thursby (1990), Krishna and Thursby (1990), and McCorriston and Sheldon (1992). The last study focuses on private firms in the food industry while the other studies concentrate on the role of marketing boards and trade in agricultural commodities.

26 Other strategic trade arguments are linked to the desirability of a certain industry because it creates (dynamic) external economies. In this section we deal with the first argument concerning rent-shifting. Section 4.4 deals partly with the (dynamic) external economies argument (i.e. spillovers).
Thursby and Thursby (1990) evaluated the nature of exporter competition in international wheat trade. In their model, two countries export wheat: one of them (Canada) through a marketing board while in the other (USA), the export industry is composed of large private firms. The authors used conjectural variation parameters to allow for a range of competitive assumptions, including Cournot and Bertrand behaviour, which means that the exporters of wheat can compete either on the basis of prices or outputs\textsuperscript{27}. According to the study, the interactions of both competitors in wheat exports can be characterised as a Bertrand game (= imperfectly competitive firms set their own prices given the price decision of the competitive firm). Thus, price is the strategic variable and determines the optimal policy. If the exporters compete on price and play a Bertrand game, as this model suggests, then an export tax (instead of the ‘strategic’ export subsidy usually sought by lobby groups) is the optimal policy (see also Eaton and Grossman, 1986).

McCorriston and Sheldon (1992) applied a strategic trade model to the USA-EC cheese-processing sector and evaluated the benefits of the US import quota regime in a strategic trade context. The authors demonstrated that, under imperfect competitive market structures such as those of the cheese processing industries in both USA and EU, overall welfare effects of the imposition of a quantitative import restriction are positive. However, important redistribution effects occur as domestic firms (through higher domestic prices) and the government (through selling quota licenses) gain, while consumers lose (through higher prices). Interestingly, McCorriston and Sheldon showed that overall welfare effects of the actual (1980) quota regime could increase if import quotas were expanded. Relative to the free trade case, the optimal quotas could increase welfare, albeit marginally, indicating that there is a case for import quotas in the US cheese-processing sector. In more recent papers, both authors further elaborated on the distribution consequences of the imposition of import quota by adding details of the import regime, and on the imperfect competitive market structure and export retaliation, to their analysis (McCorriston and Sheldon, 1994; McCorriston, 1996).

Strategic trade theory has also been used in some studies searching for the rationality behind the agreement on agriculture in the GATT by taking an explicitly game theoretic approach (e.g. Johnson et al., 1993; Abbott and Kallio, 1996). For instance, Abbott and Kallio used a stylised model of world wheat trade to illustrate, under differing institutional arrangements (game structures), the levels of export subsidies (or taxes - the strategies), net exports and the political payoffs for four regions or players: USA, EU, CAIRNS and importers. Their simulations of alternative GATT arrangements show that, given political payoffs, the USA-EU co-operative solution in which export subsidies persist is optimal relative to free trade and unilateral reform. Game theory may be useful in understanding the nature of market outcomes when policies of export subsidies matter. But although, as Abbott and Kallio state, issues of imperfect competition and strategic trade policy interaction lay at the heart of the GATT Uruguay Round negotiations, incorporating game theoretic approaches into trade policy analysis is not common, because of its complexity. Most

\textsuperscript{27} See Dixit (1988) for the calibration technique developed to quantify strategic trade models.
models used to assess trade liberalisation impacts assumed competitive world markets without explicitly examining the game theoretic aspects of market outcome.

These examples show that strategic trade theory does have some relevance for agricultural trade policy research when markets can be characterised as imperfectly competitive. However, caution is recommended in the application of these theories as the specific details of market and trade regimes can have a considerable impact on the outcomes. The empirically-measured overall benefits of strategic trade policy are small and may be negated by inappropriate policy selection, foreign government retaliation and general equilibrium effects that divert resources away from other sectors (Dixit and Grossman, 1986). Furthermore, although the new trade theories pay attention to firms, these are considered mainly as a one (domestic) plant and one product case. Consequently, the normative (‘strategic-trade-policy’) literature assumes that any profits earned by these firms enter into the income stream of the country in which the firm is located. Yet, most industries subject to scale economies, product differentiation and imperfect competition are dominated by multinational enterprises (MNEs) and not by a single firm producing solely on a national scale. As a result of substantial foreign ownership of domestic production, policy implications may be radically altered as the benefits of trade policy instruments accrue to (national and/or multinational) firms whereas the country, that applies those policy instruments, may benefit or not (see also Dick, 1993).

Imperfect competition and Computable General Equilibrium (CGE) modelling
Yet, as some of the work cited above shows, empirical modelling of agricultural trade policy under imperfect competition has developed recently together with the growth in the theoretical literature. Furthermore, monopolistic competition models have formed the basis for imperfect competition CGE models, which have also had some practical importance in quantifying the outcome of the GATT Uruguay Round (Martin and Winters, 1996) and ex-ante assessments of the Millennium WTO Round (Nagarajan, 1999)\(^{28}\). A relevant paper is also the one by Lanclos and Hertel (1995) who assessed the effects of tariffs on intermediate inputs and final goods in monopolistic competitive food processing industries. They show, for example, that input tariffs reduce output per firm and the number of firms, and indicate that monopolistic competition strengthens the response to input tariffs compared to perfect competition. Considering the joint effects of input and output tariffs, the direction of change in total output may even differ between monopolistic and perfect competition. Their results show that market structure has important implications on the outcome of policy measures.

3.2.4 Relevance of neotechnology trade theory and the new growth theory for agricultural trade

There are hardly any empirical studies that have tested the link between knowledge creation and innovation in the agricultural and food sector on the one hand, and trade

\(^{28}\) However, the empirical basis is weak. Especially, cross-country econometric evidence on key parameters that measure scale economies is not yet available: measurement of cost disadvantage ratios
in agricultural and food products on the other. The work by Dosi, Pavitt and Soete (1990) may be mentioned as an exception here, as in investigating the influence of innovation on trade and growth, these authors also take the food processing sector into account. They found that export performance is positively associated with differences in innovative products per capita (confirming the hypothesis of neotechnology trade theories) and differences in labour productivity (as Ricardian models predict). However, another result is that changes in trade performance were more strongly associated with changes in innovative activities than with changes in relative labour costs. Regarding growth, the authors found that international differences in the rate of growth of per capita income are associated with similar differences in the rate of investment and in the rate of growth of innovative activities. This study thus confirms the importance of innovative activities for trade and growth performance, as maintained by the neotechnology trade theories and the new growth theories. However, with respect to the food-processing sector, this study did not find a positive influence of innovative activities on trade performance. This may be due to the aggregation level (as one sector). Studies that investigate the relation between innovation and trade at a more detailed product level may be counted as a more balanced evaluation of the relevance of innovative activities for agricultural trade.

Empirical work based on new growth theories has recently begun to appear. These studies focus, on the one hand, on predictions (implications) on the steady-state rate of economic growth and, on the other hand, on two crucial assumptions of these theories, namely, whether spillovers do exist and, if so, whether they are national or international in scope. Jones (1995) tested the relationship between changes in R&D spending and changes in macroeconomic growth implied by these models. The knife-edge assumption of constant returns to R&D investments in the ‘knowledge as investment approach’ is crucial for endogenous growth: with decreasing returns to R&D investments there is no endogenous positive long-run growth rate. The constant returns assumption implies that when resources devoted to R&D are doubled, the growth rate of output should also double. Jones showed that this prediction receives little empirical support. The number of scientists engaged in R&D in advanced countries has grown dramatically over the last 40 years, while growth rates either exhibited a constant mean or even declined on average. This indicates that there are decreasing returns to scale to R&D, so that the influence of both policy and opening to trade on the long-run growth rate vanishes. But, how long is the long run? Policies can still have an influence on the period of growth along the transition path to the new...
steady state. Whether policies are still worthwhile depends on the length of the transition path and the magnitude with which policies can shorten this path.

Several authors have investigated whether spillovers exist and whether they are national or international in scope. The existence of spillovers is important because they cause increasing returns in production, which is necessary for endogenous growth. The (inter-) national scope is important because in models with only national spillovers, government policy can have long-lasting effects. Griliches’ (1958,1960) study on the diffusion of Hybrid corn across the United States was the first to show how differences in local climate conditions affect the use and diffusion of new agricultural technology (see also Huffman and Evenson, 1994). Griliches (1992) concluded after a survey of the empirical literature that spillovers in agriculture and industry exist and that their magnitude may be large. Recent studies by Gopinath, Roe and Shane (1996) and Gopinath and Roe (1999) confirm these results. In the latter, the authors found empirical evidence for substantial inter-industry spillovers from farm machinery to both primary agriculture and food processing in the USA for the period 1961-1991. With regard to the nature of spillovers, for example, Coe and Helpman (1995) and Bernstein and Mohnen (1994) found some evidence for international spillovers for the economy as a whole.30 Thirtle et al. (1995) also found evidence for the existence of international spillovers in agriculture within Europe. However, Branstetter (1996), in an investigation of both intra-national and international spillovers, concluded that intra-national spillovers are stronger than international ones. There is also some evidence that spillovers are geographically localised (Griliches, 1958, 1960, Jaffe 1986, Acs et al. 1992). In summary, there is evidence that some spillovers are international in nature, but local or intra-national knowledge spillovers exist as well. This gives some support to models in which government policy can have long-lasting effects.

In another strand of the empirical literature, elements of the new growth literature are embedded in applied general equilibrium models. For example, Diao and Roe (1997) explored the properties of an empirical endogenous growth model of the US economy whose analytical underpinnings are the R&D-based growth models of Romer (1990) and Grossman and Helpman (1991b). In addition to an independent R&D sector, agriculture and food processing is one of the four final output production sectors distinguished in the model. Knowledge spillovers from R&D activities increase the general national knowledge pool, which increases the productivity of factors used in both R&D and other sectors, thus enabling sustainable long-run growth. Two groups of policies - trade policies and R&D-inducing policies - are evaluated to explore how selected economic instruments affect growth through their effects on the accumulation of technological knowledge. R&D subsidies have a substantial positive impact on growth, protecting agriculture causes the growth rate to increase slightly, and protecting the manufacturing sector causes it to fall. The relative factor proportions devoted to the R&D sector are important for these results, due to Stolper-Samuelson-type effects. The R&D sector is most labour-intensive. Among the four final good-producing sectors, agriculture is relatively capital-intensive, while manufacturing is labour-intensive. Protection raises a sector’s output and induces a

30 See Mohnen (1998) for a survey on international knowledge spillovers.
relative price increase in the factor used intensively in this sector. Protecting manufacturing negatively affects the production of blueprints by bidding up the wage rate; the opposite is true for agriculture. The effects of trade on growth turn out to be small.

One reason for this result could be that this model does not take into account international knowledge spillovers. Van Meijl and van Tongeren (1998, 1999) investigated the impact of international knowledge spillovers in agriculture on production in a multi-sectoral, multi-region applied general equilibrium model, but did not focus on growth issues. Technological change in the innovating country is exogenous. The question in their paper is how this technological change is transmitted to other countries. They assumed that knowledge is ‘embodied’ in traded intermediate inputs, such as chemicals and machinery, which increase the productivity in the primary agricultural sector. Enhanced chemicals lead to land-saving technical change while improved machinery induces labour-saving technical change. The amount of knowledge transmitted depends on the volume of trade flows between the innovating and receiving country. The impact of foreign knowledge depends on the absorptive capacity (human capital) of the receiving country and the similarity of production structures (land/labour ratios) between countries. If knowledge is embodied in traded commodities, protective measures preclude countries not only from enjoying cheaper imports but also from using foreign technologies. The potential gains from trade liberalisation under embodied technology spillovers are illustrated by reducing Chinese import barriers against North American chemical or machinery exports as a case study. It is shown that negative welfare effects of unilateral trade liberalisation (mainly due to terms-of-trade effects under the Armington product differentiation assumption) may be more than compensated by the productivity advantages, which are achieved in the Chinese grain sector. This holds especially in the case of chemical innovations, which improve land productivity, the relatively scarce production factor in China: lower import barriers on enhanced chemicals from the USA induce more chemical imports and a higher use of these inputs in the production of grain.

3.3 Conclusions and further research questions

The landscape of agricultural trade is changing. An examination of trade trends indicates that processed agricultural and manufactured food products and other high-value products are gaining in importance at the expense of basic, bulky agricultural products. Furthermore, trade becomes more and more of an intra-industry nature. These observations point towards an increased importance of elements of the new trade and growth theories, such as market imperfections, product differentiation, increasing economies of scale and innovation. Recent empirical evidence shows that theoretical developments in the new trade theories, and to a lesser extent the new growth theories, are of significant practical importance for agricultural trade analysis and that trade policy with imperfect competition is not confined to theoretical abstraction.

This does not mean that traditional trade theories are not useful anymore for agricultural trade. On the contrary, first of all, they are helpful in explaining trade in
homogenous goods. Furthermore, the Ricardian model remains relevant when thinking about issues such as the effects of technological progress on the pattern of specialisation and the distribution of gains from trade. The focus on factor endowments in the H-O-S model, which assumes identical technologies across countries, remains relevant when thinking, for example, about income distribution effects. Recent empirical evidence provides support for hybrid trade models that combine ingredients from the Ricardian and Heckscher-Ohlin models. More specifically, when technologies are allowed to differ among countries, empirical evidence supports the factor content theory of trade. However, the main difficulty is that this theory does not explain why technology levels differ across countries. There seems to be a role here for the new trade and growth theories, which focus on the generation of technology differences across countries.

In general, we can say that technology as a determinant of trade is becoming more important in both empirical and theoretical work. Technological progress can create a comparative advantage. However, to understand the drivers of technological change and the impact of these changes on trade requires more emphasis on the dynamics involved. Some analytical concepts are developed within growth theories, but so far these concepts have rarely been tested empirically. Using these concepts more extensively seems to be a potentially fruitful area for empirical research because what is really needed is a more technology-oriented trade theory incorporating a dynamic perspective.

Along these lines, there is indeed considerable scope for future work. For our purpose here, and in the context of the general objective of this study, we concentrate on three important findings from the survey of empirical literature and their implications for further research.31

The first finding is that studies explaining intra-industry trade in agricultural products do not (fully) support the underlying theory and hypotheses. This result may emerge because total IIT contains two-way trade in both horizontally and vertically differentiated products, which are associated with different explanatory factors. This leads to the conclusion that the measurement and explanation of horizontal and vertical intra-industry trade needs further research.

The second finding is that there is hardly any empirical testing of technology-oriented trade theories in agricultural trade analysis, while the overview of the theoretical literature indicates that technology as a determinant of trade is increasingly important. It may be concluded that research with a focus on the relation between technology/innovation and trade may enhance the understanding of present trade patterns in agricultural products.

The third finding of the empirical survey is that although the agribusiness contains many multinational firms, the new trade theories practically ignore the possibility of multi-plant and geographically-dispersed firms. Hence, empirical studies on international agricultural trade do not take multinational behaviour into account. Only recently Markusen (1995) and Markusen and Venables (1998) have attempted to integrate multinational behaviour into trade models based on modern theoretical concepts. In this conceptual framework, a prominent role is played by the

31 See Van Berkum and Van Meijl (2000:536) for a more extended list of issues.
skill-intensity of a firm’s activities, following, among others, from investments in R&D and knowledge-based services. Referring mainly to these latter recent theoretical developments, McCorriston (1999) discussed the relation between theories of multinational firms and agricultural trade. His main conclusions are that the concept developed by Markusen and others is potentially useful in analysing patterns of FDI and its impact on trade but that empirical testing in this area lags behind theoretical development. Then, it may be concluded that there is a need for empirical testing of the recently developed framework on trade and FDI.

The study proceeds with the measurement and explanation of intra-industry trade, explicitly disentangling IIT into horizontal and vertical components in an effort to enhance the understanding of this phenomenon. A major focus is on the role of technology differences as recent theoretical literature indicates that this factor may be of increasing importance. In focusing on the role of multinationals in trade, Markusen also emphasises the importance of technology or innovation (differences or similarities) in the explanation of the relation between trade and FDI (see chapter 6 in this study). The question arises whether technology can be considered as crucial in explaining the similar patterns of agrofood intra-industry trade and FDI. Therefore, in the second part of this study, trends in FDI by the Dutch food industry are analysed and explained, using Markusen’s conceptual framework in which the relation between FDI and trade is specified, and expanded by microanalyses of internationalisation strategies of Dutch-based multinationals. In our empirical work special attention is given to technology and product differentiation as determinants of both trade and FDI.
4. Measuring Intra-industry Trade in Agricultural Products

4.1 Introduction

As indicated in section 3.1, trade in processed products has become more and more important in total agricultural trade and increasingly of an intra-industry nature. The general objective of this chapter is to examine the nature of Dutch trade flows in agricultural and food products by investigating the level and patterns of its bilateral intra-industry trade (IIT) in these products. The chapter’s main aim is to explore the levels of Dutch agrifood IIT through focusing on the country’s bilateral trade flows with other EU member states and with central and east European countries (CEECs).

This chapter starts with discussing the major methodological issues (e.g. definitions, data aggregation, etc.) related to the measurement of intra-industry trade. Next, an overview is presented of the Dutch bilateral trade flows with other EU countries and with the CEECs. This overview focuses on the nature and the importance of these trade flows for both individual countries and country blocks. Bilateral trade flows are classified according to features related to product differentiation and processing stage (primary/processed products, products for industrial/household use). The analysis of trade flows sheds light on the developments in and the present structure of trade in agricultural commodities for individual countries as well as for regions studied. In section 4.4 the levels of intra-industry trade are measured. Indices are calculated for the products distinguished and the countries involved, and the outcomes are described and analysed. Major findings and some preliminary conclusions with respect to Dutch trade patterns are reported in section 4.5. This chapter concludes with indicating issues to be addressed in the next stage of this research that will turn to determinants of Dutch bilateral IIT.

The study focuses on Dutch trade flows as the Netherlands is a major player in international trade in agricultural and food products: the Netherlands is - after the United States and France - the world’s biggest exporter of agricultural and food products. Trade analysis shows the importance of processed food products for the Netherlands. EU member countries are by far the most important trade partners of the Netherlands, while trade connections with CEECs are increasing. This paper aims to show the differences and similarities in the nature of trade between the Netherlands country and EU members on the one hand and CEECs on the other hand. Furthermore, the study may show its relevance to the highly export-oriented Dutch agribusiness in its preparations for future EU enlargement. Since, the analysis of the determinants of the present trade relation with candidate member states is a prerequisite for evaluating the consequences of their accession to the Union for Dutch trade patterns. With this in mind, the empirical investigation highlights bilateral trade relations of the Netherlands with two individual CEECs: Poland and Hungary. Both CEECs’ economies strongly depend on agriculture, in terms of production, trade and employment. Poland and Hungary are the two most important trading partners of the
Netherlands in the CEEC region. Furthermore, the two CEECs are expected to become an EU-member in due time.

4.2 Methodological issues related to the measurement of intra-industry trade

Definitions
According to the definition by Tharakan and Calfat, intra-industry trade is the “simultaneous export and import of products which are close substitutes for each other in terms of factor inputs and consumption” (1996:70).\textsuperscript{32} The level of intra-industry trade can be measured and indicates to what extent imports and exports within ‘an industry’ overlap in bilateral trade relations. The problem is, however, how to define an industry that is operational in order to measure intra-industry trade. Trade flows are not registered in statistics in terms of the products’ use of factor inputs, neither grouped in international available data accounting frameworks according to what may be close substitutes of products in terms of consumption. Trade is registered according to internationally agreed categorisation of products in SIC (Standard Industrial Classification) and SITC (Standard International Trade Classification), in which products are grouped together according to corresponding activities such as process characteristics and product characteristics, respectively. Therefore, nature, methods as well as different purposes of data collection impose constraints on the compatibility of official classifications with the needs of economic analysis.

When products are inappropriately grouped together in trade categories for the intended purpose - in the case of measuring IIT the purpose is to group together products that constitute an ‘industry’ - one has to look for alternatives. One such alternative could be a regrouping of official data in order to create a better correspondence between data and the definition of IIT. However, in practice, this may be quite difficult, as there are no objective criteria on which to base the regrouping. A second alternative approach is to select a specific level of statistical aggregation as the best approximation in the official classification to the concept of ‘industry’. This way most intra-industry trade studies have solved the problem. According to Greenaway and Milner “a degree of professional consensus does exist in regard to the third digit of the SITC as a reasonable, initial approximation of an industry; a great many researchers have conducted documentary and econometric research at this level of disaggregation” (1986:74-75). In our study, we will follow this line too. Moreover Roberts (1995) states that the issue of trade data classified into categories that do not correspond to any definition of ‘industry’ except at the most abstract level is more often a problem for industrial goods than for raw and processed products of agricultural, forestry and fishery sectors. This is because the “products of these sectors that are classified according to SITC groups can nearly always be considered substitutes in consumption or production or both” (1995:13). Both statements of

\textsuperscript{32} Tharakan formulated this definition already in the first edition of Greenaway’s book, published in 1985. As an alternative to Tharakan’s definition, Helpman and Krugman (1989:133) define intra-industry trade as “the two-way exchange of goods in which neither country seems to have a comparative cost advantage”.

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Greenaway and Milner, and of Roberts indicate that defining an agricultural industry at SITC three-digit product level may result into a grouping of agricultural and food products that fits closely to Tharakan’s definition of IIT.

**Measures**

Several measures of IIT have been proposed in theoretical literature (Greenaway and Milner, 1986: 59-79, for an overview). The most widely used measure of actual intra-industry trade in empirical studies is the Grubel and Lloyd (GL) index (Grubel and Lloyd, 1975). The GL index (GL<sub>i</sub>) measures the degree of the absolute amount of commodity exports in a particular industry or commodity grouping (i) that is offset by imports in the same grouping, and expresses this intra-industry trade as a proportion of the total trade in this commodity:

\[
GL_i = \frac{X_i + M_i - |X_i - M_i|}{X_i + M_i}
\]

or

\[
GL_i = 1 - \frac{|X_i - M_i|}{X_i + M_i}
\]

The value of the index is between zero and one, or, in extreme cases, equal to zero or to one. The index is zero, when either the export value (X<sub>i</sub>) or the import value (M<sub>i</sub>) is zero: there is no trade overlap in industry<i></i> and the whole trade is inter-industry. Alternatively, the GL index is one when exports (X<sub>i</sub>) and imports (M<sub>i</sub>) are equal (X=M, i.e. X-M = 0): there is a complete matching of exports and imports and the whole trade is intra-industry.

There are several characteristics of the GL index important to take notice of especially when the index levels are used in a cross-industry, cross-country or inter-temporal analysis.

1. The index can take a specific value for markedly different absolute values of imports and exports. The GL index has the same value, while trade values in a country’s bilateral relations with two other countries differ, say, a factor hundred. This implies that the index value gives no indication of the relative importance of a bilateral trade flow between two countries in a product (group) with respect to trade flows in other product (groups), or a country’s trade balance.

2. Further, the index is *not linear*: the rate of increase of the GL index for constant increases in M<sub>i</sub> (X<sub>i</sub>) for a given level of X<sub>i</sub> (M<sub>i</sub>) decreases as M<sub>i</sub> (X<sub>i</sub>) increases. For example, when exports are 100 and imports increase from 10 to 20, 30, and 40, the GL index value increases from 0.18, to 0.33, 0.46 and 0.57, respectively.

3. Especially with regard to food the interpretation of the index can cause problems, as there can be intra-industry trade measured due to seasonal influences. For instance, the Netherlands imports tomatoes from Spain during winter months because it is too cold in the Netherlands to grow tomatoes economically. Trade reverses during summer months as climatic circumstances in Spain are not attractive for growing tomato (too hot and dry). When trade data used for calculating GL indices are annual figures, seasonal influences on trade patterns are neglected.
4. The index is a weighted average of any sub-group indices only if the signs of the trade imbalances at the sub-group level are all the same (and therefore the same as those at a more aggregate level). If there are opposite signs on sub-group trade balances this weighting effect is lost and the indices of subgroups cannot be added up just like that. The significance of the weighting and opposite sign effects resulting from aggregating trade data will depend on the use to which the index is put and/or on one’s confidence that the appropriate level of aggregation has been selected. In general, a weighted average may be more appropriate for summary measures of IIT, especially when summarising on an economy-wide basis across all trade. In situations where there is overall trade imbalance the summary measure may underestimate the overall extent of IIT because the overall imbalance itself prevents the exact matching of exports and imports in all industries (Greenaway and Milner, 1986:60-61).

Mainly because of this latter characteristic the Grubel and Lloyd measurement of IIT has received criticism. In fact, Grubel and Lloyd already pointed out that their measure is affected by the size of the overall trade imbalance between countries. The greater the imbalance, the greater will be the share of net trade and the smaller the share of IIT. They propose to apply an adjusted index correcting for trade imbalances. Next, however, some authors identified failings in adjusting the index Grubel and Lloyd proposed and formulated alternatives to deal with the problem of aggregate trade imbalances (Greenaway and Milner (1986:67-72) refer to work of Aquino (1978) and of Bergstrand, (1983)). Subsequently, we use a GL measurement that takes trade imbalances into account.

Data and GL indices used in this chapter
We use data from the Eurostat trade data system, which are adapted by LEI-DLO, to construct bilateral trade flows between the Netherlands and regions, and between the Netherlands and individual countries. Regions distinguished here are World (WRLD), European Union (EU), all OECD countries except for the countries of the EU (OECD-less-EU) and central and eastern European countries (CEEC). We only examine Dutch trade data, which records Dutch exports and imports by country. Trade data are classified according to Revision 3 of the Standard International Trade Classification (SITC) system. Here, industries are synonymous with product groups at the three-digit level. A list of industries used in this sample can be found in Appendix 1, table 1. The GL index for the Netherlands (country \( j \)) with a certain region \( r \) (e.g. EU) for a specific industry \( i \) is given by:

\[
GL_{ijr} = 1 - \frac{\sum_{k=1}^{l} X_{ijk} - \sum_{k=1}^{l} M_{ijk}}{\sum_{k=1}^{l} X_{ijk} + \sum_{k=1}^{l} M_{ijk}}
\]

Available in an electronic database on export and import statistics.

Most product groups are at three-digit level, while some are disaggregated at further detail. See Appendix 1 for more explanation.
where $GL_{ijr}$ is the Grubel and Lloyd index for industry $i$ between the Netherlands (country $j$) and region $r$, where $k$ are the countries in a region $r$, where $t$ is the number of countries in a certain region, and where $X_{ijk}$ and $M_{ijk}$ represent country $j$’s exports to and imports from country $k$ of goods produced by industry $i$.

The classification of agricultural and food product groups can be found in Appendix 1, table 2. Products are classified as being either primary or processed. Within each category, we identify products mainly for industrial use and products mainly for household consumption. Therefore, there are four product categories. As the GL index of each product category is a sum of subgroups (and the GL index for a region a sum of data of individual countries) we will use an adjusted GL index. The GL indices for trade between the Netherlands and each region of the four product categories are calculated as follows:

$$GL_{ijr} = 1 - \frac{\sum_{s=1}^{4} \sum_{i=1}^{n} \left| X_{ijk} - M_{ijk} \right|}{\sum_{i=1}^{n} \sum_{k=1}^{t} (X_{ijk} + M_{ijk})}$$

where the four product categories are denoted by $s$, and there are $n$ industries or commodities in each sector $s$. Appendix 2 shows that category 1 (C1) includes 10 products or industries, and C2, C3 and C4 respectively 10, 16 and 21 products. Measures of IIT are reported for 57 products in total, grouped in either one of the four categories mentioned or as one value covering all products.
4.3 Dutch trade with EU countries and CEECs

4.3.1 Dutch trade with EU countries

4.3.1.1 Main features of Dutch agricultural trade flows

Total trade (imports and exports together) in agricultural products (excluding fisheries) of the Netherlands exceeded ECU 46 billion in 1997. Dutch agricultural trade flows with the world are depicted in figure 4.1. There are three main features of Dutch agricultural trade. First, agricultural exports as well as agricultural imports show an increasing tendency over the period considered. Second, the Netherlands has quite a large trade surplus in trade in agricultural products. Exports amount to ECU 29.2 billion and imports to ECU 16.4 billion, leaving an ECU 12.8 billion trade surplus in 1997. Third, EU-countries are very important markets for Dutch agricultural producers and traders. More than 80 per cent of the total Dutch export value of agricultural and food products accounts for trade with EU countries, while 60 per cent of total Dutch imports (ECU 9.7 billion) are from other EU countries (table 4.1). These general features imply that the overall trade surplus is largely due to trade with the EU (trade surplus is ECU 14.7 billion) while with non-EU countries the Netherlands has a trade deficit (of ECU 1.9 billion in 1997).

Figure 4.1 Dutch agricultural exports and imports (MECU) (source: Eurostat)

At the time of writing this chapter (winter 1998/99), 1997 trade data were the most up-to-date data available. There is no indication that the use of more recent trade data would alter the conclusions concerning the trends in and features of the Dutch bilateral trade flows.
The Netherlands takes an important position in the EU intra-trade flows of agricultural and food products. Of all EU export flows to other EU countries the Netherlands accounts for approximately 20 per cent, compared to all EU imports from other EU countries this share amounts to approximately 10 per cent. In assessing these figures one has to take into account that the Netherlands is a transit country, importing products from overseas, exporting these products to other (mainly EU) countries again, mostly after being (re)processed and/or repackaged.

When products are categorised into the four groups according to our definition in section 4.2 (see also Appendix 1, table 2), it shows that the Netherlands has a large trade surplus in all product categories except for primary products mainly for industrial use (the C1-category, see table 4.1). Trade surpluses are especially large in primary and processed products for household consumption (respectively C2 and C4). For both product categories exports are more than twice as large as imports. Further, it may be observed that the EU as an export market is equally important to all product categories: roughly 80 per cent of all products are destined for the EU market. Looking at imports, the picture is a slightly different one. C4 imports and C1 imports originate more and less than proportionally from EU countries (namely 79 and 39 per cent respectively compared to 59 per cent of all imports).

Table 4.1 Regional division (%) of Dutch agricultural imports (in MECU) from and agricultural exports (in MECU), total and per product category, 1997 (source Eurostat)

<table>
<thead>
<tr>
<th>Category</th>
<th>Imports EU OECD</th>
<th>CEECs</th>
<th>ROW</th>
<th>Exports EU OECDCEECS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EU OECD</td>
<td>CEECs</td>
<td>ROW</td>
<td>Export EU OECDCEECS</td>
</tr>
<tr>
<td>C1</td>
<td>4954</td>
<td>39</td>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td>C2</td>
<td>3790</td>
<td>56</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>C3</td>
<td>3099</td>
<td>66</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>C4</td>
<td>4611</td>
<td>79</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>16455</td>
<td>59</td>
<td>10</td>
<td>1</td>
</tr>
</tbody>
</table>

a) C1 = Primary products, mainly for industrial use, C2 = Primary products, mainly for household consumption, C3 = Processed products, mainly for industrial use, C4 = Processed products, mainly for household consumption. See Appendix 1 for product details; b) OECD covers all OECD countries, excluding the EU member states; c) CEECs covers 10 central and eastern European countries: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia; d) ROW = Rest of the World, implying all countries not included in EU, OECD and CEECs.

With a share of 63 per cent in 1997, processed agricultural products dominates Dutch agricultural export flows to the world (see figure 4.2). Exports to the EU and OECD (excluding EU) member states show a similar pattern. Total agricultural imports are equally divided among processed and non-processed products. Approximately 60 per
cent of EU imports are of a processed nature, while imports from OECD countries are mainly of a primary nature. Trends over the last decade show that the share of processed foods in exports has increased, although not for the OECD, while the percentage of processed products in Dutch imports shows some decline.

**Figure 4.2 Share of processed agricultural products (%) in total Dutch agricultural exports to and imports from the world, EU and OECD (excluding EU), 1997 (source: Eurostat)**

4.3.1.2 Bilateral trade between the Netherlands and EU member states

The Netherlands has a positive net trade position in agricultural products with all EU countries except for Spain (table 4.2). Most trade is with the founding members of the EU; trade with Germany, France, Italy and Belgium/Luxembourg accounts for over three-quarters of all Dutch trade with EU countries. If one adds trade with Spain and the UK to this group, 90 per cent of the total Dutch agricultural trade value with EU countries is covered. This indicates that Dutch trade relations are highly concentrated and largely focused on nearby markets within the European Union. Trade relations with Germany are by far the most important for Dutch agriculture, as both on the import and export side the highest trade values are registered and the highest Dutch bilateral trade surplus is recorded.
Table 4.2 Overview of bilateral agricultural trade flows of the Netherlands with other EU member states, total exports and imports (in MECU) and shares of product categories (in %), 1997

<table>
<thead>
<tr>
<th>Category</th>
<th>Exports from the Netherlands</th>
<th>Imports into the Netherlands</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>C1</td>
</tr>
<tr>
<td>Belgium</td>
<td>3320</td>
<td>0.10</td>
</tr>
<tr>
<td>Denmark</td>
<td>605</td>
<td>0.03</td>
</tr>
<tr>
<td>Germany</td>
<td>8092</td>
<td>0.06</td>
</tr>
<tr>
<td>Finland</td>
<td>202</td>
<td>0.04</td>
</tr>
<tr>
<td>France</td>
<td>3665</td>
<td>0.04</td>
</tr>
<tr>
<td>Greece</td>
<td>622</td>
<td>0.09</td>
</tr>
<tr>
<td>Ireland</td>
<td>236</td>
<td>0.09</td>
</tr>
<tr>
<td>Italy</td>
<td>2459</td>
<td>0.04</td>
</tr>
<tr>
<td>Austria</td>
<td>454</td>
<td>0.03</td>
</tr>
<tr>
<td>Portugal</td>
<td>158</td>
<td>0.10</td>
</tr>
<tr>
<td>Spain</td>
<td>759</td>
<td>0.10</td>
</tr>
<tr>
<td>Sweden</td>
<td>631</td>
<td>0.01</td>
</tr>
<tr>
<td>UK</td>
<td>3207</td>
<td>0.03</td>
</tr>
<tr>
<td>Poland</td>
<td>240</td>
<td>0.11</td>
</tr>
<tr>
<td>Hungary</td>
<td>77</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Source of total exports and imports: Eurostat

The product categories C2 and C4 play a dominant role in many bilateral trade relations with EU countries. Almost without exception, either one of the two categories is the main category in either Dutch exports to or Dutch imports from an EU member state. This indicates that Dutch trade relations largely consist of products that are classified as products for household consumption, being either of a primary or processed nature. Naturally, this conclusion depends on the definition and classification of the products. For example, a large part of Dutch agricultural trade with to EU countries consists of dairy products, meat, and horticultural products. Most dairy and meat products are classified as processed products mainly for household consumption. Also part of the fruit and vegetables traded with EU countries are classified as processed. Further, ornamental plant products (cut flowers, bulbs, pot plants, trees, shrubs) are included in the C2 category (primary products mainly for household use) (see Appendix 1). The Netherlands is a large exporter of these products, serving many countries both in and outside the EU. Due to the classification made Dutch exports is mostly categorised consisting of primary products.

Yet, despite the large influence of primary horticultural products, Dutch exports and imports with each individual EU member state are, with little exception, dominated by processed products for household use (Category C4). The exceptions are in trade relations with countries of minor importance to the Netherlands, for example, imports from Finland, Sweden, and Greece are mainly primary products, just like exports to Portugal. Trade with these four countries account for less than four per cent of all Dutch trade with EU countries. However, looking at the general picture, the composition of Dutch agricultural trade with Spain is a-typical as around 80 per
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cent of Dutch imports (almost ECU 0.7 bn) is within the C2 category. To a large extent, the products imported from Spain are horticultural products.

Although some general conclusions could be drawn regarding Dutch trade characteristics, all these observations do paint a fairly diverse picture. There does not seem to be a clear relation between some explanatory variables of IIT in literature most often mentioned such as proximity of markets, or GDP-levels on the one hand and the nature of trade (processed or primary agricultural products) on the other.

4.3.2 Dutch trade with CEECs

4.3.2.1 Overview of bilateral trade of the Netherlands with CEECs

Since the process of economic and political transition started in CEECs - in most central European countries at the turn of 1989 and 1990 with the Baltic countries following in 1991/92 - these countries' trade relations with those outside the former COMECON bloc expanded tremendously. Just like bilateral trade of the Netherlands with most countries in that region. Dutch agricultural exports to the region rose very sharply, from about ECU 80 million in 1988 to more than ECU 660 million in 1997 (see figure 4.3). Import values also increased substantially (from ECU 97 million to ECU 236 million) but less ‘dramatic’ than exports. During 1989 to 1992, imports have even declined somewhat. These developments led to a change in the net trade position of the Netherlands. Since 1992 the Netherlands changed from a net-importer into a net-exporter of agricultural and food products in its trade relations with the CEEC region.

The fruit and vegetable export value shows the most significant increase of all product groups and accounts for around a quarter of the total Dutch agricultural export value to the region. Crude vegetable material (SITC 292) is a second group of products with a substantial share in the export package of the Netherlands to CEECs. This group of products is dominated by ornamental plant products and adds significantly to the importance of horticultural products in Dutch exports to CEECs. The Netherlands mainly imports dairy products and fruits and vegetables from the region. Both product groups account for 20 per cent each of the total import value from CEECs. While the Dutch dairy import value shows some increase in recent years, the import value of fruit and vegetables has levelled off since 1991/92.
Figure 4.3. Dutch agricultural trade flows with CEECs (MECU) (source: Eurostat)

Figure 4.4 shows the development of the share of agricultural processed products in Dutch trade with the CEECs. It is remarkable that this share of Dutch exports to CEECs is lower in the second half of the period than in the first period considered. Contrary to that, Dutch imports of processed products from CEECs has increased over time and accounts for almost 60 per cent of Dutch agricultural imports from the region in 1997. While before the economic and political transition in the CEECs, the export share of Dutch processed products with CEECs was significantly higher than the import share, both have converged to similar shares in 1997.

4.3.2.2 Bilateral trade relations of the Netherlands with Poland and Hungary

Poland and Hungary are by far the most important trading partners of the Netherlands with the CEEC region. Exports to Poland and Hungary account for respectively 35 and 10 per cent of total agricultural exports to the region and 35 and 30 per cent respectively of total imports of the Netherlands from the region in 1997. Imports of the Netherlands from Poland consist mainly of fruit and vegetables, fish (but diminishing) and - increasingly - dairy products. The total import value is fairly stable, accounting for around ECU 80-90 million in the period 1995-1997 annually. Exports mainly consist of fruit and vegetables, and of ornamental plant products. Total export values fluctuate from year to year but in general showed an increase reaching ECU 240 million in 1997.
The Dutch agricultural import value from Hungary fluctuates around ECU 30-40 million annually. Export values were between ECU 60-70 million in recent years, roughly twice the import value. An important Dutch import item from Hungary is oilseeds. Fruit and vegetables is still an important group of products but has lost some of its weight in recent years. Dutch exports concentrate on fruit and vegetables and ornamental plant products, accounting for approximately half of the total Dutch export value in its trade with Hungary.

Dutch imports of agricultural products differ in nature, for example mainly processed products from Poland, compared to largely primary products from Hungary. Exports to Hungary are in line with the general picture for the region: processed products dominate Dutch export flows. However, neither primary nor processed products dominate in exports to Poland.

### 4.4 Levels of intra-industry trade

#### 4.4.1 Empirical evidence of two-way trade between the Netherlands and some regions in the world

In 1997 the value of the GL index calculated for all industries in the agricultural sector equals 0.52 for trade between the Netherlands and all other countries in the world (table 4.3 or figure 4.5). This result indicates a relatively high level of two-way trade between the Netherlands and its trade partners. Furthermore, the level of IIT with the world shows some increase over the period 1988-1997. This indicates that
the level of IIT was already high in the mid-1980s and gradually became even more important over time. Finally, it is important to remember that the Netherlands has a relatively large trade surplus in agricultural products, which causes a downward bias in the GL indices.

If we divide the world in EU and two non-EU regions, the OECD and CEECs, and calculate the level of IIT for these regions we notice several interesting findings (see figure 4.5).

First, the level of IIT with EU countries is much higher than the level of IIT trade with non-EU countries. This confirms some of the hypotheses as proposed by McCorriston and Sheldon (1991), Hirschberg et al. (1994), Christodoulou (1992) and Pieri et al. (1997) (see section 3.2.1.). According to this literature, IIT should be higher between countries that (1) participate in some form of economic integration, (2) are geographical close (e.g. overlap in consumer preferences), (3) are developed and (4) have similar factor endowments.

Second, the level of IIT with EU countries gradually increased from 0.41 in 1988 to 0.50 in 1994, and showed some decline in years since. However, the most recent indices of IIT are higher than those measured in the 1980s, indicating only a very small decline in GL indices.
Third, IIT-levels in the bilateral trade with OECD countries and with CEECs (since 1992) are relatively stable. However, comparing the levels for the 1980s with those for the 1990s, OECD IIT-levels have a slight tendency to increase.

Fourth, the levels of IIT of all three regions are lower than the IIT level with the world. This indicates that for some goods a positive (negative) Dutch trade balance with the EU cancels out a negative (positive) trade balance with non-EU countries for the same good. In other words, looking from a world perspective this would be considered mainly IIT while from a regional perspective it would predominantly be considered inter-industry trade.

Table 4.3 GL indices of trade in agricultural products for the Netherlands, per region 1997

<table>
<thead>
<tr>
<th></th>
<th>World</th>
<th>EU</th>
<th>OECD (excl. EU)</th>
<th>CEEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1: Primary, mainly for industry</td>
<td>0.43</td>
<td>0.54</td>
<td>0.15</td>
<td>0.39</td>
</tr>
<tr>
<td>C2: Primary, mainly for household consumption</td>
<td>0.49</td>
<td>0.41</td>
<td>0.18</td>
<td>0.18</td>
</tr>
<tr>
<td>C3: Processed, mainly for industry</td>
<td>0.60</td>
<td>0.47</td>
<td>0.18</td>
<td>0.17</td>
</tr>
<tr>
<td>C4: Processed, mainly for household consumption</td>
<td>0.54</td>
<td>0.45</td>
<td>0.31</td>
<td>0.25</td>
</tr>
<tr>
<td>Total</td>
<td>0.52</td>
<td>0.45</td>
<td>0.22</td>
<td>0.23</td>
</tr>
</tbody>
</table>

A more detailed view of IIT of Dutch bilateral trade can be found in table 4.3. In that table GL indices for the four product categories are presented for each of the regions distinguished. The level of two-way trade differs widely across product categories and across regions.

Figure 4.6 shows the level and development of IIT over time between the Netherlands and the EU for each of the four product categories. The IIT levels for processed agricultural products (C3 and C4) are higher than the IIT levels for primary products in the C2 category (for household consumption), however, not for the C1 category. This is only partially conform the hypothesis proposed in other studies, that levels of IIT trade are expected to be (significantly) higher in processed products than in primary products. Table 4.3 shows that this hypothesis is only partially confirmed for total trade with the world, and trade with OECD countries and CEECs.

Figure 4.6 further indicates that over time most trade overlap occurred in primary agricultural products for industrial use (C1), while index values representing IIT in processed products (C3 and C4 category) were below, yet at the end of the period rather similar to the level of the C1 category. Certainly, GL index values for all four categories distinguished have the tendency to converge rather than to diverge. It is interesting to observe that IIT in primary products for household consumption (C2) increases steadily over time. This could be explained in the way the C2 product group was classified (e.g. fruits, tea) and the high level of re-exports of particular items
within this product group without further processing (i.e. high import and high export values).

**Figure 4.6 Levels of intra-industry trade in agricultural products between the Netherlands and EU (GL index)**

![Figure 4.6](image)

### 4.4.2 IIT between the Netherlands and other EU member states

Table 4.4 shows that GL-indices values of trade between the Netherlands and other EU countries are dissimilar. The overall IIT value for neighbouring country Belgium is exceptionally high. These trade flows cover one-sixth of all Dutch trade with EU countries. The GL indices for all trade with Germany and France, covering more than 50 per cent of Dutch trade with EU-countries, are moderate, like those for Denmark, UK and Spain (i.e., between 0.25 and 0.35). For countries not-mentioned, IIT indices are rather low.

Several of the general hypotheses formulated in section 3.2.1 could be evaluated against the empirical data available from the data set on Dutch bilateral trade with other EU-countries.

One of the assumptions is that IIT would be higher in the exchange of processed products compared to the exchange of primary agricultural commodities. In the bilateral trade relations of the Netherlands with other EU countries, the empirical investigation seems to provide some, yet ambiguous evidence for this assumption. For six out of 13 countries the indices for processed products (C3 and C4) are higher than the indices for primary products (C1 and C2). In three countries, either one of the two indices for processed goods (either C3 or C4) is higher than the two indices for
primary product (C1 and C2). Yet, in four countries the index for primary products for
industrial use (C1) is the highest in this sample.

Table 4.4 GL-indices of trade in agricultural products between the Netherlands
and other EU countries (1997)

<table>
<thead>
<tr>
<th>Country</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>Total</th>
<th>Total trade share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium/Luxembourg</td>
<td>0.74</td>
<td>0.65</td>
<td>0.54</td>
<td>0.69</td>
<td>0.65</td>
<td>16</td>
</tr>
<tr>
<td>Denmark</td>
<td>0.41</td>
<td>0.14</td>
<td>0.33</td>
<td>0.37</td>
<td>0.26</td>
<td>2</td>
</tr>
<tr>
<td>Germany</td>
<td>0.40</td>
<td>0.17</td>
<td>0.50</td>
<td>0.42</td>
<td>0.33</td>
<td>37</td>
</tr>
<tr>
<td>Finland</td>
<td>0.07</td>
<td>0.01</td>
<td>0.09</td>
<td>0.07</td>
<td>0.03</td>
<td>1</td>
</tr>
<tr>
<td>France</td>
<td>0.24</td>
<td>0.33</td>
<td>0.48</td>
<td>0.23</td>
<td>0.30</td>
<td>16</td>
</tr>
<tr>
<td>Greece</td>
<td>0.35</td>
<td>0.09</td>
<td>0.16</td>
<td>0.06</td>
<td>0.11</td>
<td>2</td>
</tr>
<tr>
<td>Ireland</td>
<td>0.09</td>
<td>0.16</td>
<td>0.09</td>
<td>0.28</td>
<td>0.19</td>
<td>1</td>
</tr>
<tr>
<td>Italy</td>
<td>0.32</td>
<td>0.16</td>
<td>0.29</td>
<td>0.16</td>
<td>0.18</td>
<td>8</td>
</tr>
<tr>
<td>Austria</td>
<td>0.29</td>
<td>0.10</td>
<td>0.13</td>
<td>0.37</td>
<td>0.17</td>
<td>1</td>
</tr>
<tr>
<td>Portugal</td>
<td>0.15</td>
<td>0.12</td>
<td>0.18</td>
<td>0.24</td>
<td>0.18</td>
<td>1</td>
</tr>
<tr>
<td>Spain</td>
<td>0.17</td>
<td>0.17</td>
<td>0.32</td>
<td>0.36</td>
<td>0.24</td>
<td>4</td>
</tr>
<tr>
<td>UK</td>
<td>0.26</td>
<td>0.12</td>
<td>0.25</td>
<td>0.40</td>
<td>0.26</td>
<td>10</td>
</tr>
<tr>
<td>Sweden</td>
<td>0.02</td>
<td>0.01</td>
<td>0.08</td>
<td>0.06</td>
<td>0.04</td>
<td>2</td>
</tr>
<tr>
<td>EU</td>
<td>0.54</td>
<td>0.41</td>
<td>0.47</td>
<td>0.45</td>
<td>0.45</td>
<td>100</td>
</tr>
</tbody>
</table>

Proximity to markets foster IIT, according to another hypothesis. Our data suggest
that there is some evidence that proximity has a positive impact on the level of IIT.
That is, the countries with the lowest score (Finland, Sweden and Greece) are
geographically speaking quite far from the Netherlands. Countries that are
geographically close obtain the highest IIT levels (Belgium, Germany, France, UK
and Denmark).

IIT between countries with similar factor endowments would be greater than
between countries with dissimilar factor endowments. An indication of similarity in
factor endowments is, according to the theory, the similarity of GDP-levels between
countries. There is some evidence for the proposition that IIT is higher between
countries with equal GDP-levels than between countries that differ greatly in terms of
income levels. However, the countries that are located close to the Netherlands are
also the countries with high-income levels per capita. The impact of both hypotheses
is therefore difficult to entangle and remains an empirical (estimated) question. At
first sight, distance seems to be more important than similarity in factor endowments
(and GDP-levels), as IIT levels with high-income countries like Sweden and Italy are
lower compared to Belgium and France.
4.4.3 IIT between the Netherlands and CEECs

After some years of increase, the GL index for total agricultural trade between the Netherlands and CEECs shows a decline from 0.35 in 1991 to 0.23 in 1997 (see figure 4.5). This is due to an increase in Dutch export values while import values show a decrease or - only for some years - a smaller increase than export values grew; as a consequence, trade imbalances increase. This tendency occurs most-markedly in primary products, while the IIT nature of exchange in processed products for consumer use (C4) happened to increase in recent years (see figure 4.7). All product categories have a strongly fluctuating score on the GL index scale, especially in the first half of the period. Since 1993, GL values in consecutive years have been more constant. Furthermore, IIT levels of different product groups became more similar in the second half of the period considered.

Figure 4.7 Levels of intra-industry trade in agricultural products between the Netherlands and CEECs, per product category (GL index)

Agricultural trade between the Netherlands and CEECs is – from a Dutch perspective - relatively small. Trade is also diverse. The most important product groups in the Dutch-CEEC trade are fruit and vegetables, and ornamental plant products (bulbs, tubers, cut flowers and leaves). Both product group's export values have grown significantly over the last decade and nowadays exceed ECU 100 million annually. The product items indicated were largely in product category C2. Therefore, due to an increased trade imbalance in this product category, the GL index value for C2 has declined markedly from 0.5 in 1991 to 0.17 in 1997.
4.4.4 IIT between the Netherlands, Poland and Hungary

The degree of intra-industry trade in the bilateral trade relations between the Netherlands on the one hand and Hungary and Poland on the other is rather modest, as the GL index values vary between 0.15-0.25 (see figure 4.8). Yet, for both individual countries one may detect an increasing tendency in the levels of the GL indices, indicating that trade is – although very slowly – getting more of an intra-industry nature.

**Figure 4.8 Levels of intra-industry trade between the Netherlands and Hungary, Poland and the CEEC region (GL index)**

Looking at the product categories in further detail, trade overlap with Hungary was highest in primary products in the beginning of the 1990s. However, the two-way trade nature of the exchange in primary products has decreased, especially in primary products for industrial use (C1). Contrary to this, the intra-industry nature of processed products, and especially processed products for industrial use (C3) has increased.

For Poland, the most recent levels of IIT are higher for primary products than for processed products. However, in Poland IIT levels of different categories tend to converge. The level of IIT for primary and processed products for household consumption has increased while the others are more or less stable. This suggests that the trade relations between the Netherlands and Poland is maturing, after a period in which trade flows were strongly fluctuating from one year to another. Clearly, these fluctuations were caused by an unstable economic situation in Poland due to the
transition from a centrally planned to a market-oriented economy. Although this process may not have been completed yet, markets have turned to be more in equilibrium than in the first stage of the transition period. Since 1994 the Polish economic growth rates have been positive again. The economic restoration and growth developments in Poland and other CEECs are extremely important in creating stable trade relations with other countries, including the Netherlands. Furthermore, trade is affected by restrictive trade policies in both the EU and CEECs. Any changes in these policies will have an impact on trade flows and, therefore, on the level of trade overlap (IIT) between both regions and individual countries of these regions.

4.5 Major findings and conclusions

This chapter’s main aim was to indicate the degree of trade overlap in Dutch agricultural trade relations. We found that intra-industry trade in Dutch agricultural trade flows is, in general, significant, but most relevant in trade with other EU countries. Dutch agricultural exports are mainly focused on EU markets. The Netherlands generate large trade surpluses with (countries in) the region. These surpluses induce a downward bias on IIT indices. Yet, the degree of trade overlap within trade with EU countries is higher than with non-EU countries. From a Dutch perspective trade with the nearby countries in central and east Europe is growing but still rather insignificant. Yet, also with this group of countries the Netherlands has built-up a considerable agricultural trade surplus. As a result, overall IIT levels are fairly low.

Focusing on different product categories, GL index values vary greatly between region and trading partner. Some of the index values follow the expectations based on the hypotheses arising from the theory. One of the hypotheses is that Dutch IIT levels for processed products (C3 and C4) are (expected to be) higher than for primary commodities (C1 and C2). This hypothesis is confirmed in most of the Dutch bilateral trade with countries in the EU and with the EU as a region. The same holds in bilateral trade with the OECD countries. However, this hypothesis is not confirmed for the CEECs, where primary products obtain the highest IIT levels. At the same time, bilateral trade with non-EU regions shows lower IIT levels for all four product categories differentiated compared to with EU countries. This confirms the hypotheses that IIT is higher between countries that 1) participate in some form of economic integration (EU market), 2) are geographically close, and 3) are developed.

With respect to the future enlargement of the Union to the East, the bilateral trade relation with CEECs needs special attention. The Netherlands has a large trade surplus and, therefore, low IIT levels with CEECs since the transition. This suggests a Dutch comparative advantage in agricultural production that has been exploited with CEECs’ borders being more open than in the past. Yet, trade figures show that exports to CEECs are becoming more of a primary nature, while Dutch imports from CEECs are becoming more and more of a processed nature. Although the export value of processed products is still much higher than the absolute import value of processed products, could that trend suggest that the Netherlands is increasingly specialising in offering primary products in exchange for processed products in its trade with
CEECS? This would be against our expectations that are based on the hypothesis that highly developed countries have a comparative advantage in processed products with a high added value and that low-income countries produce primary products with a low added value. Why, then, the outcomes differ from our expectations is *prima facie* difficult to understand. One possibility is that the outcomes are much affected by our classification of products, which large puts horticultural products – which are dominant in the exports to the CEECs – in the primary-products-category. Yet, another suggestion could be that Dutch agrofood multinationals nowadays produce in CEECs instead of exporting their (processed) products from a Dutch production plant to that region. In the same vein, a multinational firm may affect the trade pattern by importing agricultural raw materials as inputs from the Netherlands and again by exporting part of their final products to the Netherlands, using for instance cheap labour as an argument to invest in the CEECs.

Although the study shows great variations in outcome, one may conclude that in many cases Dutch trade flows are significantly of an IIT-nature. Therefore, one may expect that Dutch agricultural trade patterns are caused by elements crucial in the explanatory concepts of modern trade theories. On the other hand, there are also indications that differences in factor endowments (the crucial explaining factor in the Heckscher-Ohlin theorem) may continue to be important causes for Dutch trade flows.

There are several *prima facie* unexpected and sometimes puzzling results from the measurement of the degree of trade overlap in the bilateral trade relations of the Netherlands with regions and individual countries. These results need to be further analysed, and explained using the appropriate theoretical concepts on IIT as described in section 3.2.1. In this explorative chapter, hypotheses were tested only qualitatively, by looking at the data and trying to find out intuitively whether hypotheses based on theories explaining IIT were confirmed or not. Some of the levels of the GL index values suggest that economic development, proximity and/or economic integration may foster IIT, but that is no more than a vague impression. For this, further quantitative testing is required to show the important factors in explaining the levels of IIT in Dutch bilateral trade.

The next step in this study is to use the measurements of IIT in Dutch agricultural trade to test hypotheses deduced from the theoretical concepts to explain IIT. As already briefly indicated in section 3.2.1, one important distinction in the more recent theoretical literature on the explanation of intra-industry trade is between horizontal and vertical product differentiation. Horizontal differentiation is associated with preference diversity of various varieties; vertical differentiation is represented as differences in quality between similar products. The importance of the distinction derives from the fact that different industry and country characteristics are likely to be associated with trade in the two types of product. Since theoretical models point to different determinants of the two types of IIT with different adjustment implications of a trade expansion, empirical investigations attempting to explain IIT are stimulated to separate trade flows in horizontally differentiated products (horizontal intra-industry trade or HIIT) and vertically differentiated products (vertical intra-industry trade or VIIT). Yet, only a recent strand of work has adopted an approach to attempt to break down total IIT into HIIT and VIIT (*e.g.* Greenaway *et al.*, 1994, 1995), while
in agriculture, such attempts are really scarce to date; only a study by De Frahan and Tharakan (1998) exist.

Further work on the levels, causes and implications of intra-industry trade would be fruitful if directed at the distinction between HIIT and VIIT. It would allow us to better identify the importance of country-specific and industry-specific factors in explaining IIT in a country’s trade. A crucial difference between horizontally and vertically differentiated products is that the latter differ in quality while the former products are similar in quality. As quality, innovation and technology are positively associated with each other, the disentangling of IIT into a horizontal and vertical components provides us with the opportunity to investigate to what extent country differences in technology affect the levels of IIT. This is the subject of the next chapter.
5. Technology and Product Differentiation as Determinants of Patterns of Horizontal and Vertical Intra-industry Trade in Agricultural and Food Products

5.1 Introduction

International trade in agricultural and food products has become more of an intra-industry trade (IIT) nature\(^{36}\). Based on 1994 data, Henderson et al. (1998) report a higher IIT level\(^{37}\) for the US processed food sector than McCorriston and Sheldon (1991) calculate for the US food industries for 1986. Trail (1997) refers to a study by Gomes da Silva who found that levels of intra-industry trade in the EU food, drinks and tobacco industries increased strongly between 1980 and 1992. These trends in food trade suggest that the pattern of specialisation need not be that different countries specialise in different products. Instead, the identification of significant levels of IIT in food trade indicates that a pattern whereby ‘different countries may specialise in different types of a given commodity’ (Greenaway et al., 1994:77) also holds for food products.

Much theoretical effort has been expended in explaining the circumstances in which IIT may arise. Besides a range of country-specific determinants, increasing returns to scale and differentiated products are generally seen as the main forces of IIT. Although empirical work confirms that total IIT varies with country and product characteristics across industries, the results show a degree of inconsistency across studies (Leamer, 1994). These inconsistencies may emerge because total IIT contains both two-way trade in horizontally differentiated products (different varieties of product with similar quality level) and two-way trade in vertically differentiated products (different quality levels of the same good). Theoretical literature indicates that different industry and country characteristics are likely to be associated with these two types of intra-industry trade: \textit{i.e.} horizontal and vertical intra-industry trade respectively.

Despite this, most empirical studies focus on the total level of IIT because it is difficult to disentangle horizontal and vertical intra-industry trade in the data. The few empirical papers that separate horizontal and vertical IIT find some empirical support

\(^{36}\) According to the definition by Tharakan and Calfat (1996:70) intra-industry trade is “the simultaneous export and import of products which are close substitutes for each other in terms of factor inputs and consumption”.

\(^{37}\) The common measure of intra-industry trade is the Grubel and Lloyd index (see Greenaway and Milner (1986) for a review of pros and cons of this measurement). This index measures the degree of the absolute amount of commodity exports that is offset by commodity imports of the same grouping, and expresses this intra-industry trade as a proportion of the total trade in this commodity group. In formula: \(GL = 1 - |X - M|/(X + M)\), where \(X\) is exports and \(M\) is imports. The index ranges between zero (no IIT) and one (where exports equal imports for each sub-sector of the industry in question).
for this separation for manufactured products (e.g. Greenaway et al, 1994; 1995)\textsuperscript{38}. However, for food products, De Frahan and Tharakan conclude from their attempt that “although the need to test separately determinants of horizontal and vertical IIT is well justified in the new trade theory, this is yet to be confirmed empirically” (1998:13).

The distinctive feature of horizontally and vertically differentiated products is that the latter differ in quality while the former products are similar in quality. The question is what causes quality differences. The neo-factor proportions model of vertical IIT (Falvey, 1981, Falvey and Kierzkowski, 1987) hypothesises that the level of IIT in vertically differentiated products is positively related to differences in capital endowment. However, empirical studies (e.g. Greenaway et al, 1994; De Frahan and Tharakan, 1998; 1999) found no support for that prediction. In this chapter, we focus on two possible reasons for this result. One is that the generally used variable of per capita income differences is a poor proxy of differences in capital endowments. In response, we add alternative measures of relative factor endowments to our analyses and distinguish between physical and human capital. In this, we follow suggestions by Greenaway and Milner (1986) and Torstensson (1991, 1996), who state that it is not so much physical capital but rather human capital that is positively related to quality. Another reason for the poor empirical results, which is more linked with the underlying theory, could be the source of vertical product differentiation. In recent literature on trade and growth, differences in quality are caused by differences in investments in technology (e.g. Grossman and Helpman, 1991). Therefore, in this chapter we include a country-specific technology indicator, measured at sector-level, to enhance the understanding of the circumstances and grounds for explanation of vertical intra-industry trade.

While investigating the role of technology and other factors in explaining IIT, we ask two questions. First, is it worthwhile to disentangle horizontal and vertical IIT empirically? Second, what source of quality differentiation, endowments (physical capital or human capital) or technology investments, affects the level of vertical intra-industry trade in agricultural and food products?

The main findings of the chapter are that country differences in innovative capacity do contribute to the explanation of intra-industry trade, however, only to vertical IIT. Therefore, it is indeed worthwhile to distinguish between horizontal and vertical intra-industry trade as different variables explain the two components of IIT. In addition human capital and the industry-specific technology indicator both add to the explanation of vertical IIT in food products independently. Moreover, product differentiation in food products is an important force of bilateral IIT in agricultural and food products among EU countries.

\textsuperscript{38} Both articles have been integrated and included in Brülhart and Hine (eds.), 1998: 70-97.
5.2 Theories and hypotheses

New trade theories find explanations for the phenomenon of intra-industry trade in increasing returns to scale, imperfect competitive market structures and product differentiation (Krugman, 1995)\(^{39}\). There is, however, no single model that covers all determinants to explain IIT. Instead a wide range of models has been developed, each of them emphasising one or a (different set of) combination(s) of the main determinants of trade (see, for instance, Tharakan, 1989). Models differ in assuming products to be horizontally or vertically differentiated. This is based on the assumption that consumer demand is determined either by preferences for attribute (other than quality) varieties or by preferences for quality differences. The first case refers to horizontal product differentiation. When trade occurs because consumers demand different qualities of the same type of product, vertical product differentiation dominates.

The major theoretical issue to understand two-way trade of apparently similar products has been to model economies of scale and preference diversity across a range of market structures. Earlier work in the 1980s by (e.g.) Dixit and Norman (1980), and Helpman (1981) was synthesised and extended by Helpman and Krugman (1985). They developed a consistent theoretical framework to explain inter- and intra-industry trade simultaneously. In fact, they generalise the Heckscher-Ohlin theory of factor proportions to a setting with economies of scale and monopolistic competition\(^{40}\). This can be illustrated using a simple 2x2x2 structure. There are two countries, home and foreign; two factors of production, capital and labour; two industries, one producing a labour-intensive homogeneous good under constant returns to scale, the other producing horizontally differentiated goods under an increasing returns technology. Each firm in the differentiated sector produces a unique variety of good, the number of varieties is limited in equilibrium by economies of scale and free entry. Trade increases market size, which may expand the scale of production and may enlarge the variety of goods available to consumers. Each country produces a different set of varieties of the differentiated good. Economics of scale implies that the output of each individual differentiated product is concentrated in one country or the other. Because consumers display ‘love of variety’, all varieties are in demand which implies that a country imports each of the varieties produced in the other country and exports each of the varieties domestically produced: i.e. intra-industry trade exists. The requirement that trade is balanced results in the capital-abundant country running a surplus in differentiated goods. Several testable hypotheses on the deterministic role of country-specific factors can be generated from this theoretical model. First, the greater the equality (inequality) of relative factor endowments between countries, the higher

\(^{39}\) Contrary to the new trade theories, Davis (1995) claims that comparative advantages can explain IIT as a result of technical differences within industries. Davis’ study implies that increasing returns to scale is not a prerequisite for IIT.

\(^{40}\) Helpman and Krugman (1985) explain IIT by assuming that products are horizontally differentiated and that there is a monopolistic competitive market structure. Implicitly, free entry and exit of firms is assumed. In the literature, this type of model of IIT is referred to as the large numbers case. Eaton and Kierzkowski (1984) demonstrate that a small numbers case with horizontal differentiation is possible, but this is considered as an exceptional case, critically depending on specific assumptions with respect to the (restricted) number of varieties demanded.
(lower) the level of intra-industry trade will be. Second, the greater the average market size of two countries, the greater the level of intra-industry trade in trade between the two countries. Third, the smaller (greater) the difference in market size between two countries, the higher (lower) the level of intra-industry trade in their bilateral trade will be.

Helpman and Krugman explain IIT by assuming that products are horizontally differentiated. In addition to their framework, the literature distinguishes two approaches to model the determinants of trade in vertically differentiated goods. The first one is labelled the 'neo-factor proportions trade theory' (Falvey, 1981; Falvey and Kierzkowski, 1987). The second approach is known as the 'natural oligopoly approach' (e.g. Shaked and Sutton, 1984). Both approaches assume that product differences can be explained by consumer preferences for products differentiated by quality.

Initial factor endowment differences play an important role in the neo-factor proportions trade theory to explain IIT. Falvey assumes that quality is determined by the capital-labour ratio used in producing the product: the higher the ratio, the higher the quality. He demonstrates in his analysis of IIT in vertically differentiated products that, when two countries initially have different factor endowments, the relatively capital-abundant country produces and exports the high quality variety of the product and the relatively labour-abundant country the low-quality variety. This generates the hypothesis that the greater the difference in capital/labour endowments, the greater the level of vertical IIT in bilateral trade of a pair of countries. This hypothesis contrasts with the one taken by Helpman and Krugman concerning the link between IIT and endowments (see above). Falvey and Kierzkowski (1987) add a demand side to this model, and assume that consumers always prefer a higher quality to a lower quality variety (under the restriction of their income levels). Because of income differences, there is demand for both high and low quality products. As long as there is such demand, intra-industry trade will take place, with each country exporting the product qualities, in which it uses its relative abundant factors most intensively. The results suggest that, as with horizontal IIT, the level of vertical IIT is positively correlated with the average market size of the two trading countries.

Unlike Falvey and Kierzkowski, Shaked and Sutton assume that quality enhancements are caused by research and development investments. Because of these fixed costs, trade in vertically differentiated products takes place in an imperfectly competitive market setting. In this setting entry barriers exist and one finds that the number of firms is bounded. A natural oligopoly, therefore, emerges. Like in the Falvey model, firms with high (low) R&D investments export the high (low) quality product. Next to the well known and often tested (Falvey) hypothesis that vertical IIT is positively linked to differences in endowments, one may generate an additional hypothesis and that is that the level of vertical IIT is positively associated with country differences in technology investments.

This assumption is also often used in the new trade and growth theories (e.g. Grossman and Helpman, 1991).
5.3 Measurement and model specification

To distinguish between vertical and horizontal IIT, a satisfactory means has to be found for measuring quality differences between products traded. To separate horizontal from vertical IIT, a per unit value deviation was used (following Abd-el-Rahaman, 1991; and Greenaway et al., 1994). It is assumed that the more unit values of exports and imports differ, the higher the difference in quality. This is based on the assumption that prices reflect quality (Stiglitz, 1987) and that a variety sold at a higher price must be of a higher quality than a variety sold more cheaply. Otherwise consumers would always buy the cheapest good. Horizontal IIT is defined as the simultaneous export and import of a product where the unit value of exports (measured f.o.b.) relative to the unit value of imports (measured c.i.f.) is within a specific range. As in most other empirical studies (e.g. Greenaway et al. 1994; 1995), this range is set at 0.85-1.15, (i.e. cut-off rate = +/- 15 percent difference in unit value) and at 25 percent for testing the sensitivity of results for this definition. When relative unit values are outside that range, any IIT is considered vertical in nature. Matched trade in each product level is thus categorised as either vertical or horizontal IIT.

The analysis focuses on the bilateral trade flows of France, Germany, the Netherlands and Spain with each other and with other EU-countries. The first three countries mentioned belong to a small group of most important exporters and importers of agricultural and processed food products in the world (Henderson et al., 1998). Spain is included in the analysis as it is a major South-European economy that joined the EU only in 1986. Since that date its agricultural imports and exports doubled rendering Spain an important trading country in agricultural and food products next to the northern EU member states.

In this study, IIT levels for the four countries mentioned have been calculated using the Grubel and Lloyd index (Grubel and Lloyd, 1975). We have used product groups at the SITC three-digit, with some products at SITC four- or SITC five-digit level (see Appendix 1, table 1 and 2). In studies of intra-industry trade, SITC three-digit is the most often used level of aggregation. However, products at this level of aggregation can not always be considered close substitutes in consumption 42. On the other hand, Torstensson (1991:186) claims that it is not desirable to disaggregate below the SITC four-digit level due to the risk of defining away two-way trade in quality differentiated products at a more disaggregated level. Given the purpose of our study to investigate product differentiation we have chosen further product detail only if at SITC three-digit level there is much heterogeneity in terms of processing stage and application (see Appendix ‘Definition and classification of product groups’).

All four countries report generally high IIT levels, indicating that a substantial share of their trade with EU countries is of a two-way nature (see table 5.1). These levels are lower than those reported by McCorriston and Sheldon (1991) for the EU (EC-9 in that study). Using 1986 export and import data at three-digit levels, the

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42 Following Greenaway and Milner (1986), Torstensson (1991) points at two characteristics that have mostly been considered to define a product group: (1) Factor intensities should be similar in the production of similar varieties within the product group; and, (2) different products should be close, but not perfect substitutes in consumption. Per definition, (1) cannot be used in this study. Thus, we are left with (2), i.e. that products should be close substitutes in consumption.
authors estimated IIT levels for a sample of ten processed foods being 0.73 and higher. The difference with our results may be due to the focus on processed products only by McCorriston and Sheldon, and our more detailed product groups. Henderson et al. (1998) report on IIT-levels for the US processed foods sector. Based on 1994 four-digit SIC data, an average index value across the 48 industries is estimated 0.57. This level is close to what has been estimated for the four EU countries in table 5.1.

Results indicate that bilateral IIT-levels of the four EU countries with other EU countries are largely in vertically differentiated products. Yet, there are important differences: French IIT is mainly of a horizontal nature, while German, Dutch and Spanish IIT is largely of a vertical type. This suggests that in its two-way trade with other EU countries, France competes mainly on product attribute differences and not on quality, like Germany, the Netherlands and Spain do. In Dutch bilateral trade relations, the dominant component of IIT changes from vertical into horizontal when a more generous definition of horizontal IIT is applied.

Table 5.1 IIT and its components in bilateral trade of France, Germany, the Netherlands and Spain with EU countries, 1997

<table>
<thead>
<tr>
<th>Country</th>
<th>Total IIT</th>
<th>Horizontal IIT</th>
<th>Vertical IIT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cr=+/-15%</td>
<td>Cr=+/-25%</td>
<td>Cr=+/-15%</td>
</tr>
<tr>
<td>France</td>
<td>0.62</td>
<td>0.36</td>
<td>0.26</td>
</tr>
<tr>
<td>Germany</td>
<td>0.58</td>
<td>0.22</td>
<td>0.36</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>0.45</td>
<td>0.17</td>
<td>0.28</td>
</tr>
<tr>
<td>Spain</td>
<td>0.41</td>
<td>0.12</td>
<td>0.28</td>
</tr>
</tbody>
</table>

Note: Cr = cut-off rate

IIT is determined to be vertical both when a country's exports have high unit values relative to those of imports ('high-quality' exports) and when relative unit values of exports are low ('low-quality' exports). The share of 'high quality' exports (exports with high unit values relative to those of imports) in total vertical IIT is very high for the Netherlands: 86 percent (at a 15 percent-margin). For France and Germany this percentage is 53 and 57 respectively, while Spain's share of high quality exports in vertical IIT is only 44 percent. If the cut-off rate is expanded to 25 percent, the high-quality share in vertical IIT drops to 31 percent for Spain and remains at similar levels for Germany and France as under the 15 percent cut-off rate. The Dutch high-quality share increases further to reach 91 percent of its bilateral vertical IIT.

In trying to find explanations for these patterns of IIT, our approach is eclectic in that rather than testing a specific theory, it picks hypotheses from various theoretical models. A model has been specified to test the explanatory power of a subset of country-specific and industry-specific factors on total, horizontal and vertical IIT. The hypotheses formulated in section 5.2 were tested with the following equations:
(5.1) \[ IIT_{j(ik)} = a_0 + a_1 \text{RELFAC} + a_2 \text{SIZE} + a_3 \text{DIFGDP} + a_4 \text{Border} + a_5 \text{DIFPAT} + a_6 \text{PD} + a_7 \text{USEDUM}_{ik} + a_8 \text{PROC Dum}_{ik} + e_{ik}, \]
in which the expected signs of the coefficients are: \(a_1\) indeterminate; \(a_2 > 0\); \(a_3 < 0\); \(a_4 > 0\); \(a_5\) indeterminate; \(a_6 = \text{indeterminate}\); \(a_7 > 0\); \(a_8 > 0\)

(5.2) \[ HIIT_{j(ik)} = a_0 + a_1 \text{RELFAC} + a_2 \text{SIZE} + a_3 \text{DIFGDP} + a_4 \text{Border} + a_5 \text{DIFPAT} + a_6 \text{PD} + a_7 \text{USEDUM} + a_8 \text{PROC Dum} + e_{ik}, \]
in which the expected signs of the coefficients are: \(a_1 < 0\); \(a_2 > 0\); \(a_3 < 0\); \(a_4 > 0\); \(a_5\) indeterminate; \(a_6 > 0\); \(a_7 > 0\); \(a_8 > 0\)

(5.3) \[ VIIT_{j(ik)} = a_0 + a_1 \text{RELFAC} + a_2 \text{SIZE} + a_4 \text{Border} + a_5 \text{DIFPAT} + a_6 \text{PD} + a_7 \text{USEDUM} + a_8 \text{PROC Dum} + e_{ik}, \]
in which the expected signs of the coefficients are: \(a_1 > 0\); \(a_2 > 0\); \(a_4 > 0\); \(a_5 > 0\); \(a_6 = \text{indeterminate}\); \(a_7 > 0\); \(a_8 > 0\)

where

<table>
<thead>
<tr>
<th><strong>IIT_{j(ik)}</strong></th>
<th>Average level of total IIT-index in gross bilateral trade in commodity (j) between country (i) and country (k).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HIIT_{j(ik)}</strong></td>
<td>Average level of horizontal IIT-index in gross bilateral trade in commodity (j) between country (i) and country (k).</td>
</tr>
<tr>
<td><strong>VIIT_{j(ik)}</strong></td>
<td>Average level of vertical IIT-index in gross bilateral trade in commodity (j) between country (i) and country (k).</td>
</tr>
<tr>
<td><strong>RELFAC</strong></td>
<td>Factor endowment differences, calculated as (</td>
</tr>
<tr>
<td><strong>SIZE</strong></td>
<td>Average market size, calculated as the average GDP-level of two countries (i) and (k). In formula: ((Y_i + Y_k)/2).</td>
</tr>
<tr>
<td><strong>DIFGDP</strong></td>
<td>Differences in market size, calculated as (</td>
</tr>
<tr>
<td><strong>BORDER</strong></td>
<td>Geographical proximity dummy</td>
</tr>
<tr>
<td><strong>DIFPAT</strong></td>
<td>Differences in technology levels, calculated as the absolute differences in stocks of patents (PAT) per unit value added (VA) of the agricultural and food sector between two countries. In formula: (</td>
</tr>
</tbody>
</table>
The explanatory variables and their justification for all sets of equations are the following.

RELFAC, SIZE and DIFGDP represent the role of country-specific factors linked to the hypotheses in the Helpman and Krugman (1985) model for horizontal IIT and the Falvey model for vertical IIT. RELFAC represents difference in relative factor endowments between the two trading countries. In line with other empirical studies (e.g. Greenaway et al., 1994; Hirschberg et al., 1994; De Frahan and Tharakan, 1999), per capita income differences are used as an approximation for factor endowment differences. According to the theoretical models, the expected influence of this variable is positive with regard to vertical IIT (the more countries differ in per capita income, the more vertical IIT) and negative with regard to horizontal IIT. The expected sign for total IIT is indeterminate, as IIT includes both horizontally and vertically related products. Below in section 5.4.1 we run the model using the per capita income variable as indicated here. However, this results in outcomes in the vertical IIT regressions that are inconsistent with the theory. Therefore, we re-run the model in section 5.4.2 using alternative variables for capital endowments.

SIZE is the average GDP level of both countries, which reflects the average market size. For all kinds of IIT, a positive influence is expected. DIFGDP is the (absolute) difference between two countries in market size, again approximated by their GDP levels. With regard to total and horizontal IIT a negative influence is expected.

Border is a dummy variable, representing the geographical proximity of two trading countries. It is hypothesised that geographical proximity fosters IIT (e.g. Hirschberg et al., 1994; Pieri et al., 1997). This follows from the assumption that two countries located close to one another have a higher degree of similarity in consumer preferences than countries separated by greater distance due to cultural similarities (Linder, 1961). Furthermore, trade (transport) costs are expected to be lower, so there will be little impediment to trade. A country-specific border dummy is included in our model, indicating that IIT is positively affected when countries share a common border.

PD is an industry-specific variable for product differentiation defined as the number of eight-digit SITC product categories in each selected product group in our sample. It is expected that there is a positive link between PD and horizontal IIT since

*According to theory, RELFAC should have a positive relation with VIIT. However, the model estimation points at a negative relation.*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PD</td>
<td>Product differentiation, reflected by the number of eight-digit categories in a three-digit industry</td>
</tr>
<tr>
<td>USEDUM</td>
<td>Product category dummy, indicating the difference between products for industrial use and products for (end-)consumption.</td>
</tr>
<tr>
<td>PROCDUM</td>
<td>Product category dummy, indicating the difference between primary products and processed products.</td>
</tr>
</tbody>
</table>
this type of IIT is directly related to the existence of differentiated products (e.g. Greenaway et al., 1995; Aturupane et al., 1999). For vertical IIT, the sign may be undetermined: products at, for instance, four-digit level are not only differentiated by attributes but also by processing and quality differences. This can be illustrated by several examples from our sample of products included in this analysis (see Appendix 1, table 1)\textsuperscript{44}.

In our model, we further include two additional indicators of product differentiation in the agricultural and food sectors. USEDUM and PROCDUM are dummies for respectively the difference between the end-user (industrial use versus household use) and the difference between primary and processed products (see the categories defined in Appendix 1, table 1 and 2, where USEDUM = C2 or C4, and PROCDUM = C3 or C4). It is expected that there is a positive relation between these two dummies and IIT (total, horizontal and vertical).

A novel feature compared to existing empirical literature on HIIT and VIIT is that a technology indicator is included in our explanatory model. We use patents as an indicator of the industry’s innovative capacity. Patent data are taken from the European Patent Office (EPO). The selection includes patents issued in the field of agriculture and food to an applicant (a person/firm/body) from an EU country and valid in at least one EU country. As set out in section 5.2, technology investments can be a source of product quality improvements and vertical IIT. It is assumed that differences in patent intensity levels between two countries have a positive influence on the level of vertical IIT\textsuperscript{45}. With vertically differentiated products, the country with highest patent intensities exports mainly high-quality exports while the other country exports low-quality products. DIFPAT reflects the (absolute) difference in technology level in the field of agriculture between countries, and this difference is expected to be positively related to the level of vertical IIT between countries. DIFPAT is measured as the absolute differences in stocks of patents (PAT) per unit value added (VA) of the food sector between two countries. We calculated patent stock in the agricultural and food industries for a country using the perpetual inventory method, stating that $\text{PAT}_{i,t} = (1- \text{dr}) \times \text{PAT}_{i,t-1} + P_{i,t}$, where $\text{PAT}_{i,t}$ is the patent stock in country $i$ at time $t$, dr is the depreciation rate (dr =0.1), and $P_{i,t}$ is the number of patents applied for in the EU by country $i$. We use patent data from 1977 to 1993, and 1994 data on added value.

\textbf{5.4 Discussion and interpretation of results}

The hypotheses were tested by estimating the regression equations above. However, estimating equation 5.1-5.3 involves a difficulty from an econometric point of view. The linear model could lead to inaccurate predictions because it might yield fitted values that are either negative or greater than one while the dependent variable, by construction, is bounded between 0 and 1. To overcome this shortcoming, all the equations were estimated using non-linear least squares, according to the following logistic function:

\textsuperscript{44} For instance unroasted and roasted coffee (resp. SITC 0711 and 0712): the former is classified as unprocessed mainly for industrial use, and the latter is processed mainly for household consumption.
\[ IIT_{ijk} = \frac{1}{1 + \exp(-b'x_{ijk})} + e_{ijk}, \]

where \( b' \) is the regression coefficient vector, \( x \) the explanatory variables vector and \( e \) is the random disturbance term. All equations were estimated for a sample of four countries (\( i = \) Germany, France, the Netherlands and Spain) with their EU trading partners (\( k = \) all EU members), for 57 products identified. The levels of IIT relate to the year 1996.

### 5.4.1 Innovation capacity and the levels of total, horizontal and vertical IIT

The results of the regressions testing the hypotheses about determinants of intra-industry trade and both its horizontal and vertical components are shown in table 5.2 below.

Table 5.2 presents model estimations, in which income per capita is used as an approximation for relative factor endowments (RELFAC) in explaining total, horizontal and vertical IIT. The outcomes show very satisfactorily results for total IIT: all variables have the expected sign and are statistically significant. This includes the newly introduced technology indicator DIFPAT and the two product differentiation dummies USEDUM and PROC Dum. With regard to horizontal IIT, the coefficient estimates on SIZE, DIFGDP, BORDER and the two product differentiation dummies are significant with the expected signs, while those for RELFAC and PD have the expected sign but are insignificant. The latter two variables, therefore, do not add to the explanation of horizontal IIT, and neither does DIFPAT, the technology variable. Yet, technology differences between countries are a determinant of vertical IIT: the coefficient of DIFPAT has the (expected) positive sign and is significant in the VIIT-equation. This result emphasises the point that it makes sense to distinguish total IIT into a horizontal and vertical component as horizontal and vertical IIT are not necessarily related in the same way to determinants of total IIT.

The regression estimations for vertical IIT show that, next to the technology variable, the coefficients of the two newly introduced product differentiation variable USEDUM and PROC Dum variables have the expected signs and are statistically significant. The same holds for the other variables included in the regression, except for the endowment variable. In line with the findings of previous studies on this subject (Greenaway et al., 1994; De Frahan and Tharakan, 1999), the coefficient of RELFAC in the VIIT regression is negative. However, this result is contrary to the expectations that follow from the Falvey-model. This puzzling result could be due to the fact that per capita income is an inappropriate approximation for factor endowments. We will study this proposition in section 5.4.2.

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45 Conversely, we expect a negative relation between this technology indicator and horizontal IIT.
46 A similar logistic specification is assumed by Atrupane et al. (1999) and Pombo (2001).
47 See Appendix 1, table 1 for an overview of products. Total observations are (4x13x57)-(6x57)=2964-342=2622, as each of the four countries trades with 13 partners (Belgium and Luxembourg are considered as one country in Eurostat statistics) in 57 products. Out of these, 6 (=factorial three) times 57 observations are counted twice (e.g., bilateral trade between Germany and France is the same as between France and Germany) and are, therefore, left out of the set.
Table 5.2 Non-linear regression estimation results

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>IIT</th>
<th>HIIT</th>
<th>VIIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-2.08</td>
<td>-1.25</td>
<td>-2.26</td>
</tr>
<tr>
<td></td>
<td>(-15.97)</td>
<td>(-4.38)</td>
<td>(-15.31)</td>
</tr>
<tr>
<td>RELFAC</td>
<td>-1.60E-05</td>
<td>-9.75E-06</td>
<td>-1.58E-05</td>
</tr>
<tr>
<td></td>
<td>(-2.40)</td>
<td>(-.64)</td>
<td>(-2.15)</td>
</tr>
<tr>
<td>SIZE</td>
<td>8.12E-13</td>
<td>6.27E-13</td>
<td>6.17E-13</td>
</tr>
<tr>
<td></td>
<td>(9.64)</td>
<td>(3.60)</td>
<td>(7.33)</td>
</tr>
<tr>
<td>DIFGDP</td>
<td>-2.55E-13</td>
<td>-3.70E-13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-5.01)</td>
<td>(-3.48)</td>
<td></td>
</tr>
<tr>
<td>BORDER</td>
<td>.79</td>
<td>.69</td>
<td>.77</td>
</tr>
<tr>
<td></td>
<td>(11.14)</td>
<td>(4.93)</td>
<td>(9.24)</td>
</tr>
<tr>
<td>DIFPAT</td>
<td>.12</td>
<td>-5.0E-03</td>
<td>.14</td>
</tr>
<tr>
<td></td>
<td>(2.67)</td>
<td>(0.05)</td>
<td>(2.75)</td>
</tr>
<tr>
<td>PD</td>
<td>3.06E-03</td>
<td>6.70E-04</td>
<td>3.62E-03</td>
</tr>
<tr>
<td></td>
<td>(5.55)</td>
<td>(.56)</td>
<td>(5.83)</td>
</tr>
<tr>
<td>USEDUM</td>
<td>.18</td>
<td>.23</td>
<td>.16</td>
</tr>
<tr>
<td></td>
<td>(2.88)</td>
<td>(1.75)</td>
<td>(2.28)</td>
</tr>
<tr>
<td>PROCUDUM</td>
<td>.41</td>
<td>.44</td>
<td>.36</td>
</tr>
<tr>
<td></td>
<td>(6.13)</td>
<td>(3.01)</td>
<td>(4.78)</td>
</tr>
<tr>
<td>Observations</td>
<td>2466</td>
<td>443</td>
<td>2023</td>
</tr>
<tr>
<td>R2</td>
<td>.145</td>
<td>.130</td>
<td>.125</td>
</tr>
</tbody>
</table>

Note: t-statistics are in parentheses.

To test the robustness of our results to the definition of horizontal and vertical IIT, we re-ran the regression using the data for horizontal and vertical IIT using a cut-off rate of +/-25 percent as the criterion for separating both types of IIT. The same conclusions as drawn on the regression results presented in table 5.2 hold: it makes sense to distinguish between horizontal and vertical IIT as determinants of both IIT components differ. Since, the technology variable is positively related to total and vertical IIT and significant, while both product differentiation dummies show to be among the important explanatory factors of intra-industry trade (results reported in Appendix 2).

5.4.2 Regression results with alternative proxy variables for capital endowments

Section 5.4.1 showed that in line with the findings of previous studies the influence of factor endowments on VIIT was contrary to expectations. This result may be because per capita income is an inappropriate approximation for factor endowments. Digging deeper into the question of the appropriate variable to represent factor endowments...
leads us to the suggestion made by Greenaway and Milner (1986) that it is not so much physical, rather human capital that is positively related to quality, and thus to VIIT. Torstensson (1991, 1996) followed this suggestion by separating capital into physical and human capital and claimed to find empirical support for the Falvey–model. We, in our turn, follow Torstensson’s example by considering some alternative testing of the neo-factor proportions model of vertical IIT. Instead of per capita income we use a combination of physical and human capital measurements to approximate factor endowments in the VIIT(2) and VIIT(3) regression. Following suggestions by Torstensson (1996), we use two measures to compute physical capital-labour ratios: gross domestic fixed capital per capita (PCE1) and commercial energy use per capita (PCE2). Human capital is measured by the number of tertiary students and the proxy-variable HCE measures the country differences in the number of tertiary students. The results are presented in table 5.3 under VIIT(2) and VIIT(3).

Table 5.3 Non-linear regression estimation results with alternative proxies for endowments

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>VIIT (1)</th>
<th>VIIT (2)</th>
<th>VIIT (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-2.26</td>
<td>-2.49</td>
<td>-2.48</td>
</tr>
<tr>
<td></td>
<td>(-15.31)</td>
<td>(-15)</td>
<td>(-15.20)</td>
</tr>
<tr>
<td>RELFAC</td>
<td>-1.58E-05</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-2.15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCE1</td>
<td></td>
<td></td>
<td>-1.36E-06</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-.82)</td>
</tr>
<tr>
<td>PCE2</td>
<td></td>
<td>-1.679E-05</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-.67)</td>
<td></td>
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<tr>
<td>HCE</td>
<td>1.30E-04</td>
<td>1.04E-04</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.02)</td>
<td>(1.51)</td>
<td></td>
</tr>
<tr>
<td>SIZE</td>
<td>6.17E-13</td>
<td>7.47E-13</td>
<td>7.68E-13</td>
</tr>
<tr>
<td></td>
<td>(7.33)</td>
<td>(6.66)</td>
<td>(6.47)</td>
</tr>
<tr>
<td>BORDER</td>
<td>.77</td>
<td>.84</td>
<td>.83</td>
</tr>
<tr>
<td></td>
<td>(9.24)</td>
<td>(10.63)</td>
<td>(10.50)</td>
</tr>
<tr>
<td>DIFPAT</td>
<td>.14</td>
<td>.125</td>
<td>.127</td>
</tr>
<tr>
<td></td>
<td>(2.75)</td>
<td>(2.35)</td>
<td>(2.40)</td>
</tr>
<tr>
<td>PD</td>
<td>3.62E-03</td>
<td>3.61E-03</td>
<td>3.61E-03</td>
</tr>
<tr>
<td></td>
<td>(5.83)</td>
<td>(5.86)</td>
<td>(5.86)</td>
</tr>
<tr>
<td>USEDUM</td>
<td>.16</td>
<td>.17</td>
<td>.17</td>
</tr>
<tr>
<td></td>
<td>(2.28)</td>
<td>(2.36)</td>
<td>(2.35)</td>
</tr>
<tr>
<td>PROCUDUM</td>
<td>.36</td>
<td>.35</td>
<td>.35</td>
</tr>
<tr>
<td></td>
<td>(4.78)</td>
<td>(4.71)</td>
<td>(4.69)</td>
</tr>
<tr>
<td>Observations</td>
<td>2023</td>
<td>2023</td>
<td>2023</td>
</tr>
<tr>
<td>R2</td>
<td>.125</td>
<td>.124</td>
<td>.125</td>
</tr>
</tbody>
</table>

Notes: t-statistics are in parentheses.
The regression results show that, indeed, human capital is positively related to IIT in vertically differentiated products. However, the t-statistic is only satisfactory in case of a combination with PCE2. Both physical capital endowment variables show a negative sign and are insignificant, which is contrary to the Falvey-model, from which a positive relation between factor endowments and IIT is expected. It is important to note is that the coefficient of the technology variable DIFPAT remains positive and statistically significant in all versions of the VIIT-regressions. Moreover, it appears that HCE and DIFPAT do not correlate with each other, suggesting that both variables are independent of each other. It seems that rather than physical capital, both human capital and the sector specific innovation capacity of a country are sources of vertical product differentiation and therefore VIIT.

Further, the outcomes of the VIIT-regressions show consistent results for the widely used explanatory variables SIZE and BORDER, and are in line with empirical work by Greenaway et al., 1994 and by De Frahan and Tharakan, 1999. Next, the two product dummies USEDUM and PROCDUM show good performances. These results support the view that product differentiation is positively related to vertical intra-industry trade in food products.

The fit of the estimation for aggregate IIT and for both components of IIT seems low; the adjusted $R^2$ of the regressions are in a range of .124 - .140. Yet, for a cross-section regression of this type, these results are satisfactory.

5.5 Conclusions and evaluation

The focus of this analysis of IIT is on the bilateral intra-EU trade of four countries: France, Germany, the Netherlands and Spain. The magnitude of IIT is relatively high between the four selected EU countries and the EU. IIT of Germany, the Netherlands and Spain is largely of a vertical nature, while French IIT is mainly horizontal. Except for Spain, high-quality exports dominate the vertical IIT flows of these countries. In explaining all three (horizontal, vertical and total) IIT categories, the empirical study confirms the significant role of the average market size and the importance of the geographical proximity of trading countries. As in other empirical work, differences in relative factor endowments approximated by per capita income differences explain total IIT satisfactorily but this variable does not provide the expected results with regard to vertical IIT. Yet, when separating human and physical capital, it appears that it is not so much physical, but rather human capital that contributes to the explanation of VIIT. In this chapter, we investigated whether the source of vertical product differentiation (i.e. differences in quality) is caused by country differences in investment in technology. A variable measuring country differences in patents issued in the field of agriculture and food indicating differences in innovative capacity of the sector shows to be of significance in explaining vertical intra-industry trade of the subset of countries studied. It is important to note is that the

48 For instance, De Frahan and Tharakan (1999) report correlation squares of .112 and .082 for respectively horizontal and vertical IIT.
technology variable is not affected when the human (and physical) capital variable in the model is included, meaning that they both contribute to the explanation of vertical IIT.

The outcomes of our model indicate that it is worthwhile to separate horizontal and vertical IIT as their determinants differ. The novel feature of our model – namely, the inclusion of a technology variable for differences in quality levels - turns out to be fruitful for explaining the level of vertical IIT, but, as expected, is insignificant for horizontal IIT. Moreover, human capital adds to the explanation of vertical IIT. Further, industry-specific variables used as approximations for differentiated and processed products also contribute to the explanation of total, horizontal and vertical IIT in agricultural and food products in the EU, and thereby, confirm the theory that the extent to which products are processed and differentiated is an important determinant of IIT.

Although the results indicate that the inclusion of a technology indicator and a human capital measurement in the analysis adds to the understanding of vertical IIT, not all results are evenly robust and consistent with the theory. Further, most of the two-way trade in vertical differentiated products is still unexplained: the correlation squares of our regressions are in the range of .10 - .12. On the one hand, bilateral trade flows in agrofood products may fluctuate quite heavily due to, for example, large weather influences on production and, therefore, trade. On the other hand, theory suggests that when determinants like economies of scale and market structure are taken up in the model, IIT may be better explained. However, for the moment, European data necessary to calculate concentration rates or indicators of a minimum efficient scale of production are incomplete (only for some countries) or internationally incomparable due to national differences in data definitions. Therefore, collecting data of appropriate variables for quantifying the phenomena explaining IIT as suggested by the theory seems one of the main challenges for further research in the determinants of intra-industry trade.
6. The Relationship between Trade and FDI: Theoretical Developments and Empirical Analyses

6.1 Introduction

Multinationals influence world trade; in fact, multinationals become increasingly important in world trade. Hence, a full explanation of present trade structures can not be provided without taking the role and the behaviour of multinationals into account. The theory of multinationals concentrates on firm characteristics that lead to multinationality (Caves, 1996). This literature offers many possibilities to analyse a company’s reasons for serving markets abroad. However, hardly any partial or general equilibrium analysis follows. On the other hand, theories of international trade that integrate the role of multinationals are not well developed yet. Consequently, a consistent analytical framework is lacking to empirically investigate the relation between trade and multinational behaviour.

Traditional trade theories following the Heckscher-Ohlin-Samuelson approach do not take multinationals at all into account: factor endowments are simply assumed to be internationally immobile, so there cannot be capital flows between two countries. If the assumption of factor immobility between countries is relaxed, the movement of capital can substitute trade, say in response to the introduction of a tariff (Mundell, 1957). However, given the assumptions of perfect competition and constant returns to scale, these theories deal with sectors, not with companies. New trade theories do pay attention to companies but to a limited extent, mainly as a one plant and one product case. Consequently, the normative (‘strategic-trade-policy’) literature assumes that any profits earned by these companies enter into the income stream of the country in which the firm is located. Yet, most industries subject to economies of scale, product differentiation and imperfect competition are dominated by multinational enterprises (MNEs) and not by a single firm producing solely on a national scale. As a result of substantial foreign ownership of domestic production, policy implications may be radically altered as the benefits of trade policy instruments accrue to (national and/or multinational) companies whereas the country, that applies those policy instruments, may benefit or not (Dick, 1993).

The growing importance of multinationals in international economic activities and the policy implications arising from that result in a growing need to improve the integration of both trade and multinational firm theories. Since the early 1960s several attempts have been made to bridge the gap in macroeconomic and microeconomic approaches of the phenomenon of international production. Recently, these attempts have resulted in theoretical developments allowing for a better integration of MNEs in trade analysis. This chapter gives an overview of the most important theoretical contributions incorporating the behaviour of multinational firms in trade analyses, summarising those contributions that focus on the issue whether there are any
systematic effects of FDI on trade. Underlying issues are the motivations of a company to invest in a foreign country; country features found to be attractive to foreign direct investments; different forms of FDI; whether FDI is substituting trade or complementary to trade; and the welfare effects of FDI for both the host and the home country.

The structure of the chapter is as follows. Section 6.2 outlines the main trends in FDI, linked to a number of stylised facts on multinationals and their presence. The empirical regularities found largely through informal analyses have encouraged economists to seek for a theoretical framework to understand and explain the existence of multinationals and their impact on trade. Some of the major approaches are reviewed in section 6.3. This section is followed by a brief review of recent empirical studies focused on multinationals mainly active in the food industry. Section 6.4 aims to shed light on recent empirical advances in studying the impact of multinational behaviour on trade in agricultural and food products. The chapter concludes by formulating a number of hypotheses that will be tested in an empirical investigation on the effects Dutch agrifood foreign direct investments have on trade.

6.2 Trends in FDI and stylised facts on multinationals

In recent decades the volume of foreign direct investment has grown substantially. The annual growth rate of FDI has been much higher than the growth rate of international trade (Markusen and Venables, 1998; Anderson and Hainaut, 1998). The marked rise in foreign direct investment is an important feature of the growing integration of the world economy in recent times.

Recent trends in total FDI are succinctly summarised by McCorriston (1999). His main observations from the literature are summed up in the following points:

1. FDI has grown very fast in recent years. In the period 1980-1995 the total stock of (inward) FDI in the world economy increased more than five-fold to reach USD 2658 billion in 1995. During this time the increase in the 1980s has been more profound than the growth in the first half of the 1990s. Further, FDI stocks have grown significantly faster than trade flows over the last two decades.

2. Developed economies account for the largest shares in FDI flows around the world. The share of the developed countries in the inward FDI flows increased in the 1980s to 80% in 1990 but fell in the years following to reach the same

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49 FDI is an investment in a foreign affiliate (parent firm has a substantial but not necessarily a majority ownership or interest). OECD recommends that “a direct investment enterprise be defined as an incorporated or unincorporated enterprise in which a foreign investor owns 10% or more of the ordinary shares or voting power of an incorporated enterprise or the equivalent of an unincorporated enterprise” (OECD, 1996:8). The main difference between a direct investment flow and a portfolio capital flow is that the first involves influence on the management of the firm invested in through share holders meetings, while the latter means the lending of money without any say on how it is spend by the lending company. Foreign direct investment, then, is much more than 'just' finance capital, it also involves the transfer of management skills, entrepreneurship and technology.

50 McCorriston largely relies on empirical work by Froot (1998), Feenstra (1998), Greenaway, Lloyd and Milner (1998) and statistic releases of various years by the US Bureau of Economic Analysis.
share in 1995 as they had in 1980, namely 74 percent of the world's *inward* FDI. The share of developed economies in the stock of *outward* FDI has declined since 1980 but still developed countries accounted almost wholly (92 percent) for the world’s outward FDI in 1995.

3. Further, it is noteworthy that, by the late 1980s, the position of the US changed from a net exporter of FDI into a net recipient. The US share of developed countries increased from 22 to 29% of the inward stock, while the share of the outward stock decreased from 43% to 28%. High rates of growth were recorded for the EU, involving both intra-EU FDI and FDI with non-EU countries. FDI in Japan was relatively low, while outward FDI flows from Japan grew extremely fast.

4. Developing countries received around a quarter of all FDI. This share was kept almost constant over time. However, the distribution among developing countries changed drastically. Most notably, China did not receive any FDI in the beginning of the 1980s but accounted for 20% of the inward stock of FDI to developing countries in 1995.

5. Most FDI took place between developed countries, with the intra-EU flows accounting for the highest proportion of FDI flows in the world economy, followed by flows between North America and Europe.

6. FDI flows between developed countries is mainly of an intra-industry nature. (The intra-industry FDI is measured as sales of foreign affiliates in each country in a particular SIC category.)

7. For the US a substantial amount of the country's total exports and imports is accounted for by intra-firm sales (from parent to foreign affiliate and backwards). Together with the growing importance of imported intermediates as a share of total intermediates (although not wholly due to multinationals), this suggests that vertical FDI is an important feature of total FDI activity ('Vertical’ refers to FDI by which firms geographically fragment the production process by stages. In contrast, ‘horizontal’ FDI refers to investments by which firms produce the same product or service in multiple locations).

8. For the US a vast majority of FDI takes the form of cross-border acquisitions, not ‘greenfield’ developments.

The key issues from the empirical observations are that a large part of FDI takes place between countries that are very similar to each other in terms of factor endowments and that FDI flows between developed countries is mainly of an intra-industry nature. US data indicate that much trade is intra-firm sales. The latter also shows that vertical FDI is an important feature of total FDI, which suggests that the establishment (or acquiring) of plants overseas occurs to take advantage of factor endowment differences. The latter, however, does not fit the general picture of FDI which is largely between countries similar in factor endowments.

Markusen (1998b) reviewed empirical literature in order to list a set of characteristics of multinational firms, of industries dominated by multinational firms.
and of country characteristics\textsuperscript{51}. In his overview, several country characteristics, which are associated with source and host countries, are similar to those listed by McCorriston. Markusen notes that high-income, developed countries are both major sources and major recipients of foreign direct investment\textsuperscript{52}. High volumes of direct investment are associated with similarities among countries in terms of relative factor endowments and per capita incomes, not differences. Unlike Feenstra (1998), Markusen found that most direct investment is horizontal, in the sense that the bulk of the affiliates' output is sold in the host country. These are important details as Markusen also reports that empirical literature shows that the proportion of output that is shipped back to the home country is associated with endowment and income differences.

Other regularities listed by Markusen are that high volumes of outward direct investments are positively related to a country's endowment of skilled labour and insignificantly or negatively related to its physical capital endowment. Further, there is little evidence that direct investment is primarily motivated by trade barrier avoidance; trade barriers discourage both the level of trade and investment. Yet, trade barriers and transport costs do cause a substitution effect toward direct investment as it is noted that the share of foreign affiliate sales in the sum of total exports and affiliate sales is positively related to trade barriers and transport costs (see Brainard, 1993b). There is mixed evidence that FDI is motivated by tax avoidance and/or risk diversification. Further, Markusen claims that infrastructure, skill levels, a minimum threshold level of per capita income and agglomeration effects all seem to be very important determinants of direct investment. With regard to firm and industry characteristics Markusen documents that MNEs are associated with high ratios of R&D relative to sales and that MNEs are important in industries in which intangible, firm-specific assets ('knowledge capital') are important. Further, multinationals tend to be concentrated in technologically advanced sectors, supplying goods with a high degree of product differentiation.

The empirical regularities found largely through informal analyses have encouraged economists to look for a theoretical, explanatory framework. Intuitively, reasons for FDI could be found in country differences, but industry and firm features may be important as well. Some of the major theoretical approaches developed to explain the existence of multinationals and the impact of their existence on trade flows and patterns are reviewed in section 6.3.

\textsuperscript{51} Also Caves (1996) reports much of the empirical observations.

\textsuperscript{52} This is confirmed by Lipsey (1999), who reports that six of the top ten exporters of direct investment capital were also among the top ten recipients and two of the other top recipients ranked just below the top ten as exporters. Lipsey found that direct investment is more concentrated among source countries than among recipient countries: the top ten exporters of direct investment capital accounted for over 90\% of the world total in 1989-1993 while the top ten recipients accounted for less than three quarters of reported inflows. Further, the exporter group was a little more stable: eight out of the ten largest exporters of direct investment capital in 1969-73 were also in the group in 1989-93, while only six of the ten largest importers were still among the ten largest importers in 1989-93.
6.3 Theories of trade and FDI

There is a vast body of literature on multinational enterprises, written from different perspectives. We distinguish between approaches that are mainly focused on the explanation of the existence of MNEs and approaches, which attempt to integrate multinational firms into general-equilibrium trade models in order to determine the effects of MNEs on trade.

6.3.1 Determinants of MNEs: microeconomics

Theories focusing on the determinants of MNEs and the motivations of direct investments abroad try to identify the main reasons for a firm's decision to produce internationally and its choice of location. In his review of economic and behavioural explanations of MNEs and their activities, Dunning (1977 and 1993) identifies three main theoretical streams of thought put forward in the 1960s and 1970s. The first stems from a group of scholars who have taken a macroeconomic trade perspective to MNE activities and have concerned themselves with the reason why countries engage in FDI. MacDougall and Kojima are important representatives of this group. The work by MacDougall (1960) essentially focuses on welfare effects of unconstrained capital movements between countries (that are largely assessed to be positive for both countries) rather than on the determinants of FDI. Kojima's theory of FDI can be viewed as an extension of the neo-classical theory of factor endowments (Kojima, 1982). Kojima seeks to explain trade in intermediate products, notably technology managerial skills. Kojima argues that outward FDI is undertaken by those firms that produce intermediate products requiring resources and capabilities in which the home country has a comparative advantage, in order to produce those commodities in host countries in which the investing country has a comparative disadvantage. Inward FDI will take place if the reverse conditions regarding comparative advantage apply.

A second group, more interested in the behaviour of the individual firm, derives its approaches from modern transaction costs theory and from organisational theory. These analysts (e.g. Buckley and Casson, 1976; Rugman, 1981) look at MNEs as an organisational hierarchy which internalises the market for cross-border intermediate products. Firms consider investments in foreign production in order to overcome market imperfections, like information asymmetries and buyer uncertainty. The firm chooses the modality of direct investment as it lowers the transaction costs for the firm more than other forms of servicing markets.

The third group, which is actually closely related to the second group, addresses the questions why firms of one nationality are better able to penetrate foreign markets than local firms and why firms want to control value-added activities outside their national boundaries. According to Hymer (1960, 1976) - an early representative of this stream - this is because foreign enterprises have oligopolistic power in host country markets, as there are firm-specific attributes such as product technology, management skills and economies of scale. Comparative advantage and factors such as transport costs and other trade distortions explain the location of production. This group mainly draws on industrial organisation theory. Dunning combines these three approaches in his eclectic OLI-paradigm. His conceptual
framework is generally accepted and is much relied on in analyses explaining the existence of MNEs and their activities.

Following Dunning (1993), FDI takes place when three sets of advantages exist simultaneously: ownership-specific (O) advantages, location-specific (L) advantages and internalisation incentive (I) advantages. The ownership advantages reflect the 'why' of MNE activity. O refers to firm competencies which may be technological (patents, R&D expertise), marketing (expertise in distribution) or managerial (expertise in exploiting oligopolistic markets). The location advantages determine the 'where' of production, referring to advantages making the foreign location more attractive for production than the home base (e.g. cheaper labour, lower taxes, proximity to market). The coincidence of O and L could lead to licensing, franchising or strategic alliances. Only if I advantages are also present, direct investment in foreign production is preferred. So, given O and L advantages, the internalisation advantages eventually lead to the involvement of a firm in international production. Internalisation advantages refer to avoiding costs (of negotiations, of broken contracts) or risks (buyer uncertainty, product quality), meaning that by foreign production transaction costs are lowered with respect to any other modality to enter the foreign market.

Consequently, Dunning's OLI-paradigm may be considered as a mixture of elements from (neo-classical) trade theory and industrial organisation theory. The neo-classical theory of international trade assumes capital flows between countries in response to rate of return differences (as countries are assumed to be different in terms of relative factor endowments) with a positive welfare effect for both countries. Trade theory, therefore, concentrates on the 'where'-question (i.e. location of FDI). Industrial organisation theory assumes that foreign firms have an oligopoly power in host country markets with unique firm-specific attributes such as product technology, management skills and economies of scale. Its focus is mainly on the question why FDI occurs, under what circumstances with respect to firm-specific attributes. The eclectic paradigm resorts to the modality of economic organisation in order to explain the 'how' of the involvement of the firm in foreign production. The OLI paradigm is summarised by Dunning as follows: “At a given moment in time, the more a country's enterprises - relative to those of another - possess O advantages, the greater the incentive they have to internalize rather than to externalize their use, the more they find it in their interest to exploit them from a foreign location, then the more they are likely to engage in outbound production. By the same token, a country is likely to attract foreign MNEs when reverse conditions apply” (Dunning, 1993: 80).

The OLI paradigm is a useful taxonomy in explaining the existence of multinationals. However, the framework has often been criticised as lacking theoretical rigour. This criticism has been extended to empirical work on FDI that is based on the OLI framework. Typically, this work is mainly by means of case studies, focusing on individual firms rather than on explaining patterns of direct investment in relation to country or industry characteristics. Further, examining OLI advantages may be useful in explaining the existence of MNEs but the framework does not explicitly dig into the question of the consequences of FDI and, therefore, falls short in helping to answer the question on the impact of FDI on trade. Typically, following the OLI approach trade and FDI are substitutes. A firm, which owns a specific asset,
chooses between exporting the product directly, licensing the product or production process to a foreign firm, or establishing a production facility in the foreign market to sell the product directly. The way in which this framework is set out, trade and FDI are seen as alternatives.

6.3.2 Effects of MNEs on trade: the macroeconomic framework

6.3.2.1 Some introductory remarks

The decision to produce in a foreign country may affect trade flows between the exporter of direct capital and the recipient country. How FDI affects trade, is difficult to say *a priori*. A few examples, taken from Traill (1997) may illustrate that the relation between trade and FDI is a complex one. First, suppose a firm finds that the market, which it previously supplied through exports, has reached sufficient size that it could be less expensively supplied through local production. In that case, exports and FDI are substitutes. Next, suppose a multinational firm decides to make a direct investment in another country because it thinks it can be profitable based on ownership advantages. When exports from its home country are unaffected, FDI and exports are independent. FDI may also positively affect exports, for instance in the case a firm invests in a foreign country to gain access to the distribution channels for its own products. And finally, suppose a firm that rationalises production by investing in a foreign country and supplying the home country from that foreign country. In that case, FDI may not only lower exports; it may even result in imports.

These examples show that the real issue is whether the output of (foreign) affiliates created through FDI and trade substitute or complement each other. However, in practice sales by foreign affiliates are difficult to trace as they are not registered in public statistics (except for US-firms). Therefore, theoretical models specify equations for direct investment abroad (an input) and trade in final output to estimate the relationship between the two by assuming that FDI is a surrogate for foreign affiliate output.

These examples illustrate possible consequences of FDI on trade: exports and FDI may be complementary, substitutionary or even independent of one another. It may be clear that the consequences depend on motives for FDI. Broadly speaking there are three kinds of motivations for FDI to be distinguished: resource seeking, local market seeking and efficiency seeking (see figure 6.1). Obviously, these motivations are strongly related to host country and firm characteristics. Following the insights developed by new trade theorists, models have been developed that focus on the effects of FDI inflows on international trade and economic growth, explicitly taking country, industry and firm features into account. Most of these models employ aspects of industrial organisation specifically emphasising the role of product differentiation and returns to scale. However, interestingly the recent theoretical developments in this field have also drawn on aspects of the OLI framework in modelling the characteristics of multinational firms. Seminal
Figure 6.1 Economic determinants of inward-FDI

<table>
<thead>
<tr>
<th>Type of FDI classified by motives of MNEs</th>
<th>Main economic determinants in host countries</th>
</tr>
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<tbody>
<tr>
<td>Market-seeking</td>
<td>• Market size and per capita income</td>
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<td></td>
<td>• Market growth</td>
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<td></td>
<td>• Access to regional and global markets</td>
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<td></td>
<td>• Country-specific consumer preferences</td>
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<td></td>
<td>• Structure of markets</td>
</tr>
<tr>
<td>Resource/asset-seeking</td>
<td>• Raw materials</td>
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<td></td>
<td>• Low-cost unskilled labour</td>
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<tr>
<td></td>
<td>• Skilled labour</td>
</tr>
<tr>
<td></td>
<td>• Technological, innovatory and other</td>
</tr>
<tr>
<td></td>
<td>created assets (e.g. brand names)</td>
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<tr>
<td></td>
<td>included and embodied in individuals,</td>
</tr>
<tr>
<td></td>
<td>firms and clusters</td>
</tr>
<tr>
<td></td>
<td>• Physical infrastructure</td>
</tr>
<tr>
<td>Efficiency-seeking</td>
<td>• Cost of resources and assets listed</td>
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<td></td>
<td>under B, adjusted for productivity</td>
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<tr>
<td></td>
<td>for labour resources</td>
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<tr>
<td></td>
<td>• Other input costs (transport,</td>
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<td></td>
<td>communication)</td>
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<td></td>
<td>• Membership of a regional integration</td>
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<tr>
<td></td>
<td>agreement conducive to the</td>
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<tr>
<td></td>
<td>establishment of regional corporate</td>
</tr>
<tr>
<td></td>
<td>networks</td>
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</tbody>
</table>


(recent)\(^{53}\) contributions by Helpman and Krugman and a series of papers by Markusen – some single-authored, some co-authored - are briefly reviewed below.

\(^{53}\) Mundell (1957) was one of the pioneers in this field. He spelled out the tendency for trade and FDI to be substitutes in traditional trade theory. If, in the context of the Heckscher-Ohlin factor endowment model, the assumption of factor immobility between countries is relaxed, the movement of capital can substitute for trade. Capital moves to a country in which it is initially scarce, and accordingly in which real interests are high prior to trade or investments. The movement of capital replaces the movement of goods produced by capital-intensive means. However, it can be shown that a complementary relationship between trade and FDI can arise once trade is not based on different factor endowments (only) but (also) on other factors such as differences in technology among countries (e.g. Markusen 1983). The latter insights are a further development in the most recent contributions discussed in the main text.
6.3.2.2 The relation between trade and FDI according to Helpman and Krugman

Based on empirical studies of the incidence of multinationality, Helpman and Krugman (1985:225-259) build a theory of MNEs on two major premises. First, some industries are characterised by product differentiation and scale economies. Second, there are inputs such as management, marketing and product-specific R&D that are highly specialised and that can be located in one country and serve product lines in another country. The latter captures ownership features associated with Dunning's OLI paradigm that introduces a public good element into this framework: ownership characteristics (skills, patents, etc.) may be applied to many plants without diminishing returns.

In their general equilibrium model with monopolistic competition in (horizontally) differentiated goods, Helpman and Krugman separate headquarter activities such as R&D from production. Firms maximise profits and, therefore, make cost-minimising choices in the location of production lines. Multinationals are assumed to emerge in response to factor rewards tendering differing across countries. Other sources of pressure on relative factor rewards – such as transport costs, tariffs, tax advantages - are neglected. Further, it is assumed that headquarter activities are the most capital-intensive, that plant activities in the manufacturing sector are of intermediate capital-intensity (producing differentiated products) and that food production is the least capital-intensive (i.e. the food industry is relatively labour-intensive and the product is homogeneous). Manufacturers require inputs of labour, capital and headquarter services (R&D), while food is produced by means of labour and capital only.

Helpman and Krugman demonstrate that firms will go international when countries differ in relative factor endowments in such a way that it is impossible to reach a trade equilibrium with factor price equalisation under the condition that the firms employ all labour and capital in a single location. This situation is illustrated by point E in figure 6.2 (Please refer to the text box going with figure 6.2 for a step-by-step explanation of that figure. This figure is the same as figure 12.3 in Helpman and Krugman, 1985:236). The capital-rich (home) country can only ensure full employment.

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54 Helpman and Krugman refer to Caves’ first edition of Multinational Enterprise and Economic Analysis released in 1982 as the main source for their empirical base.
Figure 6.2 Endowment allocation, multinationals and the pattern of trade

MNEs develop whenever the endowment allocation (E) lies outside the parallelogram OQO*Q', and they bring about factor price equalisation in the shaded areas ODQ and O*D'Q'. The endowment point E results in the following employment structure: OE_h represents headquarter services in Home, E_m represents plant employment in differentiated products in Home, E_em is the vector of plant employment of differentiated products by the home MNE in the foreign country. Q_em represents the plant employment in the differentiated products by the foreign based firm and Q*O is the employment in the food sector. Trade volumes and patterns are determined by obtaining C by drawing BB' whose slope is \(-\frac{w_l}{w_k}\). Home is a net exporter of differentiated products if \(P_x > C_x\) and this is the case under E. If E’ moves up to the left, home becomes a net importer of differentiated products.

for all its inputs if its firms can locate headquarter activities in the parent country and (part of) production activities in the other country. These moves will reduce the demand for labour in the home country and increase demand for labour in the foreign country, whilst increasing the demand for capital in the home country and reducing it in the foreign country (assuming that capital and labour can move freely between countries). An equilibrium is attained either when factor prices are equalised or when the home country becomes the parent of all corporations (with unequal factor prices, all headquarter activities are located in the capital-abundant country).
Helpman and Krugman show that in case of asymmetry in relative endowments, firms from the country relatively well endowed with capital become multinational, generate intra-firm trade in headquarter services and intermediate products, and therefore increase exports. Their model indicates the existence of a complementary relation between trade and FDI. Home-country operations of a multinational firm can be vertically linked with host-country operations in such a way that increased activities of the latter generate an increased demand for intermediate goods from the former. This is called vertical FDI as the MNE sources out certain activities of the firm to a subsidiary in another country benefiting from differences in factor rewards.

The emergence of vertical MNEs significantly changes the relation between differences in relative factor endowments and the share of IIT. In the absence of MNEs, both are negatively associated (see Helpman and Krugman, 1985:168-178). However, when differences in relative factor endowments are large enough to bring the emergence of MNEs about, this association turns positive, as long as the capital-rich country (the homebase of the multinational) is a net exporter of manufactures. When differences in the composition of factor endowments become large enough for the capital-rich country to become a net importer of manufactures (concentrating a large part of its resources on headquarter services), the negative association between factor dispersion and the share of IIT is restored. This pattern requires the capital-rich country to be sufficiently small (i.e, point C, determined as the country’s share in world income, should not be drawn too far into the north-east corner of the box), and this is the main way in where relative size affects these results (Helpman and Krugman, 1985:243).

Further, from the analysis emerges that, given a relative country size, the share of intra-firm trade is larger, when differences in relative factor endowments are larger. However, in the presence of MNEs no clear-cut relationship exists between the share of IIT and differences in relative factor endowments. Thus, the relationship that is quite strong in the absence of MNEs is weaker in their presence. This supports the hypothesis that the larger the involvement of multinational corporations in the world economy, the weaker the impact of changes in the degree of dispersion in income per capita on the share of intra-industry trade (Helpman and Krugman, 1985:244).

The model developed by Helpman and Krugman indicates that MNEs, and thus high volumes of FDI, are positively associated with differences among countries in terms of relative factor endowments and per capita incomes (and result in increased exports from the home to the host country). However, this seems to be a contradiction to the fact that most investment flows are among developed countries, which are, generally speaking, quite similar in endowments and per capita income. This contradiction may be due to the fact that the model by Helpman and Krugman concentrates on differences in relative factor endowments as a determinant of FDI, which is probably mainly resource-based foreign direct investment. In later work, Krugman evaluates the integrated economy approach as an unsatisfactorily and incomplete tool to model MNEs, as “direct investment goes only one direction, reflecting comparative advantage, while in reality FDI is like trade in manufactured goods: it mostly takes place among similar countries and often reflects two-way flows within the same industry” (1995:1260). Therefore, Krugman points at “an alternative
view [to the one in which firms operate in different countries for reasons of comparative advantages which is] that firms go multinational in order to improve their access to markets – in order to avoid transport costs or other barriers to trade in their products” (1995:1265). Recent work primarily done by Markusen and some co-authors addressed this issue.

### 6.3.2.3 Theoretical contributions by Markusen and others

In order to understand the interaction between MNEs and trade, Markusen (1995; 1998a, Markusen and Venables, 1998; Markusen and Maskus, 1999) developed a framework that connects the OLI paradigm approach with firm and country characteristics. In this framework a firm’s decision to go multinational reflects a trade-off between the loss of economies of scale associated with multiple plants and the reduction in transport costs it can achieve by producing locally for each market (*i.e.* a trade-off between scale and proximity). Markusen *et al.* continue to build on elements put forward in models developed by Brainard (1993) and Horstmann and Markusen (1992). Those earlier contributions contain three key elements: 1) firm-level activities (like R&D) that are joint inputs across plants (firm-level scale economies); 2) plant-level scale economies; and 3) trade (tariff or transport) costs between countries. In those models, horizontal multinationals arise endogenously and two-way investment may occur. Multinationals emerge in equilibrium when firm-specific fixed costs (firm-level scale economies) and trade cost are large relative to plant-specific fixed costs (plant-level scale economies). Multinationals are then more likely to exist when countries are large (both papers) and when countries have similar relative factor endowments (following Brainard). These results appear to fit reasonable well with some of the empirical evidence regarding firm and industry characteristics dominated by multinationals (see section 6.2). For instance, in the real world, multinationals are important in industries in which intangible, firm-specific assets are essential. These assets can generally be characterised as ‘knowledge capital’, ranging from proprietary product or process know-how to reputations and trademarks.

In the ‘knowledge-capital’ model of multinationals, ownership advantages (like R&D) play an important role as they can be spread between plants without leading to diminishing returns. There are also location decisions of production activities. The vertical multinational will locate activities where the factor used most intensively in the production process is relatively cheap. For horizontal multinationals, trade costs are the major determinant in location decisions: the higher the trade costs, the more horizontal FDI.\(^{55}\) Note, however, that high trade costs negatively affect vertical FDI since these firms are essentially outsourcing their production for import back to the parent country.\(^{56}\)

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\(^{55}\) The size of the host country market is a second source of location advantage. Should that market be fairly small, it will not pay for a firm to establish a local production facility but it will service that market by exports instead.

\(^{56}\) This approach has less in common with Helpman and Krugman who focus on the geographical separation of the headquarters and exclude multi-plant production due to the assumption of zero trade costs.
Markusen and Venables (1998) seek to understand the interplay between country characteristics and different forms of FDI. Their model explicitly solves for the equilibrium ‘regime’ as a function of both technology and country characteristics, where the term regime denotes the types of firms active in equilibrium. Markusen and Venables also analyse how technology and country characteristics affect trade volumes and welfare. The following paragraphs of this section briefly summarise the main features of their model.57

The model
Their simple general equilibrium model contains two countries (H and F) producing two homogeneous goods (X and Y), using skilled and unskilled labour (S and L, respectively) as production means. Y is produced under constant returns to scale, being intensive in L, and X is produced with increasing returns to scale, being intensive in S. The model assumes three types of firms. Type-\( m \) is a multinational with plants in both countries and headquarters in the home country. Type-\( v \) is a vertical multinational firm with headquarter services in one country only and with all production activities taking place in another. A type-\( n \) is a national firm that retains both headquarter and production facilities in the same country.

Importantly, factor intensities will vary across the firms' activities. Headquarter services are assumed to be most skill-intensive and production is relatively less skill-intensive. The integrated firm involving both headquarters and production facilities lies between the two in terms of skill intensities. In terms of factor intensities of the firms, type-\( m \) firms are more skill-intensive than type-\( v \) or -\( n \) firms assuming that type-\( m \) firms require additional management or technicians for branch plant operations, whereas type-\( v \) and -\( n \) firms need only unskilled labour for serving other countries through exports.

The model simulates the relation between the existence of these three types of firms on the one hand, and the differences between countries in terms of size and factor endowments on the other. Markusen (1998a) illustrates the outcome graphically using an Edgeworth Box with world endowments of skilled and unskilled labour being represented by the dimensions of the box58. Skilled labour is represented on the vertical axis and unskilled labour is represented on the horizontal axis (see figure 6.3). OH (OF) gives the origin for the home (foreign) country in the south-west (north-east) corner of the box. The diagonal that would stretch from these two points represents similarity of countries' relative factor endowments although countries may differ in size at any point other than the centre. The diagonal from the north-west to the south-east of the box represents the possibility that countries have the same income but differ in factor endowments. Given the solution procedure of the model, various ‘regime’ possibilities linked to country size, relative endowments and trade costs can be identified.

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57 This summary draws, of course, heavily on single- and co-authored articles written by Markusen, but also benefits from the explanation and interpretation of Markusen’s work by McCorriston (1999).
58 As this is a two-country model, any point in the box thus represents a division of the total world endowment between the two countries.
In the centre of the diagram, countries are relatively similar in both market size and relative factor endowments of skilled and unskilled labour. In this case only type-m firms will occur, i.e. only horizontal multinationals characterise this situation. Since in this scenario, trade costs are assumed to be high, firms circumvent these trade costs by establishing branch-plants in other countries. Similar countries interact through direct investment with type-m firms from both countries invading each other’s markets in what may be called intra-industry direct investment. There is no scope for vertical multinationals as the ‘world’ in this case is characterised by identical factor endowments, not differences, in such a way that there is no scope for firms to source production in a more unskilled-labour-abundant country.

However, in the north-west and south-east corners of the diagram, the regime switches to one characterised by vertical multinationals (type-v firms) only. Here factor prices are sufficiently different to encourage firms to source production in the relatively unskilled-labour-abundant country, while locating their headquarters in the skilled-labour-abundant country. Since m-firms require both skilled and unskilled labour in each country, no horizontal FDI arises in this case. The other definitive regime occurs in the south-west and north-east regions. Here, market size plays a prominent role. Take, for example, the north-east region. Although countries have the same relative endowments, country H is sufficiently large (with respect to country F) such that all headquarter and production facilities are concentrated in one country. Even though trade costs are high, it is not worthwhile for the firm from country H to establish a plant overseas as the size of the foreign market is too small given the
existence of fixed costs of running a plant overseas. Therefore, type-\(n\) firms dominate the regime.

Outside these clearly delineated regions, a complicated mixed regime arises. Markusen (1998a) does not examine those areas in detail. Yet, he points at the area below the north-west corner where country H is skilled-labour abundant but small relative to country F. This might be relevant to countries such as Sweden, Switzerland and the Netherlands. In this region, type-\(v_H\) firms are the dominant type of multinationals, but there are also significant numbers of type-\(n_F\) firms by virtue of the large size of country F. Headquarters of firms tend to be concentrated in country H, but due to the difference in market size, plants tend to be concentrated in F. This type of fragmentation, which has been of some concern in the smaller, skilled-labour-abundant countries just mentioned, is “nicely captured by the model” (Markusen 1998a: 743-744).

The main attractive feature of the knowledge-capital model is that it highlights the interplay between factors that determine the pattern of FDI. Take for instance the issue of country size again. Starting at the north-east corner, type \(n_H\)-firms will dominate, but further down the diagonal horizontal FDI occurs as countries become similar in size. However, \(m\)-firms disappear as country F becomes the larger of the two. There are two things to note. First, the model would at least superficially appear to fit the facts with horizontal FDI co-existing with vertical FDI though with each driven by different factors. Second, in terms of what the theory tells us, it is not just similarity of resource endowments that matters but the interplay between resource endowment similarities and country size. Relative endowments may be similar but (horizontal) multinationals will only exist if countries are not too dissimilar in size.

In interpreting the interplay between factors, the role of trade costs is important. When trade costs are assumed to be high, this contributes to firms locating in other countries (see figure 6.3). If trade costs are low or zero, the most obvious difference is that horizontal FDI disappears (see figure 6.4).\(^{59}\) With no trade costs to circumvent, the role of fixed costs dominates with national firms now basing production in one (national) plant and serving foreign markets through exports. Since, given plant-level scale economies, no firm will build a second plant when trade is without any cost. As factor prices are equalised in this region, there is no motive for type-v firms to enter. Yet, in the north-west and south-east corners, vertical multinationals still exist as they are primarily driven by differences in factor endowments. Indeed, zero trade costs may reinforce the existence of vertical multinationals as the out-sourced product can be imported at zero cost back to the parent country.

\(^{59}\) Note that this scenario is similar to the one assumed in the Helpman-Krugman model.
Trade implications
What, then, are the implications for trade? Figure 6.5 characterises the pattern of trade for a moderate-high trade-cost scenario. The most important conceptual point is that there are two determinants regarding the direction of trade. The first one is the relative factor endowments with the skilled-labour-abundant country having the advantage in $X$ (being the skilled-labour intensive product). The other is country size, due to scale economies at plant level, with the larger country having an advantage in producing $X$ (produced with increasing returns to scale). When a country is both large and skilled-labour abundant, these two determinants of comparative advantage work in the same direction. Thus, in the north-east corner, country $H$ exports $X$ though if there was a relative abundance of skilled labour in country $F$, it would import headquarter services (see figure 6.5). The opposite outcome occurs from country $F$ in the western region of the diagram. When countries have similar factor endowments and are similar in size, FDI replaces trade in the skill-intensive product. As seen from the figure, no trade in $X$ occurs around the central region. These patterns are roughly consistent with informal observations. FDI has grown much faster compared to trade between countries that are similar. Moreover, vertical multinationals and outsourcing are increasingly important between countries that are dissimilar in terms of factor endowments.
Summarised, the model projects that on the assumption of high trade costs, horizontal MNEs/FDI occurs when countries are similar in terms of factor endowments and size. Then, FDI substitutes for trade and FDI is of an intra-industry nature. If countries differ in relative factor endowments (but are rather similar in size), vertical MNEs/FDI occurs with the abundant factor being exported based on a comparative advantage. On the assumption of low or zero trade costs, no (horizontal) MNEs/FDI occurs when countries are similar in factor endowments (whether countries are identical in size or not; thus, country size is no longer an advantage when trade costs are zero). Trade is the result of scale economics and is of an intra-industry nature, with the skilled-labour abundant country being the net exporter of X (figure 6.6). If countries are dissimilar in terms of factor endowments (but similar in size), vertical MNEs/FDI occurs and trade is based on comparative advantage. As long as the relative endowment differences are not large, country H exports both X and headquarters services to country F. The pattern of goods reverses itself when relative endowment differences are very large. Above the south-west/north-east diagonal, headquarters services tend to concentrate in country H and production of X in country F. This relation is also being summarised in table 6.1.
Markusen’s model predicts a non-monotonic relationship between intra-industry trade volumes and size differences. Starting off with countries that are initially very different in size/income (south-west or north-east corner of the diagram), a convergence in country characteristics at first leads to an increase in the volume of intra-industry trade. Then, moving to the centre of the diagram, a reduction in intra-industry trade volumes occurs as MNEs begin to replace national enterprises. However, the sum of the trade volume and the affiliate sales volume continues to rise as countries converge. Similar results are found when countries differ in relative endowments or in technologies (Markusen, 1998a).

Finally, Markusen and Venables analyse welfare and compare the results to those generated by a (national enterprise) model in which MNEs are excluded. In general, as the result of the introduction of MNEs welfare of both countries increases when they are initially relatively similar in size, endowments and technology, and when transport costs are relatively large. However, when the differences are initially large and transport costs are relatively low, the introduction of MNEs slightly reduces the welfare of the large, well-endowed and/or more productive country, and increases the welfare of the small, poorly endowed, and/or less productive country. In a long-standing debate, the model thus supports the side, which suggests that MNEs are a vehicle for transferring economic benefits from large richer nations to the poorer nations.
Table 6.1 Link between trade costs scenarios, FDI and trade

<table>
<thead>
<tr>
<th>Assumptions at the ‘High trade costs’ scenario</th>
<th>Type of FDI</th>
<th>Relation between FDI and trade</th>
<th>Composition of trade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Countries similar in factor endowments and size</td>
<td>Horizontal FDI (type m-firms)</td>
<td>FDI substitutes exports (intra-industry FDI)</td>
<td>Intra-industry trade disappears when FDI comes in</td>
</tr>
<tr>
<td>Countries differ in factor endowments but are similar in size</td>
<td>Vertical FDI (type v-firms)</td>
<td>FDI complements exports</td>
<td>Inter-industry trade</td>
</tr>
<tr>
<td>Countries differ in factor endowments and size</td>
<td>Vertical FDI (type v-firms)</td>
<td>FDI complements trade</td>
<td>Inter-industry trade</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assumptions at the ‘Low trade costs’ scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Countries similar in factor endowments and size (or dissimilar in size)</td>
</tr>
<tr>
<td>Countries differ in factor endowments and similar in size</td>
</tr>
</tbody>
</table>

The ‘reciprocal FDI dumping’ model by Baldwin and Ottaviano
The Markusen knowledge-capital model suggests that, when countries are rather similar in size and factor endowments, trade and FDI are substitutes whereby under high trade costs we should expect intra-industry FDI, and under low trade costs we should expect intra-industry trade. However, data on trade and foreign investment suggest that between similar countries, both intra-industry trade and intra-industry FDI are observed (see section 6.2). Baldwin and Ottavia (2001)\textsuperscript{60} tried to rationalise the observation that intra-industry trade and foreign investment may go together by relaxing the assumption that MNEs produce only one good. The authors illustrate their case by referring, among others, to an example from the food sector with Nestlé producing Buitoni-brand frozen pizzas in France and Buitoni-brand pasta in Italy, selling both products in both markets, as well as ‘re-importing’ both products to the home country (\textit{i.e.} Switzerland). The two authors explain FDI along similar lines as the Brander and Krugman-model of reciprocal-dumping. Similar to that trade model, imperfect competition is at the heart of explaining two-way FDI. Profit maximising firms operate at the point where perceived marginal revenue equals marginal cost.

\textsuperscript{60} Earlier work of both authors on this issue has been distributed as NBER Working Paper 6483, March 1998.
With imperfect competition, perceived marginal revenue has two components: price (direct gain from an extra sale) and revenue-depressing effect (level of sales times price-lowering impact of an extra sale). In markets where the firm has few sales and a low market share, the revenue-depressing effect is negligible, so firms find it best to accept a lower price-marginal cost mark-up. Applying this to a trading world with segmented markets, firms accept a lower producer price on their exports since export sales entail a diminished revenue-depressing effect. In what way can this explain FDI?

Baldwin and Ottaviano characterise multinationals as multi-product firms that produce each variety in a single plant. The decision of how many varieties to produce faces a trade-off between a direct effect and the revenue-depressing effect. The latter is called the ‘cannibalisation’ effect due to the way each new variety eats into the sales of the firm’s existing varieties. A firm accepts a lower rate of return on new varieties produced abroad, when producing the variety abroad reduces the cannibalisation effect. Placing a factory abroad does have a trade enhancing effect (in the form of re-imports) in addition to the usual trade displacing effect (displacement of exports with local sales of foreign affiliates). Baldin and Ottaviano argue that the latter is stronger than the former: FDI does displace some trade but not all. As a consequence, intra-industry trade and intra-industry investments go hand-in-hand.

6.4 The application of integrated trade and FDI theories in empirical investigations

6.4.1 Empirical testability of the theory and data availability

From the theory of multinationals it could be learned that many factors influence the pattern of FDI of a company. The previous section showed that Markusen’s model of integrating FDI and trade builds on the industrial organisation approach. This approach assumes that factors relevant to FDI are differences/similarities between countries in skilled labour endowments, market size, and transport costs. Yet, given the fact that the interaction of OLI advantages determines the relation between trade and FDI, such an abstraction may easily oversimplify the complexity of the real world, since ownership and internalisation advantages directly refer to firm specific attributes. The approach of Baldwin and Ottaviano also looks at the importance of firm specific features, suggesting that in a ‘country differences’ approach one would miss the point. However, testing approaches like the Baldwin-Ottaviano model requires firm-level data, which are difficult if not impossible to obtain. Estimating Markusen’s knowledge-capital model requires country-level data, which are assumed to be easier to obtain than firm-level data. However, next to the issue of the data availability, the above review of Markusen’s theoretical model suggests that the relation between trade and FDI is ambiguous. Indeed, the knowledge-capital model implies that many relationships are non-linear. For example, an increase in the parent country’s GDP level will increase the production by affiliates abroad if the parent country is small, but decreases if the size of the parent country exceeds the size of the host country. This makes it difficult to test hypotheses following from the theory.
In order to examine what would be the best approach serving the purpose of this study, we first review recent attempts to test predictions from theories on the interaction between trade and FDI. Some of these are briefly discussed in the second part of this section. In these empirical studies, two things can be noted, both referring to data. First, many investigations focus on US firms (or markets) and their foreign affiliates. This is a direct result of data availability. US researchers are significantly supported by the data on inbound and outbound FDI and related affiliate sales provided by the US Bureau for Economic Analysis. No comparable data source is available to EU countries. Only since the beginning of the 1990s, Eurostat publishes FDI data but these are available only at a very aggregate level and, therefore, of limited use in analytical research. Secondly, most empirical studies conclude trade and FDI are complementary, whereas, intuitively, substitution effects may occur too. Blonigen (2001) claims that the (too aggregate level of) data used in the analysis may mask identification of substitution effects and exaggerate the complementarity effect. Most empirical studies rely on country- and firm-level data. Blonigen argues that even firm-level data do not allow one to separately identify a substitutionary effect to the extent that the firm is multi-product, which is quite likely given that the companies examined by him are large MNEs. The multi-product nature of the firm means that there may be demand complementarities across a firm's products and/or there may be vertical production relationships across the firm's products. To overcome this problem, Blonigen analysed product-level data from the Japanese automobile industry in the US market, using a unique data set on Japanese production in the US, which was detailed enough to list specific products at plant level. By focusing on a single product, he was convinced that substitution was not masked by the data. He found evidence of both a substitution and a complementarity effect.

Fontagne and Pajot (1997) increased the scope of Blonigen's claim that even at firm-level substitution effects may be masked because most MNEs are multi-product. Using data on industry-level, Fontagne and Pajot found trade and FDI flows are largely complementary in bilateral trade and investment relations of France, the US and Sweden. What is interesting in their study is that the authors characterise sizeable spillovers between industries. Due to subcontracting and procurement practices the potential impact of FDI surpasses the boundaries of the investing sector. For example, French investments in the Brazilian automobile industry may affect the French exports of electric parts to Brazil. The authors’ calculations show that the impact of FDI on trade is much higher when these spillovers between industries are accounted for even if the overall trade surplus remains comparable with the one estimated at the ‘industry of investment’ level. The authors conclude that a large share of the complementarity between trade and FDI at the macroeconomic level can be explained by such spillovers between industries. This result shows the possible impact the level of detail of data used in the analysis may have on the result and the size of the result.

### 6.4.2 Empirical studies with a focus on food industries

A quick scan of the existing empirical literature on agrifood multinationals learns that most researchers in this field have focussed on the determinants of FDI (using [elements from] the OLI-paradigm as mainstay), while few have concentrated their
analysis on the interaction with trade. Connor (1983) was among the first researchers looking for firm-specific features that determine firms in the food processing industry to become a multinational. Using data on US food-manufacturing industries, he documented positive impacts of firm size, advertising outlays, R&D expenditures and home market share on FDI. Overend and Connor (1994) examined factors influencing FDI patterns for a cross-sectional sample of 33 US food manufacturing firms that also do business in the UK. Their findings showed a positive relationship between a firm's investment in foreign marketing expertise and FDI. Similarly, Vaughan (1995) stressed marketing advantages that emanate from FDI. In a study covering 16 countries and using pooled, cross-section time-series data for 628 food manufacturers, Henderson et al. (1996a) found intangible assets, product differentiation, firm size and home market share positively associated with FDI.

Ning and Reed (1995) examined country factors explaining the location of US FDI for a sample of six developed countries from 1983 to 1989. They found cultural linkage and trading blocs membership as major incentives for FDI abroad, followed by a strong home currency, fast foreign market growth, and low foreign income tax rates. Regarding national characteristics, Vleugelers (1991), in a cross-sectional study of FDI patterns in OECD countries, found positive effects on FDI from common borders and similarities in culture, language, stage of economic development, labour costs and trade policies between host and home countries. For processed foods, Handy and Henderson, (1994) showed that a similar set of economically advanced countries (US, Canada, Japan and the countries of the EU) account for nearly all of the world's FDI, both inbound and outbound.

Henderson et al. (1996b) concluded that, looking at the food and agricultural sector as a whole, reasons for the relative importance of FDI to global commerce in processed foods are rather clear. Processed foods are highly differentiated products, the result of considerable effort by food manufacturers, distributors, and food service firms to develop a steady flow of new products and product innovations, and to intensively merchandise these products through advertising and other means of promotion. Global commerce tends to occur primarily among countries that are remarkably similar in overall economic character, yet whose firms have sufficient differences in intellectual property to differentiate their operations and products from those of rival firms in both home and international markets. These conclusions are clearly based on an OLI-type of analysis with emphasis on the ownership advantages of a firm. Furthermore, their arguments support the stylised fact that overall FDI is predominantly among the most developed countries for the food industry as well.

As said, there are only few studies that investigated the impact of FDI on trade in food products. The approach has been mainly to examine the correlation between FDI (or foreign affiliate sales) and exports. So far, empirical investigations have provided mixed results. Based on a survey of exports and FDI operations by 32 US-multinationals in the period 1988-1994, Henderson et al. concluded that ‘data fail to show a decline in exports coincident with an increase in foreign affiliate sales’ (1996b:112). Using data based on a sample of 34 food processing companies, Reed and Ning (1996), however, found that exports and FDI were substitutes. Their results were consistent with the relatively small amount of trade in intermediate food products and the view that most FDI by US food firms is horizontal in nature.
Overend et al. (1997), in exploring the relationship between trade and FDI for six food manufacturing firms, found three disparate patterns among firms, suggesting that the export-FDI link is ambiguous. Malanowski, Handy and Henderson (1997) found a negative correlation between affiliate foreign sales and US exports for developed countries and a positive correlation for developing countries. Lastly, Bolling et al. (1998) investigated the US bilateral relations with Canada, Mexico, Argentina and Brazil. They found evidence that, for the 1990s, trade and FDI are complementary means of accessing international food markets. The authors attribute this mainly to the types of foods available in Western Hemisphere countries. Some are too expensive to ship and thus lend themselves primarily to local production and consumption (dairy products, pet foods, soft drinks, etc.). The authors claim that US outward FDI in Western Hemisphere countries has been encouraged by liberalisation of laws on foreign investments, income growth, increased political stability in the region, and the establishment of the free trade area under NAFTA and the trade arrangement under Mercosur.

Several studies have researched the impact of exchange rate differences between countries on FDI flows, and subsequently on trade. In two recent papers, Gopinath, Pick and Vasavada (1998; 1999) find a substitution relationship between US agrifood FDI and exports in a study covering 10 developed countries for the years 1982-1995. According to the authors, this negative relationship between exports and foreign sales is due to exchange rate movements. The argument is that a strengthening of the US dollar makes US processed food exports more expensive, but that these adverse effects are accompanied by a rise in foreign affiliate sales by US-owned MNEs whose local price is unaffected by exchange rates. At the same time, the appreciation of the dollar increases the wealth of the US food processors relative to foreigners and allows them to bid aggressively for foreign assets through FDI. Further, the authors found that volatility in real exchange rate has a negative effect on both outward FDI and foreign sales. In a similar study, McCorriston and Sheldon (1998) compare their food industry results with results for several manufacturing industries. Although their aggregate results support the expectation that real effective exchange rates negatively affect FDI and relative wealth (through stock prices) has a positive influence on FDI, the authors did not find similar results for the food industry. They attributed this result to not further specified industry specific factors or data inadequacy. Pompelli (1998) pointed at the need to address the impact of exchange rate volatility on investment. An unstable exchange rate makes it difficult to calculate future revenues of a foreign investment and is therefore of greater concern than the exchange rate level (high or low). Further, Pompelli questions what impact changes in exchange rates may have on investment if such an investment requires intermediate products and results in exported goods. This question has not yet been addressed empirically.

Gopinath et al. also found that agricultural protection (approximated by the PSE measure) positively affects foreign production and negatively affects exports. This indicates that high trade barriers – frequently used in international agricultural

61 These four countries account for 90% of the total (USD 11 billion) of US food companies’ FDI in the Western Hemisphere.
trade - could be an important motivation for FDI (tariff-jumping). However, important in this respect is that trade policy may influence FDI in competing ways. On the one hand, import barriers would tend to promote import-substituting FDI while trade liberalisation would tend to discourage it and, instead, create incentives for market and/or efficiency seeking FDI. Therefore, in the context of regional integration, the impact of trade liberalisation on FDI depends on the balancing out of these competing effects (see also Blomström and Kokko, 1997).

Another important part of the research analysis effects investments (of which FDI is an important part in many countries) have on the general economy using CGE models. These studies have focused on a multiplier effect associated with the transfer of capital from one country to another that eventually leads to increased income that is translated to increased consumer demand and increased trade in the host country. In reporting on the bilateral relationship between the US and Mexico, Bolling et al. (1998) found that US FDI has beneficial effects on the economy of the host country. Processed foods can often be produced in the host country for less than the derived costs of direct export, while at the same time creating jobs, raising the gross domestic product, and producing products that can themselves be exported to earn foreign currency.

In general, the empirical studies of the determinants of FDI have been hampered by the relative scarcity of detailed data on FDI, complexities in measuring a number of the variables that are hypothesised to affect FDI in the various theories, and a lack of a consistent theoretical framework. Studies focusing on FDI flows in the European food industries are scarce, most probable because of a lack of data. This indicates a serious gap in empirical work on FDI and the relationship between FDI and trade. An important share of both trade and FDI is among the EU member states. Furthermore, it may be expected that the future enlargement of the EU with countries in Central and Eastern Europe may increase intra-EU FDI and trade flows. Thus, to evaluate the impact of the future enlargement of the EU towards the east a thorough analysis of the possible impact on trade is required. Furthermore, previous studies did not test a specific model but instead tested hypotheses on causal relationships linked to theoretical assumptions of various industrial organisation approaches and trade theories. So far, there has been little formal testing of hypotheses on the relationship between trade and FDI derived from a consistent theoretical framework. The recently developed models by Markusen and others may offer such a framework.

6.5 Questions addressed and approaches followed in further research

The next stage of this study aims to contribute to the empirical literature on the interaction between trade and FDI by expanding the scope of research in this field
towards European markets. More specifically, the trade-FDI relation of the Dutch agribusiness will be subject to investigation. The approach is a mixture of both macroeconomic and microeconomic analyses, using sector data on FDI and trade next to firm-level information on strategies how to penetrate foreign markets. This approach is justified due to the limited availability of data that is necessary to test theoretical models developed to study the relationship between FDI and trade.

The macroeconomic or country-comparative approach may help us to find empirical support for predictions on the relationship between FDI and trade based on the conceptual framework developed by Markusen et al. First, we investigate trends in FDI flows related to Dutch home-based agriculture and food industries, and address the issue of whether and how FDI systematically correlates with exports/imports. Second, relations between FDI patterns and exports/imports as functions of country characteristics like market size, size differences, and relative endowment differences are investigated empirically.

The description of trends in FDI will be based on data from the Dutch Central Bank (DNB). DNB collects and processes FDI data and presents them in the DNB's Statistical Bulletin (see also Appendix 3). The level of aggregation is rather high, as data are reported separately for both the primary agricultural sector and for the food industries, however, not for further detailed sub-branches (such as dairy industry or beverages). Data on the sales of the Dutch-owned foreign affiliates – the results of FDI - are simply unavailable. To find out about the relation between FDI and trade, bilateral FDI data are accompanied by bilateral trade data from the Eurostat Trade database to examine whether FDI and exports correlate. A negative correlation may suggest that FDI substitutes trade, whereas a positive correlation may indicate that FDI complements trade.

To find evidence to support assumptions about foreign production (FDI) versus exports of Dutch-based agrifood multinationals, several hypotheses on the relation between FDI and country characteristics are tested. According to the knowledge-capital model, important country characteristics are market size, relative factor endowments (skilled-labour abundance), trade barriers and investment costs. Hypotheses about the relations between FDI and the country characteristics are derived from simulations in the literature, mainly referring to Markusen and Maskus (1999) and Carr et al. (2001).

As explained earlier in section 6.4.1, both the explanation of FDI-location decisions and the identification of the nature of FDI ('horizontal' or 'vertical' investments) are affected by the limited availability of relevant data. The absence of detailed data may overshadow the nature or strength of the relationship between FDI and trade that may not be apparent from the more aggregated data. Therefore, there may be a need to clearly understand a company’s arguments for investing abroad and its internationalisation strategy. Therefor, we expand the analysis with case studies in

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62 Since the end of the communist era in Eastern Europe, increasing trade flows between the east and west region of Europe have been observed (e.g. Silvis and Van Bruchem, 2000) as well as growing investments in the CEECs' food industry by West-European multinationals. With respect to the latter, UNCTAD (1999:69-73) presents an overview of the increase of the inward FDI stocks in CEECs and estimates the total inward-FDI stock of the CEECs at around US$ 90 billion in 1998. The share of investors from the EU accounted for almost two-thirds of the total, while the food industry accounts for
chapter 8. Through interviews of a wide range of companies, the Dutch agribusiness is questioned on their strategic decisions with respect to internationalisation and how they put these strategies into practice, either through exports, foreign direct investments, or a combination of both. Further, the interviews will explore whether there is a systematic relation between a foreign country/region and the way firms internationalise. At the same time, they will provide insights into the character of FDI (horizontal/vertical) and other specific features of agrofood multinationals. These interviews will produce qualitative micro-level information on the motivations of FDI and possible trade effects of FDI activities, which may add important qualifications to the findings, based on the quantitative estimates of the Dutch agrifood trade-FDI relation.

11% of all inward stock.
7. FDI in the Dutch Food Industry: Trends and Explanations

7.1 Introduction

This chapter commences with an empirical investigation of trade effects of agrifood FDI. In order to do so, we first present outward and inward-FDI data related to the Dutch food industry. These data will then be used to empirically illustrate the relation between trade and FDI. Further, we apply the knowledge-capital model as developed by Markusen in an effort to explain Dutch agrifood FDI. This chapter concludes by discussing the results of the model, and introducing the next steps in the investigation.

Why do we focus on the Netherlands? The overall Dutch economy has a long tradition in being oriented towards foreign markets. This is illustrated by the ratio of exports and imports in relation to the country’s gross national product. In the Netherlands this indicator is approximately 60%. Like most other sectors in the Dutch economy, the international orientation of the Dutch agribusiness is relatively high, too. This is reflected not only by the high ratio of exports and imports in food products and raw agricultural materials to gross agricultural and food production, but also by the fact that the Netherlands is the home-base for many large multinational food companies. Many Dutch food processing companies own or participate in production locations abroad. Foreign direct investments of the agrifood companies are not restricted to countries in the EU, but are spread all over the world.

Data on FDI show that direct investments abroad by the Dutch food industry have steadily grown over time. Concurrently, inward-coming FDI in the Dutch food industry has grown substantially. This indicates that the Netherlands is considered to be an attractive place for foreign food processing companies to do business. Dutch companies internationalise their businesses abroad whereas at the same time the Netherlands is hosting foreign companies. Given a relatively small (Dutch) domestic market, foreign firms may use a production facility in the Netherlands as a steppingstone for sales in the rest of, say, Northwest-Europe. Consequently, inward FDI may generate exports as well.

Another interesting observation that may be derived from the Dutch agrifood FDI data is that most Dutch FDI (both inward and outward) is with countries in the EU. These countries are also the most important trading partners of the Netherlands. Yet, given the fact that trade barriers between EU countries are relatively low, one would expect companies to have a preference for trade over FDI. It is, therefore, interesting to learn what causes these counterintuitive facts?

This chapter will continue looking at the main trends in the Dutch agrifood FDI flows. After a more descriptive part, we will continue with an empirical analysis of the relation between trade and FDI by estimating an applied version of the ‘knowledge-capital’ model. The empirical investigation is based on macroeconomic figures and sector data. At the end of this chapter, the results of the model are discussed and evaluated, followed by suggestions for further research.
7.2 Trends in Dutch outward-FDI in the food processing industry

Data on FDI show that the amount of foreign direct investments by the Dutch food processing industries expanded from ECU 4.6 billion to Euro 19.9 billion in the period 1984-1998.\textsuperscript{63} This strong increase in the numbers was realised rather unevenly during this period (see figure 7.1). In the mid-1980s, total FDI stocks of Dutch food companies in foreign countries did not grow; some years even showed a decline. Since 1989, stocks have grown steadily over the years. Between 1989 and 1993, FDI expanded strongly and within four years the FDI stock doubled. In the years following, stocks grew relatively slow, whereas annual growth rates were significant again ever since 1996, amounting to 9 percent in 1996, 26 percent in 1997 and 15 percent in 1998.

Figure 7.1 Dutch inward- and outward-FDI in the food industry (billion ECU/Euro), 1984-1998

The most important destination for Dutch investments still is the EU (28% in 1998), although the dominance of the Union was more pronounced in the mid-1980s (see figure 7.2). However, recent growth of outward FDI by the Dutch food industry is mainly due to a strong increase in investments in countries outside the Union, especially in the USA (especially in recent years), the Netherlands Antilles and in

\textsuperscript{63} The availability of FDI data per industry is limited. The Dutch Central Bank (DNB) publishes Dutch inward and outward FDI stock data for the food industry, split up by country and/or region. Data on FDI flows are only available per country, not per industry group. See Appendix 3 for a more elaborated clarification on the availability and interpretation of FDI data.

\textsuperscript{64} The DNB statistics on FDI data have been valued in Euro since 1996. Therefore, we use ECU for numbers before 1996 and Euro for numbers since 1996.
Switzerland. These countries account for 18%, 14% and 14%, respectively, of total FDI by Dutch food industry in 1997/8. Several destinations in central and eastern Europe and other continents as well show a significant increase in Dutch outward-FDI over the past 15 years.

Why would the Netherlands Antilles and Switzerland be so important? Switzerland may be attractive to invest in because of its relatively high income whilst the country has an agricultural tradition. However, would that be an adequate enough reason for a relative large interest of Dutch investors in that country? And what about the Netherlands Antilles? An important reason could be that many companies are registered in and have a bank account in these countries due to fiscal advantages when financial transactions are carried out through bank offices in these countries. The banking sector in both countries is an important pillar of their economies: Switzerland and the Netherlands Antilles are known as major transit countries of world capital flows. The amount of FDI is registered in Swiss or Netherlands Antilles statistics, if banks in these countries are involved in a take-over (e.g. by a Dutch firm) in an other country than these two (e.g. USA). In fact, this may also be the case for other foreign direct investments. This implies that the statistics on FDI stocks of Dutch agribusiness in a certain country would not necessarily represents the Dutch ownership value of the production capacity in that country.

Dutch FDI in the USA has fluctuated heavily over the period considered. In the beginning of the 1980s, the USA used to be a major destination for Dutch FDI, but in the second half of that decade stocks declined steadily. A reason for US investments being less attractive to Dutch firms during that period could be the strong dollar, making investment in the USA expensive from the Dutch perspective. Whilst ever since 1991 Dutch outward FDI stock in the USA has increased, the growth of the stock value has truly accelerated since 1994. During this period, EU countries remain to be an important destination for Dutch FDI, as indicated by a share of 40-45 percent. However, one can observe a slight decline in the share of the EU countries in the 1990s, which has become apparent especially since 1996. Investment in Switzerland showed a strong increase in the 1980s but stock values have remained stable in the 1990s, except for 1997 when ‘suddenly’ a 30 percent increase was measured. This stock level was maintained in 1998. The share of South and Southeast Asia has been stable in recent years (around 6 percent). Latin America (including the Netherlands Antilles) has become more important: the share of FDI stocks in this region has grown to 15-20 percent of total FDI. As for Switzerland, Dutch stock in the Netherlands Antilles showed a very steep increase in 1997. Further, it should be noted that from practically non-existent in the 1980s, Dutch FDI in Eastern European countries increased to Euro 1 billion in 1998. Around half of this amount relates to investments in Poland and Hungary. Figure 7.2 shows the share of countries/regions in outward-FDI of the Dutch food industry in 1984 and 1998.

Spokesmen from De Nederlandse Bank and from the Nederlandse Investeringsbank (NIB) confirmed this suggestion.

On the other hand, an appreciation of the dollar against the Dutch guilder also implies that the assets value held in US dollars increases in terms of Dutch guilders, which should add to the stock value calculated. The impact of the exchange rate development on Dutch FDI in the USA is, therefore, ambiguous without further investigation (see also McCorriston and Sheldon, 1998).
7.3 Trends in the inward-FDI in Dutch food processing industry

In the same period, 1984-1998, foreign agrifood investments in the Netherlands increased from ECU 1.9 billion to Euro 9.8 billion. During this period, the annual growth of inward FDI stocks developed steadily. Compared to the period 1984-1988 the inflow of FDI grew at a faster pace in the years around the turn of 1990. Yet, between 1992 and 1994 growth of inward-FDI stocks was almost none existent. Since 1994 foreign investments in the Dutch food industry have increased again, with a significant rise in stock value in 1998 (see figure 7.1).

The inflow of investments originates from the EU, Switzerland and the USA for more than 80 percent (see table 7.1 in section 7.5). During this period, growth of FDI from other EU countries has been more than average, implying that EU countries have become relatively more important investors in the food industry in the Netherlands (see figure 7.3). On comparing the 1984 data and 1998 figure 7.3 shows that Switzerland remains an important source of foreign direct investments to the Dutch food industry. The position of the United States has declined, although in the latter part of the period, investments from the USA showed a significant increase after a stagnation in the 1980s. As an investor country in the Netherlands, the Netherlands Antilles accounts for only 4 percent of all agrifood inward-FDI. Yet, in the first years of the 1990s its share was around 10 percent.
Ever since 1984, annual growth rates of foreign investments in the Netherlands are slightly higher than Dutch investments abroad. Yet, in the nineties Dutch outward FDI grew at a faster pace than foreign investments in the Dutch food industry. As a result the net-FDI position of the Netherlands is positive, meaning that the Dutch food processing industry invested more in foreign countries than vice versa. Given that FDI goes with the establishment or the take-over of production capacity, Dutch agribusiness expands more in the EU and other countries outside the Union than the other way around.

### 7.4 Dutch outward FDI to and inward FDI from EU countries

In recent years, major destinations for investment in the EU are France, Belgium and Italy. These countries account for slightly more than 50 percent of all Dutch outward FDI in EU countries (see table 7.2 in section 7.5). Next to these three countries Spain and Germany are important destinations too. Spain’s position becomes more important throughout this period. Yet, Germany has lost its position as a major destination of Dutch FDI, as its share dropped from more than 20 percent in the mid-1980s to 8 percent in 1997-1998. A similar development occurred for the UK. At the beginning of the 1990s, the UK was an important destination with a share of 15-25 percent, however this share has dropped to 5-8 percent in recent years. On the other hand, the UK is by far the biggest investor in the Netherlands. The UK is the only country, whose agribusiness invests more in the Netherlands than Dutch agribusiness does in its partner country. The UK has a long tradition in holding this position. In the
1980s, firms from the UK had a share of 60-70 percent in all FDI in the Dutch food industry from EU countries. This share went down to 30 percent in the first half of the 1990s, climbing up to around 30-40 percent in recent years. Similar to the UK, Belgium has always played an important role in food industry related FDI towards the Netherlands. However, the pattern of Belgium FDI in the Dutch food industry is slightly different compared to the British one: from a share of 15-20 percent in the 1980s, there was a steady increase toward up to 40 percent in the 1990s. However, 1997 and 1998 showed a decline to a 26 percent share of food industry related FDI. In recent years, the share of FDI from France and Ireland is growing and both countries reached more than 10 percent of total agrifood inward-FDI from EU countries.

There are both inward- and outward-FDI flows between the Netherlands and many other countries. Especially with respect to neighbouring countries Belgium, Germany and France, the value of both inward- and outward FDI flows is relatively high. Also with several non-EU countries such as Switzerland and the USA there is a lot of two-way FDI in the food processing industry. This implies that there are both home and host multinational food processing enterprises in the Netherlands.

7.5 Total and agrifood FDI: differences in geographical focus and growth

There are several noticeable differences between the agrifood FDI stocks and the total FDI stocks. Geographical focus is one of them. Total Dutch outward-FDI is much more concentrated and oriented towards the EU and the US than the food processing industry is (see table 1). The figures suggest that total Dutch outward-FDI is highly regionally orientated. Yet, one has to be careful with generalisations such as ‘tax paradises’ like Switzerland and the Netherlands Antilles are important destinations of direct investments for the Dutch food industry, much more than for the total outward-FDI of the Dutch economy.

For both total and agrifood FDI, the European Union is the dominant destination and more important than the USA. Looking at destinations of Dutch FDI in the EU, it appears that all countries that are important destinations of Dutch agrifood FDI, are also important for Dutch industry as a whole. Yet, there are notable differences among countries in terms of relative importance of the food sector in Dutch FDI relations. For instance, Germany is both a major destination and source country for Dutch FDI but not for the food industry sector. On the other hand, as a country of destination and/or origin, France is more important in the category of agrifood FDI compared to FDI stocks of other economic sectors.

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67 This holds for the Dutch economy in general, not only for the Dutch food processing industry. This position is unique in the world (see Van Tulder, 2000).
68 As explained earlier, we do not know where these tax driven investment flows have actually materialised in production facilities.
Table 7.1 Most important destinations of Dutch FDI in foreign industries and most important origins of FDI in the Dutch industry, averages 1997-1998 (% of total outward or inward FDI value)

<table>
<thead>
<tr>
<th>Outward FDI</th>
<th>Inward FDI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food industry</td>
<td>All industries</td>
</tr>
<tr>
<td>EU (26)</td>
<td>EU (47)</td>
</tr>
<tr>
<td>Neth. Antilles (15)</td>
<td>USA (25)</td>
</tr>
<tr>
<td>Switzerland (14)</td>
<td>Switzerland (7)</td>
</tr>
<tr>
<td>USA (17)</td>
<td>Neth. Antilles (4)</td>
</tr>
</tbody>
</table>

Note: figures in between parentheses express a country’s share. Under the heading ‘Food industry’ the share is the estimated % of total FDI in the agriculture and food sector, and under ‘All industries’ the share is the estimated % of total FDI.

Total inward-FDI is mainly from other EU countries (50% in 1997/1998) and the USA (25%). Both EU and the USA play an important role as a country of origin of agrifood FDI, just like Switzerland. For the whole Dutch economy, investments from EU countries are more important than they are for the Dutch food industry. The UK and Belgium are the most important EU countries of origin for both total and for agrifood FDI (table 7.2).

Table 7.2 Most important destinations of Dutch FDI in the EU industry and most important EU countries investing in the Dutch industry, averages 1997-1998 (estimated % of total FDI in/from EU)

<table>
<thead>
<tr>
<th>Outward FDI</th>
<th>Inward FDI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food industry</td>
<td>All industries</td>
</tr>
<tr>
<td>France (21)</td>
<td>Belgium (27)</td>
</tr>
<tr>
<td>Belgium (16)</td>
<td>UK (22)</td>
</tr>
<tr>
<td>Italy (15)</td>
<td>France (15)</td>
</tr>
<tr>
<td>Spain (11)</td>
<td>Germany (13)</td>
</tr>
</tbody>
</table>

Note: see table 7.1.

Another issue is the relative importance of agrifood FDI compared to total FDI. Outward-FDI in food processing industries has grown as share of total outward FDI from 8 percent in the 1980s rising to 9-10 percent in the first years of the 1990s. In most recent years, however, its share has been stable at 9 percent. This pattern in the shares of FDI in food industries in total FDI indicates that the annual growth rate of agrifood outward-FDI has been slightly higher than the growth rate of total outward-FDI. Indeed, outward agrifood FDI has grown on average 11 percent per annum against total FDI at 10 percent per annum. The share of food processing industries in total inward FDI shows an equal pattern from 7 percent in the 1980s reaching 8
percent in the first half of the 1990s and back to 7 percent since 1994. During this period, the annual growth rate for agrifood inward FDI has been equal to the rate for total inward FDI, namely 12 percent. These figures also indicate that inward-FDI stocks have grown slightly more than outward-FDI stocks. Still, the Netherlands is a net-investing country as far as the food sector is concerned.

### 7.6 The relation between trade and FDI in the food processing industry

Foreign direct investment has become an important vehicle for internationalisation of the food industry. Over the last decades, overseas FDI stocks of the industry showed an enormous growth, which exceeded export growth rates several times. Most of the literature on this subject is by US authors (see, for instance, Henderson et al., in: Pick et al., 1998), using US food industry data. However, this general picture also holds for the Dutch food industry: during the period 1986-1998 Dutch exports of agricultural products increased by 43%, while outward FDI of the Dutch food industry grew by 352%! (table 7.3). The same picture holds for imports and inward-FDI: investment increased almost ten times as much as imports. The figures indicate a clear distinction between EU and non-EU countries. For both trade and FDI, the growth rates are highest for the non-EU countries.

<table>
<thead>
<tr>
<th>Table 7.3 Growth rates of trade in agricultural products and FDI by/in Dutch food industry, in percentage growth over the period 1986-1998</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>All countries</td>
</tr>
<tr>
<td>EU</td>
</tr>
<tr>
<td>Non-EU</td>
</tr>
</tbody>
</table>

Note: agricultural products are those products that are included in our sample used in chapter 4 (see Appendix 1); trade data from Eurostat, FDI data from DNB.

The increasing internationalisation of production through FDI increases the (policy) relevance of the relation between trade and FDI. Yet, the interaction of both modes of internationalisation is under-researched, especially for the food industry outside the USA (see also section 6.4). With respect to the Netherlands, there is only one study in this field, done by Van der Zwet (referred to in Van der Zet, 1996). This study concludes that there is no significant relation between the amount of FDI and the growth of Dutch exports or imports. However, that study focuses on the whole economy, whereas this study investigates this relation for the food industry only.

As a first step to get more insight into the relation between trade and foreign direct investment, we calculate correlation coefficients between exports and outward FDI and between imports and inward FDI. The export (import) data reflect total agriculture and food exports (imports) of the Netherlands and the FDI data are stock values of Dutch agribusiness’ investments abroad. These correlation coefficients aim
to determine the relationship between the *levels* of both trade and FDI-variables. In addition to that, we calculate the correlation of the *changes* in the trade and FDI variables. This is based on the assumption that changes in FDI-stocks may reflect FDI-flows\(^{69}\), and that there may be a relation between those FDI-flows (what comes in or goes out in terms of FDI every year) and changes in trade (either imports or exports). Table 7.4 below presents the results of these calculations for a set of EU-countries, Poland, Hungary, the USA, Japan and Switzerland, and for two regions, namely the EU and countries outside the EU.

Table 7.4 Correlation between Dutch trade and FDI \(^{1)}\)

<table>
<thead>
<tr>
<th>Partner country</th>
<th>Correlation coefficient Dutch exports and outward-FDI</th>
<th>Correlation coefficient Dutch imports and inward-FDI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Levels of exports and FDI</td>
<td>Changes in levels of exports and FDI</td>
</tr>
<tr>
<td>Belgium</td>
<td>.78 (.64)</td>
<td>.11 (.33)</td>
</tr>
<tr>
<td>Denmark</td>
<td>.56 (.45)</td>
<td>-.31(-.30)</td>
</tr>
<tr>
<td>Germany</td>
<td>.81 (.82)</td>
<td>.29 (.66)</td>
</tr>
<tr>
<td>France</td>
<td>.75 (.75)</td>
<td>-.18 (-.17)</td>
</tr>
<tr>
<td>Finland(^{2)})</td>
<td>-.31(-.94)</td>
<td>-.17(-.60)</td>
</tr>
<tr>
<td>Ireland(^{3)})</td>
<td>.74 (.76)</td>
<td>-.22 (.29)</td>
</tr>
<tr>
<td>Italy</td>
<td>-.23 (-.47)</td>
<td>-.19 (-.22)</td>
</tr>
<tr>
<td>Austria(^{2)})</td>
<td>-.30 (.35)</td>
<td>-.26 (.28)</td>
</tr>
<tr>
<td>Spain</td>
<td>.88 (.85)</td>
<td>-.07 (-.45)</td>
</tr>
<tr>
<td>UK</td>
<td>.35 (.12)</td>
<td>-.03 (-.30)</td>
</tr>
<tr>
<td>Sweden(^{2)})</td>
<td>.39 (.05)</td>
<td>-.36 (-.24)</td>
</tr>
<tr>
<td>Poland(^{4)})</td>
<td>.42 (.66)</td>
<td>-.96 (.34)</td>
</tr>
<tr>
<td>Hungary(^{5)})</td>
<td>.68 (.49)</td>
<td>.09 (-.01)</td>
</tr>
<tr>
<td>USA</td>
<td>.77 (.75)</td>
<td>.18 (.27)</td>
</tr>
<tr>
<td>Japan(^{6)})</td>
<td>.72 (.64)</td>
<td>-.37 (-.45)</td>
</tr>
<tr>
<td>Switzerland</td>
<td>.82 (.75)</td>
<td>.41 (-.45)</td>
</tr>
<tr>
<td>EU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>World (ex-EU)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


\(^{69}\) But note that changes in stocks are not similar to flows, see Appendix 3.
The higher the coefficient, the stricter the relation between the two variables. A positive sign indicates that there is a positive link between the export (import) flows and the FDI stock values, which implies that exports (imports) and FDI are complementary to each other. The results indicate that there is a positive, thus a complementary relation between export *levels* and FDI-stocks in the bilateral contacts between the Netherlands and a majority of the EU member states. Some coefficients have a modest level (UK, Sweden) while some of them indicate a strong relation (among others, Belgium, Germany, Spain). The coefficients between the brackets indicate the link between the trade variable in year $t$ and the FDI variable in year $t-1$. The results of this relation suggest that for most (EU and non-EU) countries in the sample the positive relation between exports and outward FDI-stocks is confirmed.

For Italy, Finland and Austria, however, the coefficient shows a minus number, indicating that exports and outward-FDI towards these countries are substitutes. The values of the Dutch FDI stocks in Finland and Austria are the lowest of all countries included in this sample. Also trade contacts with these two relatively new EU member states are of minor importance, as low Dutch export and import values indicate. Yet, Italy is the third important destination for Dutch agrifood investors in EU-countries, after Belgium and France. The outward FDI stock value in Italy strongly increased in the course of the 1990s. In the same period, the average Dutch exports to the Italian market showed some decline compared to levels in the 1980s.

With respect to the relation between imports and inward FDI, the data indicate a mixed relation between the two variables: for some countries the relation is positive, for others negative. In general, the coefficients that are below the levels measured for the export/outward-FDI relation are also below those coefficients measuring the relation between imports and FDI in the previous year.

The correlation of the *changes* in both properties indicates a rather varied relationship, too. The signs are positive or negative and the coefficients are predominantly low. Even when trade variables are assumed to adjust to FDI with one year delay, no significant relationship seems to be apparent. The results did not improve in calculations of the link between trade variables on the one hand and FDI$(t-2)$, or FDI$(t-3)$ on the other.

**7.7 Model specification to explain FDI**

Correlation coefficients are being used to determine the relationship in terms of direction and strength of the link between two phenomena, in this case between FDI and trade. However, it is unable to indicate how trends in both variables could be explained and whether there is a cause connection between trade flows and FDI. What could help us here is the ‘knowledge-capital’ (Kc) model developed by Markusen and
others. The features of this model are explained in chapter 6 (section 3.2.3). This model provides us with a theoretical framework that can be empirically applied to estimate the relation between trade and FDI. However, this is an indirect relationship as the Kc-model simulates the relation between the existence of different types of multinationals (horizontal, vertical) on the one hand, and differences between countries in terms of market size and factor endowments on the other. Trade effects can be deduced only after the type of multinationals has been identified. In the empirical application of the Kc-model that follows, we estimate a version of the model in which the Netherlands serves both as the headquarters country for its firms producing abroad and as the affiliate country for foreign firms producing there.

Markusen et al. emphasise the differences between countries in market size and in skilled labour as explanatory factors of foreign direct investments. Large differences in market size (a large and a small country) discourage FDI. Since, it is not worthwhile for a firm from the large country to establish a plant overseas when the size of the foreign market is too small given the existence of fixed costs of running a plant overseas. Next, FDI is positively affected by the size of the joined market of the two countries. This factor results in foreign direct investment of a horizontal type, if countries are similar in relative factor endowments of skilled and unskilled labour. Yet, when countries differ in these relative factor endowments, there is scope for firms to source production in a more unskilled-labour-abundant country. FDI, then, is positively affected and is mainly of a vertical type. As explained in chapter 6, horizontal FDI is associated with local production substituting for exports while vertical FDI complements exports. If we can identify the dominant nature of the Dutch agrifood FDI, we are able to elaborate on the link between FDI and exports. First, we have to identify the main factors explaining FDI.

According to the theory, market size, differences in skilled labour and trade costs are crucial explanatory factors. Important to re-emphasise here is that the theory predicts many interactive or non-linear relationships (see also chapter 6). This is, again, illustrated by Carr et al. (2001:696-698). For example, an increase in trade costs will increase FDI if countries are similar (direct investment is horizontal) but may decrease investment if the countries are different in relative endowments (direct investment is vertical). For another example, the effect of an increase in the parent country’s GNP level on production by affiliates of firms abroad is non-monotonic. It increases if the parent country is small but decreases if the size of the parent country exceeds the size of the host country. Further, the effect of an increase in the parent country’s relative endowment of skilled labour on production by its firms’ affiliates are positive and large if trade costs are small (vertical investment is encouraged) but are smaller when trade costs are large. Finally, the volume of affiliate production is highest when the parent country is both small and skilled-labour abundant relative to the host country.

Based on the theory and following efforts of empirical testing by Carr et al. (2001) and by Markusen and Maskus (1999), the following model specification is proposed:

\[
(7.1) \quad \text{FDI} = a_0 + a_1 \text{SUMGDP} + a_2 \text{GDPDIFSQ} + a_3 \text{SKDIF} + a_4 (\text{SKDIF*GDPDIF}) + a_5 \text{TCJ} + a_6 (\text{TCJ*SKDIFSQ}) + a_7 \text{TCI} + e
\]
In which
- FDI is the foreign direct investment stock of the Dutch food industry in a foreign country.\textsuperscript{71}
- SUMGDP: sum of real GDP of two countries as an approximation for market size. The theory predicts a positive sign for the coefficient $a_1$;
- GDPDIFFSQ: the squared difference in real GDP between two countries as an approximation for market size difference. The theory predicts a negative relationship with FDI since FDI has an inverted u-shaped relationship to differences in country size, meaning that FDI increases if the parent country is small but decreases if the size of the parent country exceeds the size of the host country, with a maximum at zero differences (this is demonstrated along the SW-NE diagonal in figure 6.3 and 6.4);
- SKDIFF: approximation for differences in relative factor endowments. This variable indicates an abundance of skilled labour of the parent country relative to the host country. We expect the coefficient $a_3$ to have a positive sign, as firms tend to be headquartered in the skilled-labour-abundant country;
- SKDIFF*GDPDIFF: variable that indicates the interaction between differences in skill endowments and economic size. We expect the coefficient to have a negative sign because of the u-shaped curve of affiliate production along the SW-NE diagonal in the figure, but affiliate production is highest when the parent country is small and highly skill-labour abundant;
- TCJ: trade (costs) barriers for exports to the host country. We expect the coefficient to be positive;
- TCJ*SKDIFFSQ: this interaction term is designed to capture the fact that trade costs may encourage horizontal investment but not vertical investment and that horizontal investment is most important when relative factor endowments are similar (when SKDIFF is [close to] zero). The coefficient, therefore, should be negative, weakening the direct effect of host country trade costs;
- TCI: trade (costs) barriers for exports back to the home country. We expect this coefficient to have a negative sign as trade costs diminish the incentive to locate plants abroad for shipment back to the home market.

Data for the estimation are cross-country observations of 1997. We take FDI data as published by DNB for the Netherlands. The Netherlands serves as both headquarters country for its firms producing abroad and as an affiliate country for foreign firms producing there. There are 17 countries in addition to the Netherlands, 12 of them are (the other) EU member states\textsuperscript{72}, Poland, Hungary, Switzerland, USA and Japan.\textsuperscript{73}

Data on GDP, skilled and unskilled labour, as well as trade costs (tariff barriers) are from the GTAP database version 5 (Dimaranan and McDougall, 2002). GDP 1997 data are GDP expenditure side data, measured in US$. The GTAP database

\textsuperscript{71} In Carr et al., the dependent variable is not FDI but affiliate sales. Yet, the latter is non-existing for the Dutch food industry. Carr et al. also include an independent variable ‘trade investment costs’, which could not be included here due to a lack of data.

\textsuperscript{72} Belgium and Luxembourg are considered one country in DNB FDI statistics, and Greece and Portugal are counted as one country.

\textsuperscript{73} Due to a lack of data on inward-FDI from Poland and Hungary, we only take into account the Dutch
provides skilled and unskilled factor payments in US$, for several sectors such as primary agriculture and primary processed.\textsuperscript{74} Skilled labour abundance is defined as the share of skilled labour in the total labour force employed in the agriculture and food industry of the Netherlands. The variable SKDIF is simply the difference between relative skill endowment of the parent country minus the share of skilled labour in total labour employed in the agriculture and food industry in the affiliate country. Trade barriers are measured as \textit{ad valorem} tariff equivalent import taxes in 1997.

### 7.8 Interpretation and discussion of the results

The predictions are tested by estimating the regression equation above. The regression is of a linear type and estimated with a weighted least-squares procedure to correct for heteroscedasticity. The results testing the hypotheses are shown in table 7.5 below.

**Table 7.5 Results from the model: WLS estimation**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter estimate</th>
<th>Sign as predicted?</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUMGDP</td>
<td>4.67E-04</td>
<td>Yes (.0001)</td>
</tr>
<tr>
<td></td>
<td>(3.79)</td>
<td></td>
</tr>
<tr>
<td>GDPDIFSQ</td>
<td>-2.20E-16</td>
<td>Yes (.0001)</td>
</tr>
<tr>
<td></td>
<td>(-6.49)</td>
<td></td>
</tr>
<tr>
<td>SKDIF</td>
<td>.189</td>
<td>Yes (.844)</td>
</tr>
<tr>
<td></td>
<td>(.199)</td>
<td></td>
</tr>
<tr>
<td>SKDIF*GDPDIF</td>
<td>-1.41E-05</td>
<td>Yes (.0001)</td>
</tr>
<tr>
<td></td>
<td>(-4.57)</td>
<td></td>
</tr>
<tr>
<td>TCJ</td>
<td>-26.07</td>
<td>No (.02)</td>
</tr>
<tr>
<td></td>
<td>(-3.57)</td>
<td></td>
</tr>
<tr>
<td>TC*SKFIFSQ</td>
<td>8.09E-03</td>
<td>No (.0001)</td>
</tr>
<tr>
<td></td>
<td>(6.05)</td>
<td></td>
</tr>
<tr>
<td>TCI</td>
<td>5.15</td>
<td>No (.034)</td>
</tr>
<tr>
<td></td>
<td>(2.24)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-149.05</td>
<td>(1.14)</td>
</tr>
<tr>
<td></td>
<td>(-1.64)</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Adjusted R2</td>
<td>.985</td>
<td></td>
</tr>
</tbody>
</table>

Note: t-statistics between parentheses

The outcomes show mixed results. The coefficient estimates for SUMGDP, GDPDIFSQ, SKDIF and the interaction term SKDIF*GDPDIF have the expected outward-FDI in those two countries.

\textsuperscript{74} In the GTAP database, skilled and unskilled labour is measured in terms of value of factor payments, not as numbers of employees.
signs and are significant except for SKDIF. This implies that in our application of the Markusen Kc-model, we find support for the theory indicating the impact of market size, size differences and the interaction between differences in skilled endowments and economic size on FDI. Further, there is only minor support for the hypothesis that difference in skilled labour would encourage FDI. This might suggest that differences in skilled labour would not be an important factor behind Dutch agrifood-related FDI. Differences in skilled labour would be the key motivation for FDI for vertical MNEs. Next, the estimations of the coefficients for the variables where trade costs play a role are really not very clear. We anticipate a positive sign for trade costs of the affiliate country (TCJ) and negative signs for the interaction term (TC\*SKDIFSQ) and trade costs of the parent country (TCI). However, the contrary occurs as well as that the coefficients are significant\(^{75}\). Overall, the model estimation suggest that contrary to the expectations that trade costs will encourage (horizontal) FDI, the negative relation estimated indicates that import barriers in a foreign country will limit Dutch FDI in that country.

The outcomes need several qualifications. The results with respect to the impact of skilled-labour differences could be influenced by the way the approximation is measured, namely by factor payments for skilled and unskilled labour in the primary and food industry, as constructed in the GTAP database. This measure includes salary per person paid to an unskilled and a skilled employee. The ratio of the two may differ among countries, which would indicate that skilled (unskilled) labour is differently valued among countries. Instead of factor payments, the number of skilled and unskilled persons employed in agriculture and food industries would be more appropriate, as a more distinctive measure. However, data on skilled and unskilled labour are not registered by economic sector, but by occupation\(^{76}\). Further, contrary to what we anticipate from the theory, trade costs do not seem to encourage FDI. The model outcomes indicate that high import tariffs of the affiliate country do not lead to high FDI, which suggests that Dutch inward and outward FDI is not driven by tariff jumping. This outcome may be affected by the sample, which largely consist of EU countries, where trade barriers are non-existent.\(^{77}\) Consequently, our sample includes only a small number of countries where tariff barriers apply in agricultural trade with the Netherlands. Another reason may be that the assumption that trade costs being only tariff barriers might be too narrow. Trade costs may not only consist of tariffs but may also include transport costs, non-tariff trade barriers like packaging or labelling requirements, costs related to language and cultural differences, (local) marketing costs, costs related to exchange rate fluctuations, and other costs. To avoid

\(^{75}\) Next to the model estimates presented in table 7.5, we tested two alternative samples. First, we excluded the non-EU countries from the sample and ran the model again. Second, we estimated the model for only Dutch outward-FDI, and used a sample in which the Netherlands is the parent country for investments in all other 17 countries. For both variants of the model, results were disappointing in terms of anticipated signs and in terms of significance. Moreover, model variants, using GDP and GDPSQ as alternatives for SUMGDP and GDPDIFSQ (conform Carr et al. 1998) showed similar results to what we already had.

\(^{76}\) See ILO statistics, in which, for instance, professional, technical and kindred workers are defined as one and administrative workers as another category. Data from the GTAP database on labour splits per sector are approximations. For the method used to generate data, see Van Leeuwen and Timmer (1999).

\(^{77}\) Indeed, all trade costs measures between the Netherlands and EU-countries were set at zero.
or lower these costs, a firm may opt for FDI instead of exporting. However, such a broad definition of trade costs is difficult to capture into quantitative approximations.

### 7.9 Implications of the outcomes for the relationship between FDI and trade

Given the results of the model estimation, what can be said about possible trade effects of Dutch FDI in the food industry? If the empirical results would be consistent with the theoretical model, and if we would be able to identify the dominant nature of Dutch agrifood FDI in terms of being largely of a horizontal or vertical nature, we could elaborate on the relation between FDI and exports and say something about the impact of FDI on trade.

From the result of the empirical investigation presented in the previous section, we learned that both Dutch inward- and outward-FDI is positively affected by the sum of the countries’ market size, their similarity in size, and the interaction between size and relative endowment differences. Relative skilled-labour abundance may play a role but not a significant one. These outcomes can be transposed to an Edgeworth Box. As the model results are most clear on market size and less so on relative endowments, the outcomes lead us to the Southwest-Northeast-diagonal of the Box. Since, this diagonal represents countries having similar relative factor endowments but differing in market size. Further, the model calculations indicate that Dutch FDI is encouraged when countries are not too different in market size. This leads us from the extremes up to the direction of the centre of the box, but not necessarily to the centre (in the centre, countries are identical both in terms of market size and skilled labour abundance). Next, differences in relative factor endowments may play a role, but these differences are not large enough to be significant. Combining the above, this suggests that areas parallel to the Southwest-Northeast-diagonal and around the centre are likely to be the most relevant regions (figure 7.4).

In defining the type of multinational that occurs in equilibrium, Markusen points at the impact of trade costs. Assuming trade costs are relatively high, type-m firms dominate in the area depicted for the Dutch agribusiness in figure 7.4 (see also figure 6.3 in section 6.3.2.). These types of firms are horizontal multinationals, that possess plants in both home (the Netherlands) and foreign countries and have their headquarters located in the home country. In this regime, there is no trade in the range of skilled-labour intensive products: with most production done by type m-firms, the interaction through direct investment completely dominates. In reality, this implies that trade between two countries is largely stagnant while FDI increases. As similar countries interact through direct investment with type-m firms from both countries invading each other’s market, this is intra-industry FDI.
The high trade costs scenario resembles the situation between the Netherlands and countries outside the EU (assuming that trade costs are associated with tariff barriers). The implications of this particular scenario for trade and FDI seem to be confirmed by data on trade and FDI between the Netherlands and two of its most important sources of FDI, the USA and Switzerland. Exports to, as well as imports from these two countries have been stagnant or have increased rather slowly, while Dutch outward- and inward-FDI has shown rapid growth throughout the 1990s. On the other hand, exports and outward-FDI both have increased bilateral relations between the Netherlands with Japan, Poland and Hungary, the other three non-EU countries in our sample.

In the low trade costs scenario between the Netherlands and partner countries - the regime in the areas identified above as the most likely - would be dominated by type-n firms. These type of firms are defined as national firms that possess a single plant and headquarters in the home country. These firms may export skilled-labour-intensive products when the country is skilled-labour abundant, otherwise they will import the skilled-labour-intensive products. In this regime, firms do not own foreign production locations, but tend to prefer trade due to a similarity between countries in relative endowments and low trade costs. Trade, then, is of an intra-industry trade nature.

Model simulations under this latter scenario are not consistent with what is known in reality. The model outcome suggests that the Dutch food industry would not invest in countries in the EU. Given plant-level scale economies, exporting would always be a lower cost option than FDI under the zero trade cost scenario when
countries are similar enough in size and factor endowments. Yet, Dutch food firms do have many plants in other EU countries and foreign firms from other EU countries have production facilities in the Netherlands.

The question is what causes these counterintuitive results? As already noted above, some variables may be poorly defined or measured. This largely refers to skilled labour and trade costs. How should these variables be defined and how important are they to companies who want to invest abroad? Another reason may be the small sample of countries of which the majority is within the EU where trade barriers in the form of tariffs are non-existing. This small sample is due to the limited FDI data on food industry, available from DNB statistics. Yet, the data also shows that much Dutch agrifood FDI is invested in other EU-countries. So, the question is why so many firms are engaged in FDI in other EU countries while trade costs are zero? Could it be that, different from what Markusen’s model of FDI claims, trade costs are not that important in a firm’s decision on FDI or trade, at least not as far as it the EU market concerns? Are there any factors other than the key elements identified by Markusen through which FDI affects trade? Or would the fact that we deal with agricultural products be of influence? A significant share of agricultural products is taken by perishables and trade in such products may imply high transport costs in relation to added value. In such case, FDI might be encouraged although tariff barriers are low or non-existent. Yet, if transport costs were important, FDI would substitute trade. However, our data on investments and trade indicate differently.

The counterintuitive results of the above empirical exercise suggest that Markusen’s knowledge-capital model is not able to fully capture the complexities of the real world of trade and foreign production by the food industries. Therefore, for a more profound investigation into the interaction between trade and FDI, we turn to company case studies. The argument is that, in addition to the country characteristics, that were subject of the empirical exercise in this chapter, more detailed information on company, product and market characteristics might be important in order to find an appropriate explanation for the Dutch FDI patterns. The next chapter will go into more detail into the internationalisation strategies of several Dutch home-based multinationals in the agro- and food industry.
8. Trade Effects of FDI: a Company Case Study

Approach

8.1 Introduction

This chapter further analyses the relation between trade and FDI using firm-level information on internationalisation strategies. As indicated in previous chapters, the explanation of FDI versus trade decisions is seriously hampered by the limited availability of relevant data. Further, the absence of detailed data limits the identification of the nature of FDI (horizontal versus vertical types) and, thus, overshadows the possibilities to statistically access the nature of the relationship between trade and FDI. Earlier work considering the growth of FDI and its impact on trade indicates that aggregate data does not appear to establish a robust relationship either over time or across sectors (see also McCorriston, 1999). The results of the applied Kc-model in the previous chapter gave mixed signals regarding this, as the outcomes support the significance of some of the variables included in the model, at the same time it leaves us also with a number of counterintuitive and puzzling results. The latter is an important argument to expand the analysis with case studies. Through interviews with eleven firms, the Dutch agribusiness was questioned on their strategic decisions with respect to internationalisation of their business and how they put these strategies into practice, either through exports, foreign direct investments, or a combination of both. Further, the interviews are to explore whether there is a systematic relation between the firm’s choice of mode to internationalise, and features of the host country/region. It is also expected that the interviews provide insights into the character of FDI (horizontal/vertical) and other specific features of agrifood multinationals. These interviews produce qualitative micro-level information on the motivations of FDI and possible trade effects of FDI activities, which may add important qualifications to our earlier findings, based on quantitative estimates of the Dutch agrifood trade-FDI relation.78 This chapter concludes with a re-assessment of the outcomes as reported in the previous chapter by integrating firm features into Markusen’s framework on FDI and trade.

8.2 Characteristics of the Dutch food industry and selection of firms

Key features of the Dutch food industry

Total turnover of the Dutch food industry was 93 billion Dutch guilders (Euro 42 billion) in 1998 (CBS, National Accounts). Total employment totalled around 136,000. The industry is both in terms of employment (17 percent) and in sales (14 percent) the largest category within the Dutch manufacturing sector. In the ranking of 22 economic sectors in terms of value added per labour year (1998) the food industry

78 Reports on company interviews can be found in Appendix 4.
ranks at number five, only preceded by very capital-intensive sectors like, for example, chemicals (CBS, National accounts).

Table 8.1 Key data of the Dutch food industry (1998)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Number of firms</th>
<th>Employees (x1000)</th>
<th>Production value (million HFL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slaughterhouses and meat processing industry</td>
<td>201</td>
<td>22.118</td>
<td>15.389</td>
</tr>
<tr>
<td>Fish processing industry</td>
<td>39</td>
<td>2.754</td>
<td>1.103</td>
</tr>
<tr>
<td>Dairy industry</td>
<td>43</td>
<td>11.409</td>
<td>14.254</td>
</tr>
<tr>
<td><strong>Subtotal Processing of animal products</strong></td>
<td><strong>283</strong></td>
<td><strong>36.281</strong></td>
<td><strong>30.746</strong></td>
</tr>
<tr>
<td>Vegetable and fruit processing industry</td>
<td>63</td>
<td>7.452</td>
<td>4.915</td>
</tr>
<tr>
<td><em>a.w. Potato products industry</em></td>
<td>22</td>
<td>3.854</td>
<td>2.562</td>
</tr>
<tr>
<td>Margarine, other oils and fats industry</td>
<td>19</td>
<td>2.973</td>
<td>6.690</td>
</tr>
<tr>
<td>Animal feed industry</td>
<td>77</td>
<td>7.659</td>
<td>8.549</td>
</tr>
<tr>
<td>Other foodstuffs industry</td>
<td>404</td>
<td>41.110</td>
<td>21.407</td>
</tr>
<tr>
<td><em>a.w. Bread, cake, cracker and biscuit industry</em></td>
<td>282</td>
<td>19.287</td>
<td>4.099</td>
</tr>
<tr>
<td><em>a.w. Chocolate and confectionery industry</em></td>
<td>46</td>
<td>5.834</td>
<td>3.216</td>
</tr>
<tr>
<td><em>a.w. Pasta industry; coffee-roasting &amp; tea packing; vinegar &amp; spice industry; food preparations industry; special diet food industry</em></td>
<td>28</td>
<td>6.585</td>
<td>4.470</td>
</tr>
<tr>
<td><em>a.w. Food industry, other</em></td>
<td>48</td>
<td>9.404</td>
<td>9.622</td>
</tr>
<tr>
<td><strong>Subtotal Processing of vegetable products</strong></td>
<td><strong>563</strong></td>
<td><strong>59.194</strong></td>
<td><strong>41.561</strong></td>
</tr>
<tr>
<td>Beverages industry</td>
<td>34</td>
<td>11.016</td>
<td>7.556</td>
</tr>
<tr>
<td><em>a.w. Distilleries and liqueur distilleries</em></td>
<td>13</td>
<td>1.017</td>
<td>734</td>
</tr>
<tr>
<td><em>a.w. Beer breweries; maltings</em></td>
<td>12</td>
<td>7.522</td>
<td>4.995</td>
</tr>
<tr>
<td><em>a.w. Mineral water- and soft drink industry</em></td>
<td>9</td>
<td>2.477</td>
<td>1.827</td>
</tr>
<tr>
<td>Tobacco processing industry</td>
<td>11</td>
<td>5.354</td>
<td>9.050</td>
</tr>
<tr>
<td><strong>Subtotal Beverages and tobacco</strong></td>
<td><strong>45</strong></td>
<td><strong>16.370</strong></td>
<td><strong>16.606</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>891</strong></td>
<td><strong>111.845</strong></td>
<td><strong>88.913</strong></td>
</tr>
</tbody>
</table>

Source: CBS, Summary overview of the industry, CBS, The Hague; adaptation LEI. Figures refer to firms with 20 employees or more.

The food industry consist of firms processing domestically produced raw material, like milk, meat, sugar and potatoes, and of firms processing foreign raw materials like cocoa, coffee and oilseeds. The most important branches within the food industry in terms of production value are slaughterhouses and meat processing industry, dairy industry and tobacco processing industry. In total, the food industry accounts for
almost 7,000 companies, of which more than 6,000 have less than 20 employees. Turnover of these smaller firms are estimated at EURO 2-2.5 billion. Numbers and turnover of the larger companies are shown in table 8.1. Since 1992, the number of large companies has decreased by around 10 percent. Yet, turnover increased by 70 percent (nominal) between 1992 and 1997 (Silvis and Van Bruchem, 2000). Approximately a quarter of the larger companies employ between 100 and 500 people, and 4 percent of them have more than 500 employees. Concentration rates differ among branches. Compared to the sugar and the dairy industry, the animal feed industry is rather fragmented. Yet, the overall tendency is one of further concentration.

External orientation
The significance of the food industry for the economy is not only visible in its share in employment and turnover, but also in its large contribution to the overall trade surplus of the country. International markets are important for the Dutch agricultural and food sector. In the rankings of net-exporting countries the Netherlands is second after the USA and has held that position already for several years. The generation of added value in the primary and processing food sector increasingly depends on exports. In 1997 73 percent of the added value in the Dutch agriculture and food sector was achieved by exports, against 65 percent in 1985 (Wijnands and Silvis, 2000). The processing industry increasingly imports raw material and intermediate products from overseas. This implies that the Dutch food processing industry is less attached to the Netherlands as a production location for its inputs. While food processing importantly depends on imports, the primary production sector heavily depends on exports of processed and unprocessed products. The Netherlands imports more from non-EU countries than it exports to those countries. As a result, the positive trade balance is mainly due to trade in the EU-market. The EU-share in the origin of imports is more than 60 percent and the share in the destinations around 80 percent. The composition of both exports and imports varies. Recent years have shown an increasing share of horticulture products (especially ornamental flowers) in Dutch exports.

Selection of companies
The following analysis of the relationship between trade and FDI is based on a survey of internationalisation strategies of a selection of Dutch agrifood multinationals. The selection of Dutch agribusiness enterprises is based on several criteria. One important selection criterion is the character of the business: companies should be involved in processing of agricultural products. It is argued that for these companies a trade-off may occur between exporting and other supply arrangements for foreign markets. This criterion excludes food traders and retailers from our sample, as these sectors do not produce for exports but add value to products in terms of the service they provide. Processing activities should be located in at least one foreign country, next to the Netherlands, since only multinational firms are considered in our sample. Further, the amount of sales of the firm is important. Larger firms were selected as these firms are – in general – more international-oriented than smaller firms are, and more easy to trace than small companies. Next, we tried to construct a sample, which would represent the wide array of the Dutch agribusiness sector. For that, we chose firms
having their main activities divided over different branches. And finally, for practical reasons we opted for Dutch companies having headquarters in the Netherlands. These criteria result in the sample of firms presented in table 8.2. This table also shows some of the key data features of the selected companies.

8.3 Profiles of the selected companies

Unilever, the Anglo-Dutch multinational is, next to Swiss-based Nestlé, the largest group of companies in the world with main activities in food products. Started in the 1930s by the merger of two multinationals - Nederlandse Margarine Unie and British Lever Brothers - Unilever has an impressive record of international operations. The group has operational activities in around 90 countries and sales in about 150 countries. The company produces consumer products for daily usage, mainly food products and home and personal care products. In 1999, food accounted for around 50 percent of the company’s total sales (i.e. 45,183 million HFL). Unilever owns internationally leading brands of a wide variety of food products.

Friesland Coberco Dairy Foods (FCDF) is the largest dairy company of the Netherlands. In 1997 FCDF came into existence when four Dutch dairy companies merged. The origin of the co-operative goes back to 1894. Since then many mergers and take-overs have led to the present structure and size of the company. FCDF produces a broad range of (mainly long-life) dairy products, and dairy-based fruit beverages for consumers, and for professional (restaurants, fast food chains) and industrial use.

Campina Melkunie (CM) is the next largest milk processor in the country. CM has its origin in the merger of Campina Melkunie and DMV in 1989. This co-operative produces a wide variety of dairy products for consumers and industrial clients, next to a broad range of food ingredients and special foods. The Dutch dairy industry is heavily concentrated: the two dairy companies FCDF and CM together process 90 percent of all Dutch milk deliveries. Both co-operative firms are within the top-ten of dairy companies in the world.

Founded in the second half of the 18th century mainly as a trader in seeds, in the year 2000 Wessanen has two key activities: dairy and natural (health) foods. The company is largely operating in European and North American markets. In the European market, it produces and sells the largest European cheese brand, Leerdammer. In the North American market, Wessanen is the largest distributor of natural and speciality (among others, ethnic) foods, with a market share of around 35 percent. In 2000, Wessanen bought Distribourg, the leading European marketer of natural and speciality foods. Wessanen is also producing and distributing a broad range of convenience foods (snacks, poultry meat) and breakfast cereals, mainly for the European markets.

Nutreco was established in 1994 after a buy-out of activities previously belonging to BP Nutrition. Some of the business units have already existed for (more than) half a century. Nutreco’s key activities are the production of feed (premixes, specialities) for fish, poultry, pigs and cattle, the processing and marketing of fish (salmon) and the processing of poultry and pig meat. The company’s operations also
include pig and poultry breeding. The company is the world market leader in fish feed for salmon with a market share of 40 percent and has a 9 percent market share in the sales of Atlantic salmon.

**Table 8.2 Selected Dutch agribusiness firms; some key data**

<table>
<thead>
<tr>
<th>Firm name</th>
<th>Legal structure</th>
<th>Main activities</th>
<th>Total sales (million HFL) in 1999</th>
<th>Personnel (of which % in NL) (average 1999)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unilever</td>
<td>Public limited company (PLC)</td>
<td>Food, home and personal care products</td>
<td>90,890</td>
<td>+/- 250,000 (3%)</td>
</tr>
<tr>
<td>Friesland Coberco Dairy Foods</td>
<td>Co-operative</td>
<td>Dairy</td>
<td>8,873</td>
<td>12,095 (45%)</td>
</tr>
<tr>
<td>Campina Melkunie</td>
<td>Co-operative</td>
<td>Dairy</td>
<td>7,280</td>
<td>6,939 (56%)</td>
</tr>
<tr>
<td>Wessanen</td>
<td>PLC</td>
<td>Dairy, natural health food products</td>
<td>6,646</td>
<td>14,912 (8%)</td>
</tr>
<tr>
<td>Nutreco</td>
<td>PLC</td>
<td>Animal feed, aquaculture, meat</td>
<td>5,730</td>
<td>9,185 (27%)</td>
</tr>
<tr>
<td>Numico</td>
<td>PLC</td>
<td>Food products</td>
<td>4,912</td>
<td>18,853 (8%)</td>
</tr>
<tr>
<td>CSM</td>
<td>PLC</td>
<td>Sugar and other foodstuff</td>
<td>4,847</td>
<td>10,707 (27%)</td>
</tr>
<tr>
<td>COSUN</td>
<td>Co-operative</td>
<td>Sugar, food ingredients</td>
<td>2,237</td>
<td>4,782 (n.a.)</td>
</tr>
<tr>
<td>Avebe</td>
<td>Co-operative</td>
<td>Potato Starch and kindred products</td>
<td>1,605 (1998/9)</td>
<td>2,799 (n.a.)</td>
</tr>
<tr>
<td>Van Melle</td>
<td>PLC</td>
<td>Sugar confectionery</td>
<td>987</td>
<td>3,456 (32%)</td>
</tr>
<tr>
<td>Farm Frites Ltd</td>
<td></td>
<td>Potato products</td>
<td>700</td>
<td>1,600 (n.a.)</td>
</tr>
</tbody>
</table>

Source: Annual reports, 1999

The activities of *Numico* are the development, production and marketing of specialised food products, based on medical-scientific concepts. Next to specialised food for baby’s and people with specific food needs (a.o. medical foods, special diet food, and nutriceuticals), Numico produces dairy consumer products, mainly drinks. Through recent acquisitions the company has been able to significantly increase its market share in the US market of food supplements and natural health products.
CSM (Centrale Suiker Maatschappij) is an international company with activities focussing on the development, production, marketing and distribution of a set of food products and ingredients. Originally, the company was a sugar producer. Nowadays, CSM’s most important business areas are bakery products, sugar confectionery and lactic acid (Purac). The company recently emphasised its focus on bakery ingredients through acquisitions in the USA and in Europe in order to strengthen its position in these regional markets. The company is quoted at the Amsterdam Stock Exchange.

COSUN – the acronym of COöperatie Suiker UNie – has turned into an international manufacturer of food ingredients for professional and industrial clients. Like CSM, the company’s roots are in sugar beet processing, but in the 1970s and 1980s the range of activities was broadened to include seeds, spices, fruit and vegetable preparations, alcohol, sugar products and carbohydrate derivatives. Sugar processing is still the key activity on which many other group activities are based.

Van Melle is specialised in the production and sales of confectionery (sweets). The company is quoted at the (Amsterdam) stock exchange and sells a number of international brands. Next to that, local brands produced by foreign production units increasingly contribute to the success of the company. Based on the evaluation that western markets are saturated and growth can only be achieved by take-overs and displacement of existing products by innovations, the company considers presence in growth markets essential for its future growth and profitability. Therefore, the company has invested in production facilities in many emerging economies in recent years.

The co-operative AVEBE is a producer of potato starch and derivatives. Its products have many applications and are sold, among others, to the food industry, the paper industry, the textile industry and the oil industry. Next to potato starch, the company increasingly uses other raw material (tapioca, starch from grains) for the production of derivatives.

Farm Frites produces and sells a wide range of potato products (fresh and deep-frozen). Soon after this family company started its activities in the early seventies, expansion began towards countries in the vicinity of the Netherlands. The company is now one of the largest potato processors in the European Union and exports 90 per cent of its production to around 45 countries in the world. Farm Frites’ main markets are in the EU. Next to processing units in the Netherlands, Belgium and France, the company owns production facilities in Poland, Egypt and Argentina. Farm Frites has established a strategic alliance with Simplot, a US-based producer of potato products, in which it co-operates in the area of testing new varieties, product development, logistics and distribution. Due to this agreement FF is able to sell its products world-wide.

### 8.4 Major markets of the Dutch food industry

Table 8.3 shows the most important markets of each of the companies selected. Several observations can be made to characterise the presence of Dutch-based multinational food manufacturers in the world. Unilever has a world-wide orientation:
it has activities in continents throughout the world. Yet, the most important market of the Anglo-Dutch multinational is still Europe (including the Dutch market that accounts for approximately 4 percent of all sales). Like Unilever, most other companies are focussed on the European market. Campina Melkunie, Nutreco, and Cosun rely for more than three-quarter of their total sales on the European market. For Cosun, the Dutch market is by far the largest one. This also holds for the two large dairy companies Friesland Coberco and Campina Melkunie, and for Nutreco. Other companies have chosen for a mixture of the European and (North) American markets. For instance, Numico, CSM and Van Melle achieve more than 20 percent of their sales volume from overseas markets, mainly from the USA. Because of its size and homogeneity, the US market is very attractive to internationally operating companies.

The market perspectives in Southeast Asia are in general very promising due to (expected) income growth in this densely populated region. Still, for the moment, markets in the Far East are not of significant importance to the majority of the selected Dutch food manufacturers: only Unilever, Friesland Coberco and Van Melle make more than 10 percent of their total company sales in this region. Recently, however, several companies have established production facilities in China (e.g. Numico) which result in a more important role for Dutch agribusiness in this region (see also section 8.6). Latin America and Africa are minor markets to most Dutch multinationals. Only Unilever and Friesland Coberco are worth mentioning in this respect as they achieve a percentage of their total sales in these two regions that is higher than five.

Table 8.3 Regional distribution of (net) sales (in % of total company sales), 1999

<table>
<thead>
<tr>
<th></th>
<th>Netherlands</th>
<th>Europe 1)</th>
<th>North America</th>
<th>South America</th>
<th>Africa/ Middle East</th>
<th>Asia/ Pacific</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unilever</td>
<td>4</td>
<td>42</td>
<td>22</td>
<td>10</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>FCDF</td>
<td>42</td>
<td>31</td>
<td>4</td>
<td>8</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Campina Melkunie 2)</td>
<td>36</td>
<td>54</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Wessanen</td>
<td>25</td>
<td>75</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Nutreco</td>
<td>35</td>
<td>55 3)</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Numico</td>
<td>11</td>
<td>55 4)</td>
<td>26</td>
<td>1</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>CSM</td>
<td>27</td>
<td>26</td>
<td>42</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cosun</td>
<td>55</td>
<td>25</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Avebe</td>
<td>10</td>
<td>49 5)</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Van Melle</td>
<td>15</td>
<td>42 6)</td>
<td>28</td>
<td>2</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Farm Frites</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

Notes: 1) Europe excludes the Netherlands (except for Wessanen); 2) Distribution of sales in Europe outside the Netherlands is: Belgium 8%, Germany 28%, rest of EU 14%, Europe excl. EU 3%, Jaarverslag 1999); 3) 37% in other EU and 18% in rest of Europe; 4) Numico’s sales in the EU are 41% and in other Europe 14% of total sales, Jaarverslag 1999:23; 5) 43% in EU and 6% in rest Europe. 6) divided by EU 30% and other Europe 12%, Jaarverslag 1999:3.
As table 8.3 shows, Dutch food multinationals are mainly active on the European and North American market. A minority spread its wings to Asia, while Latin America and Africa are marginal markets to most companies.

Most Dutch food manufacturers in this sample realise an important share of their turnover in foreign countries. The question is how they achieve these results: through exports, through FDI, or through a combination of both? If either one dominates, what would be the reason for it? Why would a firm follow a mixed strategy of internationalisation, through both exports and FDI? Firms’ annual reports do not provide information on whether the company’s turnover in foreign markets has been realised through exports from the Netherlands or through local production in a host country. Different from US firms, Dutch companies are not obliged to report on that. However, most firms report on a regional distribution of foreign owned production facilities, yet in different detail. This may roughly indicate the importance of FDI as a mode of internationalisation to the Dutch food multinationals.

### 8.5 Foreign direct investments of the Dutch food industry

Table 8.4 presents an overview of the regional distribution of production facilities abroad owned (full or in majority) by the selected Dutch food multinationals. This overview happens to correspond with in table 8.3 presented regional distribution of total sales of the companies: firms are locally present with production facilities in countries and/or regions that are important sales markets to them. However, the causal relation is unknown: whether sales in these countries/regions are realised because of FDI or whether FDI is encouraged because of the importance of these markets through exports remains to be considered. Moreover, nothing can be said about the importance of FDI relative to exports because the share of foreign affiliate sales in total sales is not reported on in any food manufacturer’s annual report. Yet, what the overview might suggest is that local production (through FDI) and trade (exports) could be more of a complementary than substitutionary nature. Further, the number of production facilities abroad suggests that FDI is an important mode of internationalisation to many Dutch food manufacturers. At the same time, there are eye-catching differences among the firms in terms of regional concentration of sales. Some of these differences are discussed below.

Unilever has production facilities in around 90 countries. This implies that the Anglo-Dutch multinational is a true local producer of food (and other) products as the company is present in quite a number of countries in the world. Unilever’s position is unique compared to most Dutch companies that have their majority of overseas factories in the vicinity of the Netherlands (Belgium, Germany, France and UK). Yet, similar to Unilever, companies like Nutreco, Numico and CSM have a close network of factories in many EU countries, too. Many Dutch multinationals have shown interest in central and eastern Europe and decided to invest in local production in one

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79 When companies’ representatives were asked to indicate the share of exports and the share of foreign affiliate sales of total sales, no one was able to answer this question not even by a rough estimate,
<table>
<thead>
<tr>
<th></th>
<th>West Europe</th>
<th>Central and Eastern Europe</th>
<th>North America</th>
<th>Asia/Pacific</th>
<th>Africa/ Middle East</th>
<th>South America</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unilever</strong></td>
<td>&gt;10</td>
<td>6</td>
<td>USA, Canada</td>
<td>&gt;10</td>
<td>&gt;10</td>
<td>&gt;10</td>
</tr>
<tr>
<td><strong>FCDF</strong></td>
<td>Belgium</td>
<td></td>
<td>Guam (USA)</td>
<td>Malaysia, Indonesia, Vietnam, China, Hong Kong, Singapore</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Campina Melkunie</strong></td>
<td>Belgium, Germany</td>
<td>Poland, Russia</td>
<td></td>
<td></td>
<td>Nigeria, Saudi Arabia</td>
<td>Columbia</td>
</tr>
<tr>
<td><strong>Wessanen</strong></td>
<td>Belgium, Germany, France, UK, Italy</td>
<td>USA, Canada</td>
<td>Thailand</td>
<td>Brazil</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Nutreco</strong></td>
<td>10</td>
<td>Hungary, Poland</td>
<td>Canada</td>
<td>Japan, China</td>
<td>Chile</td>
<td></td>
</tr>
<tr>
<td><strong>Numico</strong></td>
<td>&gt;10</td>
<td>Poland, Hungary, Czech rep., Slovakia, Russia</td>
<td>USA</td>
<td>Indonesia, Hong Kong, Taiwan, India, China, Australia, New-Zealand</td>
<td>South Africa</td>
<td>Netherland Antilles, Argentina, Brazil</td>
</tr>
<tr>
<td><strong>CSM</strong></td>
<td>&gt;10</td>
<td>Poland, Hungary, Estonia</td>
<td>USA, Canada</td>
<td>Singapore, Japan</td>
<td>Brazil</td>
<td></td>
</tr>
<tr>
<td><strong>Cosun</strong></td>
<td>Belgium, Germany, UK</td>
<td>Poland, Slovenia, Romania</td>
<td>USA, Canada</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Avebe</strong></td>
<td>Germany, France, Sweden</td>
<td>USA</td>
<td>Thailand, Indonesia</td>
<td>Turkey</td>
<td>Argentina</td>
<td></td>
</tr>
<tr>
<td><strong>Van Melle</strong></td>
<td>Belgium, Germany, France, Switzerland</td>
<td>Poland, Czech rep., Hungary, Slovakia, Russia</td>
<td>USA, Canada</td>
<td>Philippines, Hong Kong, China, Indonesia, Singapore, India</td>
<td>Neth. Antilles, Brazil</td>
<td></td>
</tr>
<tr>
<td><strong>Farm Frites</strong></td>
<td>Belgium, France</td>
<td>Poland</td>
<td></td>
<td>Egypt</td>
<td>Argentina</td>
<td></td>
</tr>
</tbody>
</table>

Source: Annual Reports 1998, 1999; internet companies’ webpages

or more countries in that region. Poland and Hungary appear to be the most attractive countries for direct investments to Dutch companies. Only some enterprises have

because these data are not registered by the company.
invested in production facilities in Russia, indicating that at this moment in time Dutch agribusiness does not have much confidence in the country’s economic perspectives.

The majority of the selected firms have one or more production location in the United States of America. Those without local activities in the USA are the two large dairy co-operatives. Sales both Friesland Coberco and Campina Melkunie realise in this market are through exports. Yet, the USA/Western Hemisphere is not that important to both dairy companies: each company achieves only 4 percent of their total turnover from these markets (see table 8.3). Campina Melkunie is most geared to European markets and operates several local plants in a few European countries. Distant markets are served through exports. Friesland Coberco, on the other hand, sells its products largely in the European market through exports. Further away markets are served through a mix of exports and local production. The company owns factories in six countries in Southeast Asia, as well as in Nigeria (Africa) and in Saudi-Arabia (Middle East).

Several Dutch companies have branches in densely populated countries in South East Asia. Next to Unilever, companies like FCDF, Numico and Van Melle are present in a number of countries in this region. Countries like Indonesia, Thailand, China and India are considered to be promising markets as incomes have grown fast over the last decades. Yet, due to the ‘Asian crisis’ in 1997-1998, sales in most of the countries in the region have stagnated or dropped, sometimes even drastically. This may have resulted in a cautious attitude of Dutch multinationals towards investing in the region in recent years (see section 8.7).

Only a few companies have shown interest in investing in Africa and the Middle East region. Some companies have done an acquisition in Africa, for example Friesland Coberco in Nigeria, Numico in South Africa and Farm Frites in Egypt. Other firms may have been discouraged by the lack of purchasing power in most of the African countries. The Latin American continent, on the other hand, has received an increasing sum of FDI from Dutch agrifood multinationals in recent years. Argentina and Brazil are the main destinations of investment flows in this region. These two countries are attractive to foreign companies because of the relatively high levels of income per capita compared to those in the rest of the region.

8.6 Reasons to internationalise through foreign direct investments

The literature on internationalisation mentions many reasons why companies would internationalise their business. Dunning (1993) categorises such arguments into market seeking, resource seeking and efficiency seeking arguments (please also refer to chapter 6). The companies in our sample were questioned about their drive to internationalise. This section summarises their responses. The most prominent reasons mentioned by them can be classified under the market seeking argument, yet depending on specific company characteristics and the market it is operating in, other reasons for investing in production facilities abroad are mentioned too (see table 8.5).

80 FCDF has a local production facility on Guam, an island in the Pacific Ocean belonging to the US.
Market seeking driven by economies of scale

A major motivation for enterprises to expand their production abroad is that a larger market provides opportunities to benefit from (both firm-level and plant-level) economies of scale. Several forces play a role in encouraging companies to take advantage of producing at larger scale and consequently further internationalise their business. First, companies have an inherent desire to grow, especially those stock registered companies that have to show increasing growth rates to their shareholders in order to remain attractive to them; when growth objectives are no longer achievable in the home country, expansion abroad may be the next step. As the Netherlands is a small country this factor becomes of importance much sooner compared to, for example, German or French companies. Second, due to changing consumer preferences, companies are forced to invest in product innovation, market development and quality control. Scale effects are important in these investments: companies need a larger market to have sufficient return on investment. Simultaneously, R&D investments are generally speaking risky, as the results of the investments are difficult to measure. Large companies are better able to bear these risks and are able to invest larger sums in R&D than smaller ones. Third, fierce competition and investments in product innovation and marketing require specialisation in a limited number of products and market segments. This implies that the domestic market becomes ‘smaller’ and a firm is forced to look at international expansion in order to achieve the necessary economies of scale.

Resource seeking

Next to market seeking, resource seeking is a second category of reasons referring to arguments to establish or take over production facilities abroad. The motivations are especially relevant in having access to raw materials, but also in access to cheap labour, access to technology or specific know-how. Further, access to created assets such as brands may be an argument for a take-over that is classified as resource seeking.

A company that has invested in foreign countries because of improved access to raw material is AVEBE. This company has invested in plants that process tapioca (in Brazil and Thailand), maize (USA) and wheat (France) as long-term supply of raw materials in the Netherlands (starch potatoes) is uncertain due to agro-ecological and agricultural policies. Changes in European agricultural policies in the last decade have also led to cheaper alternatives for starch potatoes as a base for starch derivatives, a reason why AVEBE has invested in the processing of those alternatives. A second example in this category is Farm Frites. As part of their internationalisation strategy, this company is seeking access to raw materials in the vicinity of large markets. The company has two reasons to do so. First, the area cultivated with potato’s in the Netherlands can not easily be expanded, only at high costs (mainly due to high land prices). Second, transport costs of potato’s are large, both in unprocessed and in processed form, and having the cultivated area close to the market results in lower transport costs. It is the company’s opinion that the growth markets for chips are located in Mediterranean countries and Latin America and that is why Farm Frites has invested in processing plants in south-France, Egypt and Argentina. Further, Nutreco’s investments in salmon farming and processing also has a strong resource-
seeking component, due to natural circumstances salmon can only be produced in a limited number of places in the world.

Dutch food multinationals mention that cheap labour in a host country not a decisive argument to internationalise, and only considered to be an additional advantage to invest in a foreign production facility. Most companies operate with local management because they are familiar with working habits as well as local consumer preferences. The argument of cheap labour, however, is little heard. Meanwhile, many companies emphasise that production costs are lower in many countries outside the Netherlands and that production costs remain an important element in maintaining their international competitive position.

**Efficiency seeking**

Efficiency seekers are motivated to rationalise the structure of established resource-based or market-seeking investments in such a way that the investing company is able to gain from the common governance of geographically dispersed activities. Such benefits are in essence those of economies of scale or scope and risk diversion. Examples of patterns of internationalisation are those firms that rationalise their international network of local production facilities such as explicitly mentioned by Unilever in its 1999 Annual Report (please refer to section 8.8). Following Unilever’s announcement, many companies are continuously searching for efficiency improvements in existing operations in an effort to improve efficiency at company level. This may include the closure of local plants and/or re-allocation of production activities or overheads. Restructuring of the company’s operations may also be the follow-up of a merger or acquisition. In most cases, parts of the newly acquired firm are being integrated into existing parts in order to benefit from expected synergy, so that the newly formed unit(s) may grow faster. Management may decide to cut overlap of activities through the closure of resale of activities. Also, companies investing in forward (distribution) or backward (supply) linkages may find improving efficiency a main argument for FDI. Examples may be found in the acquisitions done by Farm Frites (investing both in potato growing and processing) and by Nutreco (feed production; pig, poultry and salmon breeding and processing).

**Internationalisation of clients**

From their inherent wish to grow firms are looking for large markets in terms of a large population with sufficient purchasing power. Most Dutch multinationals indicate that the main reason to invest in a foreign production facility is to take up a prominent position in a local (foreign) market that have promising perspectives for sales growth rates. Firms prefer a location in the vicinity of their clients (either households or industries). The intuition is that a company close to the local client is more familiar with local needs and preferences, hence, will be more successful.

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81 See, for instance, an article in Wessanen News, the company’s newsletter, of September 2000. The article, entitled ‘Integration process means adjustments for everyone’ the company’s approach towards integrating newly acquired companies into the existing Wessanen organisation is being explained. From the interviews with other Dutch agrifood multinationals it appears that all companies run into similar issues and problems when integrating newly acquired companies into its existing organisation.
An increase in scale and internationalisation of the customers of the food industry (other companies in the food industry, other industries, fast food chains, catering, retailers, etc.) is a recent trend. Due to these developments, the food industry has to increase scale and has to internationalise too. For instance, internationally operating fast food chains prefer local sourcing to show that they support the local economy. At the same time, they want to be supplied at their world-wide operations by large, well-known suppliers because such suppliers are able to give guarantees on continuous supply both in terms of quantity and quality. The concentration and internationalisation in the food retail sector continues (see e.g. Jansen, 2000). Large food retail chains have enormous market power. Food processing companies have to take changes in location of their clients into account, due to clients’ internationalisation process.

Several companies in our sample mentioned this as a reason to invest abroad. For example, for many years Cosun’s fruit and vegetable products division supplied soft fruit products to multinationals like Danone and Hagen Dass in their West-European processing units. When these clients went into Poland, Cosun was told that it was better to locate production facilities in the clients’ vicinity. This would reduce Cosun’s production costs and costs of transport as well as reducing the risk on losses of quality due to transport. Furthermore, if Cosun would decide not to enter Poland and would try to supply its clients by exports, import tariffs would restrict Cosun’s chances to remain in business. Farm Frites had similar experiences and opted for the strategy to follow important clients in the supermarket and fast food sector. The need to do so is strong, because transport of its products is relatively expensive. Transport costs, therefore, are an important aspect in the decision whether to export or to produce locally, but also strongly related to product characteristics. Similar conclusions follow from Campina Melkunie’s strategy to expand dairy processing in Germany. Dairy products are, generally speaking, rather voluminous products, especially fresh products. The increased concentration of retailers in Germany (where US giant Wal-Mart has penetrated in 2000) causes pressure on suppliers to offer their products as price competitive as possible. Therefore, if Campina Melkunie wants to maintain its market position, the company has to exploit the advantages of large-scale production in that market as much as possible. Through local investments rather than through exports from the Netherlands, Campina Melkunie was able to optimise on logistics.

Consequences for trade?
The motivations for FDI may determine the behaviour of the firm in terms of choices between foreign production and foreign trade. However, although the motivations are known, it is still difficult to say how FDI affects trade. The only obvious case seems to be when a company invests abroad to follow an important client, which – for several reasons - prefers to be supplied locally. In such a case one may assume that

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82 The costs of transporting a product is related to its (added) value, the higher the ratio of the two, the sooner the company will consider to shift from exports to foreign production. Note that with respect to transport costs, firms may also take the risk into account that something happens during transport that may negatively affect product quality. To cover that risk, packaging and insurance costs add to the costs of shipping.
this direct investment negatively affects exports from the home to the host country. However, FDI largely based on (one of) the other reasons mentioned above does not have an unambiguous impact on trade: there may be positive or negative effects, depending on specific circumstances linked to firm, product and market characteristics (see also Traill, 1997). Furthermore, most companies claim that their decisions to invest abroad are not based on a single reason but rather on a set of motivations. Reasons for FDI as mentioned by the firm representatives in the interviews are summarised in table 8.5. The mix of motivations makes it even more complex to derive a relation between FDI motivations and their subsequent trade effects. Moreover, the set of motivations underlying FDI may also include some that are not mentioned explicitly during the interviews. These ‘hidden’ reasons could be of political (political stability of a country, affecting a country’s investment climate) or policy (taxes, FDI policy) nature, or strategic reasons like the ‘bandwagon’ effect which is that a company invests abroad because the main competitors are investing abroad.

For a more thorough understanding of possible trade effects of FDI, a more detailed insight into the internationalisation strategy of the multinationals is necessary. To illustrate the internationalisation strategy of the Dutch agrifood multinationals, the next section examines how these companies have recently expanded their business through international mergers and acquisitions. Then, in section 8.8, this overview will be followed by an analysis of these strategies and an interpretation of the implications of the acquisition strategies for international trade. The last part of this chapter aims to show how the findings based on the company case approach can matched with Markusen’s approach to explaining FDI and trade.
<table>
<thead>
<tr>
<th>Reasons for Internationalisation</th>
<th>Unilever</th>
<th>FCDF</th>
<th>Campina</th>
<th>Wessanen</th>
<th>Nutreco</th>
<th>Numico</th>
<th>CSM</th>
<th>Cosun</th>
<th>Avebe</th>
<th>Van Melle</th>
<th>Farm Frites</th>
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<tbody>
<tr>
<td>Penetrate new markets</td>
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<tr>
<td>Create/maintain (dominant) market position</td>
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<tr>
<td>Access to raw material</td>
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<td>Access to specific knowledge (know-how)</td>
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<td>Tariff barriers</td>
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<tr>
<td>Reduce production costs</td>
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<tr>
<td>Reduce transport costs</td>
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<tr>
<td>Follow clients</td>
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</table>
8.7 Dynamics in companies’ portfolios and in their geographical presence

Table 8.4 presented in section 8.5 reflects the ownership of foreign production facilities in 1998/1999. This overview is largely built on information from the 1999 Annual Reports, supplemented with miscellaneous sources of information like the company interviews, newspaper articles and company presentations on the internet. The table falls short in presenting the actual situation, which may change from day to day. Indeed, the Dutch food industry appears to be a dynamic sector in the sense that many firms are buying other companies and selling part of their activities as part of a process of continuous reassessment of their portfolio of activities, brands and (the regional distribution of) productive capacity. Stirred up by fierce international competition, this process aims to increase market shares, encourage sales and gain ‘share holders value’ (in order to remain attractive for shareholders). Companies are constantly looking for opportunities to increase their profitability and, when identified, invest in activities with the highest prospects on growth and expansion. As part of this objective, a company acquires other companies to accelerate the process of so-called autonomous growth of the enterprise. In choosing its targets the company picks those companies that are evaluated to strengthen its position in the market segment(s) with the best prospects. Company business units with poor market results and meagre prospects are often sold off. Also well performing units may be closed down when the unit’s activities do no longer belong to the company’s core activities.

An overview of mergers, acquisitions and joint ventures, involving the selected Dutch multinational food companies over the period January 1999-July 2000, is attached as Appendix 5. That overview gives an impression of changes in multinationals’ portfolios over the period considered. Eurofood (Agra Europe) registered 68 transactions in which at least one of the selected Dutch agrifood multinationals was involved. Based on that overview, the following observations can be made:

- Dutch companies have acted as a buyer in 75 percent of the transactions they were involved in and sold business in 25 percent of the cases. Although the number of transactions does not reflect the scale of foreign ownership, the buying activities of Dutch companies suggest they have expanded their businesses abroad.

- Some companies have been involved in relatively many transactions during the period considered: Unilever accounted for 30 percent of all registered transactions, followed by CSM (17%), Numico (14%), Van Melle (8%), Wessanen (6%) and Nutreco (6%). Unilever, CSM and Van Melle have acted both as a buyer and as a seller, while Numico, Wessanen and Nutreco were mentioned only as a buying company. Companies most active at acquisition are all privately owned companies.

- Co-operative companies like Friesland Coberco, Campina Melkunie and COSUN have also done acquisitions in 1999 and 2000. Yet, compared to the firms mentioned above, co-operative companies are less active when it comes to investing in foreign production.

- Companies bought by the Dutch multinationals are mainly operations producing differentiated products rather than companies processing raw materials like milk.
or meat. This suggests Dutch food companies are largely investing in activities that yield more added value and profits, and that these investments are aimed at strengthening market positions in specialised (niche) markets.

- Some of the companies – Numico, Wessanen – are increasingly operating as a distributor or even a retailer of food and kindred products.
- Most acquisitions of Dutch firms have taken place in Europe. At the same time, Dutch companies also sold businesses in Europe (mainly to other European companies). This observation suggests that Dutch food companies are (in a process of) reorganising their foreign-owned portfolios with a strong regional focus on Europe.
- Next to Europe, most acquisitions were take-overs of US-based companies. No sales were reported of US assets over the period considered. This indicates that Dutch multinationals have expanded business in the US over the period considered.
- Dutch companies also bought food companies in Latin America (four transactions) and Asia (seven transactions). The expansion of business in these two regions is mainly the result of Unilever’s acquisitions: if this giant is excluded, only two registered transactions in Latin America and two in Asia are left. Unilever’s acquisition activities are not as dominant looking at trends in Europe.
- There were no registered transactions in Africa over the period considered. This confirms the impression that Africa is considered to be a peripheral market by the Dutch agribusiness.

These observations indicate that the Dutch food industry is heavily engaged in the process of (further) reorganising their portfolios through foreign direct investments. In this process, the largest Dutch food companies show a strong regional focus on Europe and the US. Further, the multinationals largely invest in companies that produce and/or distribute differentiated processed products, either intermediate products for industrial use or products for household use. Some companies become increasingly involved in the role of distributor or even retailer next to that of producer. Moreover, privately-owned companies seem more active at the acquisition front line than co-operative firms do. In the following section, we discuss the differences in internationalisation strategies and operations undertaken by individual companies to materialise their strategic objectives in more depth. This analysis plays an important part in formulating our conclusions on the impact of foreign direct investments in food and kindred production facilities on trade flows.

### 8.8 Internationalisation strategies of the Dutch food multinationals

International acquisitions of Dutch food multinationals are driven by the inherent desire of these companies to improve their economic performances. The recent take-overs summarised and discussed in the previous section indicate that firms show different acquisition patterns in their strive for better results. First, it is evident that
some companies are in a process of reshaping their product portfolios in order to adapt to the changing market perspectives. These enterprises buy complete or parts of other companies, and at the same time sell parts of existing or newly acquired activities. Key words, in that respect, are reorganisation and refocus of business in order to increase efficiencies and benefit from economies of scale by (further) specialisation. Second, a number of companies are on a growth track due to continuous geographical expansion of present activities. Expansion of geographical markets seems to be the key issue for the management of these multinationals. This strategy also aims to benefit from economies of scale, however not through focusing on a smaller number of products (doing less things better), but through increasing the scale of production of the existing product portfolio (doing the same for more clients). Some examples below may illustrate the distinction between the strategies above mentioned.

Yet, it should be noted that, just as we distinguish between these two strategies for analytical purposes, in reality the two strategies do not exclude each other. When a company reconsiders its product portfolio, its presence in international markets is also reassessed, following the principle that a company pursues improvement of its current market position, which is a combination of product and market. The distinction presented here is more a matter of emphasis in a company’s growth strategy. Further, this emphasis may shift to other matters over time. The following paragraphs characterise the main strategies of the Dutch multinationals.

**Focus on product portfolio**

Unilever, for example, has been reorganising its portfolio quite drastically since it announced to reduce the number of brands from 1600 to 400 (Annual Report 1999). The remaining brands all (should) have leading positions in their market segments. The objective of Unilever’s strategy to focus on a smaller number of (leading) brands is to produce more efficiently and to achieve higher returns on investments in marketing, technology, research and development. As part of this process, the multinational not only sells companies (e.g. its European bakery business to CSM) but also buys others to strengthen its position in the most promising markets (e.g. Ben & Jerry’s, the US ice cream group, and SlimFast Foods, an US dietary supplement producer). In its Annual Report 1999, Unilever announced to reshape production activities into so-called ‘integrated regional networks’, which may be understood as a network of plants tuning their activities to a certain region. As part of the reorientation the company has closed down production facilities in Europe and North and South America and has withdrawn from certain countries that will now be supplied by production facilities in close proximity. Due to technological developments in production as well as in logistics, Unilever calculates it is attractive to expand the scale of production locations. The reorganisation process of Unilever will result in concentration of production in fewer countries and, therefore, may lead to more international trade.

Another example of a company re-shuffling its portfolio rather drastically in about ten years time is CSM. For long, the core activity of this company has been sugar processing and, in addition to that, sugar confectionery and food products. After a process of diversification in the eighties, CSM gradually became more focused on...
bakery ingredients and sugar confectionery. Both operations could benefit from long-term experiences in and extensive knowledge of sugar chemistry. Nowadays, the company is a leading supplier of baking ingredients in Europe and in the USA, largely due to recent acquisitions in this area. Further, CSM has strengthened its position in the European sugar confectionery market through the acquisition of the Finnish-based Leaf in 1999. Several non-core activities of this newly acquired company were immediately sold off. In recent years, the food division has been restructured following the focus on operations that hold strong market positions, primarily A-brands. An increasing focus in terms of activities and regions (namely Europe and the USA) seems to be the guiding principal behind CSM’s recent acquisitions.

Companies like Numico and Nutreco are also good examples of companies adjusting their portfolios. In recent years, these two companies have enlarged their product portfolio enormously in line with existing activities that were taken-up by the firms years ago. Thus, compared to Unilever and CSM, these two companies are not so much eliminating but are gradually enlarging their product portfolio. Since the beginning of the nineties, Numico has developed its business towards new areas in which it could explore its outstanding knowledge of milk components. Having been a producer of baby food for over decades, the company started to expand applications of its in-depth knowledge of the features of milk toward medical food and nutriceuticals (health food). Important element in the strategy to become a major player at the medical and health food markets was an active acquisition policy resulting in take-overs of key players in Europe (Germany and Sweden) and the USA. Nutreco, then, has added the production of salmon to its portfolio in the second half of the nineties, continue to build forward on its knowledge and market position in the field of feed and premix operations for cattle, pigs and poultry. The fast growing consumption of salmon in many developed countries is part of changing preferences towards low-fat, protein-rich alternatives for meat. Investments in fish feed production and acquisitions of fish production (breeding) and processing facilities have offered Nutreco access to this lucrative market. Recent acquisitions adding production and processing facilities to its fish feed activities are an example of forward vertical integration. These types of acquisitions are part of the companies’ explicit strategy to acquire added value to the companies activities by controlling key positions in the product chain.

Cosun’s acquisition activities show some parallels with the above mentioned examples. The company’s core activity was and still is sugar processing on which many other in-house activities (mainly food ingredients based on sugar or sugar alternatives) are based on. Cosun tried to expand its core business and invested in the sugar industry in several central European countries (Slovenia, Croatia, Romania) in 1997 and 1998. Yet, in the course of 1999 and 2000, the company announced to withdraw from these countries because of bad losses and bad prospects. Next, Cosun decided to buy the food ingredients division of Döhler with activities in the fine bakery and food service-sector largely concentrated in the Netherlands, France and the USA. With this acquisition Cosun chose for further exploiting its expertise of sweetening applications and to concentrate in the North-Atlantic markets.
**Geographical focus**

Next to companies reshaping their focus of activities there are companies that emphasise a geographical coverage of their operations in their growth strategy. In fact, these companies are trying to do the same in new markets. Van Melle, for instance, focuses on markets in countries outside West-Europe where the per capita consumption of sugar confectionery products is at a low level and, thus, possibilities for growth in volume are existent. The company regards growth in home markets (*i.e.* the Netherlands and neighbouring countries) only possible by ousting competing products, forming new strategic alliances and/or by take over purchases, and developing new product varieties (Van Melle, Annual Report 1999). Farm Frites is a company also searching for new markets for their potato products. These markets are said to be in countries around the Mediterranean Sea and in Latin America. As a consequence, Farm Frites decided to invest in local companies in these regions. Exports would be a much more expensive alternative because of the relative high transport costs of the products Farm Frites is producing. Nutreco, to mention a third example, has a strong position in the European market for feed and premixes. Recently, it has expanded this core activity towards countries in South and East Europe, and plans to expand these activities in other countries in the world as well (Nutreco, Annual report 1999). A last example in this row is Wessanen. Already in the eighties, Wessanen stepped into the market of natural and health foods by its acquisitions in the US (and significantly changed its product portfolio). Mainly through further acquisitions, the company is now market leader in the distribution of natural and health foods in the States. In the summer of 2000, the company expanded in this area by the take-over of one of Europe’s most important (French-based) supplier and distributor of these products. By expanding its activities geographically in this field, Wessanen is now a key player in the marketing and distribution of natural food products and specialities in a large part of the developed world.

**A mix of portfolio reshuffling and geographical reorientation**

However, as mentioned above, in many cases when a company reshapes its product portfolio it also changes its geographical presence. Numico is one of the companies that can be taken as an example. In 1996, this producer of infant and clinical food sold its products mainly on the European market; around two-third of Euro 875 million. In 1999, its total sales were almost tripled and the share of the US-market increased from only 4 percent in 1996 to 25 percent in 1999. Over this period, Numico first acquired a Swedish-based nutriceutal producer and subsequently expanded in this field in the US through a number of acquisitions. In this latter market, Numico became market leader of food (health) supplements, a market segment with double digit annual growth rates. Within three years time, the company transformed from an EU-oriented firm into an European/American group.

**Implications of the acquisition strategies for international trade**

We now derive some conclusions about whether there is any systematic relation between the way firms focus their acquisition on product portfolios or market portfolio on the one hand and trade on the other hand. It should be noted, however,
that these conclusions are based on the indications and suggestions from interviews without the possibility of further analysing these.

The examples by Unilever and CSM suggest that (re-)focussing on a limited number of products may have a positive effect on trade. Underlying the reorganisation of its product portfolio is the company’s efforts to increase its efficiency. A reduction of the number of products in a company’s portfolio implies that factories become more specialised and standardised, resulting in lower production costs per output unit. Production may become more concentrated so that it can take place in fewer factories whilst the remainder may be of a larger scale, again adding to lower production costs.

To service international markets, the company has to rely more on trade, as a substitute for disinvestment in foreign production.

On the other hand, an expansion of a company’s product portfolio (examples Nutreco and Numico) may also lead to more trade. This is the case when FDI leads to trade of intermediate products from a home-country plant or from an affiliate in another foreign country to the newly acquired affiliate in the host country. Also, when products from the host country are traded (back) to the home country or to affiliates in other foreign countries, FDI would result into more trade. This assumes a kind of vertical FDI, which complements trade flows.

Next, when a firm follows a strategy of expanding geographical markets, this suggests that the company is mainly looking at markets in which it can sell products from its existing portfolio. Than, FDI is mainly of a horizontal nature, which implies that FDI is substituting trade. This suggestion is endorsed by a statement that companies first trade with (i.e. export to) a foreign country partner and only after they have discovered that the foreign market is attractive and offers good prospects, the companies may consider an investment in local production facilities. Only when sales in the foreign market are growing very fast, exports from the home country may exist next to local production, but is only a temporary situation.

The above reasoning results in the conclusion that FDI, aimed to expand the company’s products portfolio, complements trade while FDI with a focus on market expansion would first and foremost substitute trade. These suggested effects are largely based on the assumption that the two FDI strategies can be distinguished. However, as already indicated, in reality this may not be the case: both strategies do not exclude one another, and may even be difficult to disentangle. Furthermore, over time firms may change their focus of their internationalisation strategy, depending on the market prospects of their existing product portfolios. Therefore, it is difficult to point towards an unambiguous relationship between the main characteristics of FDI-strategies and trade flows.

The examples put forward illustrate that reality is much more complicated than theoretical analytical models may encompass. This was also the reason why we expanded the analysis based on the rather general framework by Markusen with company interviews. Yet, both approaches in themselves do not offer us clear answers about the trade-FDI relationship: the Markusen-framework seems to lack in detail and the firm-level information needs a more consistent theoretical framework in order to yield clear answers. It is assumed that an integration of some of the major company features as noticed in our interviews with Markusen’s knowledge-capital model may bring the analysis a step forward.
8.9 Integrating firm features into the Markusen framework of FDI and trade

In the previous sections of this chapter we looked at the company profiles and looked at their major geographical markets they operate in. We analysed the location of their production facilities and the reasons why they internationalise through foreign direct investments. Further, we looked at the dynamics of their portfolios and geographical presence. The list and investigation of all these issues significantly add to our understanding of the forces behind foreign direct investments in the Dutch food industry. However, the survey also sheds light on differences in features and behaviour of the food companies. We argue that, by emphasising firm characteristics and their differences, Markusen’s approach to understand trade and FDI patterns in the agribusiness would better match the reality.

The key elements from the Markusen model are market size, skilled labour and trade costs. The interaction of these factors produces a pattern of national and multinational enterprises. Now, whilst Markusen interprets market size and skilled labour at national level (differences among countries both in terms of market size and in terms of skilled labour abundance) we interpret his model from a firm-level perspective in order to allow for a role of firm-specific features.

Market size
Markusen links market size to country size in terms of GDP. In his conceptual framework, the Netherlands would be presented as a small country and, consequently, the other partner country as large. In this ‘Netherlands versus the rest of the world’ context, Dutch firms would have an incentive to establish a plant abroad as the size of the foreign market is large. Yet, the multinationals in our sample already own many production facilities in various countries and most of them do no longer regard the Netherlands as their main or home market. Therefore, from a company’s point of view, it would be more appropriate to interpret the market size as the geographical markets in which a company operates. Those companies with few plants abroad could be associated with Markusen’s small country position, while those enterprises with many production facilities in many countries would take the ‘large country’ position.

Table 8.3 in section 8.4 presents the regional distribution of the Dutch companies’ sales in 1999. The overview reveals that the Netherlands is still an important market for a number of Dutch agrifood multinationals. Yet, it is also clear that many Dutch-based multinationals largely rely on (Northwest) Europe as their main market. Some companies may even claim that the USA is part of their home market since these companies own many production facilities and/or have large market shares over there.

In order to make this difference useful for our study, we define multinationals to be largely domestic-market players if they sell more than one third of their total sales in the Dutch market and there is no external market more important. Companies are regionally oriented when they sell more than two-thirds of their sales on the European markets including the Netherlands. Those who sell more than one-third in markets outside Europe are called global players. Defined in this way, the following picture emerges: global players are Unilever, Wessanen, and CSM. Numico and AVEBE are on the edge of being European or global players: both sell around 50
percent in the European market but also 30-40 percent at markets outside Europe. Campina Melkunie, Nutreco, and Van Melle may be defined as European oriented, while Friesland Coberco, Farm Frites and Cosun largely operate in the Netherlands and neighbouring countries.

Skilled labour abundance or the application of knowledge capital

In taking up skilled labour as a determinant of FDI, Markusen relies on the ideas of Dunning (1977; 1993) a lot. Dunning claims that one of the conditions needed for firms to have a strong incentive to undertake foreign investments is that the firm should have ownership advantages: that is, a firm must have a product or production process such that the firm enjoys some market power advantage in foreign markets. Those ownership advantages relate to R&D, marketing, product innovation and complexity, and product differentiation. The creation of these advantages requires skilled labour. Multinationals, then, are firms that are associated with a relative intensive use of skilled labour or ‘knowledge capital’. However, while Markusen assumes skilled-labour intensities to be similar in an industry (namely X versus Y, see section 6.3.2), our survey of company profiles indicates that Dutch agrifood multinationals are considerably different in intangible assets. Some firms use ‘knowledge capital’ rather intensively – and thus employ relatively much skilled labour – when it is their strategy to put a lot of effort into research and product development, and invest in the development and marketing of brands. On the other hand, there are companies with little ‘unique’ ownership advantages and that do not invest large sums in R&D and product development. It is not that these enterprises consider innovation to be unimportant: all companies interviewed acknowledge the vital importance of R&D in keeping up their competitive position. Indeed, in order to survive in a long-lasting increasingly competitive environment, companies claim they are searching for ways to differentiate their products and to better target their markets. Yet, only few companies have an explicit policy and are able to spend a significant amount of money on fundamental in-house research that may eventually result in marketable products. The latter companies spending a relatively high amount of money on R&D and marketing may be called the most innovative – or innovative-minded – companies.

One of the companies that emphasise the importance of an in-house top research unit is Numico. This enterprise claims to be the world leader in the use and application of human resources in the production and marketing of specialised food products based on medical-scientific concepts. The company does not provide details about its R&D programme, only that the company employs over 300 researchers, who are largely located in the Netherlands. Other companies that explicitly claim to put in a lot of effort into research are Unilever and Nutreco. Although detailed information

83 Only a few food companies publish data on R&D expenses in their annual reports. Unilever, for example, reports the spending of NLG 2 billion on technology and innovation, an amount equal to 2.3% of the net sales (Unilever Annual report 1999). According to Nutreco’s 1999 Annual report the company invested around Euro 15 million in its R&D programme that year, which is 0.5% of the company’s net sales. FCDF states that innovation is the driving force behind the accelerated development of branded goods with clear added value, and reports operating expenses included R&D for new products amounting to some NLG 33 million in 1999, around 0.4% of the company’s total net sales (FCDF Annual report 1999:42). Overall, the impression is that the amount of money invested in
is unavailable, AVEBE and CSM are assumed to have a significant R&D department, since these companies have in-house laboratories in several countries world-wide where they put in a lot of effort in developing new processes and products. Furthermore, these companies operate to an increasing extent in markets with (very) differentiated products.

Next to (claimed) activities displayed in the field of R&D, the Dutch companies may be called more innovative the more (other) knowledge-based assets they own or develop, like (public known) brands, patents or expertise in the field of marketing and/or management. However, ‘hard’ data on these issues are missing, while at the same time trying to measure (and to define) innovation is very complex (see also Dosi et al., 1988, Grossman and Helpman, 1991b). So, any assessment would have a strong element of subjectivity in it. Nevertheless, publicly available material such as in annual reports and the interviews we held in the context of this study give enough notion to build a wide range of companies that indicates differences in innovativeness among them. We conclude that in our sample Unilever, Wessanen, Numico, CSM, Nutreco and AVEBE are the more-than-average innovative companies. These companies have all build-up a relatively strong portfolio of high-valued, highly differentiated products, of which many consumer-ready products. Furthermore, they explicitly invest in new product and process development, with or without in-house research facilities.

Dutch food companies in Markusen’s framework

Given the assessments of the company profiles in terms of knowledge-based assets – and subsequently in terms of the use of skilled labour - and the size of the (geographical) markets in which local production facilities are owned, figure 8.1 illustrates how the Dutch food industry may fit in Markusen’s framework. The diagram represents an Edgeworth Box with world endowments of skilled and unskilled labour at the vertical and horizontal axes respectively. The Northwest-Southeast diagonal represents the possibility that firms act in a similar market but differ in their use of skilled labour. The Southwest-Northeast diagonal represents the size of the market, indicating that companies are similar in relative factor endowments, but act in an increasing and larger geographical market when moving from the Southwest corner along the diagonal up to the Northeast corner.

Given the differentiation of the firms within the industry, it seems plausible to place the more innovative firms in the Dutch food industry more up to the Northwest-corner than around the centre in the Edgeworth Box as was suggested by the model estimates in chapter 7 (see figure 7.4). And indeed, companies like Unilever, Wessanen and Numico show resemblance to type-v multinationals as defined by Markusen because they largely have their production facilities abroad, with headquarters services in the Netherlands. Further, the geographical division of their activities suggests that these companies could be placed in the so-called mixed regime, between the Southwest-Northeast diagonal and the Northwest-corner in the diagram, and in the upper half of that area in the Box. The less-innovative firms may
then be placed around the Southwest-Northeast-diagonal near the centre, or further down to the Southwest-corner where firms sell predominantly in the Dutch and nearby markets.

Figure 8.1 Knowledge-based assets and international orientation of the Dutch agrifood multinationals

Figure 8.1 illustrates the diversity of the Dutch agrifood multinationals, which has already been mentioned several times in the previous sections. Some of the companies have a world-wide (i.e. a mainly North-Atlantic) orientation, others are largely operating in European markets, a number of them are innovators, and some are laggards in that respect. Further, the figure demonstrates that the most innovating companies are global players, while firms characterised as being relatively less innovative largely operate in the domestic market. Next, the majority of the firms in the sample are placed in the European market segment; of them, some are classified as relatively more innovative than others are.

These observations suggest that there is a positive relation between the use of knowledge-based assets and to what extent companies operate in international markets through FDI. This hypothesis – which is basically one of the premises for Markusen’s model - is supported by a number of examples of companies indicating that their R&D efforts that have culminated into substantial firm-specific knowledge capital, have affected their internationalisation pattern significantly. Numico, for instance, claims the company was able to take-over key market players both in Europe and in the US who were willing to join Numico because of the company’s strong

of its total sales in R&D activities in 1999 (Philips Annual report 1999).
research performances (see Numico report in Appendix 4). CSM claims that just because of a strong R&D position in the area of milk acids and derivatives, the company could jump to the US market and start its international network of bakeries, which is now an important division of the group (see CSM report in Appendix 4). Next, Nutreco also attributes its success to strong and market-oriented R&D activities. This company uses in-house facilities but also leases in expertise and knowledge from specialised research institutes. Much of its R&D programme is aimed at improving the performances of premixes and speciality feeds that are considered to be its key assets (see Nutreco report in Appendix 4). The examples presented suggest that knowledge offers a competitive edge and provides a company with a tool to rapidly expand in international markets through take-overs.

The influence of trade costs on FDI
In Markusen’s framework, hypotheses about the importance of FDI relative to trade depend on the level of trade costs. For high trade costs, both horizontal and vertical multinationals may occur but when trade costs are low MNEs will emerge only if countries are dissimilar in relative endowments. If not, firms will prefer exports above fixed-cost increasing investments in plants abroad and therefore no FDI occurs. Markusen’s model implies that with the lowering of trade barriers, it is less likely that multinationals emerge. Within free trade zones or customs unions like the EU, companies would prefer trade above FDI. On the contrary, we have seen a strong increase in FDI between the Netherlands and EU countries over the last decade. As indicated in chapter 7 this phenomenon could not be explained in the Markusen framework with country-level data. However, firm-level specific features of the multinationals explored in this chapter may offer the clue.

One possible explanation of the misfit of Markusen’s model with the empirical analysis of the simultaneous occurrence of intra-industry trade and intra-industry FDI in the EU might be in the interpretation of trade costs. Markusen c.s. approach tariffs as trade costs. However, as already indicated in section 7.6, this might be a too narrow approach. Company interviews indicate that trade costs do affect a company’s decision to internationalise through exports or FDI (see also table 8.5), yet that these trade costs consist of many different aspects, such as, for example, transport costs, language and cultural differences, among others. 84

However, even if we assume that trade costs are still an important force behind Dutch agrifood FDI within the EU, following Markusen would imply that FDI substitutes trade, as countries are rather similar in size and factor endowments. Yet, the data indicate differently: both FDI and trade have grown over time and trends suggest a complementary relation rather than a substitutionary one. The foregoing analysis of company cases provides us with two arguments that may counteract

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84 Indeed, even within the EU trade is not without cost. These trade costs largely relate to a range of non-tariff trade barriers and transport costs. Non-tariff trade barriers are factors, such as legal requirements concerning labelling, packaging, and product contents, hedging, or language and cultural differences. When a company considers these aspects to be trade barriers, it has an incentive to look for foreign production instead of exports. Further, and probably much more than non-tariff barriers, transport costs are an important characteristic of trade costs, especially for perishable food products. Transport costs depend on distance, natural and/or infrastructure barriers, traffic congestion and the type of product, which determines whether and how it should be packed, cooled, or insured.
Markusen’s conclusions on the type of FDI that dominates and the impact of FDI on trade. One is the increasing importance of intangible assets in the food industry and the other is that each multinational produces more than only one single product.

Most if not all companies interviewed expressed that in order to have success in a largely saturated and highly competitive food market in the EU and US, it is increasingly important to produce and sell ‘distinct’ products, in terms of quality, content, form, and all kinds of other attributes. A company’s assets like product and process know-how, reputations and trademarks are becoming crucial for a company’s performance. Such intangible assets can be spread between plants without resulting in diminishing returns. Markusen states that multinationals emerge when firm-level scale economies and trade costs are large relative to plant-level scale economies. The impression is that in the food industry there is a shift in technology in the direction of firm-level scale economies, away from plant-level scale economies, implying that food production becomes more R&D intensive. Consequently, firm-level activities (such as R&D) that are joint inputs across plants and create firm-level scale economies are getting more weight relative to plant-level scale economies in a company’s decision how to internationalise. The occurrence of trade costs – either high or low - is therefore less important as a determinant of FDI, since indeed ownership advantages offer companies a major incentive to invest in a foreign location. Firm-level scale economies may outweigh falling or low trade costs. By emphasising the importance of firm-level scale economies, FDI may be more vertical than horizontal in nature, as FDI is largely driven by firm-specific, proprietary knowledge and know-how. Following Markusen, vertical FDI would imply a complementary relation to trade.

A second argument to call the implication based on Markusen into question that in the EU FDI would substitute trade is given by Baldwin and Ottaviano (2001). Here, it may be of help to briefly review the arguments behind the Baldwin-Ottaviano model already presented in section 6.3.2.3. and see how their approach relates to empirical analysis.

Baldwin and Ottaviano posit a model in which two-way FDI arises due to imperfect competition and in which intra-industry trade and intra-industry investment go hand in hand. Their main idea follows the lines of the Brander-Krugman (1983) reciprocal-dumping trade model. Based on the assumption that multinationals are multiproduct companies, the authors argue that the decision of how many varieties to produce faces a trade-off between a direct effect (operating profit of the new variety) and the revenue-depressing effect (the level of sales times the price-lowering impact of an extra sale). In the jargon of the multiproduct companies, this revenue-depressing effect is called the ‘cannibalisation’ effect because of the way that each new variety eats into the sales of the firm’s existing varieties. Firms accept a lower rate of return on new varieties produced abroad, when producing the variety abroad reduces cannibalisation. Specifically, companies prefer to produce some of their varieties abroad since trade barriers partially shield home-produced varieties from cannibalisation of foreign-produced varieties, and vice versa.

The latter condition suggests that without trade barriers there would be no FDI at all. Indeed, Baldwin and Ottaviano demonstrate that FDI is conditional to sufficiently low investment barriers. The critical value of investment barriers – the
threshold – falls when trade gets freer. The implication, then, is that when trade is almost free, almost any barrier to FDI would make intra-industry FDI unprofitable. Baldwin and Ottaviano argue, however, that even natural trade barriers such as transport costs and language are sufficient in creating FDI in the EU. Similar statements are made by the company representatives in the interviews, supporting the view by Baldwin and Ottaviano on trade costs. Moreover, the company profiles of the Dutch MNEs in our sample indicate that multinationals do indeed produce (sometimes) a (wide) range of goods.

As some of these real world aspects support the logic of the Baldin-Ottaviano model, the model might be potentially valuable to explain the simultaneous occurrence of trade and FDI. Yet, formal testing of the model is impossible as it requires company data on, for instance, domestic and foreign market shares, prices per product variants, and how each variety’s sales effects the profitability of other varieties. Such firm details are just not available.

**Conclusion**

This section has shown that the understanding of Dutch agrifood FDI patterns is enhanced if Markusen’s framework on FDI and trade is interpreted from a firm-level perspective, allowing for differences in company characteristics. For example, Dutch multinationals differ significantly in terms of knowledge capital. This observation confirms one of the major premises of Markusen’s model, explaining FDI through difference in factor endowments. By focusing on firm features with respect to their specific intangible assets, we are also better able to understand the occurrence of FDI in the European market, which could not be thrashed out by Markusen’s model when using country-level data. The survey indicates that many agrifood companies are able to distinguish their products through knowledge-based assets. Further, in the agribusiness firm-level scale economies are getting more important than plant-level scale economies and encourage FDI even when trade costs are low. Moreover, multinationals are multi-product companies and - as the Baldwin-Ottaviano model illustrates – these firms find the production of a number of product varieties in different countries attractive because FDI reduces the cannibalisation effect of the introduction of new varieties in the home market. Following Baldwin and Ottaviano, Dutch FDI would be predominantly driven by the interaction of product differentiation and market segmentation.
8.10 Impact of FDI on trade

Based on our model estimation in chapter 7, we identified all Dutch agro-related MNEs as horizontal multinationals. According to Markusen’s model, then, FDI is of an intra-industry nature and substitutes trade. Following our findings in the previous sections, we now have ground to modify our earlier conclusions on the trade effects of FDI. We claim that the Dutch agrifood multinationals are much more heterogeneous in order to be able to identify them all as horizontal multinationals. Several companies are able to distinguish themselves with complex, high-valued and highly-differentiated products. These are the companies that invest in R&D, as well as in the development of strong brands in large markets. Other companies also have unique ownership advantages, but they are behind the first group in terms of firm-specific assets in which knowledge capital is embodied.

By emphasising firm-specific features in terms of knowledge capital, we argue that at least part of the Dutch agrifood related FDI complements trade. Indeed, companies that are able to markedly distinguish themselves from competitors in terms of knowledge-based assets may be called vertical MNEs according to Markusen’s jargon. These companies have an argument to geographically fragment production provided differences in local resources (e.g. skilled labour) are large enough. However, if the latter condition does not hold and home and foreign country characteristics in terms of income levels and relative endowments are rather similar, companies may still have an incentive to invest in order to explore firm-level scale economies. Since, aspects that create firm-level scale economies are increasingly important to food companies to be able to compete with other suppliers. In order to exploit these (potential) scale economies a firm prefers to invest abroad rather than export, even if trade costs are relatively low. Following this implies that trade is importantly of an inter-industry nature (see also figure 6.5 and 6.6). Baldwin and Ottaviano add an extra argument in support of FDI, which is the reduction of cannibalisation when introducing a new variety in the home market. They argue that FDI displaces trade, but both are not perfect substitutes. Their assumption of multinationals producing differentiated products makes it possible to understand that FDI is able to go hand in hand with intra-industry trade. Firms invest in producing some varieties abroad. Since these varieties are differentiated, all varieties are sold in all markets regardless of where they are produced. Thus while FDI displaces some exports, it creates trade through reverse imports.

The reasoning behind the trade effects of FDI follows the example in Baldwin and Ottaviano. Starting from an initial situation in which firms are not engaged in FDI, a company moves a single variety factory from the home country to a foreign country. The investment has two immediate effects. The shifted variety is now supplied to the foreign market via affiliate sales rather than exports. This is the trade displacing aspect of FDI. However, the variety is now being supplied to the home market via ‘re-exports’. This is the trade enhancing effect of FDI. Which effect is larger? The answer is crucially dependent on prices. The mark-up on sales in the local market is higher than the mark-up in sales in the foreign market, regardless of where goods are produced. As a consequence, the re-imports into the home market will be priced higher than the exports were prior to the FDI. The volume and value of the re-imports after the FDI are, therefore, less than the volume and value of the exports prior to the FDI. Thus, FDI does replace some trade but not all trade as in the single-product, multi-plant models.
Therefor, it may be concluded that the analysis of features and internationalisation strategies of Dutch agrifood multinationals has improved our understanding of the trade effects of FDI patterns. Only where a company’s knowledge capital stands out Markusen’s approach may offer insights into trade effects of FDI. Irrespective of whether the company invests in EU or in non-EU countries, we expect a complementary effect to trade if FDI is being conducted by an innovative firm, conform Markusen’s model (see section 6.3.2.3). For the less innovative firms we expect a trade substitution effect. However, the extent of substitution depends on the reason for investing abroad. When most important is to circumvent trade costs, than the investment is expected to fully substitute trade. Yet, when the main reason is taking advantage of product differentiation and scale economies, FDI is expected to substitute trade but to a smaller extent than indicated in the former case. The export of one variety against the imports of another variety implies that trade is of an intra-industry nature.
9. Conclusions and Discussion

9.1 Introduction

The general objective of this research is to investigate how patterns of agricultural trade and FDI through the agribusiness can be explained. An important question is whether agricultural trade and agrifood FDI are substitutes or complement to each other, and whether the nature of the relationship between the two can be better understood if firm-specific characteristics are taken into account. The approach applied in this study uses recently developed concepts in trade theories. Empirical investigations focus on Dutch agricultural trade flows and Dutch agrifood multinationals.

The objective of this chapter is twofold: 1) to answer the research questions and to derive conclusions that exceed the relevance of the separate chapters, 2) to indicate future directions for research in the field of agrifood trade and foreign direct investment.

9.2 Research questions and conclusions derived

This study centres on the following question: How can patterns of intra-industry trade in agricultural and food products and foreign direct investment in the agrifood sector be explained, and how can the interaction of trade and FDI be better understood?

In section 1.3, the central research question was subdivided into seven more specific research questions. These were:

1) what are the main theoretical concepts to explain international trade and how have these concepts been used in agricultural trade analyses?;
2) to what extent are Dutch trade flows in agricultural and food products of an intra-industry trade nature?;
3) how can intra-industry trade in agricultural and food products be explained?;
4) what is the theoretical base for understanding the link between FDI and trade?;
5) what are the major trends in Dutch agrifood FDI, how can these trends be explained and how does FDI affect trade?;
6) how do Dutch agrifood MNEs internationalise and how do their strategies affect trade flows?

Chapter 2 reviews the main determinants of international trade as identified by the major trade and growth theories. The survey indicates that a broad range of theoretical concepts is available to explain international trade in agricultural and food products. Theories differ in their assumptions, determinants of trade and consequences. Traditional theories suggest that trade is determined by country differences in natural resources, technology levels and factor endowments. These theories assume homogeneous products and predict inter-industry trade between countries. Modern
trade theories and the trade implications of new growth theories identify imperfect competition, economies of scale, product differentiation, and process and product innovations as the main determinants of trade patterns. Based on these theories, intra-industry trade (IIT) and specialisation in differentiated products can be explained. Overall, recent theoretical and empirical development point to an increasing role for technology in explaining trade patterns.

It may be concluded that recent developments in trade theories have enlarged the toolbox of economists studying trade issues importantly. Country differences in technology are increasingly recognised as an important determinant of trade flows.

Observations of agricultural trade presented in chapter 3 indicate the importance of intra-industry trade and multinationals in the agriculture and food industry. These observations suggest that concepts from modern trade and growth theories are indeed increasingly relevant to agricultural trade analysts. A survey of recent empirical work explaining and projecting agricultural trade patterns demonstrates that many opportunities have been taken for applying these new theories to the modern food economy. However, empirical work on the explanations of IIT shows mixed results. Next, new trade theories practically ignore the possibility of multi-plant and geographically-dispersed firms. Further, there are hardly any empirical studies that have tested the link between knowledge creation and innovation on the one hand and trade in agricultural and food products on the other hand.

The conclusion is that whilst observations demonstrate the increasing relevance of concepts from modern trade theories, the role of technology differences as a determinant of international trade in agricultural and food products is empirically underresearched. This omission is the reason for this dissertation. The objective of this dissertation is to contribute to an expanded base of support for modern trade theories that point towards an increasing role for technology to explain trade.

As a start-off of the empirical part on international trade, chapter 4 presents the Dutch agricultural trade position by analysing trends in exports and imports. The Netherlands is, next to the USA and France, the biggest exporter of agricultural and food products in the world (in terms of net-exporting country even second after the US). The country’s trade relations are largely with other EU countries. It appears that trade in processed products dominate both in exports and imports. Next, the degree of trade overlap (intra-industry trade) in Dutch agricultural trade flows is considerable. Moreover, the level of IIT in trade relations with EU countries is, on average, higher than in trade relations with non-EU-countries.

The conclusion is that Dutch agricultural trade flows largely focus on the EU, are dominated by processed products and are significantly of an intra-industry nature.

Chapter 5 explores in more detail how intra-industry trade in agricultural and food products in the EU can be explained. An explanatory model is designed to investigate determinants of bilateral IIT among EU countries, explicitly focusing on approximations measuring product quality differences. Two questions in particular are
addressed. First, is it relevant to empirically disentangle horizontal and vertical IIT? Second, what source of quality differentiation, endowments (physical capital or human capital) or technology investments, affects the level of vertical intra-industry trade? Estimation results indicate that technology is a determinant only of vertical IIT. Therefore, it is worthwhile to separate horizontal from vertical IIT. In addition to the technology variable, human capital contributes to the explanation of vertical IIT. Further, industry-specific variables used as approximations for differentiated and processed products also add to the explanation of total, horizontal and vertical IIT in agricultural and food products in the EU, and thereby, support the theory that product differentiation is an important determinant of IIT.

The conclusion is that it is worthwhile to distinguish between horizontal and vertical IIT, as both have different determinants. Technology differences and human capital add to the explanation of vertical IIT. Moreover, product differentiation is a determinant of IIT in agricultural products.

In chapter 6 the question of the relation between trade and FDI is addressed. The key elements from empirical observations are that a large part of FDI takes place between countries that are very similar to each other in terms of factor endowments and that FDI flows between developed countries is mainly of an intra-industry nature. The most recent theoretical attempt to understand the interaction between FDI and trade is Markusen’s ‘knowledge capital model’. In this model, he connects Dunning’s OLI-paradigm with company (technology) and country characteristics. Key elements in this framework are firm-level scale economies, plant-level scale economies and trade costs. A company’s decision to go multinational reflects a trade-off between the loss of economies of scale associated with multiple plants and the reduction in transport costs it can achieve by producing locally for each market (i.e. a trade-off between scale and proximity). Market size, skilled labour differences and the interplay between the two are the major determinants of the type of FDI and, consequently, of trade effects from FDI.

A quick scan of the largely US-based existing empirical literature on agrifood multinationals learns that most researchers in this field have focussed on the determinants of FDI (using [elements from] the OLI-paradigm as mainstay), while few have concentrated their analysis on the interaction with trade. Those empirical investigations that did, have provided mixed results. The studies undertaken have followed different approaches: some refer to correlation of exports and FDI, others emphasise the impact of exchange rate developments or protection levels on FDI and trade.

It may be concluded that earlier studies on the relation between trade and FDI have not resulted in clear conclusions. Recent theoretical developments by Markusen c.s. seem to offer a consistent analytical framework for research into the systematic effects of FDI on trade. An application of that framework to agriculture could add to the existing empirical base to explain the interaction between agrifood trade and FDI.

Chapter 7 reports on trends in agrifood related inward-FDI to and outward-FDI from the Netherlands. Most FDI is with EU countries, Switzerland and the USA. It appears that Dutch exports and outward-FDI are positively related in the country’s bilateral
relations with major trading partners in the EU as well as with the USA and Switzerland. Model estimates based on Markusen’s approach indicate that FDI can be explained by market size, similarity in market sizes and the interplay between market size and relative factor endowment. This implies that the more FDI is expected between the Netherlands and another country a) the larger the common market of the two countries; b) the more similar both countries are in terms of market size, and c) the more countries are similar in terms of market size and relative abundance of skilled labour. On the other hand, neither skilled-labour abundance, nor trade costs is a convincingly significant factor of explanation. Overall, neither the key motivation for vertical MNEs (which is to benefit from differences in skilled-labour endowments) nor the main motivation for horizontal MNEs (namely, to avoid or circumvent trade costs) stands out in the estimated model. Model results are even in contrast with observations, namely that many if not all Dutch multinationals invest in EU countries despite zero (or low) trade costs. The counterintuitive results of the empirical testing suggest that the model applied is not able to capture fully the complexities of the real world.

The conclusion is that the empirical testing of Markusen’s framework leads to ambiguous results. The model calculations support some hypotheses, yet the impact of skilled-labour abundance and trade costs is insignificant. Further, model outcomes project that Dutch agrifood multinationals would not invest in other EU countries, which is a contradiction to the facts.

In chapter 8 we turn to a company case study approach to enrich our understanding of the trade-off between agrifood FDI and trade. A selection of Dutch agrifood multinationals in terms of profile, international activities and internationalisation strategies were investigated. As companies do not report nor register whether the companies’ turnover in foreign markets was realised through exports from the Netherlands or by foreign affiliates, the relationship between trade and FDI can only be deduced through interviews and/or indirectly through combining relevant firm features. The companies were questioned about their motivations to invest in foreign countries and how foreign affiliate sales affect exports from the Netherlands. The outcomes of the interviews indicate how divers the Dutch agribusiness internationalises. Firms differ in geographical focus and in their main reasons to invest abroad. Firms also show different patterns in acquisition. Some seem to focus on a re-organisation of their product portfolio while others emphasise geographical expansion. Verbal information suggests that the former strategy may result in more trade, so that FDI and trade are complementary, while the latter strategy may imply that FDI substitutes trade. Many times company representatives emphasise specific firm features, such as knowledge of process, brands, and other advantages that the company might possess. For the Dutch agribusiness there might be a positive relationship between the ownership of knowledge-based assets and a presence in international markets through FDI: the most innovative companies operate most internationally. This finding is one of the basic assumptions of Markusen’s knowledge-capital model. Some examples indicate that knowledge offers a considerable competitive advantage, providing a company with a powerful tool to rapidly expand in international markets through FDI.
Markusen’s theoretical approach in explaining FDI and trade seems appropriate in understanding Dutch FDI especially when firms have distinctive knowledge-based assets. These assets, which allow a company to benefit from firm-level economies of scale, are becoming increasingly important in the food industry. To hold controle over these assets is an important reason for FDI for some Dutch companies. Those Dutch companies that lack such assets would invest abroad only if can circumvent trade costs, according to Markusen’s model. Markusen therefor can not explain FDI through these companies in the EU. A model designed by Baldwin and Ottaviano probably could. That model assumes that most multinationals produce more than one single product. FDI would predominantly be determined by product differentiation, and driven by the effort to minimise a cannibalisation effect from introducing new varieties on the market. The Baldwin-Ottaviano model is not estimated in this study as it requires very specific firm-level data.

The relation between Dutch agrifood related FDI and trade largely depends on a firm’s knowledge-based assets. Such assets lead to (product and process) innovation and product differentiation. Companies that possess these assets, invest abroad to benefit from differences between countries factor endowments, the latter interpreted as differences in knowledge assets or skilled-labour abundance. When an innovative firm invests abroad, we expect a complementary trade effect: FDI and trade are based on a comparative advantage. For the less innovative firms we expect a trade substitution effect. However, the extent of substitution depends on the reason for investing abroad. When most important is to circumvent trade costs, than the investment is expected to fully substitute trade. Yet, when the main reason is taking advantage of product differentiation and scale economies, FDI is expected to substitute trade but to a smaller extent than indicated in the former case. The export of one variety against the imports of another variety implies that trade is of an intra-industry nature.

9.3 Practical implications of the study

It is interesting to think about the consequences of these findings for future trade and FDI patterns. Especially for agriculture, further trade liberalisation in the context of World Trade Organisation (WTO) negotiations and the enlargement of the EU with countries from central and eastern Europe are important upcoming events to be considered. Both events imply a lowering of trade costs as trade tariffs would be reduced. In principal, this would result into more trade opportunities world wide, and especially within the enlarged European region. However, the West-European agriculture and food industry fears increased competition in the present EU market as the Union has to give up some of its protectionism nature for agricultural and food products, while expansion of the Union with CEECs is expected to result into a sharp increase of cheap products from the East in the West-European market. Furthermore, a reduction of support for exports to markets outside the Union could result into less trade opportunities for those agricultural products that heavily depend on the export restitution instrument. Although some sub-sectors may expect to gain from a further opening up of external markets, the general expectation is that for some sub-sectors
the consequences of further trade liberalisation as well as enlargement may be negative and that these trade policy changes will induce rather strong structural adjustments. The question is to what extent the findings of this study could contribute to an (ex-ante) evaluation of possible impacts of these events.

This study indicates that the Dutch agricultural trade is to a considerable extent of an intra-industry nature. Investments in technology and in human capital, as well as product differentiation add markedly to the explanation of IIT levels. Countries and companies are able to create a comparative advantage over competitors through investments in production and process technology and in human capital. Through FDI, companies are able to take full advantage of their knowledge-based assets, while exports run the risk of asset dissipation. Yet, the study also shows that IIT and FDI mainly occurs between the Netherlands and other EU or developed countries, not so much with, e.g., CEECs.

Indeed, intra-industry trade levels of bilateral trade between the Netherlands and CEECs are rather low. This is caused by a large trade surplus of the Netherlands with this region (chapter 4). Yet, where trade overlap occurs, the dominance of the vertical component in IIT is striking (Van Berkum, 1999). This means that intra-industry trade is mainly in products differentiated in quality with the Netherlands exporting the high quality varieties and importing lower quality varieties from CEECs. This Dutch-CEECs trade feature is similar to the picture for bilateral trade between the EU and the CEECs. This indicates the technological lead of the EU over CEECs. This further indicates that to an important extent there is a complementary relationship between agriculture in the East and the West.

The trade increase between the Netherlands and the EU on the one hand and CEECs on the other hand is certainly a sign of closer relations between both regions. This is not only revealed by more intensive trade relations but also by an increasing presence of European companies in the CEECs’ food sector. Many Dutch agrifood companies have shown their interest in the region in recent years. Interviews with Dutch MNEs revealed that this type of FDI is only to a limited extent driven by tariff-jumping. This somewhat surprising denial of the impact of tariffs is confirmed by studies by Genco et al. (1993) and the OECD (1998). Both studies claim that (expected) market opportunities is the main rational of FDI in the CEEC food sector. Indicators for market growth for processed food are reasonable economic growth figures in most countries in recent years and prospects of increasing spending power by an increasing number of people. Foreign investments aim to position investors in CEEC markets to enable them to satisfy growing local demand for high-value-added food products such as confectioneries and beverages. Contrary to what might have been expected, FDI does not seem particularly motivated by aiming to benefit from lower production cost due to lower prices for natural resources (raw agricultural material) and/or cheap labour. According to an overview compiled by OECD (1998), FDI in resource intensive activities (grain milling, meat processing) is considerably less in agro-industries than the production of highly processed food (confectionery, beverages, tobacco).

In case the motivation to invest in the CEECs’ food sector is mainly market seeking (and driven by the prospect of a growing demand for food products in that market), FDI may be considered to complement to rather than to substitute exports.
Since the start of the reform process in CEECs, both trade and FDI flows have increased significantly, an indication that there might be a positive relation between the two. However, as emphasised in this study, the relationship between trade and FDI is a complex one: given the rational for FDI, exports and FDI may complement or substitute each other, depending on motives for FDI, host country and firm characteristics. Therefore, it is impossible to deduce a general projection on the adjustments in trade patterns due to changes in trade policies. The conclusions drawn at the end of chapter 8 should also be repeated here, which essentially implies that adjustments will be smoother when Dutch agrifood business explores its technological lead over competitors in CEECs or in other regions in the world.

9.4 Contributions of the study and implications of findings for future trade and FDI analyses

This study has been an effort to contribute to the empirical base of elements from the new trade theories that may help to explain the occurrence of similar patterns in both agricultural trade and agrifood related FDI. In this study it was shown that Dutch agricultural trade and FDI is to a considerable extent of an intra-industry nature, which cannot be explained satisfactorily by the traditional neoclassical theory of comparative advantage. Empirical literature using elements from the new trade theory confirms that IIT varies with country and product characteristics across industries. What we have added here is that investments in technology and in human capital, as well as product differentiation can contribute importantly to the explanation of the levels of IIT, especially trade in vertically differentiated products that are distinctive in terms of quality. Through investments in production and process technology and in human capital, countries and companies are able to create a comparative advantage over competitors.

Through FDI, firms are able to take the full advantage of their knowledge-based assets, while exports run the risk of asset dissipation. Traditional trade theory considers trade and FDI to be substitutes, while empirical observations indicate parallelism between trade and FDI patterns. Research into the link between trade and FDI, however, suffers from a rather limited theoretical framework to test hypotheses. The main concept was developed by Markusen’s knowledge-capital model. His concept offers a useful tool for analysing foreign investments and the interaction of FDI to trade. This framework was applied in the Dutch agrifood sector. Yet the results indicate mixed support to the model’s premises. This may be due to the fact that the theoretical framework is mainly a comparison between countries, using country-level data. This level of aggregation may hide important features of the relationship between trade and FDI features that can only be picked up with company level data. By focusing on country-level data Markusen’s conceptual framework implies that the endowments (technology) used in separate economic sectors would reflect the general characteristics of the whole economy. However, this implication is not plausible to the real world. In fact, our Dutch case studies show that even more so: companies within the agrifood sector are definitely heterogeneous in terms of technology. Therefore, the relation between FDI and trade depends on a firm’s knowledge-based assets, in
correspondence with country characteristics like income levels and resources available.

A further development of theory should address the issue of which and who firm-specific features affect a company’s mode of internationalisation and how firm-specific assets may determine patterns of FDI and, subsequently, of trade. Theoretical development, then, should focus on bridging the gap between the macro- and micro approach in a more formal way than executed in this study. The Baldwin-Ottaviano model takes a micro- or firm-level approach and, therefore, seems an interesting alternative to Markusen’s macro-approach to substantiate the relationship between trade and FDI. By explicitly assuming multiproduct multinationals, the model argues that the simultaneous occurrence of intra-industry FDI and intra-industry trade is caused by product differentiation. However, the empirical testing of this approach is very difficult, with several equilibria to be estimated requiring very specific data on, for example, operating profits per variety, sales, prices and trade costs experienced by the company. Given the lack of such data, empirical testing of this conceptual framework is practically impossible.

Indeed, matching theory with formal statistical analysis is a real problem. Empirical work in Europe on testing the existing theoretical developments on intra-industry trade and FDI is seriously hampered by a lack of internationally compatible data on the explanatory variables identified by the theory. For instance, theory suggests that when determinants like economies of scale and market structure are taken up in the model, IIT may be better explained. However, at the moment, European data necessary to calculate concentration rates or indicators of minimum efficient scale of production are incomplete (for some countries only) or internationally incomparable due to national differences in data definitions. Next, there is no unified database on agrifood related FDI covering all EU countries, or a database on characteristics of multinationals. Most of the empirical work on trade and FDI involves the USA, which reflects the availability of data.

Linked to data availability, the question is how an explanatory variable identified in the theory could best be approximated. This study suggests that both the explanation of intra-industry trade and intra-industry FDI may be enhanced by including variables indicating the level of technology (or innovative capacity) and product differentiation. Yet, how to measure these variables? In this study, we used data on patents and skilled labour at sector level. However, the accuracy of these indicators are debatable as a measurement of technology levels since technology levels can be measured in many different ways, e.g. as an input (like R&D investments, patents) or as an output of innovation (new products, performance). Further, FDI stocks were used to indicate foreign production activities of a sector. We commented on the usability of these data in Appendix 3. Moreover, FDI is an input and not the result of multinationals’ activities. The result is rather the output or sales of foreign affiliate sales created through FDI. Yet, except for US companies, data on foreign affiliate sales are non-existent.

In sum, theoretical developments on trade and FDI have come a long way in recent decades but empirical testing lags behind importantly. Therefore, collecting data of appropriate approximations at the right level of aggregation to quantify the phenomena explaining IIT and FDI as suggested by the theory is one of main
challenges for further research in the determinants of intra-industry trade and FDI, and the interaction between the two.
Samenvatting

In dit onderzoek worden patronen in de agrarische handel en in buitenlandse investeringen in de voedingsmiddelenindustrie onderzocht. Een belangrijke vraag is hoe beide met elkaar samenhangen. Via handel en via buitenlandse directe investeringen (BDI) internationaliseren bedrijven hun activiteiten. Vaak beschouwen de belangrijkste economische theorieën beide manieren als alternatieven. Echter, empirische observaties duiden eerder op een complementaire relatie tussen handel en BDI dan op een substitutieverband. Deze dissertatie tracht verklaringen te vinden voor patronen in zowel de agrarische handel als in de BDI, en voor de interactie tussen beide.

Het empirische gedeelte van het onderzoek richt zich op Nederlandse handelsstromen en op Nederlandse multinationale agribusiness bedrijven. De Nederlandse agribusiness is een interessant geval omdat deze een belangrijke handelspositie in de wereld inneemt. Tegelijkertijd is Nederland een belangrijke bron en bestemming van buitenlandse investeringen in de agrarische sector.

Handelstheorieën en toepassing in agrarische handelsanalyses


Waarnemingen van handelsstromen en buitenlandse investeringen tonen een groeiend belang van intra-industrie handel en multinationale ondernemingen in de landbouw- en voedingsmiddelenindustrie aan. Deze observaties suggereren dat concepten vanuit de moderne handels- en groeitheorieën in toenemende mate relevant zijn voor de analyse van agrarische handel. Hoofdstuk 3 presenteert een overzicht van recent uitgevoerd empirisch onderzoek dat agrarische handelspatronen tracht te verklaren en te voorspellen. Dat overzicht laat zien dat er al veel mogelijkheden zijn benut om nieuwe handelstheoretische inzichten toe te passen op de voedingsindustrie. Echter, empirische onderzoek gericht op de verklaring van intra-industrie handel geeft tegenstrijdige resultaten. Voorts zijn er nauwelijks empirische studies waarin de
relatie is onderzocht tussen kenniscreatie en innovatie aan de ene kant en handel in landbouw- en voedingsproducten aan de andere. De invloed van multinationale ondernemingen is in het geheel niet opgenomen in agrarische handelsanalyses. Deze dissertatie tracht deze hiatenaan te vullen met empirisch onderzoek.

**Agrarische handelsstromen van Nederland**

In hoofdstuk 4 wordt ingegaan op de handelspositie van de Nederlandse agribusiness. De analyse van de handelsstromen maakt duidelijk dat Nederlandse agrarische handelsrelaties met name op andere EU-landen gericht zijn. Voorts blijkt dat zowel bij de uitvoer als bij de invoer de verwerkte landbouw- en voedingsproducten domineren. Daarbij is sprake van aanzienlijke intra-industrie handel.

**Verklaringen voor intra-industrie handel**


**Markusen’s kennis-kapitaal model**

Onderzoek naar de relatie tussen handel en BDI ondervindt hinder van een nogal beperkt theoretisch kader voor hypothesetoetsing. De theorie van multinationale ondernemingen concentreert zich op bedrijfscharacteristieken die leiden tot het ontstaan van multinationale ondernemingen, zonder aandacht te schenken aan de handelseffecten daarvan. De meest recente theoretische bijdrage aan het begrip van de relatie tussen BDI en handel is Markusen’s ‘kennis-kapitaal model’, dat in hoofdstuk 6 uitgebreid wordt beschreven. In dit model verbindt Markusen Dunning’s OLI-paradigma met bedrijfs- en landenkenmerken. De sleutelcomponenten in het model zijn schaalvoordelen op bedrijfsniveau, schaalvoordelen op fabrieks niveau, en handelssystemen. Bij een bedrijfsbeslissing om in het buitenland te investeren, wordt een afweging gemaakt tussen het verlies van schaalvoordelen die worden
geassocieerd met meerdere fabrieken en de reductie in handelkosten die zijn te bereiken door lokaal te produceren voor elke markt (d.w.z. er is een wisselwerking tussen schaal en nabijheid). Marktomvang, verschillen in de beschikbaarheid van geschoolde arbeid, en de interactie tussen deze twee zijn de belangrijkste determinanten van BDI, en, daarmee, van de handelseffecten van BDI. Hierbij is het onderscheid tussen zogenaamde verticale en horizontale BDI van belang: de eerste worden gepleegd door bedrijven die willen profiteren van verschillen tussen landen in geschoolde arbeid, terwijl de tweede door handelsbarrières worden gedreven. Markusen’s conceptuele model lijk een van de meest consistent analytische modellen die beschikbaar zijn om systematisch de effecten van BDI op handel empirische te onderzoeken, maar is nog nauwelijks getoetst.

Toepassing van Markusen’s model
In hoofdstuk 7 wordt het kennis-kapitaal model toegepast om Nederlandse agro-gerelateerde BDI te verklaren en daar vervolgens de handelseffecten van BDI vanaf te leiden. Er wordt een simpel model ontworpen. Modelschattingen geven aan dat BDI kunnen worden verklaard door de marktomvang, de overeenkomst in marktomvang en de wisselwerking tussen marktomvang en relatieve verschillen in bezit van productiemiddelen. Dit houdt in dat BDI tussen Nederland en een ander land positief wordt beïnvloed (toeneemt) als a) de beide landen gezamenlijk een grote gemeenschappelijke markt hebben; b) de twee landen sterk op elkaar lijken in termen van marktomvang; en, c) beide landen op elkaar lijken wat betreft de marktomvang en de beschikbaarheid van geschoolde arbeid. Echter, anders dan uit Markusen’s model zou volgen, kunnen verschillen in geschoolde arbeid op zichzelf de Nederlandse BDI niet verklaren. Dit houdt in dat voor de Nederlandse agribusiness de kernmotivatie voor verticale BDI ontbreekt. Ook de belangrijkste reden voor horizontale BDI (namelijk handelsbarrières vermijden) is afwezig volgens deze modelschattingen. De modelresultaten geven daarmee een uitkomst dat niet lijkt te sporen met de werkelijkheid: wanneer Nederlandse bedrijven geen motivatie hebben voor buitenlandse investeringen omdat ze daarmee geen voordeel behalen uit verschillen tussen landen in geschoolde arbeid of door handelsbarrières te omzeilen, hoe kunnen dan de vele investeringen van Nederlandse multinationals in andere EU-landen worden verklaard?

Bedrijfsinterviews
Analyses op bedrijfsniveau maakt het mogelijk de wisselwerking tussen agrogrammerelateerde BDI en handel beter te begrijpen. In hoofdstuk 8 zijn de profielen, internationale activiteiten en internationaliseringstrategieën van een selectie van Nederlandse multinationals met hoofdactiviteiten in de agribusiness bestudeerd. Omdat de ondernemingen niet rapporteren of omzet in het buitenland wordt gerealiseerd door export dan wel door een buitenlands filiaal, kan het verband tussen handel en buitenlandse investeringen alleen maar worden afgeleid met behulp van interviews en/of indirect door het combineren van relevante bedrijfskenmerken. De ondernemingen zijn ondervraagd over hun motivatie om in het buitenland te investeren en hoe hun verkopen via buitenlandse filialen de export vanuit Nederland beïnvloedt. Uit de antwoorden blijkt hoe divers de Nederlandse agribusiness
internationaliseert. Ondernemingen verschillen in geografische focus en in hun belangrijkste redenen om in het buitenland te investeren. Ondernemingen hebben ook een verschillend acquisitiepatroon. Sommige lijken gericht op een reorganisatie van hun productportfolio terwijl andere ondernemingen geografische expansie als belangrijkste strategie benadrukken. Interviews geven de indruk dat de eerste strategie kan resulteren in meer handel, zodat BDI en handel complementair zijn, terwijl de tweede strategie kan inhouden dat BDI handel vervangen. In de reacties van het bedrijfsleven wordt ook veelvuldig gewezen op specifieke bedrijfsactiva, zoals kennis van procédés, merken, en andere voordelen die het bedrijf zou bezitten ten opzichte van andere. Voor de Nederlandse agribusiness zou er een positieve relatie tussen eigendom van op kennis gebaseerde activa en de aanwezigheid op internationale markten door middel van BDI kunnen bestaan: de meest innovatieve bedrijven opereren het meest internationaal. Dit is ook een van de basisveronderstellingen van Markusen’s kennis-kapitaal model. Enkele voorbeelden tonen aan dat het bezit van kennis een aanzienlijk concurrentievoordeel geeft en dat het Nederlandse ondernemingen ook een sterke troef biedt voor snelle expansie op internationale markten via BDI.

Toepasbaarheid van Markusen’s model
Markusen’s theoretische benadering voor de verklaring van BDI en handel lijkt geschikt om Nederlandse BDI te begrijpen als ondernemingen op kennis gebaseerde activa bezitten. Deze activa, die bedrijven in staat stellen te profiteren van schaalvoordelen, worden steeds belangrijker in de voedingsmiddelenindustrie. Voor een aantal Nederlandse bedrijven is de controle over deze kennisactiva een belangrijke reden voor BDI. Als Nederlandse bedrijven deze activa ontberen, plegen ze volgens het model van Markusen alleen BDI als ze daarmee handelsbarrières kunnen omzeilen. Markusen geeft dan geen uitsluitend over investeringen van deze bedrijven binnen de EU, waar handelstarieven afwezig zijn. Een model ontworpen door Baldwin en Ottaviano kan dat misschien wel. Dat model gaat uit van de veronderstelling dat multinationale ondernemingen meer dan een enkel product produceren. Investeringen in het buitenland zouden voornamelijk bepaald worden door productdifferentiatie en gedreven worden door pogingen om het kannibalisatie-effect van de introductie van nieuwe producten op de markt zo klein mogelijk te houden. Het Baldwin-Ottaviano model is in deze studie niet getoetst aangezien daarvoor zeer specifieke bedrijfsinformatie nodig is en die ontbreekt.

Conclusies: wat is de relatie tussen handel en buitenlandse directe investeringen?
Deze studie laat zien dat de relatie tussen BDI van de Nederlandse agribusiness en handel in landbouwproducten grotendeels afhankt van op kennis gebaseerde activa van de ondernemingen. Deze activa leiden tot (product- en proces-) innovatie en productdifferentiatie. Bedrijven die dit soort activa bezitten, investeren in het buitenland om te profiteren van verschillen in productiefactoren – geïnterpreteerd als verschillen in kennisactiva of geschoolde arbeid. Wanneer een innovatief bedrijf in het buitenland investeert, verwachten we een complementair handelseffect: handel vindt plaats op basis van comparatieve voordelen. Voor de minder innovatieve bedrijven, verwachten we dat handel en BDI elkaar vervangen. De mate waarin die
substitutie plaatsvindt, hangt af van de reden om in het buitenland te investeren. Is dat vooral om handelsbarrières te omzeilen, dan zal de investering handel volledig vervangen. Is de belangrijkste reden voor BDI echter om te profiteren van productdifferentiatie en schaalvoordelen, dan zal BDI handel weliswaar vervangen maar niet geheel. De export van een variëteit tegen de import van een andere variëteit houdt in dat er sprake is van intra-industrie handel.
References


Dimaranan, Betina V. and Robert A. McDougall 2002, *Global Trade, Assistance, and Production: The GTAP 5 Data Base*, Center for Global Trade Analysis, Purdue University.


DNB (De Nederlandse Bank), Statistical Bulletin, various issues, DNB, Amsterdam.


Jansen, J., 2000, ‘Geallieerden’ beheersen meer dan 50% Europese retail, Zuivelzicht, jgn 92, 10 mei 2000, pp.10-13

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Oustapassides, K., et al. 1995, A review of some structural change data within the European food industries, University of Reading, Reading UK, Concerted Action on Structural Change in European Food Industries, Discussion Paper Series, no.9.


Van Leeuwen, N. and H. Timmer, Labour splits in GTAP, an evaluation and some suggestions for further development, paper presented at the Second Annual Conference on Global Economic Analysis, June 1999, Denmark


APPENDICES
Appendix 1  Definition and classification of product groups

Fifty-seven products were included in the calculation and analysis of IIT-levels. In general, product detail is at the SITC three-digit level. Studies focused on non-agricultural products mainly use five-digit levels of SITC to emphasise differences in product characteristics and to avoid that the two-way trade recorded would mainly be a statistical phenomenon. However, when using a disaggregation below the SITC four-digit level, there is considerable risk of defining away two-way trade in quality differentiation (Torstensson, 1991). Greenaway and Milner (1986) claim that ‘a professional consensus does exist in regard to the third digit of the SITC as a reasonable, initial approximation of an industry’ (p.74). The same authors illustrate that average levels of IIT for the United Kingdom calculated at three- and at four-digit level are practically the same for the section ‘Food and live animals’. In taking the three-digit level, we follow empirical studies focusing on agricultural products like those by McCorriston and Sheldon (1991) and Roberts (1995). Yet, in our analysis some products at three-digit level are further disaggregated to four- or five-digit level. For instance, when much heterogeneity is assumed at 3-digit level, in terms of process and application (for industry or for household consumption).

Products are classified into four groups (see Table 2 in this Appendix). Criteria for classification are 1) level of processing (raw, primary or processed by an [off-farm] industry) and 2) product use (industrial or consumer). This classification is in line with the UN definition of Broad Economic Categories (of 1971), which Roberts (1995) applied as well.

Table 1 Products in sample

<table>
<thead>
<tr>
<th>SITC code</th>
<th>Definition</th>
<th>Classification</th>
<th>SITC code</th>
<th>Definition</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>Live animals</td>
<td>C1</td>
<td>06</td>
<td>Sugar, sugar prep., honey</td>
<td></td>
</tr>
<tr>
<td>01</td>
<td>Meat</td>
<td></td>
<td>061</td>
<td>Sugar and honey</td>
<td>C3</td>
</tr>
<tr>
<td>011</td>
<td>Meat, fresh/chilled/frozen</td>
<td>C2</td>
<td>062</td>
<td>Sugar confectionery</td>
<td>C4</td>
</tr>
<tr>
<td>012</td>
<td>Other meat</td>
<td>C2</td>
<td>07</td>
<td>Coffee, tea, cocoa, spices</td>
<td></td>
</tr>
<tr>
<td>016</td>
<td>Meat, dried/salted/etc</td>
<td>C4</td>
<td>071</td>
<td>Coffee</td>
<td></td>
</tr>
<tr>
<td>017</td>
<td>Meat preparations, etc.</td>
<td>C4</td>
<td>0711</td>
<td>Unroasted coffee</td>
<td>C1</td>
</tr>
<tr>
<td>02</td>
<td>Dairy products &amp; eggs</td>
<td></td>
<td>0712</td>
<td>Roasted coffee</td>
<td>C4</td>
</tr>
<tr>
<td>022</td>
<td>Dairy, excl. butter and cheese</td>
<td></td>
<td>0713</td>
<td>Extracts</td>
<td>C4</td>
</tr>
<tr>
<td>022</td>
<td>Milk/cream, not</td>
<td>C4</td>
<td>072</td>
<td>Cocoa</td>
<td></td>
</tr>
<tr>
<td>SITC code</td>
<td>Definition</td>
<td>Classification</td>
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<td>Definition</td>
<td>Classification</td>
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</tr>
<tr>
<td>0222</td>
<td>Milk/cream, concentrated</td>
<td></td>
<td>0721</td>
<td>Cocoa beans</td>
<td>C1</td>
</tr>
<tr>
<td>02221</td>
<td>Skimmed milk powder</td>
<td>C3</td>
<td>0722</td>
<td>Cocoa powder</td>
<td>C3</td>
</tr>
<tr>
<td>02222</td>
<td>Milk powder</td>
<td>C3</td>
<td>0723</td>
<td>Cocoa mass</td>
<td>C3</td>
</tr>
<tr>
<td>02223</td>
<td>Condens without sugar</td>
<td>C4</td>
<td>0724</td>
<td>Butter and fats</td>
<td>C3</td>
</tr>
<tr>
<td>02224</td>
<td>Condens with sugar</td>
<td>C4</td>
<td>073</td>
<td>Chocolate and other prep.</td>
<td>C4</td>
</tr>
<tr>
<td>0223</td>
<td>Yoghurt etc.</td>
<td>C4</td>
<td>08</td>
<td>Feeding stuff for animals</td>
<td></td>
</tr>
<tr>
<td>0224</td>
<td>Whey</td>
<td>C3</td>
<td>0813</td>
<td>Oilcakes</td>
<td>C3</td>
</tr>
<tr>
<td>023</td>
<td>Butter</td>
<td>C4</td>
<td>0819</td>
<td>Offals, other feed</td>
<td>C3</td>
</tr>
<tr>
<td>024</td>
<td>Cheese and curd</td>
<td>C4</td>
<td>09</td>
<td>Miscellaneous food</td>
<td></td>
</tr>
<tr>
<td>025</td>
<td>Eggs</td>
<td>C2</td>
<td>091</td>
<td>Margarine</td>
<td>C4</td>
</tr>
<tr>
<td>04</td>
<td>Cereals and cereal</td>
<td></td>
<td>098</td>
<td>Food preparations, n.e.s.</td>
<td>C4</td>
</tr>
<tr>
<td>041</td>
<td>Wheat</td>
<td>C1</td>
<td>11</td>
<td>Beverages</td>
<td></td>
</tr>
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<td>042</td>
<td>Rice</td>
<td>C2</td>
<td>111</td>
<td>Non-alcoholic beverages, n.e.s.</td>
<td>C4</td>
</tr>
<tr>
<td>043</td>
<td>Barley</td>
<td>C1</td>
<td>112</td>
<td>Alcoholic beverages</td>
<td>C4</td>
</tr>
<tr>
<td>044</td>
<td>Maize</td>
<td>C1</td>
<td>12</td>
<td>Tobacco and tobacco man.</td>
<td></td>
</tr>
<tr>
<td>046</td>
<td>Meal and flour of wheat</td>
<td>C3</td>
<td>121</td>
<td>Tobacco, unmanufactured</td>
<td>C1</td>
</tr>
<tr>
<td>048</td>
<td>Cereal preparations</td>
<td>C4</td>
<td>122</td>
<td>Tobacco, manufactured</td>
<td>C4</td>
</tr>
<tr>
<td>05</td>
<td>Fruits and vegetables</td>
<td></td>
<td>22</td>
<td>Oilseeds, oil nuts and kernels</td>
<td>C1</td>
</tr>
<tr>
<td>054</td>
<td>Vegetables, fresh/cooked/frozen</td>
<td></td>
<td>24</td>
<td>Cork and wood</td>
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<tr>
<td>0541</td>
<td>Fresh potatoes</td>
<td>C2</td>
<td>248</td>
<td>Wood, shaped or simply worked</td>
<td>C1</td>
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<td>0544</td>
<td>Fresh tomatoes</td>
<td>C2</td>
<td>29</td>
<td>Crude animal and vegetable material, n.e.s.</td>
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<td>0545</td>
<td>Other vegetables, fresh/cooked</td>
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<td>291</td>
<td>Crude animal material</td>
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<tr>
<td>056</td>
<td>Prep./cons. Vegetables</td>
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<td>292</td>
<td>Crude vegetable material</td>
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<td>0566</td>
<td>Vegetables, frozen</td>
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<td>2925</td>
<td>Seeds</td>
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<td>2926</td>
<td>Bulbs &amp; tubers</td>
<td>C2</td>
</tr>
<tr>
<td>057</td>
<td>Fruits, fresh/dried</td>
<td>C2</td>
<td>2927</td>
<td>Cut flowers &amp; leaves</td>
<td></td>
</tr>
<tr>
<td>058</td>
<td>Prep./cons. fruits</td>
<td></td>
<td>29271</td>
<td>Cut flowers</td>
<td>C2</td>
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</tr>
<tr>
<td>0581</td>
<td>Jam</td>
<td>C4</td>
<td>41</td>
<td>Animal oils &amp; fats</td>
<td>C3</td>
</tr>
<tr>
<td>0583</td>
<td>Fruits, frozen</td>
<td>C3</td>
<td>42</td>
<td>Fixed vegetable oils &amp; fats</td>
<td>C3</td>
</tr>
<tr>
<td>0589</td>
<td>Other fruits/nuts, frozen</td>
<td>C4</td>
<td>43</td>
<td>An./veg. Oils/fats, processed etc.</td>
<td>C3</td>
</tr>
<tr>
<td>059</td>
<td>Fruits/vegetable juices</td>
<td>C4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 Classification of product groups

<table>
<thead>
<tr>
<th>Primary products mainly for industrial use – C1</th>
<th>Primary products mainly for household consumption – C2</th>
<th>Processed products mainly for industrial use – C3</th>
<th>Processed products mainly for household consumption – C4</th>
</tr>
</thead>
<tbody>
<tr>
<td>00, 041, 043, 044, 0711, 0721, 121, 22, 248, 2925</td>
<td>011, 012, 025, 042, 0541, 0544, 0545, 057, 2926, 29271</td>
<td>02221, 02222, 0224, 046, 0566, 0567, 0583, 061, 0722, 0723, 0724, 0813, 0819, 41, 42, 43</td>
<td>016, 017, 0221, 02223, 02224, 0223, 023, 024, 048, 0581, 0589, 059, 062, 0712, 0713, 073, 091, 098, 111, 112, 122</td>
</tr>
</tbody>
</table>
Appendix 2 Non-linear regression estimation results, with cut-off rate = +/- 25%

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>HIT</th>
<th>HIIT</th>
<th>VIHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-2.08</td>
<td>-1.43</td>
<td>-2.32</td>
</tr>
<tr>
<td></td>
<td>(-15.97)</td>
<td>(-6.29)</td>
<td>(-14.49)</td>
</tr>
<tr>
<td>RELFAC</td>
<td>-1.60E-05</td>
<td>-2.45E-05</td>
<td>-8.55E-06</td>
</tr>
<tr>
<td></td>
<td>(-2.40)</td>
<td>(-2.02)</td>
<td>(-1.08)</td>
</tr>
<tr>
<td>SIZE</td>
<td>8.12E-13</td>
<td>5.94E-13</td>
<td>6.30E-13</td>
</tr>
<tr>
<td></td>
<td>(9.64)</td>
<td>(4.24)</td>
<td>(6.87)</td>
</tr>
<tr>
<td>DIFGDP</td>
<td>-2.55E-13</td>
<td>-2.35E-13</td>
<td>-8.55E-06</td>
</tr>
<tr>
<td></td>
<td>(-5.01)</td>
<td>(-2.81)</td>
<td>(-1.08)</td>
</tr>
<tr>
<td>BORDER</td>
<td>.79</td>
<td>.58</td>
<td>.83</td>
</tr>
<tr>
<td></td>
<td>(11.14)</td>
<td>(5.12)</td>
<td>(9.00)</td>
</tr>
<tr>
<td>DIFPAT</td>
<td>.12</td>
<td>.12</td>
<td>.10</td>
</tr>
<tr>
<td></td>
<td>(2.67)</td>
<td>(1.58)</td>
<td>(1.81)</td>
</tr>
<tr>
<td>PD</td>
<td>3.06E-03</td>
<td>1.19E-03</td>
<td>3.75E-03</td>
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<tr>
<td></td>
<td>(5.55)</td>
<td>(1.28)</td>
<td>(5.47)</td>
</tr>
<tr>
<td>USEDUM</td>
<td>.18</td>
<td>.21</td>
<td>.17</td>
</tr>
<tr>
<td></td>
<td>(2.88)</td>
<td>(1.93)</td>
<td>(2.13)</td>
</tr>
<tr>
<td>PROC Dum</td>
<td>.41</td>
<td>.39</td>
<td>.34</td>
</tr>
<tr>
<td></td>
<td>(6.13)</td>
<td>(3.32)</td>
<td>(4.25)</td>
</tr>
<tr>
<td>Observations</td>
<td>2466</td>
<td>699</td>
<td>1767</td>
</tr>
<tr>
<td>R2</td>
<td>.145</td>
<td>.130</td>
<td>.123</td>
</tr>
</tbody>
</table>

Notes: t-statistics are in parentheses.
Appendix 3  Availability and interpretation of FDI data

Availability
Data on Dutch outward and inward FDI can be found in the Statistical Bulletin (het Statistisch Bulletin) of De Nederlandsche Bank. This Bulletin is a quarterly publication, presenting quarterly data, while the June-issue includes the most recent annual data.

Foreign direct investments are defined to exist in three components: 1) a participation in capital share of a in a foreign country located firm. This can be an existing firm or a new to establish firm (‘greenfield investment’); 2) short-term and long-term credits within the company; 3) retained profits of the foreign subsidiary. DNB registers FDI when the investment has a permanent character and is linked to influence in the management of the firm. For the latter a minimum share of 10% in the firm’s assets are required.

Important is the distinction between flows and stocks. Investment flows are registered by DNB as part of the balance of payments statistics and are international capital transfers. Stocks are cumulated investment flows and re-invested profits. The stock data are compiled by DNB based on interviews of individual firms, both Dutch and foreign, operating in the Netherlands.

As we focus on sector specific information for the food industry, we have to make use of the stock data. In its reporting on FDI flows, DNB does not separate out industry groups.

The annual stock data presented by DNB are broken down into a selection of countries and regions, and split-up in industrial sector groups. For our purpose, it is important to note that there is a group ‘Agriculture and fisheries’ referring to the primary agricultural activities and a group ‘Food and kindred products’, which is including food, beverages and tobacco industry. It is this latter industry group we focus on. The food and kindred products group is not being split-up in further detail. Further, the breakdown in countries and regions is limited. Most EU-member states, Switzerland, USA and Japan are represented in the table and several regions, like East-Europe, Latin America, Asia and Southeast-Asia. On request, one may get additional information for countries not included in the table in the Statistical Bulletin, but depends on whether this information is considered confidential by the Bank or not. If the FDI figure is low, one may detect activities of an individual firm behind the figures and in those cases, DNB is not willing to supply additional information.

Data used in this sector analysis refer to stocks of foreign direct investments, and not to flows, or, in other words to changes in the stocks, because DNB does not supply FDI flows crossed over countries and industrial sectors. Note that it is incorrect to calculate the annual flows with help of the stock data of two years. Indeed, the alteration of the stock is the result of new investments, de-investments (selling of stake), retained profits/losses on existing direct investments, re-assessment (depreciation) of the assets, and exchange rate fluctuations. So, it may happen that the stock declines while there has been new investments coming into the country. It is
even possible to find a negative stock registered. To complicate things further, the exchange of ownership to a company abroad may add to the FDI stock, without being registered as a FDI flow. Take the following example: an US-subsidiary of a Dutch-based multinational buys another company in the US. If the finance is from the headquarters, there will be a registration of a FDI flow. If the subsidiary finances the transaction itself (by own means or through the US capital market), there is no FDI flow registration, yet the take-over adds to the FDI stock as the Dutch multinational has increased its American assets.

How to interpret FDI statistics?
One may interpret a FDI flow from the Netherlands to Germany as an increase in the productive capacity of a Dutch-based company in Germany. Yet, presently the real world may be a little more complicated. Take the following example. A Dutch company buys a German subsidiary of a French company. Dutch productive assets in Germany increase but the FDI flow may be registered from Netherlands to France, where the headquarters is located. The FDI flow suggests that a Dutch company invested in France. The example can be complicated even more when the Dutch company is owned by a company of UK. The point is that the financial transaction – what is registered as foreign direct investment – may be an international payment registered by two countries (one as inward, and one as outward FDI) while the buying company as well as the target company are located in countries different from the countries registering the FDI. International agreement how to measure and register FDI would tackle these problems. Yet, such agreement lacks. DNB does not account FDI to or from the Netherlands when the Netherlands is obviously used as a counter office. Only investments by foreign (Dutch) companies, which employ operations in the Netherlands (abroad) are registered as FDI. The US, for example, decides differently, with the consequence that Dutch direct investments in the US according American statistics are much higher than according Dutch (DNB) statistics.

In this respect, countries with favourable tax regime are interesting cases. In such countries, world-wide operating companies may find it attractive to create a so called post box company: a company that is located in a country only because of the favourable tax climate. Netherlands Antilles is an example of such a country and many multinational firms make use of the possibility to have a post box over there. Transactions of direct investments abroad can be financed in assignment of or by mediation of the post box company (sometimes a financing company), so that the FDI flow is registered in the Netherlands Antilles statistics, either as inward or outward. This practice may explain the notable position of the Netherlands Antilles being a significant investor in the Netherlands as well as receiving relatively much direct investment according. Yet, these investments are only passed through and do not expand NA firms’ productive capacity abroad, or increase foreign assets in Netherlands Antilles.
Appendix 4  Company interviews

Vragenlijst Internationaliseringsstrategieën van de Nederlandse agribusiness

Naam bedrijf:
Naam en functie van geïnterviewde:

Belang buitenland

1. Behaalde omzet ...... Mln gulden
2. Omzet behaald in buitenland ....... % van totale omzet
3. Omzet behaald via export vanuit NL .......% van totale omzet uit buitenland
4. Omzet behaald via buitenlands vestigingen ....... % van totale omzet uit buitenland

Internationaliseringsstrategie

5. Wijze van internationaliseren, onderverdeeld naar regio’s/landen

<table>
<thead>
<tr>
<th>Markt/strategie</th>
<th>Export (% markt in totale exportwaarde)</th>
<th>Licentie (aantal)</th>
<th>Buitenlandse vestigingen (totaal, joint venture, overname, zelfstandige vestiging)</th>
</tr>
</thead>
<tbody>
<tr>
<td>West-Europa</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Centraal en Oost-Europa</td>
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<tr>
<td>Australië/Nieuw-Zeeland</td>
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</tr>
</tbody>
</table>

   - Grote marktommvang eq. –potenties;
   - creëren van een uitvalsbasis voor export naar de regionale markt;
   - verkrijgen van een dominante positie op de betreffende markt;
   - gebruik maken van goedkope arbeid;
   - gebruik maken van fiscale voordelen;
   - toegang tot grondstoffen;
   - toegang tot specifieke (product/markt)kennis;
   - omzeilen van handelsrestricties (tarief, NTBs, etc.);
   - vermijden van hoge transportkosten;
   - verticale integratie;
   - import (in Nederland) van lokale productie (halffabrikaten);
   - anders, nl ................................

7. Wat zijn belangrijke belemmeringen voor FDI en waar/wanneer doen die zich voor?
   .................................................................................................................................
   ....

8. Volgens DNB-statistieken investeert de Nederlandse agribusiness veel in Zwitserland en Nederlandse Antillen, maar de overgenomen bedrijven bevinden zich vaak in andere landen. Hoe
verlopen de financiële stromen bij buitenlandse transacties van Uw concern?

…………………………………………………………………………………………………………………………

…………

Bedrijfskenmerken

9. Welke unieke voordelen heeft de onderneming ten opzichte van haar concurrenten? Is dat een
uniek product/productieproces, een handelsmerk, kwaliteitsreputatie, anders..?
…………………………………………………………………………………………………………………………
…………

10. Vaak spelen R&D investeringen een belangrijke rol in het opbouwen van die unieke voordelen van
een bedrijf.
a) Hoe groot zijn de uitgaven aan R&D in % van de omzet? ..........%
b) Welk percentage van werknemers is actief in de R&D-afdeling? ..........%
c) Waar worden R&D activiteiten (vooral) uitgevoerd?
d) R&D of innovatie kan gericht zijn op kostenbesparing (procesinnovatie) of op productdifferentiatie
(productinnovatie). Is een van beide innovatierichtingen dominant binnen de onderneming?
…………………………………………………………………………………………………………………………

11. Op welke wijze wordt een buitenlandse vestiging aangestuurd op het gebied van marketing,
merkontwikkeling, strategische samenwerking op lokale markten: zijn beslissingsbevoegdheden
centraal (in Nederland) of decentraal geregeld?
…………………………………………………………………………………………………………………………

12. Verschilt het productiepakket van buitenlandse vestigingen van die in Nederland? Zo ja, op welke
wijze (mate van verwerking en productdifferentiatie, onderscheid per markt/regio?)
…………………………………………………………………………………………………………………………

13. Hoge transportkosten van de fysieke producten van de onderneming is een belangrijke reden om te
besluiten een buitenlandse vestiging te openen. Spelen transportkosten bij export een cruciale rol
in de beslissing een buitenlandse vestiging te openen? Hoe verschilt dit per markt (regio’s in de
wereld)? Geldt dat op veraf gelegen markten wordt geïnvesteerd en naar dichtbij gelegen markten
wordt geëxporteerd?.................................

14. Kunnen export naar en directe investeringen in locale productie in één en dezelfde markt elkaar
versterken? Onder welke voorwaarden (niet)?
…………………………………………………………………………………………………………………………
---
Toekomst

15. Hoe schat u de exportkansen in voor de komende 5-10 jaar naar de volgende gebieden? Waar is een uitgesproken (on)gunstige verwachting op gebaseerd?

<table>
<thead>
<tr>
<th>gebied</th>
<th>Negatief</th>
<th>Neutraal</th>
<th>Positief</th>
<th>Onbekend</th>
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<tbody>
<tr>
<td>West-Europa</td>
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16. Hoe schat U de kans in dat Uw onderneming de komende jaren een productievestiging zal openen in een van de volgende gebieden?

<table>
<thead>
<tr>
<th>Gebied</th>
<th>Negatief</th>
<th>Neutraal</th>
<th>Positief</th>
<th>Onbekend</th>
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<tr>
<td>West-Europa</td>
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Beknopte verslagen van gesprekken met vertegenwoordigers van Nederlandse agro-industriële multinationals

UNILEVER

Gesprek met de heer W.J. Laan, Agricultural Policy Advisor, afdeling Food, External Corporate Affairs, 20 juni 2000, te Rotterdam

Unilever is wereldwijd actief en heeft een hoofdkantoor in Rotterdam (van de NV) en in Londen (van de PLC). Toch zou je Unilever een Nederlands bedrijf kunnen noemen omdat het merendeel (55%) van het aandelenkapitaal in handen is van Nederlandse beleggers. Een tweede aspect om het bedrijf Nederlands te noemen is gelegen in het feit dat een substantieel deel van de R&D-activiteiten in Nederland plaatsvindt. In Vlaardingen werken zo’n 1000 mensen in concern-relevante onderzoeks- en ontwikkelingsprojecten. Het omzetandaal van de Nederlandse markt is met zo’n 3-4% klein. De Duitse markt, bijvoorbeeld, is veel belangrijker, evenals de Britse.

Unilever is nu vrijwel geheel gehecht op het produceren en verkopen van consumentenartikelen. Daarmee is het contact met de primaire landbouw beperkt en, vooral, indirect. Binnen de organisatie van Unilever uit zich dat door een samengaan van (twee) afdelingen die zich bezig hielden met ontwikkelingen in de primaire sector en grondstoffenmarkten. Nu zijn er (nog) vier personen die onderwerpen die de primaire landbouw aangaan in hun portefeuille hebben. Deze tuffunctionarissen - waarvan Laan er een is - volgen de maatschappelijke ontwikkelingen die voor de primaire sector van belang zijn en zorgen voor een interpretatie van die ontwikkelingen voor Unilever. Voorbeelden van belangrijke onderwerpen waarover men nadenkt zijn de implicaties van duurzame landbouw, biotechnologie, en ethische aspecten (dierenwelzijn). Over deze onderwerpen brengt het concern standpunten naar buiten om haar maatschappelijke betrokkenheid te illustreren. De buitenwereld eist dat tegenwoordig van het bedrijfsleven. Unilever geeft ook boekjes en brochures uit over deze onderwerpen waarin het de eigen gezichtspunten beargumenteert en uitlegt.

Unilever haalt zijn omzet voor iets minder dan de helft (1999:46%) uit Europa. De Noord-Amerikaanse markt is goed voor 22% van de omzet in 1999. In tegenstelling tot het Europese aandeel neemt het Amerikaanse markt goed voor 22% van de omzet in 1999. In tegenstelling tot het Europese aandeel neemt het Amerikaanse toe. De VS is een zeer aantrekkelijke markt vanwege zijn homogene karakter: de cultuur (i.e. consumentengedrag) is vrijwel overal hetzelfde; het is een grote (thuis)markt (meer dan 200 miljoen koopkrachtige burgers) zonder handelspolitieke drempels, een zelfde wetgeving en een zelfde munt. Hierdoor zijn er ‘grote merken’ te creëren en over te nemen (zie de meest recente overnames door Unilever). In Europa is sprake van veel versnipperde markten en kost het opbouwen van een internationaal merk enorm veel moeite.

Twee belangrijke criteria voor overnames zijn de productportfolio en de geografische activiteiten van het over te nemen bedrijf. Unilever wil overal aanwezig zijn en sluit geen markten uit voor een vestiging. De bedrijfsfilosofie is dat wanneer men dichtbij de lokale consument zit en de behoeften en de preferenties van die consument veel beter kent en het bedrijf succesvoller zal zijn. Men prefereert het slepen met grondstoffen boven het slepen met consumentenproducten. Men wil daar produceren waar de afzet kan worden gerealiseerd. Men kijkt vanzelfsprekend wel naar de (potentiële) marktomvang en de minimale schaalgrout waarbij het productiebedrijf rendabel is. Een lokale markt kan daarom ook een internationale regio zijn. Door technologische ontwikkelingen in het productieproces en in de logistiek wordt het aantrekkelijk om de schaalgrout van productielocaties uit te breiden. Daardoor kan een vestiging een steeds grotere bedrijf bedienen. In dit proces kan het leiden tot sluiten van productievestigingen in bepaalde landen en deze markten via een vestiging in een naburig land te bedienen. De reorganisatie waarmee Unilever nu bezig is (van 1600 naar 400 merken en de sluiting van 100 productielocaties) kan dan ook meer internationale handelsstromen tot gevolg hebben.

Transportkosten zijn bij de consumentenproducten van Unilever slechts een klein onderdeel van de totale kosten. Advententiecampagnes zijn bijvoorbeeld veel omvangrijker. Men zoekt voordurend naar het behalen van schaalvoordelen. Een manier is om het productieproces per vestiging
te standaardiseren. Vervolgens wordt een regio dan bediend vanuit een locatie. Zo’n regio kan groter zijn (en de voordelen van schaalvergroting kunnen toenemen) wanneer zo’n regio één munt, één wetgeving, gelijksoortige consumentenpreferenties, etc. kent.

De kracht van Unilever ligt in de marktposten van het concern. Daarmee wordt bedoeld dat het concern een groot aantal succesvolle producten in bezit heeft die worden verkocht in koopkrachtige markten. Dat is niet zomaar gekomen. Unilever bouwt al decennia lang aan een succesvolle portfolio van bedrijven en merkartikelen. Unilever is al langdurig aanwezig in een groot aantal landen en kent de lokale behoeften. Dat geeft een voorsprong op de (m.n. internationale) concurrentie.

Verwachtingen ten aanzien van de omzetgroei zijn gebaseerd op de huidige posities die Unilever inneemt op de diverse markten. Groei wordt verwacht in zuidoost-Azië, Latijns-Amerika en ook in Centraal en Oost Europa. Deze groei hangt samen met de bevolkingsgroei en de inkomensgroei in genoemde regio’s. Wel merkt Laan op dat het ontwikkelen van grote merken in deze regio’s moeizaam is omdat de markten zeer sterk versnipperd zijn.

De VS is en blijft een zeer belangrijke en interessante markt. Het land beleeft al enige jaren een sterke economische groei (met hogere groeicijfers dan in West-Europa) en de bevolking van rond de 200 miljoen is bovendien gemiddeld erg rijk.


Bij overnames moet veel zorg besteed worden aan de politieke verhoudingen van dat moment en de inschatting voor de middenlange termijn (‘Politici zijn een risico-factor’). In sommige landen is de scheidijng tussen staat (politici) en bedrijfsleven niet erg duidelijk. De overnamevoorwaarden moeten zo min mogelijk worden bepaald door politieke opvattingen. Verder is van belang de wetgeving rondom kartelvorming, wegsluizen van winsten e.d. te kennen en de mogelijke (te verwachten) veranderingen daarin in te schatten.

FRIESLAND COBERCO DAIRY FOODS

Interview met drs. Werner Buck, directeur Public Affairs, 10 mei 2000, te Meppel

FCDF is een coöperatie en heeft een afnameplicht van alle 5,1 miljoen ton melk van haar leden. Dit is een zeer belangrijk gegeven voor de wijze waarop het bedrijf internationaliseert. De omvang van de melkplas is teveel voor Nederland; men zoekt naar afzetgebieden van Nederlandse melk en niet naar grondstoffen in het buitenland ten behoeve van groei van de onderneming. Bij de verwerking van de melk werkt het concern vraaggestuurd, hetgeen betekent dat elke werkmaatschappij (wekelijks) aangeeft hoeveel melk het denkt te kunnen verwerken op basis van afzetprognoses. Productielocaties van werkmaatschappen zijn dus niet gedwongen alle aangeboden melk uit hun regio te verwerken. Een reststroom melk wordt verwerkt in Lochem tot poeder en boter.


Motivaties voor buitenlandse vestigingen
De redenen waarom FCDF sterk vertegenwoordigd is in zuidoost Azië zijn van historische en strategische aard. CCF, een van de coöperaties waaruit het concern is voortgekomen, had al in het
begin van 1900 handelscontacten met Nederlands-Indië en exporteerde veel condens naar de kolonie. Toen de kolonie zelfstandig werd, werd handel bemoeilijkt door invoerrestricties en een importsubstitutiebeleid van het land. In die tijd is de keuze gemaakt om een productievestiging op te zetten in Indonesië. Van daaruit zijn de belangen in de regio tegemoet. FCDF hanteert de strategie dat men vestigingen wil hebben in ‘emerging markets’ waar de groeiverwachtingen te aanzien van inkomens optimistisch zijn en de bevordering groei. Veel Zuidoost-Aziatische landen voldoen aan die criteria. Daarnaast is het beleid om eerst een markt- en merkpositie op te bouwen via export, voordat een lokale productievestiging wordt overwogen. Men doet geen greenfield investments. Deze strategie sluit aan bij de doelstelling de kwaliteit van de producten en de winst van het bedrijf te verbeteren via de afzet van producten met een hogere toegevoegde waarde. FCDF streeft naar betere marges en niet naar meer volume. Het concern stelt zich dan ook niet tot doel wereldwijd meer melk te verwerken.

De productie van de buitenlandse vestigingen is in eerste instantie bedoeld voor de lokale markt. Voor de vestigingen in Saoedi-Arabië, Nigeria en Colombia is er een strategie ontwikkeld om vanuit deze landen ook de regionale markten te bedienen.

Productdifferentiatie

In de buitenlandse vestigingen worden voornamelijk langhoudbare producten (long-life products) geproduceerd, met daarnaast nog verse producten (toetjes). Alle producten worden onder merk verkocht (Friesland International is de enige werkmaatschappij waar voor 100% merkproducten worden voortgebracht). Deze producten concurreren vooral op kwaliteit en imago en in mindere mate op prijs. Bij afname van de algemene vraag zijn ze minder prijsgevoelig dan de bulkproducten met lage toegevoegde waarde. De crisis in de Aziaanse regio was dan ook minder ernstig voor het concern dan gevreesd: de prijzen voor de merkproducten hoefden niet en nauwelijks omhoog om afzetvolumes en marktaandelen te behouden. De totale omzet bleef daardoor nagenoeg stabiel (in lokale valuta). Alleen omgerekend in Nederlandse guldens waren de resultaten duidelijk minder.

De totale omzet van het concern wordt voor 50% behaald uit de verkoop van merkartikelen. Doelstelling is om dat percentage de komende jaren te verhogen. Niet-merkartikelen zijn kwetsbaarder in de markt dan merkartikelen. De buitenlandse vestigingen produceren niet anders dan merkartikelen, maar de Nederlandse productielocaties nog (lang) niet. De Nederlandse productielocaties hebben, naast de Nederlandse markt, vooral West-Europa als afzetmarkten. Het kost erg veel inspanning (en investeringen) om op de Europese markten een merkpositie voor een merk op te bouwen.

Intangibles assets

Een uniek voordeel van het bedrijf is de kennis van long-life products procédés (procestechnologie). Naast FCDF zijn alleen Nestlé en Parmalat concurrenten op dit terrein. Deze kennis past men binnen het concern ook steeds meer toe op het gebied van verse en drankenproducten (fresh and juices). Het concern heeft geen centrale R&D-afdeling. Over het algemeen wordt research gedaan in Nederland in laboratoria op het gebied van verwerkingsprocédés en worden productontwikkelingen (plus marketing) zoveel mogelijk lokaal gedaan, met het argument dat men lokaal veel beter weet wat er mogelijk is op de eigen lokale markt. Uitgaven aan R&D bedragen naar schatting niet meer dan een paar procent van de omzet.

Aansturing

De zelfstandigheid van de buitenlandse vestigingen is groot. Ze zijn voor een belangrijk deel zelfsturend en hebben beslissingsbevoegdheid op het gebied van marketing, productontwikkelingen en het aangaan van strategische allianties op de lokale markten. Over acquisities neemt de Raad van Bestuur van het concern de uiteindelijk beslissing. Bij acquisitie in het buitenland wordt concernbreed een afweging gemaakt: is de gulden die wordt geïnvesteerd in die acquisitie de meest rendabel voor het concern als geheel? Soms kan een vestiging in een bepaald land aantrekkelijk lijken op de wat langere termijn (bv. Oost-Europa) maar geeft de investering voorlopig geen uitzicht op een bijslagte tot de doelstelling van winstverbetering van het concern als geheel. In deze lijn ligt ook de terugtrekking van FCDF uit Polen (problemen met aanlevering van kwaliteitsmelk en distributie van eindproducten) en Peru. Daarentegen zijn investeringen in bestaande (bv. via uitbrieding van belang) en nieuwe vestigingen in ZO-Azië aantrekkelijker.
Belemmeringen bij FDI

Overheidsregels ten aanzien van buitenlandse investeringen stellen vaak een aantal restricties op het gebied van zeggenschap en brengen financiële verplichtingen (belastingen, herinvesteringen van winsten, etc.) met zich mee. FCDF kent over het algemeen de markt waarin zij investeert goed en dus ook de regels ten aanzien van FDI (bv. ten aanzien van belastingen en winst). Voldoen aan deze regels is meestal geen (groot) probleem, en heeft tot nu toe nog nooit een struikelblok gevormd. Een van de belangrijkste belemmeringen van FDI zijn de cultuurverschillen. Verschillen in percepties en manier van zaken doen maakt acquisitie tot een vaak moeizaam proces. Wanneer dan de overname heeft plaats gevonden, spelen cultuurverschillen ook nog vaak een belangrijke rol in de interne bedrijfsvoering en in de organisatie van levering en afzet. Bestaande patronen kun je niet gemakkelijk veranderen zonder economische en sociale schade aan te richten. Buck wijst in dit verband op het image van het bedrijf als betrouwbare werkgever en producent van kwalitatief goede producten.

Volgens DNB FDI-statistieken investeert de Nederlandse agribusiness enorm veel in de Nederlandse Antillen en Zwitserland. Financiële transacties die gemoeid zijn met acquisitie hoeven niet rechtstreeks plaats te vinden tussen landen waar de hoofdkantoren van beide betrokken bedrijven zetelen. Volgens Buck is van belang waar beide betrokken bedrijven geregistreerd staan. Die registratie kan verband houden met belastingtechnische argumenten. De Nederlandse Antillen en Zwitserland zijn om die reden geliefde landen om een bankrekening in aan te houden.

Substitutie of complementariteit van handel en buitenlandse investeringen


CAMPINA MELKUNIE

Gesprek met Eppo Bolhuis, company secretary van Campina Melkunie, Zaltbommel, 12 september 2000

Strategie van de onderneming

CM is ontstaan in 1989 door de samenvoeging van DMV Campina en Melkunie. Beide waren actief op het gebied van consumentenproducten en ingrediënten. De fusie had als achtergrond dat schaalvergroting in de zin van R&D-inspanningen, geografische markten en breder pakket aan (gedifferentieerde) producten nodig was om te kunnen overleven op de internationale zuivelmarkt. Vervolgens werd Comelco, de in die tijd grootste Belgische zuivelonderneming, overgenomen. Ook Comelco was actief met dezelfde producten (consumentenproducten en ingredienten) als CM. CM had al een lange historie met export van eindproducten naar Duitsland en importeerde ook wel grondstoffen (melk). Men volgde de ontwikkelingen op de Duitse markt en in de Duitse industrie dus goed. In 1993 ging Südmilch (Stuttgart) failliet en CM heeft het bedrijf samen met Danone gekocht (meerderheidsbelang bij CM). In 1997 volgde MKW (Tuffi). Ook dat bedrijf had als belangrijkste activiteiten consumentenproducten. Deze Duitse coöperatie is met name actief in Noordrijnwestfalen (Roergebied). Per 1 januari 2000 is Tuffi Campina een joint venture aangegaan met Emzett Berlijn. Hiermee is Campina een belangrijke locale speler op de Duitse markt geworden met vestigingen in diverse regio’s in Duitsland.

Motieven voor FDI

Bolhuis noemt drie belangrijke motieven om in het buitenland vestigingen over te nemen:

1. concentratie van de retailers in Noord-West Europa. In Nederland heeft CM zo’n vijf grote klanten (supermarktketens) die een groot deel van de omzet bepalen. In Duitsland is de concentratie bij de afzet ook toegenomen. Vooral de komst van Wal-Mart met z’n lage prijzenbeleid heeft de
zuivelprijzen in Duitsland onder druk gezet. Andere ketens moeten wel mee, en inkopers van die retailers zetten fabrikanten onder druk. Om in de markt te kunnen blijven, is schaalvergroting (zodat de kosten per eenheid kunnen dalen) noodzakelijk.

2. Innovaties in producten zijn noodzakelijk om concurrentie het hoofd te bieden. Ontwikkelen van een sterk merk kost veel onderzoek, ontwikkeling en promotie. Ook daarom wordt schaalvergroting nagestreefd.

3. Door technologische ontwikkelingen is het mogelijk om de schaal waarop een fabriek rendabel kan produceren, voortdurend te laten toenemen. Uit concurrentie-overwegingen moet voortdurend geïnvesteerd worden in nieuwe productiecapaciteit. Als de concurrent het wel doet en jij niet, staan jouw marges onder druk. Om kostprijsleider te kunnen zijn (en blijven) kunnen de investeringen alleen terug verdiend worden wanneer een grote markt kan worden bediend.

Export
De verse zuivelproducten (melk yoghurt, vla) worden met name in Nederland afgezet. De export bestaat vooral uit kaas en boter. Desserts en yoghurts worden internationaal verhandeld, waarbij het ook gaat om de producten voldoende te kunnen onderscheiden van die van de concurrenten.

CM is eigenlijk geen Nederlands bedrijf meer. Er worden grondstoffen uit Duitsland en België naar Nederlandse fabrieken gehaald en er vinden ook interne leveringen plaats van Nederland naar Duitsland. Eigenlijk is er door het samengaan van verschillende bedrijven in Nederland, Duitsland en België onder de vlag van Campina steeds meer uitwisseling van producten binnen het bedrijf maar over de grenzen heen ontstaan.

De exportstrategie bij consumentenproducten is vooral gericht op kaas en boter. Door GATT/WTO concentreert de uitvoer zich steeds meer op de EU-markt, want de exportsubsidies nemen af. Eppo Bolhuis: ‘Het effect van deze zogenaamde liberalisering is dat we op de Europese markt steeds meer geïsoleerd worden.’ Boter gaat vooral met behulp van subsidies naar landen in het Midden Oosten (Iran) maar niet meer zoveel als toen er nog boterbergen waren en er ten aanzien van restituties veel minder regels werden gesteld.

Aanwezigheid in Polen en Rusland
Bij de overname van Menken werd ook een fabriek in Polen gekocht. Binnen CM ontstond de discussie wat hiermee aan te vangen. Verschillende overwegingen speelden een rol die hebben geleid tot het aanhouden van een productielocatie in Polen:
1. Toetreding op termijn leidt er toe dat Polen onderdeel van de EU-markt wordt en er waren op dat moment (1989) nog marktposities te verwerven;
2. Onze klanten gaan naar/zitten ook in Polen en als we die willen blijven beleveren, moeten we ook locaal aanwezig zijn.

Voordat er fabrieken in eigen beheer werden genomen in Polen en Rusland was er al behoorlijk wat export naar beide landen, met dank aan de exportrestituties. Het ging hierbij met name om verse consumentenproducten en boter. CM had daarmee een marktpositie in, met name, Rusland van een omvang waarbij het rendabel was de producten locaal te produceren. De beslissingen van een locale productiebevestiging werd afgedwongen door terugvallende exportsubsidies, valutacrisis en importtarieven.

Andere Oost-Europese markten worden beleverd vanuit Nederland en/of Duitsland. Deze markten zijn te klein voor CM om te investeren in lokale productie.
Ingrediënten-poot van CM
Deze activiteit komt voort uit DMV. Deze divisie hanteert een wereldwijde strategie. Fabrieken staan in Nederland, Duitsland, België en de VS. De belangrijkste vestigingsfactor is de aanwezigheid van benodigde kennis. In Japan heeft CM een verkooppand en een sterke marktpositie. Belangrijke klanten zijn o.m. Unilever, Danone en de farmaceutische industrie.

Voor de producten van deze divisie zijn de transportkosten relatief laag. Daarom kan de hele wereld worden beleverd vanuit een aantal fabrieken. Van de vier CM-fabrieken is het productiepakket grotendeels overlappend, maar ook zijn er specialisaties. De verkoop van de ingrediënten-producten is geconcentreerd in de VS.

CM streeft kostprijsleiderschap na bij basisproducten en een groeiend aandeel van merkartikelen in de totale omzet. Merkartikelen betekenen meer marge, maar gaan ook gepaard met meer kosten. Dus, ook voor merkartikelen worden lage productiekosten nagestreefd, anders blijft er niets van de marge over.

CM heeft op dit moment ongeveer 30% van haar omzet uit merkartikelen. Dat moet meer worden, want daar valt meer mee te verdienen. Echter, dit soort producten ontwikkelen vergt veel geld en de investeringsruimte van het bedrijf is klein. De leden (boeren) moeten het opbrengen. Grote dure acquisities zijn nauwelijks mogelijk.

Het ingrediëntensegment is interessant voor groei, maar investeringen in deze hoek hangen af van de ‘opportunities’ (EB wil daar niet verder op ingaan). Acquisities in deze hoek zijn wel relatief duur. De coöperatieve vorm van CM is hiervoor een beperking.

Ook ten aanzien van R&D inspanningen is EB terughoudend met informatie. Dat het zal groeien in de komende tijd staat vast maar EB wil niet kwijt hoeveel en in welke activiteiten.

WESSANEN


Activiteiten
Wessanen heeft nog maar weinig contact met de Nederlandse landbouwsector. Vroeger was het een bedrijf sterk in de olie, cacao, en rijstverwerking (van geïmporteerde grondstoffen). Ook verwerkte het bedrijf granen tot meel en veevoer, en deed het in kunstmelk (melk, verrijkt met plantaardige eiwitten als voer voor jonge kalveren). De zuivelactiviteiten beperkten zich verder tot de productie van poeder en condens. Met die laatste activiteiten werd nauwelijks winst gemaakt. Daarom werd besloten tot de overname van een kaasproducent bedrijf. Het werd Baars, kaasproducent van Leerdammer in 1973. Baars was toen een klein bedrijfje en bij Wessanen (en ook bij Baars) had men geen vermoeden van de waarde die zo’n merk later zou vertegenwoordigen.

De overname van Baars paste in de strategie van Wessanen om ‘uit de bulk’ te gaan en meer activiteiten te ontplooien in consumentenproducten. Wessanen heeft geprobeerd deze strategie toe te passen in hun graan- en meelactiviteiten door bakkerijen en bakkerswinkels over te nemen maar dat werd geen succes. Ook andere pogingen om dichterbij de consument te zitten (onder meer via de verkoop van kleinverpakkingen) bracht niet het verwachte succes. Halverwege de jaren zeventig werd de markt in de VS verkend. De VS werd als een aantrekkelijke markt gezien door Wessanen in verband met de omvang (homogene consumenten, in ieder geval minder versnipperde markten en consumentenpreferenties dan in Europa) en het aantrekkelijke ondernemersklimaat (i.e. het gemak waarmee Nederlanders zaken kunnen doen met Amerikanen, een zelfde zakelijke instelling en cultuur; dit in tegenstelling tot ervaringen in de EU met bv. Fransen, Spanjaarden etc). Wessanen ging op zoek naar een ‘goedlopend productiebedrijf in de VS in de voedingsmiddelensector’. Het gaf een consultant opdracht ‘iets’ te zoeken binnen een hele range van producten. Bij het aangeven van die range werden een aantal criteria gevolgd. Het moest iets zijn in de voedingsmiddelenbranche, maar geen bakkerijproducten in verband met minder goede ervaringen in Nederland. De consultant kwam na enige tijd met Marigold, een zuivelbedrijf in de MidWest, sterk in consumptiemelk. Dat bedrijf heeft Wessanen gekocht, zonder expertise te hebben van de consumptiemelmarkt in de VS, eigenlijk meer als een ‘investeerder’ dan als producent.

Door de grote nadruk op consumentenproducten is de relatie met de primaire landbouwsector zeer indirect. Landbouwbeleid is voor Wessanen dan ook niet van belang, in die zin dat het geen bedrijfsbeslissingen over locatie van productie bepaald. De Wessanen-bedrijven zijn nu eenmaal weinig grondstofafhankelijk. Ook de zuivelgroep is dat niet. Men betrekt melk van zogenaamde vrije boeren. Deze boeren leveren op een jaarcontract. Wessanen wil geen lange-termijn contracten afsluiten opdat het bedrijf zoveel mogelijk vrijheid van handelen behoudt.

Management
Amerikaanse managers leiden de bedrijven in de VS. Lokale managers zijn belangrijk in verband met de cultuur van de lokale markt. De VS-groepen zijn heel zelfstandig maar er is ook een strikt schema van rapporteren aan het hoofdkantoor. Er is weinig verloop in de management. Wessanen is er in geslaagd om een overgenomen bedrijf betrekkelijk soepel te integreren in de bestaande organisatie. Als de meerwaarde (intangible assets) van het bedrijf moet worden aangeduid, dan ligt dat bij de managementkwaliteiten in de bestaande structuur. Men heeft in de top van Wessanen en van de groepen en werkmaatschappijen mensen zitten die verstand hebben van het managen van een bedrijf in de voedingsmiddelenindustrie. Voeding heeft specifieke kennis nodig, zoals bijvoorbeeld met allerlei regelgeving.

Marktposities
Gezondheidsvoeding in de VS is een groeimarkt. Het is in de jaren tachtig begonnen met kleine winkeltjes en een franchise formule. Nu worden ook producten verkocht via de supermarkten. Tree of Life is de inkoop- en distributie-organisatie van Wessanen voor deze producten. Tree of Life kan het beste gezien worden als een soort postorderbedrijf. De sterkte van Tree of Life – ook ten opzichte van supermarkten die zelf schappen met gezondheidsvoedsel gingen inrichten – is dat ze de inkoop en distributie organiseert. Voor supermarkten zou het samenstellen van zo’n pakket in eigen beheer te duur zijn. Tree of Life kan dit wel vanwege de uitgekiende logistieke organisatie.

Wessanen heeft een aantal pogingen gewaagd om van Baars een Europees kaasbedrijf te maken. Dat is niet gelukt. Er zijn op de Europese markt een tiental zelfstandige kaasbedrijven actief. Deze laten zich momenteel niet kopen. Wessanen heeft 10% van de Europese markt in ontbijtgranen. Kelloggs is de grote concurrent met een marktaandeel van 45%. Voor Wessanen is er niet zoveel groei meer mogelijk op deze markt. De markt voor gemaksvoedsel (convenience food, zoals snacks, kippenvleesproducten, etc.) is wel een groeimarkt.

Thaise connectie
Het Thaise kipbedrijf (Golden Foods International) werd gestart met een Thaise partner. Deze kwam bij Wessanen langs. De Thaise partner had contact met een groot aantal kippenboeren en wilde verdergaan met de verwerking tot kippenvleesproducten. Wessanen zag hier wel brood in en is met de partner in zee gegaan, onder de voorwaarde dat de Thaise partner de aanvoer van de kippen zou verzorgen en Wessanen de verwerking zou doen.

De samenwerking ging stroef en is op gegeven moment verbroken. Wessanen heeft het bedrijf gecontinueerd. Ook de aanvoer is nog binnen het bedrijf, hoewel dat eigenlijk tegen de bedrijfsfilosofie in is. Toch wilde Wessanen dit bedrijf behouden en verder uitbouwen, om verschillende redenen. Azië is een belangrijke markt om aanwezig te zijn. Een vestiging in Thailand wordt gezien als springplank naar andere landen, bv. naar Japan (in eerste instantie via export vanuit Thailand, mogelijk ook meer vestigingen in Oost-Azië). Ook vindt Wessanen de verwerking van kip tot producten een interessante activiteit, aangezien de marktperspectieven voor verfijnde kipproducten volgens het bedrijf wereldwijd gunstig zijn. En Wessanen heeft in Beckers (snacks) een bedrijf in haar portfolio dat de kipproducten afneemt en verder kan verwerken tot consumentgerede producten. Dat is wat nu ook plaatsvindt: Beckers verwerkt veel Thaise kip in producten die in Nederland en Duitsland in Beckers-fabrieken
worden geproduceerd. Ten aanzien van de transportkosten (van Thailand naar Europa) merkt Kwak op
dat er enorm veel vlees over de wereld wordt versleept. ‘Vlees is een hoogwaardig product en daardoor
zijn de transportkosten per eenheid product niet zo erg hoog.’

Export versus FDI
In hoeverre is er sprake van een wisselwerking tussen export en lokale productie en hoe ziet die eruit?
Volgens Kwak vindt vaak eerst export naar een aangrenzende markt plaats, net zolang tot het
binnenlandse productiedeficit de productiecapaciteit volledig heeft benut. Wanneer dat het geval is,
vindt de afweging plaats of het bestaande bedrijf moet worden uitgebreid, of dat een nieuwe
productiefaciliteit in de betreffende (groeiende) exportmarkt zal worden gestart. Bij dat laatste heeft
men nog de keuze een bestaand bedrijf (concurrent) over te nemen of een ‘greenfield’ investering te
doen. Wanneer de markt blijft groeien, kunnen export(groei) en productie in een lokale vestiging naast
elkaar bestaan. Wanneer de markt meer verzadigd raakt, is dat volgens Kwak minder logisch. Dan zal
de importstroom vervangen worden door lokale productie. ‘Het is een simpele rekenformule’, volgens
Kwak. Transportkosten spelen dan wel een belangrijke rol.

NUTRECO

Profiel
Nutreco Holding NV is een beursgenoteerde internationale onderneming op het gebied van voeding
voor mens en dier. Belangrijke activiteiten van de groep zijn de productie van voeders voor vis,
pluimvee varkens en rundvee en de kweek, verwerking en vermarkting van zalm. In samenhang
daarvan is Nutreco betrokken bij de productie van premixen en speciaalvoer, de verwerking van
pluimvee- en varkensvlees en de fokkerij van pluimvee- en varkensrassen. De activiteiten zijn
georganiseerd in Nutreco Aquaculture en Nutreco Agriculture. Binnen vijf Business Groups opereren
16 Business Units, met 80 productie- en verwerkingseenheden in 19 landen. In totaal zijn bij Nutreco
9.185 mensen in dienst (ultimo 1999). Nutreco behaalde in 1999 EUR 64,3 miljoen winst (24% meer
dan in 1998) bij een omzet van EUR 2,6 miljard (142 miljoen gulden bij winst 5,7 miljoen gulden
omzet) (Jaarverslag 1999).

De onderneming is wereldmarktleider op het gebied van visvoer voor zalm met een
marktaandeel van 40%. In de kweek van Atlantische zalm heeft de onderneming een
wereldmarktaandeel van 9%.

Ontstaansgeschiedenis
Nutreco is ontstaan in oktober 1994 na een buy-out van een aantal activiteiten die voorheen tot BP
Nutrition behoorden. Sommige werkmaatschappijen bestaan al (bijna) een halve eeuw. De wettelijke
structuur van de onderneming veranderde in november 1996 van Nutreco Holding BV in een NV. Op 3
juni 1997 volgt een introductie op de beurs.

Structuur
De hoofdstructuur van Nutreco wordt gevormd door twee Business Streams, Nutreco Aquaculture en
Nutreco Agriculture. De eerste ‘poot’ doet in vis (vooral zalm), en de tweede in pluimvee en varkens.
De voer- en premix activiteiten vormen het fundament voor de overige activiteiten van het bedrijf. Het
bedrijf heeft viskwakkenrijen in eigen beheer, maar geen fokkerijen voor pluimvee en varkens. De
verwerking is wel weer in handen van Nutreco. (Nutreco is (nog) niet vertegenwoordigd in de
distributie van de producten.) Dat Nutreco actief is in diverse geledingen van de voedselkolom van vis,
pluimvee en varkens heeft een aantal voordelen. Naast het directe rendement van deze activiteiten, stelt
het Nutreco in staat een groot deel van de betrokken kolom te coördineren. Die coördinatie kan
enerzijds efficiëntie-verhogend zijn, en anderzijds ook bijdragen aan de bewaking en verbetering van
het gehele productieproces op het gebied van voedselkwaliteit en –veiligheid. Dit laatst genoemde
aspect van traceerbaarheid van het productieproces (van e[i]cel tot eindproduct) wordt steeds
belangrijker met het oog op de toenemende nadruk die afgemmers/eindgebruikers op voedselkwaliteit en
–veiligheid leggen.
Geografische spreiding van de activiteiten van Nutreco

De activiteiten van Nutreco Agriculture zijn over meer landen verspreid dan die van Aquaculture. Toch is binnen deze verscheidenheid sprake van concentratie, namelijk vooral in (West-)Europa. Ook binnen de diverse activiteiten zijn concentraties van productielocaties te onderscheiden. De fokkerij van varkens en/of pluimvee, de voerfabrieken en de vleesverwerking vindt voornamelijk plaats in Nederland en Spanje, en in mindere mate ook in Frankrijk (4 locaties premixfabrieken). De locaties van voerfabrieken zijn het meest verspreid; over 9 landen. De activiteiten zijn vooral in West-Europa geconcentreerd. Daarnaast zijn ook in Polen (2 voerfabrieken, 1 premixfabriek) en Hongarije (1 voerfabriek) locaties gestart. Buiten Europa is Nutreco alleen aanwezig in China (met een voerfabriek).

Nutreco gebruikt R&D-faciliteiten in Nederland (fokkerij rundvee en varkens), Frankrijk (kalkoenen en konijnen), Noorwegen (vis en visvoer), Spanje (pluimvee), Canada (fokkerij kalkoenen) en Chili (viskwekerij). Onderzoek op gebied van vis is geconcentreerd in Stavanger (Noorwegen). Naast onderzoek in eigen beheer worden ook onderzoeksinstellingen verspreid in de wereld ingeschakeld. Zo is er in 1999 een samenwerkingsovereenkomst afgesloten met het instituut voor Dierhouderij en Diergezondheid (ID) in Lelystad.

Strategie

Acquisities
Omzet naar activiteit en per land/regio

In 1999 draagt Aquaculture voor het eerst meer bij aan het netto-resultaat van de onderneming dan Agriculture (EUR 58,4 miljoen tegenover EUR 47,4). Dit is te wijten aan de groei bij Aquaculture ten gevolge van de acquisitie van Marine Harvest, terwijl het resultaat van Agriculture daalde vanwege problemen in de veevoersector ten gevolge van de Belgische dioxinewetgeving.


De belangrijkste afzetmarkten voor Nutreco Agriculture liggen hoofdzakelijk in West-Europa, m.u.v. van de fokkerij-activiteiten. Dit laatste worden wereldwijd aan de man gebracht (Jaarverslag 1999: 67).

Marktvooruitzichten
Vooral voor zalm en zalmproducten verwacht Nutreco een groeiende markt. Ook verwacht men dat de consumptie van pluimvee- en varkensvlees in Europa zal toenemen. De markten vertonen echter onderling verschillen ‘onder invloed van overheidsmaatregelen’ (Jaarverslag 1999:19). Nutreco denkt echter door haar spreiding van activiteiten en haar marktleiderspositie goed in te kunnen spelen op de kansen die er onder de verschillende marktomstandigheden zullen zijn.

Reactie van dhr. Rik van Westendorp, manager Mergers and Acquisition van Nutreco, op een aantal stellingen. Zijn reactie heb ik per email ontvangen (dd. 6 september 2000). Er was geen face-to-face interview mogelijk in verband met zeer beperkte beschikbaarheid van dhr. Van Westendorp gedurende een lange periode.

Stelling 1: Buitenlandse markten penetreren we volgens een vast patroon: we verkennen eerst de markt door middel van export en vervolgens, bij voldoende groeiperspectieven, overwegen we een lokale (buitenlandse) vestiging.

Stelling 2: Directe investeringen in lokale productie sluiten export naar die markt uit (investering vervangt export).

Stelling 3: Wij investeren in het buitenland om handelsbelemmeringen (tarieven, koersfluctuaties, hoge transportkosten, etc.) te omzeilen.
Van Westendorp: Dit zijn niet de belangrijkste overwegingen. Voornaamste argument is dat mogelijkheden voor (volume)groei in Nederland niet groot zijn – integendeel. Om onze economies of scale verder te benutten, zijn we aangewezen op groei in het buitenland. Voorts zijn kostprijzen veelal lager in andere landen. Met de toenemende internationalisering van de handel is dat een belangrijk concurrentievoordeel.

Stelling 4: De afstand tot de buitenlandse markt is een belangrijke criterium om locale investeringen te overwegen: op verra gelegen markten investeren we locaal, naar dichtbij gelegen markten exporteren wij.

5. Ons bedrijf onderscheidt zich van concurrenten door de toepassing van eigen onderzoek in de ontwikkeling van nieuwe producten.
Van Westendorp: Dat streven we zeker na. Nutreco investeert aanzienlijke bedragen in R&D met dat doel.

NUMICO

Gesprek met Klaas de Jong, Corporate Affairs, Numico, op 22 augustus 2000 te Zoetermeer

Numico is een zeer internationale onderneming met activiteiten in meer dan 100 landen. Verspreid over de wereld heeft de onderneming 55 fabrieken (productielocaties). Het bedrijf karakteriseert zichzelf als een specialist, als producent van voedingsmiddelen die op de grens zitten van food en pharma. Als specialist in een niche-markt moet het bedrijf wel internationaal gaan, want Nederland is veel te klein. Als specialist op het gebied van babyvoeding is Numico (Nutricia) al decennia lang een internationaal bedrijf. De afgelopen 20 jaar zijn er de activiteiten op het gebied van voedingssupplementen en natuurvoeding bijgekomen, eerst in Europa, sinds 1999 ook in de VS. Ook bij deze producten spreek je van een specialistische markt.

Kennis als kerncompetentie
Numico is wereldleider op het gebied van human resources, ofwel het gebruik maken en toepassen van onderzoek ten behoeve van productontwikkeling. Onderzoek staat bij Numico los van ontwikkeling; ontwikkeling wordt als productie-activiteit gezien. Onderzoek is geconcentreerd in Wageningen (‘Food Valley’) waar zo’n 80-90% van de totale staf van 300 onderzoekers zitten. ‘Kennis is heel belangrijk om zelf in huis te hebben en waardevoller dan geld’. De synergie van de verschillende activiteiten (babyvoeding, ziekenhuisvoeding, nutriceuticals) komt voort uit het onderzoek.


Numico’s sterke punt is haar onderzoekprestaties. Bij de overname van de Amerikaanse bedrijven op het gebied van voedingssupplementen heeft deze karakteristiek van Numico een doorslaggevende rol gespeeld. De Amerikaanse producenten van voedingssupplementen investeerden niet zelf in kennisontwikkeling maar huurden kennis in. Die kennis was ook toegankelijk voor concurrenten zodat na introductie van een innovatief product al snel een kopie van de concurrent volgde. Een sterke prijs concurrentie op de grote Amerikaanse markt was het gevolg. Hierdoor daalden de aandelenkoersen van de bedrijven waardoor Numico in staat was eerst GNC en later Rexall Sundown te kopen en daarmee in heel korte tijd meer dan 20% marktaandeel in deze aantrekkelijke markt in de VS te verkrijgen. Deze Amerikaanse bedrijven hebben volgens De Jong zelf contact gezocht met Numico omdat het bedrijf veel productkennis in huis heeft en in staat is daarvan de voordelen uit te buiten.
Relatie export en buitenlandse vestigingen
De relatie tussen handel en FDI is heel duidelijk, volgens De Jong. Je begint met export naar een land en probeert daar een marktpositie op te bouwen en merkbekendheid te genereren. Wanneer na enige tijd een acceptabele groei plaatsvindt, wordt een buitenlandse investering overwogen. Dat moet dan een bedrijf zijn met een sterk lokaal merk. Lokale merken hebben het voordeel dat ze bekend zijn bij de consument. De emotionele waarde van een lokaal merk in de marktsegmenten waar Numico actief is, wordt hoog ingeschat. Vandaar dat Numico zoveel mogelijk met lokale merken verder gaat.

De lokale productie vervangt de export van de eindproducten: FDI is daarmee een substituut voor export. Echter, wanneer lokaal niet genoeg of niet de juiste grondstoffen aanwezig zijn, worden deze ingevoerd. Meestal is dat een tijdelijke zaak. Maar in zo’n geval vervangt een handelsstroom in grondstoffen de eerdere handelsstroom in eindproducten.

Er wordt niet gesleept met eindproducten, wel met grondstoffen. De grondstoffen kunnen overal vandaan komen (hieruit valt af te leiden dat er nauwelijks [nog] een relatie is tussen Numico en de Nederlandse primaire landbouw). Grondstoffen worden zonder problemen toegelaten tot het land, maar dat is voor de eindproducten veelal niet het geval. Landen schermen hun markten voor de eindproducten meer af dan voor de grondstoffen. Internationale handel van de eindproducten brengen grotere transport risico’s met zich mee, er zijn hogere tarieven op import en men krijgt te maken met verschillen in wetgeving (is het voeding of medicijn? In Europa is er nog veel verschil in wetgeving op dit gebied waardoor hogere kosten kunnen ontstaan. De eindproducten worden dichtbij de afzetmarkt (dus lokaal) geproduceerd om flexibel op de veranderende wensen van de consument te kunnen reageren.

De belangrijkste drijvende kracht achter FDI is (uitzicht op) een koopkrachtige markt. Numico’s producten zijn over het algemeen niet goedkoop. Marktbescherming zoals tarieven etc. worden niet als belemmeringen voor FDI gezien: ‘daar kom je wel doorheen en als je binnen bent, zijn belemmeringen weer een voordeel want het houdt anderen buiten’.

Numico’s financiering van buitenlandse investeringen vinden veelal plaats via de eigen bank vanuit Ierland: daar is een goede financiële infrastructuur aanwezig en heerst een gunstig belastingregime. Numico heeft geen ‘loket’ op de Nederlandse Antillen of in Zwitserland voor het doorzuiven van kapitaal t.b.v. FDI.

Centrale Suiker Maatschappij CSM
Gesprek met F.J. (Frans) Olieman, lid concerndirectie CSM en directeur van CSM Suiker, op 5 september 2000, te Diemen

Proces van diversificatie
De transitie van CSM van een suikerverwerker (tot sluiting van de Amsterdamse Wester Suikerfabriek in jaren zestig riet- en bietsuikerproductie, daarna alleen bietsuiker) naar een producent van diverse voedingsmiddelen (bakkerij-ingrediënten, suikerwerk, melkzuurderivaten) is gestart in 1978 met de overname van de levensmiddelen-tak van het failliete KSH (Honig). Het management formuleerde een diversificatie-strategie. Diverse bedrijven werden overgenomen, die op zich niets met suikerproductie te maken hadden. Dat werd echter als een voordeel gezien want daardoor werd CSM minder afhankelijk van suiker. Suiker was/is een politiek product en de resultaten van de verwerking zijn sterk afhankelijk van wat de politiek ten aanzien van het suikerbeleid vaststelt.

Tijdens de jaren tachtig is getracht om de levensmiddelenpoot uit te breiden en er een Europese positie mee te bereiken. Dat is niet gelukt vanwege de concurrentie van veel grotere(ers) bedrijven, zoals Danone, Nestlé en Unilever. Toen heeft de onderneming rond 1990 de portfolio heroverwogen en gekozen voor een strategie met een focus op de bakkerij-ingrediënten en suikerwerken (zoetwaren). De Europese suikermarkt was al verdeeld en de conclusie van het management was dat CSM een kleine speler zou blijven – net als bij de levensmiddelen - omdat de grote concurrenten (m.m. die in Duitsland en Frankrijk) te sterk waren. Tegelijkertijd werd besloten de surochemie-activiteiten te verkopen aangezien de productie van melkzuur(derivaten) reeds geruime tijd verliesgevend was. Echter, toen niemand serieuze belangstelling toonde, bleef CSM de
sucrochemie-poot aanhouden. Deze activiteiten, die CSM eigenlijk tegen wil en dank doorzette, bleken later het bedrijf veel mogelijkheden te geven om alternatieve richtingen in te slaan.

Mellkzuur(derivaten) hebben namelijk veel toepassingsmogelijkheden: ze kunnen worden gebruikt als conserveringsmiddel in voeding en bij het verbeteren van smaak en structuur van voeding. In de jaren tachtig begon CSM al met verkoopactiviteiten in de VS omdat dat land de grootste en meest homogene markt voor mellkzuur vormt. Deze verkooporganisatie krijgt de naam Purac (Pure Acid). Uitbouw van deze activiteiten naar bakkerij-ingrediënten volgde in de loop van de jaren tachtig met de aankoop van een belangrijke afnemer (groot bakkersbedrijf) van mellkzuur in 1984. Dit is het begin van het Amerikaanse belang in de bakkerij-branche en legt de basis voor de groei van de bakkerij-divisie zoals die met name door acquisities zijn beslag krijgt aan het eind van de jaren negentig en begin 2000.

Bij de heroverweging van de productportfolio rond 1990 identificeerde het management bakkerij-ingrediënten als een belangrijke groeisector. In de VS had men toen al een kleine positie verworven. CSM besloot tot acquisities, allereerst aan de Oostkust van de VS, later ook in andere delen van de VS. De Amerikaanse markt was toen nog erg versnipperd en er was nog volop keus om een geschikte overname kandidaat uit te zoeken en mee in onderhandeling te gaan.

Tegenwoordig is een snelle integratie noodzakelijk om de voordelen van synergie te bereiken. Synergie wordt behaald door a) overlap weg te snijden; b) elementen van oude en nieuwe bedrijven samen te voegen waardoor het geheel meer groei kan realiseren dan de twee afzonderlijke onderdelen zouden kunnen. Zogenaamde PMI (post-merger teams met daarin zowel interne als externe deskundigen) gaan snel na de deal aan de slag om de plannen om synergie te bereiken, te verwezenlijken. Die plannen zijn vaak al gesmeed voordat de daadwerkelijke overname plaatsvindt. In het traject van een (voorgenomen) overname worden veel externe consultants ingezet bij marktonderzoek, acquisitie-onderzoek, etcetera.

Primair wordt synergie gezocht tussen activiteiten binnen een divisie. Soms wordt gestreefd naar synergie tussen divisies, bijvoorbeeld door gezamenlijke inkoop, of (product)ontwikkeling.

Kennis
Olieman stelt grote vraagtekens bij de economische voordelen van onderzoek ten behoeve van product- en marktinnovaties. Bakkerij-ingrediënten en levensmiddelen die CSM in portfolio heeft, zijn ook niet zo kennisintensief, dus wat CSM betreft hoeft daar ook geen nadruk te worden gelegd op R&D. CSM heeft zelf ontwikkelaars in huis, terwijl onderzoek veelal buitenshuis plaatsvindt. Bij de divisie Purac is onderzoek en ontwikkeling wel in eigen huis. Het onderzoeksdeel is geconcentreerd in Gorichem. Productontwikkeling vindt ook plaats bij de productielocaties in Nederland, Spanje, Brazilië en de VS. De ontwikkelaars zijn mensen die dicht tegen het onderzoek aan zitten, veel contact hebben met de onderzoek(ers)wereld, en onderzoeksresultaten proberen te vertalen in verkoopbare toepassingen voor CSM. Bij Purac zijn een paar honderd, met name chemische onderzoekers aanwezig om derivaten te ontwikkelen. Deze divisie wordt wel gekenmerkt door kennisintensieve productiemethoden. Ofschoon de Purac-divisie een sterke groei doormaakt, bepaalt deze divisie (nog) niet het ‘gezicht’ van CSM. Toch is het zo dat, juist door een sterke R&D positie op het terrein van mellkzuur en –derivaten, CSM heeft kunnen internationaliseren en expanderen op het gebied van bakkerij-ingrediënten.

Markten
CSM focust zich op ‘die dingen waar we goed in zijn’ en probeert zich te beperken. Olieman stelt dat CSM niet de ambitie heeft in elke markt aanwezig te zijn, maar ‘in een paar segmenten willen we de beste zijn’. Daarnaast heeft CSM gekozen voor een geografische focus op Europa en Noord-Amerika. In beide regio’s heeft CSM sterke markt posities opgebouwd op het gebied van bakkerij-ingrediënten (vooral VS, nu na overname EBSB ook eerste in Europa) en levensmiddelen (A-merken, met name in Europa). Die posities wil men behouden en verder uitbouwen. Geografische expansie naar Azië is in een beginfase: de levensmiddelendi visie heeft in China een deelname. Maar CSM gaat in die regio voorzichtig te werk. Bakkerij-ingrediënten leveren in regio’s buiten EU en VS/Canada is moeilijk omdat je een infrastructuur nodig hebt van bakkerijen die technologie gebruiken die bij de westerse infrastructuur aansluit. Beide zijn (nog) niet aanwezig in Azië, waar brood ook geen dagelijkse kost is.

Purac heeft wel een wereldwijd netwerk van verkoopkantoren en diverse productielocaties in Europa, de VS, Brazilië en Singapore. Op veel van die plaatsen wordt hetzelfde geproduceerd maar
deels ook weer niet (specialisatie). Olieman stelt dat het beginpunt van veel buitenlandse avonturen ligt bij het opzetten van een verkoopkantoor.

Interactie export en FDI
Volgt hieruit dan CSM een buitenlandse vestiging altijd eerst vooraf laat gaan door een periode waarin het de markt verkent via export vanuit Nederland of een andere vestiging buiten Nederland? Zo zou het kunnen gaan, maar Olieman benadrukt het belang van het vinden van de juiste partners in het nieuwe afzetland, zoals bijvoorbeeld een groothandelaar en/of retail, om zo’n strategie tot een succes te maken. CSM heeft in Oost-Europa negatieve ervaringen op dit terrein. Olieman geeft er de voorkeur aan om een markt te bedienen via een lokale vestiging in plaats van door middel van export. ‘Bij export ben je kwetsbaarder en verlies je gemakkelijker je marktpositie. Bij export, heb je altijd te maken met valutaschommelingen waartegen je moet indrukken.’ Olieman nuances direct zijn stelling door aan te geven dat een sterk merk de onderneming als exporteur wel een sterke marktpositie kan bieden, waardoor, bijvoorbeeld, valutaschommelingen niet zo sterk van invloed zijn op opbrengsten als bij bulkproducten omdat producten met een hoge toegevoegde waarde minder prijsgevoelig zijn. ‘Je hebt meer kans om als exporteur in de markt te blijven als je een specifiek (gedifferentieerd) product kunt maken met een hoge toegevoegde waarde. Zo niet, dan is lokale productie te prefereren: dichtbij de consumenten. Echter, voordat je tot een lokale vestiging over kan gaan, moet in het betreffende (buiten)land wel een stabiele economische en politieke infrastructuur aanwezig zijn’. Ook op dat punt is Oost-Europa volgens Olieman nog niet zo’n aantrekkelijke regio voor CSM.

Sourcing (verslepen van spullen) is afhankelijk van logistieke kosten en productiekosten. Bij die productiekosten spelen valutakoersverschillen soms een hele belangrijke rol. Op de Europese markt met één munt (Euro) bestaat dat valutarisico niet meer. Waar men eerst zei: ‘Laten we maar een fabriek aanhouden in b.v. Frankrijk om minder gevoelig te zijn voor valutaschommelingen’, is dat nu niet meer nodig. Schaalvergroting en concentratie van productie-activiteiten zijn het gevolg, waarbij het land van de vestigingskeuze van veel factoren afhankelijk is zoals waar zit de kennis, waar is de consument, infrastructuur, congestie, etcetera. Ook kan lokale productie meer worden gespecialiseerd, daarbij profiterend van schaalvoordelen.

Global sourcing wordt alleen binnen de PURAC divisie nagestreefd. De grondstoffen voor melkzuur en –derivaten zijn koolhydraten, met een hoge graad van zuiverheid. In Europa en Brazilië is suiker de grondstof voor de koolhydraten, in de VS is dat glucose uit maïszetmeel. Vóór de bouw van de fabriek in de VS (in joint venture met Cargill) werd de Amerikaanse markt bediend vanuit Nederland, Spanje en Brazilië. Reden om een fabriek op te zetten in de VS is dat daarmee de productiecapaciteit wordt opgezet in de markt waar het product verkocht wordt, en gebruik kan worden gemaakt van een relatief goedkope grondstof, namelijk maïszetmeel.

COSUN
Interview met John van Kuik, Business Development Manager van Cosun, 16 mei 2000, Den Haag.

Internationalisering en organisatiestructuur
Cosun heeft een coöperatieve structuur, waarbij de coöperatie voor 100% eigenaar is van de holding. Deze structuur is, volgens Van Kuik, vooral nog geen belemmering geboden bij internationalisering: de financiering van (buitenlandse) overnames vindt vooral plaats uit eigen middelen en door leningen. Later in het gesprek zegt Van Kuik overigens dat overnames niet altijd mogelijk zijn omdat de financiële polstok van het concern niet ver genoeg reikt. Daarmee lijkt hij toch een kanttekening te zetten bij zijn eerde uitalting. De leden zouden volgens Van Kuik best bereid zijn om extern kapitaal aan te trekken via aandelenuitgifte maar het bestuur is nog niet zover en houdt vast aan de huidige structuur en eigendoms (c.q. zeggingschaps)-verhoudingen. Het bestuur wil volledige zeggenschap behouden, terwijl extern eigen vermogen tot vermindering van zeggenschap leidt.

Kennis
Cosun heeft een eigen onderzoeks- en ontwikkelingscentrum. Deze is in Rozendaal gevestigd en er werken circa 30 mensen. In totaal zijn er rond 50 mensen als R&D staf in dienst. Dit is ongeveer 1%
van alle medewerkers. Uitgaven aan R&D als percentage van de omzet worden geschat op 1 a 2%. Productontwikkeling vindt in Nederland plaats, marketing-onderzoek wordt vooral lokaal gedaan. R&D bij Cosun blijkt vooral applicatie en productontwikkeling. Basiskennis haalt men elders.

Markten en productlocaties
Cosun heeft veel interesse in de Noord-Amerikaanse markt. Daar is een koopkrachtige markt aanwezig voor haar meervoudige, samengestelde producten en ook voor inuline als vetvervanger. De VS kent reeds vele bedrijven, die samengestelde grondstoffen voor de voedingsmiddelenindustrie leveren (en die bedrijven zijn de klanten van Cosun). In Oost-Europa, ‘emerging markets’ en (andere) ontwikkelingslanden is daarentegen vaak nog alleen maar een markt voor de meer eenvoudige producten aanwezig (producten van met name de divisies Suiker Unie en Sensus). In de Noord-Amerikaanse vestigingen (Unifine, Advanta en Aviko) wordt hetzelfde geproduceerd als in Nederland en concurreert export met investeringen in lokale vestigingen.

De productie van sommige onderdelen is nogal grondstoffensensitief. Daardoor wordt bij de vestiging van verwerkingscapaciteit sterk gekeken naar waar de grondstof vandaan komt. Immers, transportkosten van de grondstof naar de verwerkingslocatie kunnen snel oplopen. Er moet dan een afweging worden gemaakt tussen schaalvoordelen van een fabriek en transportkosten. De verwerking van suikerbieten in Nederland is nu zo geconcentreerd dat bieten over een afstand van 100 km of verder moeten worden aangevoerd. Dat kan blijkbaar uit vanwege de schaalvoordelen: het is efficiënter om veel op een centrale plaats te verwerken dan de verwerking te verspreiden over een aantal locaties met een kleinere capaciteit. Transportkosten maken op dit moment (nog) circa 30% uit van alle verwerkingskosten.


Oost-Europa wordt door Cosun niet zo zeer als afzetmarkt maar meer als leverancier van voor het concern interessante grondstoffen gezien. Bijvoorbeeld, voor inuline wordt een grote afzetmarkt verwacht, zowel in voedseltoepassingen (als vetvervanger) als in de non-food toepassingen (bijvoorbeeld t.b.v. waterzuivering). Inuline (en ook fructose) wordt geproduceerd uit cichorei- wortels. In enkele Oost-Europese landen en met name in Oekraïne zijn er ervaringen met de productie en verwerking van deze wortels (tot surrogaatkoffie) en zijn er grote arealen beschikbaar voor de teelt. Van Kuik kijkt rond in die regio naar de mogelijkheden op teelt- en verwerkingsgebied.

Cosun heeft de afgelopen jaren veel geïnvesteerd in toepassingen van fructose. Er bestaat in de EU een productiequotum van fructose als onderdeel van het suikerbeleid. Alleen Nederland en België vullen dat Europese quotum. Door de applicatie-investeringen heeft Cosun een sterke marktpositie voor fructose.

Licenties

Hoge invoerheffingen zijn soms ook een motief om in het buitenland een vestiging te starten (zie boven over SVZ). De Amerikaanse importheffingen op groente- en fruitapplicaties en
Intangible assets
Op het gebied van specerijen (mixen, sauzen etc.) heeft Cosun een uniek voordeel; nergens anders is volgens Van Kuik zoveel kennis aanwezig op het gebied van procédé’s en applicaties als bij Cosun. Op het gebied van suikerspecialiteiten, –toepassingen en andere grondstoffen ten behoeve van de bakkerij-industrie heeft men (te) weinig in huis en er is voor gekozen om die kennis in te kopen: in die lijn moeten acquisities zoals Custom Industries in de VS, en Imarco (Ede) worden gezien.

Expansie van afzetmarkten worden door Van Kuik als volgt ingeschat:
- Voor specerijen (mixen, sauzen etc.) is West-Europa de groeimarkt
- Voor snacks is dat de VS (Noord-Amerika)
- Voor suiker is de groeimarkt Oost-Europa

Van Kuik geeft aan dat het voor toeleveranciers van de grote producenten van voedingsmiddelen en de grote fast-food-ketens belangrijk is om meer dan één fabriek te hebben. Zij willen geen zaken doen met toeleveranciers die slechts één productielocatie hebben, vanwege de risico’s van niet kunnen leveren.

Voor het ontwikkelen en introduceren van nieuwe producten ziet Van Kuik interessante mogelijkheden om speciale ketens op te zetten in alliantie met grote voedingsmiddelenproducenten. Voorbeeld: Advanta zaden voor zonnebloemen, productie in Oekraïne, en verwerking ter plekke door Unilever. Of brouwgerst in Oost-Europa met Interbrew.

Aanpassingen in het Europese suikerbeleid
Volgens Van Kuik behoort Cosun (Suiker Unie) bij het wegvallen van de ondersteuning van de suikerprijs en het quotum tot de overlevenden in Europa omdat Suiker Unie de afgelopen jaren zijn productiekosten sterk heeft gereduceerd

AVEBE
(In verband met langdurige onrust in het bedrijf over de ondernemingsstrategie is het niet mogelijk geweest een interview af te nemen met iemand van AVEBE. Onderstaande karakteristieken zijn overgenomen van en afgeleid uit verschillende bronnen, zoals de meest recente ondernemingsjaarverslagen en enkele kranten/tijdschriftenartikelen, de NRLO-studie van Bijman et al, 1997 en enkele gesprekken met ‘AVEBE-watcher’ en journalist Steef van Duin)

Profiel
De coöperatie AVEBE is ’s werelds grootste producent van aardappelzetmeel en aardappelzetmeelderivaten. De producten worden toegepast in de voedingsmiddelen-, papier-, kleefstoffen- en textielindustrie, bij de exploratie en winning van aardolie en aardgas, in de diervoedingsindustrie, in waterzuiveringsprocessen en voor vele andere doeleinden. Naast aardappelzetmeel maakt AVEBE in toenemende mate gebruik van tapioca, en van tarwe- en mafszetmeel als grondstof voor derivaten.

Structuur
Productie- en onderzoekslocaties

Afzetmarkten
De klanten van AVEBE zijn de verwerkende industriëen (Het product Brinta is het enige AVEBE product dat rechtstreeks voor de consument te koop is). Vanwege de vele toepassingsmogelijkheden van zetmeel is de klantengroep divers. Naast de diervoedings- en (diverse geledingen binnen de) voedingsmiddelenindustrie zijn dat de papier- en golfkartonindustrie, de kleefstoffenindustrie, de textiel-, en de bouwindustrie. Uit de afzetverdeling van zetmeelproducten per toepassingsgebied blijkt voeding de belangrijkste (ca. 40%), gevolgd door papier (25%) en kleefstoffen (10%). De omzet wordt slechts voor zo’n 10% in Nederland behaald. Andere EU-landen zijn belangrijke afzetmarkten waar AVEBE zo’n 40% van zijn totaal omzet behaalt. Uit de rest van Europa komt 6% van de totale omzet en de markten buiten Europa zijn met ruim 40% even belangrijk als de EU.

Strategie
Het beleid van de Divisie Zetmeel & Diervoeding is gericht op het realiseren van de laagste kostprijs voor aardappelzetmeel in Europa. De Divisie Voeding & Pharma legt de nadruk op de ontwikkeling van hoogwaardige(r) derivaten (uit aardappel- en tarwezetmeel) die worden verwerkt tot of in gedifferentieerde producten (voedingsingrediënten, specialiteiten, neutraaceuticals). Hierbij gaat veel aandacht uit naar nieuwe toepassingsmogelijkheden. Ook de Divisie Industriële Applicatie legt het accent op de ontwikkeling en toepassing van hoogwaardige derivaten voor haar klanten.

Uit de verdeling van de omzet over de verschillende omzetcategorieën blijkt dat bijna 70% van de omzet uit derivaten wordt gehaald tegen ruim 20% uit zetmeel. Derivaten kunnen worden onderverdeeld in laagwaardige en hoogwaardige derivaten (AVEBE produceert meer dan 600 verschillende zetmeelderivaten). Bij de eerste is de kostprijs doorslaggevend voor de klant. Met hoogwaardige derivaten onderscheidt AVEBE zich van andere zetmeel- en derivaten producenten, en die zijn voor de onderneming dus ook veel aantrekkelijker. R&D van AVEBE is er dan ook op gericht zoveel mogelijk hoogwaardige derivaten te ontwikkelen.


Internationalisering
Als gevolg van de verschuiving in haar grondstofbehoefte heeft AVEBE in Frankrijk (tarwe), de VS (mais) en Zuid-oost Azië (Thailand: tapioca) gïnvesteerd in lokale verwerking. Reden voor die directe investeringen buiten Nederland is de verminderde aantrekkelijkheid van de aardappel als grondstof

In veel landen heeft AVEBE een verkoopkantoor of vertegenwoordiging. Het belang daarvan is groot: door deze kantoren zit men dichtbij de (potentiële) afnemers. Klanten worden niet alleen voorzien van producten maar ook van technische ondersteuning. Het laatste is van groot belang wanneer het gaat om specialistische producten. AVEBE mikt op groei door samenwerking met haar afnemers, d.w.z. in samenspraak met afnemers en in een soort van co-makership specialistische producten ontwikkelen voor die afnemers (zie SPIL, 1999, nr.161/162: 9).

Relatie export en lokale productie
In het Jaarverslag 1998/99 wordt genoemd dat de resultaten in een regio worden bepaald door de export vanuit Europa en de activiteiten van buitenlandse productielocaties in die betreffende regio. Tegenvallende exporten werden geboekt voor zowel de Aziatische, de Noord- en de Zuid-Amerikaanse markten, vooral doordat een aantal producten hinder ondervond van lokale prijsconcurrentie. De lagere export werd echter voor een belangrijk deel gecompenseerd door meer omzet van de lokale productieeenheden. Binnen de onderneming wordt voor markten buiten Europa het ‘local for local’ concept gehanteerd. Hierbij wordt lokaal geproduceerd en lokaal verkocht. Voor dit concept is gekozen omdat er buiten Europa geen groei meer wordt verwacht van de afzet van Europese producten op basis van aardappelzetmeel maar wel van producten op basis van locale grondstoffen tapioca en mais (Bijman et al., 1997:41). Uit het Jaarverslag kan worden afgeleid dat export en lokale productie elkaar aanvullen voor zover het gaat om de levering van andere producten vanuit Europa dan lokaal worden geproduceerd.

Van Melle
Verslag van het gesprek met Lieke van Aalten, Van Melle, op 3 oktober 2000 te Breda.

Historie
Van Melle is in 1900 in Breskens begonnen met zoetwarenproductie. In de omgeving werden veel suikerbieten verbouwd dus de grondstof suiker(glucose) was er ruim voorradig. Al snel werden de zuurtjes en roomboterbabbelaars ook in het buitenland verkocht; naast België werd met name geëxporteerd naar Nederlands-Indië (Indonesië) en Zuid-Afrika (i.v.m. aanwezigheid van Nederlanders). Nadat in 1944 de fabriek in Breskens was platgebombardeerd, werd nieuwbouw gepleegd in Rotterdam. Rotterdam was een veel gunstiger locatie zowel voor het bedienen van buitenlandse markten als het aanvoeren van grondstoffen.

Na de Tweede Wereldoorlog kwamen er al snel verkoopkantoren in landen rondom Nederland. De oplopende spanningen tussen Oost en West (Koude Oorlog) in die tijd bracht de Van Melle-directie ertoe te zoeken naar een vestiging in een land dat buiten de invloedsferen van de grootmachten Rusland en de VS lag. Gekozen werd voor Brazilië, waar zowel een verkoopkantoor als een productielocatie werd geopend. Het argument van risicospreiding speelt ook heden ten dage een rol in de beslissingen ten aanzien van het kiezen van productielocaties over de wereld (zie ‘Motivaties voor buitenlandse investeringen’).

Geografische expansie
In de jaren zeventig werden fabrieken opgericht in onder andere het VK en in de VS. In de jaren tachtig was een eerste golf van overnames. Van Melle nam o.a. Van Duin (Breskens), Peco (Den Haag) en Look-o-look (Ridderkerk) over. Door de overnames schakelde de onderneming concurrenten

Zuidoost-Azië
Van Melle bezit in een aantal landen productiefaciliteiten: Indonesië, China. In India wordt gebouwd aan een nieuwe fabriek. De vestiging in Filippijnen is in juli 1999 gesloten. De bestaande fabriek moest fors worden gerenoveerd. Gekozen is voor investeren in China (nieuwe locatie) en Indonesië (uitbreiding) en vanuit een van beide landen de Filippijnse markt te bedienen. De landen maken deel uit van het ASEAN-blok zodat export vanuit een van deze landen naar de Filippijnen niet wordt belemmerd door invoerheffingen.

Midden en Oost-Europa

In Midden-Europa zijn relatief veel kleine zoetwarenfabriekjes, veelal familiebedrijfjes. Het geproduceerde behoort meestal tot de lagere kwaliteitssegmenten. Van Melle is geïnteresseerd in deze regio omdat de consumptie per capita traditioneel relatief hoog ligt. Men verwacht een verdere groei van de consumptie, en dan ook met name van de ‘duurdere’ internationale merken van Van Melle, bij inkomensgroei.

Driehoekshandel

Motivaties voor buitenlands investeringen
Marktpotentieel (in relatie tot koopkrachtontwikkeling) en het omzeilen van importheffingen zijn de belangrijkste argumenten om in het buitenland een productievestiging te starten. Van Melle wil met het netwerk aan fabrieken in diverse landen/regio’s ook het totale bedrijfsrisico spreiden. Als in één regio het minder goed gaat, hoeft dat nog geen grote gevolgen te hebben voor de totale resultaten van het Van Melle (zie bv. persbericht van 5 maart 1998 waar aangegeven wordt dat de geografische spreiding van de activiteiten in Azië Van Melle heeft behoed voor omzetverlies als gevolg van de economische crisis die sommige landen in die regio doormaken). Een locale vestiging heeft het voordeel dat je dicht bij de lokale consument zit waardoor de locale behoeften beter te peilen zijn dan van een (grote) afstand. Aspecten als infrastructuur en politieke stabiliteit van een land spelen ook een rol bij de overweging te investeren in het buitenland. Grondstoffen worden veelal locaal ingekocht. De grondstof suikerglucose is vrijwel over de hele wereld goed beschikbaar en vormen geen argument om in een
bepaald land een productievestiging te hebben.

Relatie export en buitenlandse investering

Unieke eigenschappen van Van Melle
Twee unieke karakteristieken: 1) het product Mentos verkoopt in zo’n 170 landen en heeft een uniek procédé. (Mentos zorgt voor ongeveer de helft van de omzet en de helft van de winst van het bedrijf); 2) samenwerkingsverbanden op het gebied van distributie (Chupa Chups: Duitsland en Spanje; Perfetti: Zuid-Europa; Warner-Lambert: VS, Zuid-Amerika, Japan en VK). Door deze samenwerkingsverbanden zijn heel veel Van Melle snoepjes in heel veel landen te koop.

Research & Development
Er zijn geen bedragen bekend (Van Melle geeft daarover geen openheid van zaken), maar wel is zeker dat de uitgaven aan ontwikkeling toennen. Er zijn een aantal locale ontwikkelingscentra waarin Van Melle productontwikkeling heeft geconcentreerd. Productontwikkeling betekent nieuwe, lekkere producten maken door voort te bouwen op de bestaande, maar ook kijken welke mogelijkheden er zijn op het gebied van functional foods (door bv. vitamines en/of mineralen toe te voegen aan snoep). Productontwikkeling reageert ook op maatschappelijke signalen. Gelatine als veel gebruikte grondstof voor snoepjes is enigszins in een kwaad daglicht komen te staan vanwege BSE en het dioxyne-schandaal in de veehouderij (gelatine is een afvalproduct van dierbeenderen). Daardoor is men nu op zoek naar vegetarische bestanddelen als alternatief voor gelatine.

Farm Frites
Interview met Piet de Bruijne, directeur Farm Frites, te Oudenhoorn, 6 juli 2000

Farm Frites Beheer BV (FF) is een aardappelverwerker. De onderneming produceert en verkoopt verse en diepgevroren aardappelproducten, variërend van frites tot een uitgebreid assortiment van aardappelspecialiteiten en aardappelvlokken. FF heeft haar hoofdbasis in de EU en tevens productiefaciliteiten in Polen, Egypte en Argentinië.

De kernstrategie van FF is (1) volumegroei en (2) kostenverlaging. Door middel van volumegroei kan een kritische massa worden bereikt in productie, logistiek en marketing, en kan de tweede doelstelling – efficiëntieverbetering – worden bereikt.

FF doet steeds meer aan productontwikkeling. Het heeft momenteel 5 mensen full-time bezig met productontwikkeling. Hoewel zij in de afdeling R&D zijn ondergebracht, worden ze vooral aangestuurd door de marketingafdeling.

Buitenlandse vestigingen in België, Egypte, Polen en Argentinië
Farm Frites heeft al sinds begin jaren tachtig drie productievestigingen in Belgie:
- Poperingen (bij Yeper), productie van kleine verse aardappeltjes (soort Cela Vita);
- Sint Truiden, productie van verse frites;
- Lommel, productie van kroketten, puree, vlokken, en diepvries frites.

FF was al de grootste aanbieder van frites op de Egyptische markt, toen circa 10 jaar geleden een Koeweitse investeerder een fritesfabriek wilde opzetten. Egypte heeft een imPortheffing van 50%, dus binnenlandse productie is aantrekkelijk. FF heeft toen die Koeweitse investeerder overgehaald om samen een fabriek op te zetten. Momenteel is FF de grootste binnenlandse producent, en levert het o.a.
aan alle internationale hotelketens. Ook de omringende Arabische landen zijn een belangrijke afzetmarkt. Agronomische expertise voor de aardappelproductie in Egypte haalt FF voornamelijk uit Israël.

In begin jaren negentig werd een boerderij gekocht in Polen om aardappelen te telen en de mogelijkheden van een frietfabriek te bestuderen. In 1994 werd samen met Aviko (70% Cebeco, 30% Cosun) een eerste investering gepleegd in aardappelteler en -verwerking. Nu gaat alles (productie, logistiek, marketing) op 50-50 basis. Aviko levert aan de retail, FF levert aan de fastfood. Deze producten komen uit dezelfde fabriek.

De Poolse markt wordt door een importheffing van 55% op verwerkte aardappelproducten van de wereldmarkt afgeschermd. Daardoor is er (nog) weinig concurrentie op deze markt (alhoewel McCain in 1999 ook een fritesfabriek heeft geopend bij Warschau). De binnenlandse Poolse markt is dan ook de belangrijkste afzetmarkt voor de FF/Aviko fabriek. Daarnaast exporteert de Poolse fabriek naar omliggende landen als Tsjecho en Hongarije. De fabriek wordt voornamelijk beleverd vanaf de eigen boerderij. Omringende, veelal buitenlandse telers vullen de rest van het benodigde kwantum aan. Slechts enkele Poolse telers kunnen de strenge kwaliteiteisen halen.

In 1996 werd in Argentinië een fabriek opgezet, in joint venture met een Argentijnse partner (50-50). Later heeft FF deze Argentijnse partner uitgekocht omdat de samenwerking niet goed verliep.

Grondstof / relaties met toeleveranciers
FF doet 90% van haar inkoop via contracten met individuele telers. Medewerkers van FF komen regelmatig op de bedrijven van de telers en adviseren ook op het gebied van teelt en opslag.

Het sterke punt van Nederland is de grondstof, die een goede prijs/kwaliteit verhouding heeft. In de jaren tachtig had Nederland ook een voorsprong op het gebied van kennis van aardappelbewaring, maar die kennis is nu ook in landen als België aanwezig. België (vooral in het zuiden) is momenteel het meest aantrekkelijke grondstofgebied voor Farm Frites: de productiekosten in de aardappelteler zijn lager dan in Nederland (grond is goedkoper, productie per hectare is hoog). Daarnaast roemt De Brijne de instelling van de Belgische boeren en hun bereidheid tot samenwerking, tot lange-termijnovereenkomsten en tot het uitproberen van nieuwe zaken. Ook de Belgische concurrenten van FF zijn zeer actief en zeer competitief; ze groeien snel, maar zitten vooralsnog op een lage-kosten strategie.

FF heeft goede relaties met pootaardappelbedrijven: HZPC, Agrico en Van Rijn. Samen zoeken ze naar nieuwe rassen. FF investeert in het rassenonderzoek, met als tegengesteld dat zij 5 jaar lang een voorkeursbehandeling krijgen mocht het nieuwe ras op de markt komen. FF doet per jaar 80 veldproeven om nieuwe rassen te testen. Een persoon is full-time bezig met het uittesten van deze rassen (zowel op het veld als in de fabriek). FF hecht aan de goede samenwerking met pootgoed-bedrijven.

Redenen voor internationaliseren
Een van de belangrijkste redenen om fabrieken in meerder landen te openen heeft een logistieke achtergrond. Dat geldt zowel voor de aanvoer van de aardappelen als voor de afvoer van de verwerkte producten. Door een fabriek in de buurt van een teeltgebied te brengen wordt bespaard op transportkosten. Transportkosten wegen nu eenmaal erg zwaar in deze sector en het minimaliseren van transportkosten is van groot belang om de concurrentie voor te blijven. Uitbreiding van het areaal is in Nederland niet meer mogelijk, dus wordt een investering in een frites-fabriek moeilijk rendabel te maken. De grondprijzen in het buitenland zijn vaak lager dan in Nederland zodat de kostprijs van aardappelen ook lager kan zijn dan in Nederland (afhankelijk van de opbrengsten per ha). Voor de afvoer geldt hetzelfde logistieke verhaal. De groeimarkten voor frites liggen volgens de Bruijne in het Zuiden van Europa, rond de Middellandse Zee en in Zuid-Amerika (zie ook het artikel in Aardappelwereld, december 1996, nr.12). Vandaar vestigingen in Zuid-Frankrijk, Egypte en Argentinië.

FF volgt de markt en de klant. Wanneer de klanten zich in het buitenland vestigen, gaat FF er achteraan. Bij de keuze om de belevering via export of via een eigen vestiging te doen, vormen de laagste kosten van aanvoer en afvoer een belangrijk aspect bij het nemen van de beslissing.
Klanten van FF

In West-Europa heeft FF twee groepen klanten: de food service (horeca, institutionele keukens, catering, etc.) en de retail. Aan de retail levert FF alleen private label products. In de levering aan de food service is de laatste jaren een verandering opgetreden in de zin dat voorheen FF aan een grossier leverde en die vervolgens aan de food service verkocht. Nu wordt er steeds meer zaken gedaan met de ondernemingen in de food service zelf. De service, het accountmanagement, het prijsbeleid, de logistiek, allemala zijn ze gericht op de eindverbruiker.

FF levert aan grote inkooporganisaties van retailers, bijvoorbeeld EMD (European Marketing Distribution, en is met ruim 11% van de markt de grootste inkooporganisatie in Europa; JB). EMD is de grootste inkoper van private label producten in Europa. Het aantrekkelijk van FF is dat zij elke aankoop in Europa, hoe groot ook, aankunnen.

Fastfoodketens hebben een voorkeur voor local sourcing, om te laten zien dat zij het beste voor hebben met de lokale economie (vaak worden ze als buitenlandse indringers gezien). Toch willen de ketens het liefst beleverd worden door een grote, bekende toeleverancier, omdat die garantis can geven voor zowel continue levering (kwantiteit) als de kwaliteit van de grondstof. Hierdoor wordt de toeleverancier ook aangespoord te investeren in een locale vestiging.

FF levert in Nederland aan Albert Heijn, en verzorgt voor deze klant de category management, de logistiek, en de productontwikkeling. Het VK is een hele belangrijke markt voor FF. Jaarlijks wordt 80.000 ton frites in de UK verkocht. De levering vindt plaats vanuit Nederland. Het dure pond maakt van de VK een aantrekkelijk exportmarkt. Nadeel is dat er nauwelijks retourvracht is voor de vrachtauto’s. De retail in de VK heeft jarenlang vooropgelopen met het opzetten van traceability systemen. Die voorsprong zijn ze nu kwijt. Alle grote retailers eisen inzicht in en controle op de gehele toeleveringsketen.

Organisatiestructuur

Vroeger had FF per land verkoopmanagers. Nu werkt men met een Europees verkoopsysteem, waardoor de landenmanagers minder centraal staan. Dit heeft ertoe geleid dat een aantal landenmanagers vervangen moesten worden. Toch is het belangrijk ook de managers in de verschillende landen voldoende gemotiveerd te houden bij centrale beslissingen vanuit Oudenhoorn. Om deze reden en voor de duidelijkheid in de organisatie zijn de accountmanagers per regio ook verantwoordelijk voor de relaties met grote (wereldwijde) klanten die hun hoofdkantoor in die regio hebben. Zo is de regiomanager Scandinavië ook accountmanagers voor alle Ikea-vestigingen, om dat Ikea zijn hoofdkwartier in Zweden heeft.

Europa is voor FF een geheel, dat centraal vanuit Oudenhoorn wordt gemanaged. FF ziet zichzelf niet als een Nederlands bedrijf dat aardappelproducten exporteert, maar als een Europese producent van aardappelproducten. Productie, logistiek, en commercie worden vanuit Oudenhoorn voor heel Europa (exclusief Polen) gedaan. Alle vestigingen buiten Europa staan onder leiding van een Directeur Internationaal, die ook lid is van het management team. Deze is ook verantwoordelijk voor de alliantie met Simplot.

Alliantie met Simplot

Drie jaar geleden heeft FF zich afgevraagd wat te doen in de toekomst, welke strategie te volgen. Toen is besloten om – naast te willen behoren tot de Europese top - een wereldwijde strategie te volgen, omdat de klanten dat wensen, maar om dat niet alleen te doen. Toen is het plan ontstaan om een alliantie met het Amerikaanse Simplot aan te gaan. In 1999 was deze alliantie een feit. In de alliantie is afgesproken dat Simplot de Noord-Amerikaanse en Australische markt als thuismarkt zal bedienen, en FF Europa (inclusief Centraal en Oost-Europa) zal bedienen. Daarbuiten volgt men een gezamenlijke strategie, terwijl degene die het eerste in een land is (of was) de leiding zal nemen bij de expansie. Simplot levert vooral aan de fast food, o.a. aan McDonald’s, in Noord-Amerika. De samenwerking met Simplot betreft het uittesten van nieuwe rassen, logistiek, gezamenlijke levering als de een of de ander niet voldoende kan leveren, productontwikkeling en kwaliteitscontrole, en gezamenlijke commercialisering van nieuwe producten. Voor de nabije toekomst wordt gewerkt aan het opzetten van een global sales office, om grote klanten wereldwijd te kunnen bedienen.
Appendix 5 Overview of mergers, acquisitions and joint ventures, involving selected Dutch multinational food companies during 1 January 1999-31 July 2000
(Source: Eurofood, Agra Europe. This source is the best there is for this purpose but it should be noted that it is still offering an incomplete picture. Information on acquisitions presented in Eurofood issues before January 1999 is too fractional to build any analyses on)

<table>
<thead>
<tr>
<th>Date</th>
<th>Buyer</th>
<th>Target</th>
<th>Country</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 July 2000</td>
<td>CSM</td>
<td>Unilever</td>
<td>NL/UK</td>
<td>CSM buys Unilever’s European Baking Supplies Business (EBSB) for £440m – Unilever acquired the consumer bakery division through its purchase of Bestfoods</td>
</tr>
<tr>
<td></td>
<td>Wessanen</td>
<td>Distribourg</td>
<td>NL/France</td>
<td>Dutch food group acquires 51% stake in a French counterpart and proposes to buy outstanding stake for a total of Euro 115m</td>
</tr>
<tr>
<td>N/A</td>
<td>Ludus</td>
<td>Romania/NL</td>
<td></td>
<td>Dutch sugar and food group COSUN sells its stake in the Romanian sugar refinery Ludus as part of its strategic withdrawal from Eastern-Europe</td>
</tr>
<tr>
<td>22 June</td>
<td>Unilever</td>
<td>Best Foods</td>
<td>UK/NL/USA</td>
<td>Unilever acquires Bestfoods for £13.4bn to become the world’s second largest food business</td>
</tr>
<tr>
<td>8 June</td>
<td>Struik Food Group</td>
<td>Unilever</td>
<td>NL</td>
<td>Anglo-Dutch giant sells Belgian meat procession subsidiary to Dutch group</td>
</tr>
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<td>11 May</td>
<td>Numico</td>
<td>Rexall Sundown</td>
<td>NL/USA</td>
<td>Dutch nutritional food group acquires US-based counterpart for US$ 1.8bn</td>
</tr>
<tr>
<td>27 April</td>
<td>Unilever</td>
<td>Ben&amp;Jerry Homemade</td>
<td>NL/UK/USA</td>
<td>Anglo-Dutch conglomerate scoops up US ice cream manufacturer for US$326m. ..and swallows US dietary supplement producer for US$2.3 bn.</td>
</tr>
<tr>
<td></td>
<td>Unilever</td>
<td>SlimFast Foods</td>
<td>NL/UK/USA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brocacef Holding</td>
<td>Roter</td>
<td>NL</td>
<td>Dutch confectioner Van Melle sells Roter brand food supplements acquired as part of last year’s take-over of Klene</td>
</tr>
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<td>13</td>
<td>Packbond</td>
<td>Leaf UK</td>
<td>UK/NL</td>
<td>CSM reaches final agreement on</td>
</tr>
<tr>
<td>Date</td>
<td>Buyer</td>
<td>Target</td>
<td>Country</td>
<td>Remarks</td>
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<tr>
<td>April</td>
<td>Holding</td>
<td></td>
<td></td>
<td>sale of Leaf’s UK chocolate activities, comprising the Elisabeth Shaw and Famous Names brands</td>
</tr>
<tr>
<td></td>
<td>Nutreco</td>
<td>Norsk Hydro</td>
<td>NL/Norway</td>
<td>Dutch feed group seeking to acquire seafood unit of Norwegian State-run conglomerate for HFl. 1 bn</td>
</tr>
<tr>
<td></td>
<td>Marigold Foods</td>
<td>Oak Grove Dairy</td>
<td>NL/USA</td>
<td>US subsidiary of Wessanen acquires Minnesota dairy</td>
</tr>
<tr>
<td>30 Mar</td>
<td>Nutreco</td>
<td>Hydro Seafood</td>
<td>NL/UK</td>
<td>Hydro set to be acquired by Dutch group to create combined fish-farming group employing 1100 staff in Scotland</td>
</tr>
<tr>
<td></td>
<td>Boost Nutrition</td>
<td>M/S/C/ Lebensmittelei, Euryza Reis</td>
<td>Belgium, Spain, USA, Germany, NL</td>
<td>Boost, the Belgium group owned by Herba of Spain and Riviana Foods of the US completes acquisition of German rice subsidiaries of Dutch food group CSM as German competition authorities give green light</td>
</tr>
<tr>
<td></td>
<td>Katjes</td>
<td>Leaf</td>
<td>Germany, NL</td>
<td>CSM finalises sale of German arm of Leaf confectionery division to local liquorice group</td>
</tr>
<tr>
<td>16 Mar</td>
<td>Unilever</td>
<td>Grupo Cressida</td>
<td>NL/UK/Honduras</td>
<td>Anglo-Dutch consumer goods group pays Euro 322.5m for Honduras-based diversified conglomerate</td>
</tr>
<tr>
<td></td>
<td>Unilever</td>
<td>Amora maille</td>
<td>NL/UK/France</td>
<td>.. while EU finally clears Unilever’s acquisition of French mustard group [French manufacturer of leading Dijon mustard brands and culinary range]</td>
</tr>
<tr>
<td></td>
<td>Numico</td>
<td>Endlich Internationale</td>
<td>NL/USA</td>
<td>Dutch food group completes acquisition of nutritional health supplement producer with annual turnover of Euro 200m</td>
</tr>
<tr>
<td>2 Mar</td>
<td>Van den Bergh Foods</td>
<td>Plva Piim</td>
<td>UK/NL/Estonia</td>
<td>Estonia’s largest dairy company, United Dairies, signs preliminary agreement to sell its milk division to subsidiary of Unilever</td>
</tr>
<tr>
<td></td>
<td>Kamps</td>
<td>Quality Bakers</td>
<td>Germany/NL</td>
<td>German bakery giant acquires bakery division of Dutch food</td>
</tr>
<tr>
<td>Date</td>
<td>Buyer</td>
<td>Target</td>
<td>Country</td>
<td>Remarks</td>
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<tr>
<td>17 Feb</td>
<td>Numico</td>
<td>Wuxi Chia-Tai</td>
<td>NL/China</td>
<td>Dutch clinical nutrition expert buys Chinese pharmaceuticals group to boost local production</td>
</tr>
<tr>
<td>3 Feb</td>
<td>Chiary &amp; Forti</td>
<td>Oil brands</td>
<td>Italy/UK/NL</td>
<td>Unilever subsidiary Van den Bergh Foods sells non-core seed oil brands to Italian group</td>
</tr>
<tr>
<td>20 Jan</td>
<td>Unilever</td>
<td>Rossel Industries</td>
<td>NL/UK/India</td>
<td>Anglo-Dutch giant pays £125 m to take over 65% stake in Indian tea business</td>
</tr>
<tr>
<td></td>
<td>Van Melle</td>
<td>Fundy</td>
<td>NL/Hungary</td>
<td>Dutch confectioner acquires Hungarian manufacturer with Euro 17m annual sales</td>
</tr>
<tr>
<td></td>
<td>Wessanen</td>
<td>Karl Kemper, Vegeta</td>
<td>NL/Germany</td>
<td>Dutch food group acquires German manufacturers (Kemper produces frozen ready meals, Vegeta specialises in vegetarian products)</td>
</tr>
<tr>
<td>16 Dec 1999</td>
<td>Struik</td>
<td>California</td>
<td>NL</td>
<td>CSM finalises sale of soup and sauce maker to compatriot food group.</td>
</tr>
<tr>
<td>2 Dec</td>
<td>Van Melle</td>
<td>Candy Tech</td>
<td>NL/USA</td>
<td>US subsidiary of Dutch sugar confectioner acquires Illinois group specialising in children’s confectionery</td>
</tr>
<tr>
<td></td>
<td>Unilever</td>
<td>Frudesa</td>
<td>NL/UK/Spain</td>
<td>Spanish frozen food group absorbed into Unilever subsidiary</td>
</tr>
<tr>
<td>18 Nov</td>
<td>Zwanenberg Food Group</td>
<td>Offerman</td>
<td>NL/UK</td>
<td>Division of Meatpoint pork processor acquires ArgentGroup subsidiary</td>
</tr>
<tr>
<td></td>
<td>Friesland Coberco</td>
<td>DSM</td>
<td>NL</td>
<td>Dutch dairy group acquires baking operations (annual sales of HFl133m) of compatriot chemical group taking effect 1 January 2000</td>
</tr>
<tr>
<td>21 Oct</td>
<td>Friesland Coberco</td>
<td>Mizo</td>
<td>NL/Hungary</td>
<td>Dutch dairy giant acquires 33% stake in small Hungarian dairy</td>
</tr>
<tr>
<td></td>
<td>Silvo</td>
<td>Euryza</td>
<td>NL</td>
<td>Dutch rice processor acquires</td>
</tr>
<tr>
<td>Date</td>
<td>Buyer</td>
<td>Target</td>
<td>Country</td>
<td>Remarks</td>
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<tr>
<td></td>
<td>Nutreco</td>
<td>Biomaster</td>
<td>NL/Chile</td>
<td>Dutch food group acquires Chilean fish feed business with turnover of Euro 19m</td>
</tr>
<tr>
<td>23 Sep</td>
<td>CSM</td>
<td>Steel City Milling</td>
<td>NL/USA</td>
<td>Dutch group adds another North American bakery ingredients producer to its growing BakeMark network</td>
</tr>
<tr>
<td>29 Jul</td>
<td>Nutreco</td>
<td>Marine Harvest McConnell</td>
<td>NL/UK</td>
<td>Booker sells salmon farming business to Dutch animal and fish feed group for £32.7bn</td>
</tr>
<tr>
<td>15 Jul</td>
<td>Goodman Fielder</td>
<td>Shangai Van den Bergh</td>
<td>Australia/Chin a/UK/NL</td>
<td>Australian food manufacturer acquires 90% stake in Chinese edible oil group from Unilever and partners</td>
</tr>
<tr>
<td></td>
<td>Numico</td>
<td>Mocoa</td>
<td>NL/Brazil</td>
<td>Dutch food group acquires leading Brazilian babyfood producer</td>
</tr>
<tr>
<td></td>
<td>CSM</td>
<td>St. Louis Bakers’ Co-operative Association</td>
<td>NL/US</td>
<td>Acquisitive Dutch food and ingredients group buys Missouri baked goods distribution firm with annual turnover of US$6m for integration into BakeMark Ingredients</td>
</tr>
<tr>
<td></td>
<td>Numico</td>
<td>General Nutrition</td>
<td>NL/USA</td>
<td>Dutch food and ingredient group acquires food supplement maker and retailer for US$2.5bn</td>
</tr>
<tr>
<td></td>
<td>Unilever</td>
<td>Sociedad Indsial Dominicana</td>
<td>UK/NL/Domin ican Republic</td>
<td>Anglo-Dutch consumer products giant acquires ice cream and home &amp; personal care business from SID</td>
</tr>
<tr>
<td></td>
<td>Wessanen</td>
<td>A-1 International Foods</td>
<td>NL/USA</td>
<td>Dutch manufacturer of branded and own label dairy, breakfast, chilled and frozen foods acquires speciality food distributor in Los Angeles with annual sales of US$225m and 1000 employees</td>
</tr>
<tr>
<td>17 June</td>
<td>Friesland Coberco</td>
<td>DSM Bakery Ingredients</td>
<td>NL</td>
<td>Dairy giant acquires part of DSM’s Dutch, French and Belgian bakery ingredients activities</td>
</tr>
<tr>
<td>Date</td>
<td>Buyer</td>
<td>Target</td>
<td>Country</td>
<td>Remarks</td>
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<tr>
<td>Van Melle</td>
<td>Confectionery producer acquires liquorice manufacturer for HFL110m</td>
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<tr>
<td>Van Melle</td>
<td>Dutch confectioner acquires Wybert throat lozenge brand from Swiss group</td>
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<tr>
<td>Van Melle</td>
<td>Spanish confectionery giant enters into sales and distribution <em>joint venture</em> with Dutch counterpart to achieve stronger position in French and German markets</td>
<td></td>
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</tr>
<tr>
<td>3 June</td>
<td>Anglo-Dutch conglomerate acquires Chinese tea group for an alleged US$15m</td>
<td></td>
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<tr>
<td>Numico</td>
<td>Dutch food group acquires dairy activities of Indian group to produce infant formula</td>
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<tr>
<td>Numico</td>
<td>Dutch food group acquires dairy to launch its first Chinese production facility</td>
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<tr>
<td>Wessanen</td>
<td>Cooked meat products group sells undisclosed stake to Dutch food group</td>
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</tr>
<tr>
<td>6 May</td>
<td>Dutch food group acquires sugar confectionery division of Finnish packaging group Huhtamäki</td>
<td></td>
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<tr>
<td>Campina Melkunie</td>
<td>Dutch dairy giant acquires organic milk and butter producer</td>
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<tr>
<td>22 April</td>
<td>Unilever sells bakery ingredients subsidiary</td>
<td></td>
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<tr>
<td>8 April</td>
<td>Anglo-Dutch multinational sells Rome olive oil plant to Colavita</td>
<td></td>
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<tr>
<td>HL Foods</td>
<td>Dutch food group COSUN sells canned fruit unit</td>
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<tr>
<td>25 Mar</td>
<td>Definitive agreement reached on acquisition of New York bakery</td>
<td></td>
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<tr>
<td>11 Mar</td>
<td>Dutch potato chip factory in 50/50 <em>joint venture</em> with Polish co-operative</td>
<td></td>
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<tr>
<td>25 Feb</td>
<td>Unilever sells salad and dressing business of FHL to Dutch</td>
<td></td>
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<tr>
<td>Date</td>
<td>Buyer</td>
<td>Target</td>
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<tr>
<td></td>
<td>Management Lebewitte</td>
<td></td>
<td></td>
<td>investment fund</td>
</tr>
<tr>
<td></td>
<td>Unilever Selecta Dairy</td>
<td>Philippines/UK/NL</td>
<td></td>
<td>Anglo-Dutch giant acquires Asian ice cream business</td>
</tr>
<tr>
<td>11 Feb</td>
<td>Chaucer Foods SPAB</td>
<td>UK/NL</td>
<td></td>
<td>Ingredient provider buys competitor from Unilever</td>
</tr>
<tr>
<td></td>
<td>Nutricia [Numico] Efamol</td>
<td>UK/NL</td>
<td></td>
<td>Scotia sells nutritional product business to subsidiary of Dutch food group to focus on pharmaceuticals</td>
</tr>
<tr>
<td>28 Jan</td>
<td>Hajdutej Szabolstej</td>
<td>NL/Hungary</td>
<td></td>
<td>Nutricia [Numico] finances acquisition of controlling stake in Hungarian dairy by local subsidiary</td>
</tr>
<tr>
<td></td>
<td>CSM Frank A. Serio&amp;Sons</td>
<td>NL/USA</td>
<td></td>
<td>Dutch food and ingredient group reaches agreement in principle on acquisition of bakery ingredients distributor in Maryland</td>
</tr>
<tr>
<td></td>
<td>Numico VIVA, Pharma Bürger</td>
<td>NL/Germany</td>
<td></td>
<td>Dutch food group acquires German producers of vitamins, minerals and food additives</td>
</tr>
<tr>
<td></td>
<td>Unilever Mountain Cream</td>
<td>UK/NL/China</td>
<td></td>
<td>Anglo-Dutch conglomerate acquires Chinese ice cream market leader</td>
</tr>
<tr>
<td>14 Jan</td>
<td>Unilever Gilde Investment Fund</td>
<td>NL/Germany</td>
<td></td>
<td>Conglomerates form joint venture from existing gourmet food subsidiaries Fritz Homann Lebensmittelwerke and Beeck</td>
</tr>
</tbody>
</table>
Siemen van Berkum (Gaastmeer, 1961) completed his secondary education in Sneek at the Bogerman College and studied Economics at the State University of Groningen (RUG). After his graduation in 1987, he took up a position at the Research and Documentation Centre of Latin America (CEDLA) at the University of Amsterdam. At this centre he worked on a research project analysing the economic consequences of (IMF and World Bank) adjustment policies in highly indebted Latin American economies. In May 1989, he joined the Agricultural Economics Research Institute LEI in The Hague, where he currently holds the position of senior-researcher agro-economic developments. His research work focuses on the analysis of agricultural (policy) developments in the European Union and Central and Eastern European countries, as well as on the review and analysis of international trade (policy) issues. Since 1991, he has worked on many international projects. Most of these projects are related to the agricultural situation in Central and Eastern European countries and the possible impact of EU enlargement with CEECs.