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Between Safety and Commerce: How Sanitary Measures Affect Global Dairy Trade

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Executive Summary

While sanitary requirements play an important role in safeguarding human and animal health, they can also serve as impediments to trade and increase business costs. There is an arguably inevitable tension inherent in the SPS agreement, namely the push towards harmonization based on international standards on the one hand, and the right of countries to not be bound by international standards, if they provide scientific justification for going beyond international standards.

The dairy sector is a protected sector mainly because of remaining high tariffs and quotas but divergent standards do pose difficulties and are likely to increase in importance after further trade liberalization, as demonstrated by the results of this survey of major dairy exporters. The dairy sector was chosen for this study since it is subject to both Codex food safety and OIE animal health standards, but has not received as much focus as the meat sector. Since dairy exporters are usually willing to abide by divergent standards so as to not lose market access altogether, they cannot always easily quantify the economic impact of divergent sanitary standards, which are folded into their business costs. Nonetheless, the survey results show that there are significant economic costs for firms confronted with divergent standards, as there are sometimes for entire industries and societies.

A limited number of leading global dairy firms was asked to identify sanitary measures that hinder their access to foreign markets. The sample includes 9 firms with headquarters in New Zealand, United States, and the EU, whose accumulated value of dairy sales amounts to USD 31.7 billion in 2005. Seven of these firms are in the Top 20 of global dairy firms, covering 36 percent of global top 20 sales.

The survey recorded how export firms encounter a 'patchwork' of diverging sanitary requirements and other mandatory food standards. As the requirements are repeatedly reported as lacking stability and transparency, the biggest impact of divergent sanitary requirements on trade is related to increased complexity and trading costs, apparently more than to protectionist abuse. Many respondents indicated that the company structure is geared towards compliance with multiple regulatory requirements across export markets, which added to their difficulties in differentiating the additional costs of compliance from their overhead or operational costs.

The survey results pointed to three overriding difficulties faced by exporters. The first is that **emergency trade restrictions put into place by importing countries following an animal disease outbreak are not expeditiously removed upon declaration of disease free status**. Trade in dairy products often comes to a full stop in the case of an outbreak, although the benefits in terms of reducing the transfer of risk are not well assessed. The OIE recommends importing countries to resume trade (with normal precautionary measures) immediately after a country is declared free from the infectious disease. Six out of nine firms in the survey reported trade restrictions in the aftermath of an animal disease outbreak, hampering large volumes of trade through veterinary certification requirements.

A second difficulty identified by exporters pertains to **divergent analysis and sampling methods used in particular to enforce mandatory zero tolerance standards for contaminants and pathogens**. Zero tolerance – which given the increasingly sophisticated nature of detection technology – is often simply not feasible; moreover non-uniform detection methods can lead to vastly different findings in different countries and even within countries. Solutions to this issue to be explored include replacing zero-tolerances with maximum residue levels; harmonized sampling and testing methodology; and greater use of equivalence agreements. A sudden upgrade of sanitary standards in an East Asian market illustrates the issue at hand. A zero-tolerance for *Enterobacter sakazakii*, a dairy pathogen that causes particular concern

for newborn babies, was imposed for infant formula. Trade problems for various exporters started when, as a temporary measure, the stringent tolerance limit for *E. sakazakii* was extended to all dairy imports without scientific underpinning. In addition, exporters claimed, the methods used for laboratory analyses by the importing authorities deviated from the internationally recommended approach and produced more contamination than tests undertaken by the exporters. Firms' responses varied from additional testing and the disclosure of information to the importing authorities to a restructuring of the value chain with a local joint-venture.

The third issue identified by dairy exporters is **the lack of differentiation of dairy products for the application of animal health standards**. While the OIE recognizes that properly treated dairy products are not vectors for animal or zoonotic diseases, importing countries nonetheless do often apply veterinary standards. Milk products are only traded after heat treatment or other processing. In addition, most traded product will undergo at least one other round of processing before it is brought on the market, which again reduces the possibility of the transfer of risk to consumers in the importing country. This matter could be addressed by establishing more differentiated rules for different categories of dairy products.

It seems there are policy options for the global institution governing global trade and standards (WTO and the 'three sisters' Codex, OIE and IPPC) to reduce the exporter's costs incurred from having to meet divergent sanitary measures. However, given the extensive tariff and quota policies still governing market access in the biggest dairy markets, reductions in trade costs shall effectively not result in much improved market access. Only when current tariff and licensing procedures in trade are reduced, will a reduced incidence of divergent sanitary standards have a significantly positive impact on dairy trade.

Survey respondents also indicated that the WTO's formal dispute settlement process is too lengthy and would like to see a more rapid consultation procedure for addressing some disagreements over standards. This, however, will also require a change of attitude among exporters who tend to comply with whatever risk-related regulation put forward by the importing country in order to prevent trade disruptions.

Introduction

Milk and dairy products are considered high-risk goods in production, consumption, and trade. The risks, or perceived risks, are that milk products pose threats to food safety and animal health. As a result, dairy trade is subject to a considerable amount of regulation to limit the transfer of risk. Whereas such sanitary measures are generally applied for legitimate reasons, they can also be used in a protectionist manner, and such tendencies might increase with the further lowering of tariffs and expansion of tariff rate quotas. Business representatives formulated concerns already a decade ago that the expanding body of safety and quality regulations is ‘...diverting from its objective of facilitating trade while protecting public, animal and plant health by erecting disguised restrictions to trade’ (IDF, 2000).

The present paper extends the survey of dairy exporters undertaken by Henson and Loader (2000), which assesses the effects of regulatory differences in trade between France, Germany, Japan and the US. Wide divergence in regulations was recorded, such as differences in compositional and labelling standards for dairy products across the European countries, the US and Japan. At least two observations from that useful work are worth exploring in the present study. First, problems in dairy trade were found to arise mainly regarding the export of certain specialty products (as opposed to bulk products). Second, the total impact of regulatory divergence on trade is determined not only by the impact on the firm’s ability to export in view of compliance costs, but also by the relative importance of technical barriers to other restrictive measures such as tariffs and quotas. It is clear that under the extensive tariff and quota policies currently governing market access in the biggest dairy markets, improvements in the ability to export may effectively not result in improved market access.

This paper reports on a survey of selected Top 20 companies in global dairy trade to ascertain the economic impact of sanitary requirements that go beyond those agreed to in international standard setting bodies, or for which no corresponding international standards have been agreed. This study covers an approximate 30 percent of global dairy trade in a sample of nine firms, seven of which are ranked in the Top 20 of global dairy firms, with a total coverage of 36 percent of sales by Top 20 dairies. The survey examines the difficulties exporters face due to sanitary measures. It also examines how producers respond to trade impediments and recommends an improved institutional framework to address such problems. As the agreement on sanitary and phytosanitary (SPS) measures under the World Trade Organization (WTO) provides the backbone to the global regulation of sanitary requirements, the paper will reflect to what extent its provisions are suited to the practice of dairy trade. Attempts are made to quantify economic impact, using measures for trade losses and trading costs. The paper is based on the following research objectives:

1. Examine the trade-impeding effects of sanitary requirements related to food safety and animal health, with in the context of trade policies, from the perspective of exporters.¹
2. Explore how dairy exporters minimise trade losses and costs in case sanitary requirements create obstacles to trade.
3. Explore possible solutions for timely resolution of disputes over divergent standards perceived to be obstacles to trade.

Measuring the incidence and costs of technical barriers to trade is a challenge. There have been some improvements in the methodology for impact assessments, but the lack of objective data on barriers remains a key constraint (WTO, 2006). Sanitary measures and standards play a crucial role in protecting human and animal health and thus also facilitate international trade. This survey, however, is focused on instances when standards are perceived to be unjustifiably onerous restrictions to trade.

1. Sanitary Requirements in Dairy Trade

This chapter discusses the impact of sanitary standards on the operations of dairy exporters. It presents a framework to address sanitary requirements based on three elements: 1. the trade barrier effect of requirements and associated costs for business; 2. the firm's response to a sanitary barrier in the short term, which generally involves actions to prevent disrupted trade; and 3. the scope for solutions in the area of trade and SPS-related institutions. It then suggests a classification of sanitary trade problems and their costs.

1.1 Global Dairy Trade²

Milk processing

Milk has some unique characteristics in terms of its composition and its potential to serve as the basis for numerous dairy products. The core business of the dairy industry is processing raw milk into different consumer and intermediate products. Processors can be seen as 'bio-refineries': apart from the 87 percent of water, cow milk contains approximately 4.9 percent lactose, 3.7 percent fat, 3.5 percent proteins and 0.7 percent other minerals. Milk is the input for a wide range of different products that meet the demands of both consumer and industrial markets. Examples include drinking milk (full cream, semi-skimmed, skimmed), cheese, yoghurt, butter, and flavoured milk drinks. Lactose, butter, skimmed milk powder, and whey are sold on industrial food markets (i.e. chocolate, candies, and meat). Lactose and newly developed specialty products are also targeted at the pharmaceutical industry. Table 1 indicates dairy production in the major dairy producing and trading regions.

Table 1 Production of dairy products (in million kg)

Product	EU-25		US		Australia		Canada		New Zealand	
	1995	2004	1995	2004	1995	2004	1995	2004	1995	2004
Liquid milk	30670	32858	24757	26950	1951	2025	na	2750	na	390
Cheese	5974	7592	3122	4008	254	370	313	340	197	290
Milk powder	2411	1861	632	727	315	377	77	90	460	905
Butter	1715	1984	572	557	136	85	93	88	241	300
Condensed milk	1280	1218	216	238	99	90	Na	59	30	1

Source: Productschap Zuivel 2004.

Trade patterns

New Zealand is the largest net-exporter of dairy products, followed by France. The largest net-importer is Italy, followed by the UK. Germany is the largest simultaneous importer and exporter. Figure 1 provides an overview of global dairy trade and demonstrates the increase in trade between 1996 until 2004.

The US, New Zealand, and Australia have seen their shares of global dairy trade expand, at the expense of countries in the European Union. In addition, EU import growth exceeds its export growth, resulting in a negative trade balance. However, differences between export and import growth are even larger in the US. Within the EU, Austria, Spain, and Italy are the best performers.

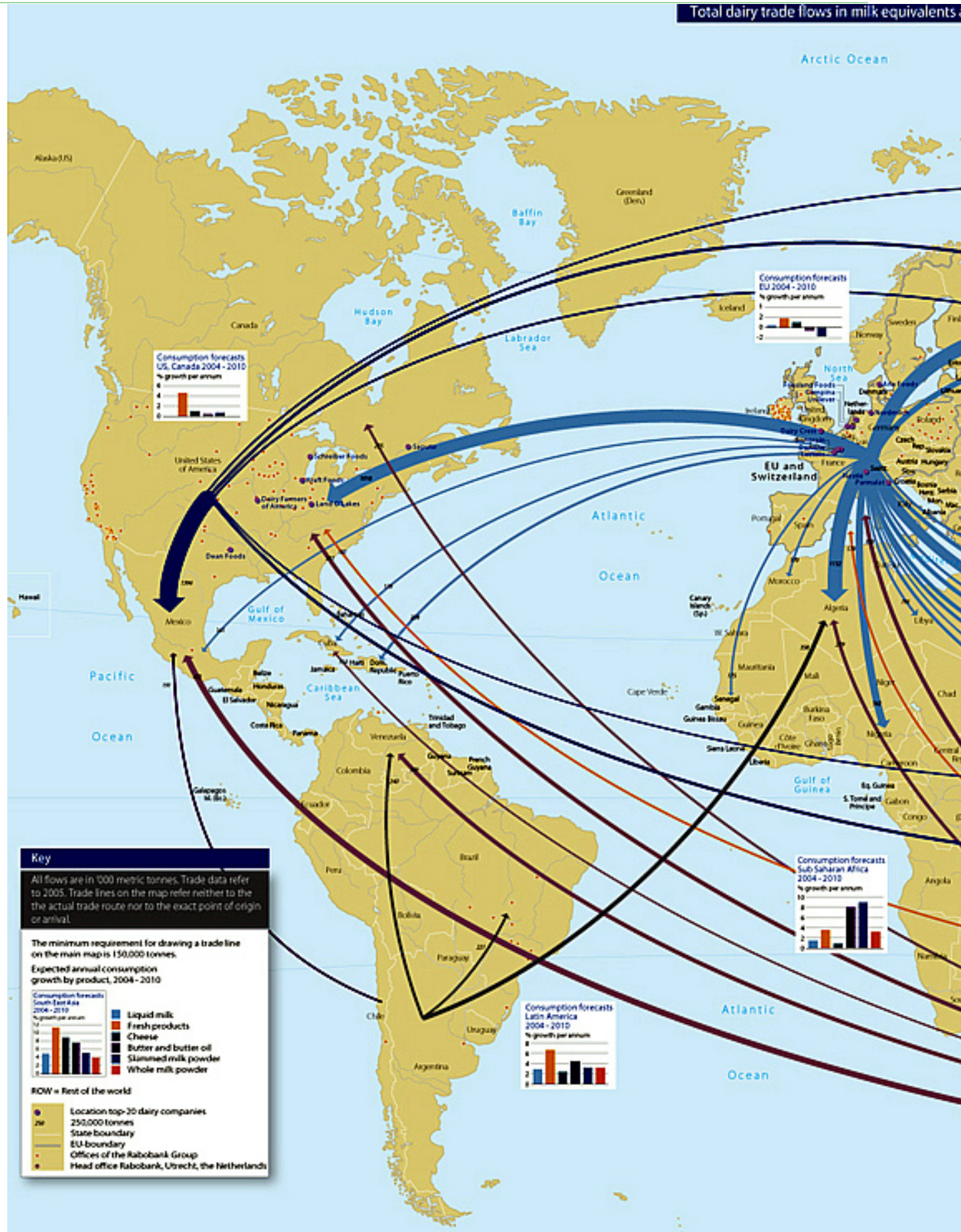
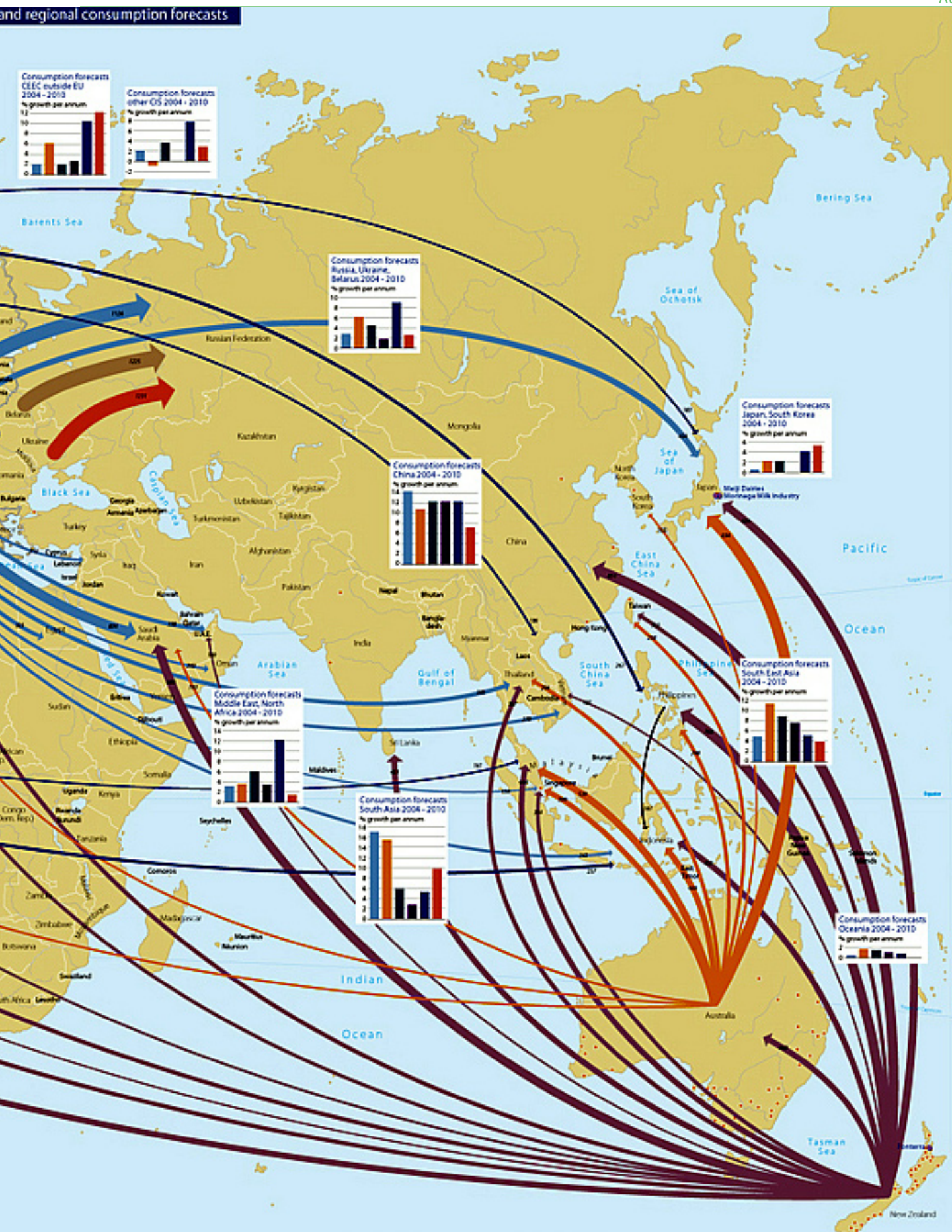


Figure 1 World Dairy Map
Source Rabobank and Dutch Dairy Board (2006)

and regional consumption forecasts



Main products in detail

Cheese is a key commodity in global dairy trade. The main importers of cheese are Germany, Italy, France, Spain, and the Netherlands. The main exporters are Germany, France, The Netherlands, Denmark, Belgium, and Ireland. Cheese from the EU is exported mainly to the US, Russia, and Japan; these three count for 50 percent of global destinations. Saudi-Arabia and Switzerland are also significant trading partners for cheese. The main yoghurt and dessert importers are Germany, The Netherlands, France, Spain, and Italy. The main exporters are Germany, Belgium, France, Austria, and Spain. Less than 1 percent of yoghurt in the EU is coming from third countries or going to third countries.

Another commodity is milk powder. New Zealand is the global market leader for whole milk powder (i.e. fat content exceeds 1.5 percent); the EU is a close second, followed by Argentina and Australia. New Zealand is also a global market leader for skimmed milk powder (low fat) followed by the EU, Australia, and the US. The US, in particular, improved its position in 2004. Algeria is the most important destination for milk powder, followed by China, Mexico, Philippines, Saudi Arabia, Malaysia, and Indonesia. These countries combined account for nearly 55 percent of global imports.

China is becoming an important market for exports and foreign direct investment for dairy processors. China carries out a small dairy production in the northern part of the country, but not in the south where there is major consumption. The market for industrial and intermediate products like milk powder (in combination with proteins and fats, or low-fat substitutes) is growing world-wide (based on a growing consumption of ice cream and chocolate).

Asian growth markets

Dairy consumption has grown particularly fast in China and various other parts of Asia. As per capita income in the region rises, consumption growth is expected to continue over the next decade (see Table 2). Despite considerable growth in domestic milk supplies, much of the demand expansion is met by imports. Market analysts more or less agree on who will supply Asia, as stated by John Beghin: "India has some potential for milk powder especially in the context of WTO agricultural trade reforms. Australia, New Zealand, and several countries in Latin America (Argentina and more recently Chile and Brazil) will probably provide the bulk of the Asian import expansion. The EU is likely to remove its dairy export subsidies at the conclusion of the Doha Round, and this policy change will remove large dairy supplies from world markets. Chile and Argentina have emerging dairy industries mostly geared toward the export market; the available technology and comparative advantage based on cheap feed and weather in those countries have made this export capacity possible. Large food processors have been involved in these countries and have catalyzed the transformation of the food industries" (Beghin, 2006).

Table 2 Consumption outlook for Asian 'emerging' dairy markets

	Cheese			Whole milk powder		
	2005 (Thousand Metric Tons)	2009	2014	2005 (Thousand Metric Tons)	2009	2014
China	258	287	323	910	1018	1165
Indonesia	8	9	11	68	79	92
Malaysia	6	8	9	86	100	117
Philippines	19	21	25	13	19	24
S. Korea	65	75	87	6	6	6
Thailand	4	5	6	37	41	48
Vietnam	1	1	2	45	61	87

Source: Dong (2005), projections based on the FAPRI international dairy model

Table 3 portrays the twenty largest dairy companies in the world, by volume of sales. Some of these firms are active in other (food) industries (e.g. Nestlé, Danone, Unilever), and some use milk to produce chocolates and candies. Danone and Nestlé use relatively little milk as input: they are not the biggest dairy producers. Product innovations, branding and internationalization are major themes. The Swiss company Nestlé is the largest dairy company in the world, however not in terms of processed milk volume. Danone, a French company, is the EU's largest and the world's fifth largest company. Among the world's top twenty dairy companies, ten are from the EU, five from the US, and three from Japan. Most of these firms export to countries in Latin America, Africa, and Asia, and to some extent to other high-income markets. Increasingly, the global dairy companies operate through subsidiary firms in these markets, which they supply with raw material and know-how. For example, seven of the top ten European dairy companies also have production facilities outside the EU.

Table 3 Top-20 Global Dairy companies, by turnover in 2005

Rank	Company	Country	Ownership	Dairy sales, billion euro
1.	Nestlé	Switzerland	Private	14.3
2.	Dean Foods	USA	Private	7.2
3.	Lactalis	France	Private	7.2
4.	Danone	France	Private	7.2
5.	Dairy Farmers of America	USA	Co-operative	7.2
6.	Fonterra	New Zealand	Co-operative	6.6
7.	Arla Foods	Denmark/Sweden	Co-operative	6.2
8.	Kraft Foods	USA	Private	5.2
9.	Unilever	Netherlands/UK	Private	5.0
10.	Friesland Foods	Netherlands	Co-operative	4.2
11.	Meiji Dairies	Japan	Private	3.6
12.	Campina	Netherlands	Co-operative	3.6
13.	Parmalat	Italy	Private	3.5
14.	Bongrain	France	Private	3.3
15.	Morinaga Milk Industry	Japan	Private	3.2
16.	Land O'Lakes	USA	Co-operative	3.1
17.	Schreiber Foods	USA	Private	2.4
18.	Saputo	Canada	Private	2.4
19.	Dairy Crest	UK	Private	2.1
20.	Nordmilch	Germany	Co-operative	2.1

Source: Rabobank

1.2 Trade barriers

The international dairy market is highly distorted by tariffs and quotas. High tariffs effectively block certain markets for exports or place severe restrictions through limited levels of quota access. High trade restrictions, combined with domestic support for dairy production, are common in the largest dairy markets such as Canada, the US, the EU and Japan. These trade restrictions are a key reason why only 7 percent of global dairy production is traded. Trade in dairy is expected to increase due to the rising demand for dairy products in emerging and developing markets. In addition, further liberalization through the Doha Development Agenda (DDA) negotiations under the WTO and subsequent multi-lateral and regional trade agreements are expected to drive further trade expansion. The main issues of interest to the dairy sector in the DDA are the phasing out of export subsidies, increasing market access through tariff cuts and tariff rate quota expansion, reducing the trade-distorting impact of food aid, and protecting geographical indications for niche products, but dairy will nonetheless continue to be a relatively protected sector in a number of countries. Historically, most dairy producing countries have had leeway to shield the dairy sector from the most liberalizing reforms by designating key dairy products as a sensitive.

1.3 Sanitary regulations: food safety and animal health

Milk and dairy products are considered high-risk goods in production, consumption, and trade. The risks, or perceived risks, are associated with the health status of the dairy herd as well as the handling and the processing of raw milk into dairy products which, if left unaddressed, may pose threats to food safety and animal health. Dairy companies apply sanitary control measures and monitoring, so as to comply with mandatory requirements and possibly with additional buyer specifications. The risks and control measures for dairy processing are set forth below, as are the specific measures to limit the transfer of risks through trade. In general, food control authorities will apply the same regulations to domestic production and to imports. Importer requirements address both the products and, possibly more contentious, the production process. Thus, the hand of the import inspector reaches into the activities of foreign-based milk farms and dairies. Additional measures specific to risk-reduction in dairy trade include quantitative restrictions such as import bans and conformity assessment, i.e. the provision of guarantees that the production processes in the export firm are at least equivalent to those demanded by the importing country.

1.3.1 Risk-motivated regulation

From a food safety perspective, milk is considered a vulnerable product that must be handled with the greatest care to maintain its quality. Dairy industries seek to guarantee this quality from the cow to the dairy factory and monitor deliveries of milk for purity and freshness using analytical and microbiological tests. Preventive measures are taken so that the milk is not infected or polluted during transport and the production. Due to the perishable nature of dairy products, hygienic measures including heat treatment and cold storage are required to prevent hazardous bacterial contamination. The preventive strategy further includes requirements for the raw materials, auxiliary materials, and equipment that are important for the production of milk, which involves monitoring of water quality, animal feeds, veterinary drugs, and the chemicals used in cleaning. For a long time the pollution of milk with undesirable substances was a specific area of concern. Some substances that may be found in a cow's feed or that are used as medication can enter the milk, although often only in minute quantities. By subjecting veterinary drugs and pesticides to strict authorization requirements, undesirable residue accumulation in dairy products is minimized. Other residues or contaminants, including diverse persistent environmental pollutants can actually accumulate in milk fat. Ensuring low levels of such pollutants in milk products requires adequate environmental protection. In the case of residues and contaminants that may constitute a danger to public health, regulations will set the maximum residue levels that are permitted in foodstuffs (Rikilt, 2005).

The animal disease status of dairy cows must be verified to avoid the transmission of diseases to other livestock, or to humans. (Humans are susceptible to a subset of animal diseases that are referred to as zoonoses.)

1.3.2 Types of sanitary regulation

A vast array of regulatory requirements apply both to dairy products and to the production processes.³ Regulation, which can be a mix of international recommendations and national legislation, is often dynamic. Regulation often is reactive: outbreaks of BSE in the UK and the associated fatalities of variant CJD in humans, were followed by increased regulation of livestock products. In addition, rules develop in response to new scientific findings, albeit with a lag.

(1) Sanitary *product standards* set targets for test results, and generally are composed of a maximum level of pathogenic load or contamination and the method for measurement. Microbacterial standards apply to the dairy product as well as the raw milk inputs and are often measured by plate counts and cell counts. Tolerance levels also apply to contaminants such as residues of antibiotics or other veterinary medicine, mycotoxins and other 'natural' contaminants, or concentrations of food additives or pollution. Tolerances are set on the basis of toxicological and epidemiological data that show effects on the health of humans and animals.

The lower bound of a tolerance level is set by the limit of determination (LOD), which is the lowest possible concentration that can be picked up in a test. Due to the continuous progress of science and laboratory analyses, the LOD is continuously decreasing over time and moving ever closer to zero.

A particular type of regulatory tolerance is the maximum residue limit (MRL), which is applied in dairy to regulate tolerances for veterinary drugs and pesticides. Underlying MRLs are agreements on good agricultural practices (GAP) for milk farms and the production of feed crops, and good manufacturing practices (GMP) in the dairy plants.

Tolerances are set for each veterinary drug or pesticide in two steps. The first stage is to collect data on residue levels in supervised residue trials (field experiments) carried out according to GAP and GMP. As a second stage, toxicological and epidemiological data are checked for effects on the health of humans and animals. If the experimental data are not available, the MRLs are automatically set by default at the analytical level of determination (LOD).

The actual requirement in trade is the importer's tolerance level, or maximum count for a set of contaminants and pathogens. The SPS agreement urges importers to set tolerances at levels agreed to by international standard setting bodies such as Codex and OIE, but allows more stringent requirements if scientifically justified.

(2) *Process standards* are used as a benchmark to judge whether a food has been produced in a manner so as to be fit for human consumption or trade (Henson and Loader, 2000). There are various required practices to ensure hygienic conditions of holdings and milk collection, processing plants, storage, and transport. Often, hygiene requirements demand a quality management scheme, such as hazard analysis critical control point (HACCP). A second important set of process standards applies to the health of the dairy cattle.

1.3.3 Specific sanitary measures in trade

The potential hazards that dairy products pose during shipment and in the domestic food supply chain motivate governments to impose sanitary requirements on imports. In dairy trade, specific measures are required to account for the fact that when shipping products to another country, they enter into the domain of different regulators.

(3) *Conformity assessment* is the provision of guarantees that the processes of hazard monitoring and control in the export firm are at least equivalent to those demanded by the importing country. The importing country has three mechanisms for enforcing that dairy shipments indeed meet its legal requirements: through certification, prior approval of handlers, and testing of the end-product.

a. Certification

Dairy shipments that cross country borders have to be accompanied by official certificates that attest that products comply with the mandatory requirements of the food safety and animal health requirements of the importing government. Content and format of certificates is specified by the importing authorities. By signing off on certificates, officials in the exporting country assume responsibility for the claims made in the certificates – to the importer, the governmental stamp supplies the certificate with the necessary trustworthiness. As such, certificates are a critical instrument for the importing country to manage potential risks to human or animal health. If authorities cannot endorse one or more claims, goods are not cleared for shipment to the export destination.

Generally speaking, certification text is specific to each importing country. Among the reasons for this is the fact that certification statements tend to be based on national food safety and animal health regulation. Some trading partners may conclude veterinary or sanitary agreements, which spell out an agreed certification text and format.

b. Prior approval

Some importers, such as the EU and the US, require prior approval of dairy processing plants. Under prior approval, the control authorities of the importing country assess whether the production plant complies with the regulatory requirements in the importing country. Typically, this involves audits by inspectors of the importing country or by certifying agencies that are accredited by the importing country. The basis for such approval is compliance with national regulations, with possible further requirements imposed by the importer.

c. End-product testing

In order to check the validity of certified statements, it is common practice among importing authorities to test the quality and safety of sampled shipments. End-testing also occurs because the quality of dairy products may alter during transport. Failing a test can result in clearance being rejected, such that the exporter must re-ship the product (which creates losses in terms of freight costs and loss of product value). Another possible consequence is the rechanneling of the product, for example by not allowing products to be processed for human consumption. Importers are commonly charged for the costs of inspection, and in addition face a delay in the clearance of goods.

(4) Quantitative trade restrictions, including *import bans*, are appropriately applied “when the risks or uncertainties posed by a hazard are great and alternative measures for effectively reducing the risk to negligible levels are technically infeasible” (Josling, Roberts and Orden, 2004:21). Import bans are often used to protect livestock and crops from foreign pests and diseases.

1.4 Sanitary regulation as possible impediments to trade

This study explores the difficulties created by sanitary measures in the export of dairy products to foreign markets and seeks to examine the economic impact of such impediments. It is therefore a contribution to the economic literature on non-tariff barriers to trade.⁴ Non-tariff barriers (NTBs) are defined as “the wide and heterogenous range of policy interventions other than border tariffs that affect and distort trade of goods, services, and factors of production” (Beghin, 2006b:1). In the influential classification of Deardorff and Stern (1997), sanitary requirements are grouped under the technical barriers to trade, which are the technical regulations designed for domestic objectives, but which may discriminate against imports. Sanitary policies may restrict trade but improve welfare as far as they control the spread of risk or address issues of trust and conformity.

Sanitary measures encountered by exporters possibly operate as barriers to trade, making trade more costly (up to prohibitive) or creating an unlevel playing field. Firms follow various strategies to minimize the costs of sanitary regulations, and are eager to expeditiously comply with requirements. Occasionally, this involves negotiation with importing authorities, or working towards more structural solutions for reducing the impact of sanitary measures.

Thus, a useful framework for analyzing sanitary measures from the exporter perspective includes distinguishing between three elements: the trade barrier effect of requirements and associated costs for business; the firm’s response to a sanitary barrier in the short term, which generally involves actions to prevent disrupted trade; and the scope for solutions to reduce the trade barrier impacts of sanitary requirements under trade-related institutions (Figure 2).

1. Trade barrier	2. Response	3. Structural solutions
<ul style="list-style-type: none"> • Type of impediment • Motivation or cause • Direct impact on trade 	<ul style="list-style-type: none"> • Comply: inform on compliance under current practices; additional testing; adjust export certification; change trade routes • Negotiate: political pressure government-to-government or through buyers 	<ul style="list-style-type: none"> • International agreements, standards, disputes; • Product or process innovation in product specification; farm or manufacturing practices; traceability • Alternative national policies, practices
<p>Economic effects</p> <ul style="list-style-type: none"> • Trade losses • Transaction costs 		

Figure 2. Framework to analyse sanitary measures in trade from the exporter perspective

1.4.1 Trade barriers

Academic literature on impediments caused by sanitary regulations in dairy trade is fairly limited, particularly when compared to meat trade. The literature suggests that trade impediments arise mainly from three sources: regulatory differences; difficulties in achieving compliance; and temporary calamities.

Regulatory differences

Although food safety and animal health standards are internationally agreed under OIE and Codex, national regulations may still differ and become impediments to trade. Henson and Loader (2000) recorded divergence in regulations such as differences in compositional and labelling standards for dairy products across the EU, Japan, and the US. Divergent standards and procedures proliferate, especially concerning sanitary requirements. Examples relate to microbiological quality standards (i.e., US standards for cell counts and plate counts for bacteria including zoonotic pathogens are more stringent than EU rules), aflatoxin contamination (i.e. EU maximum tolerance level is well below US level), milk hygiene standards, permitted additives, maximum residue levels for veterinary medicines, and so on. Other impediments may be caused by divergent methods for laboratory analysis including sampling.

Bureau and Doussin (1999) signaled regulatory differences, particularly between the US and the EU, but also other import and export countries, which they consider potential material for trade disputes. Among the contentious issues are the tolerated use of BST (rbGH), a growth-stimulating hormone, then allowed for use in farming in more than a dozen countries. A second issue was the use of raw, unpasteurized milk in processed dairy products, which impacted in particular EU exports of cheese.

In studies on NTBs, there is a tendency to focus on individual measures or pairs of trade partners in isolation. Few studies take the perspective of export firms, which are confronted with multiple standards in multiple markets. Particularly in dairy, export firms need to comply with many standards simultaneously, given their wide range of products and the large multiple markets they service. Richard Baldwin has aptly spoken of the implications of such a multitude of standards: 'Regulatory protection is but one name for the tens of thousand cost-raising, behind-the-border measures that continue to substantially inhibit trade. Most of these measures are seemingly innocuous, but tangled together they are able to significantly fragment world markets' (quoted in Henson and Wilson, 2005:xiv).

Difficulties of compliance

Henson and Loader highlight the beneficial effect from the convergence of sanitary regulations. Dairy firms pointed to expanded trade between Germany and the UK following the implementation of regulation 92/46/EEC, which harmonized sanitary rules (Henson and Loader, 2000).

The total impact of regulatory divergence on trade depends in part on the firm's ability to meet compliance costs. In their business survey, Henson and Loader (2000) analyzed various compliance processes. Responses to sanitary requirements are largely company-specific, and there is huge variation in the costs reported for meeting standards so as to safeguard market access.

The rise of safety and quality standards is widely presumed to be associated with structural changes in the food industry at large. There is a trend towards increased vertical integration within food supply chains, often dominated by corporate retailers, with their system of centralized procurement and preferred suppliers. Economies of scale in producing safety and quality drive increased market concentration, market segmentation, and almost certainly the exclusion of certain suppliers that cannot meet the requirements posed. Specific concerns over compliance are present in developing countries, in particular for small and medium scale enterprises (see, for example, FAO, 2004).

Temporary impediments following animal disease outbreaks

Outbreaks of infectious animal diseases can severely disrupt international trade in livestock products, affecting volumes and prices for the length of outbreaks. Often exports are discontinued and quantitative trade restrictions are imposed by importers during the outbreak. The meat sector has been greatly impacted by animal disease outbreaks. A prolonged disease-free status was one of the key factors supporting the North and Latin American preponderance on the global market (Dyck and Nelson, 2003). But a single BSE-case in the US in 2004, and an outbreak of foot and mouth disease (FMD) in Brazil dramatically impacted their exports, at least in the short to medium run. The price, supply, and demand effects from outbreaks are dramatic at first, and tend to fully disappear only after 2 years or so. For example, the combined trade losses in Argentina and Uruguay from FMD outbreaks in 2000 and 2001 amounted to \$550 million according to Morgan and Prakash (2006), but market shares of both countries have recovered since, with the absence of further outbreaks or regulatory restrictions. In dairy trade, there is anecdotal evidence on the trade-impeding impact of emergency measures particularly for FMD in the Netherlands. Dutch dairy exports were effectively impeded in some markets due to certification requirements stipulating that the exporter must demonstrate FMD-free status.

Trade disputes arise when such risk control measures are maintained after an outbreak has ended. Risk control measures imposed by importing countries heavily affects import competition; continued import restrictions against major exporters may prolong windfall for competitors and domestic producers.

While individual exporters may benefit from regulatory differences, the premise of this paper is that uniform trade rules promote trade, and are in the best interest of industries and society as a whole. Considering that international standards are the nearest approximation to a trade system without regulatory barriers, a set of problems encountered by exporters is identified here that differentiates between cases where internationally agreed standards (under Codex and OIE) are available, but import measures are divergent, and cases where no international standards have been agreed (Figure 3).

- | |
|--|
| <ol style="list-style-type: none">1. Internationally recommended standards (under Codex and OIE) available but measures on imports are divergent<ol style="list-style-type: none">a. Requirements go beyond international standardsb. National standards are not based on available international reference standardsc. International standards are applied but with divergent implementation2. No internationally recommended standards (under Codex and OIE) available<ol style="list-style-type: none">a. Technology is running ahead of regulationb. Standards are under preparation |
|--|

Figure 3. Classification of trade problems encountered by exporters in relation to divergent standards

1.4.2 Response: comply or negotiate

In the short term, the practice of dairy exporting companies is generally to comply with whatever regulation put forward by the food and veterinary authorities in the importing country in order to prevent trade disruptions.

How do export firms respond if trade is impeded? In the case of an infectious outbreak or other incident, exporters do temporarily resign themselves to a temporary export ban, not least because of their wish to protect their reputations. Yet, upon the lifting of a ban, additional marketing efforts are often necessary to regain some of the lost market share. Several companies voiced complaints about delays in lifting temporary trade.

Commonly, a change in regulations translates into changes to an export certificate, issued by the food authorities in the country of origin, e.g. the chief veterinary officer (CVO). Good communication between authorities such as the CVO in the exporting country and the export firm appears to reduce transaction costs of regulatory changes. Trust is equally important when exporters wish to negotiate terms of compliance with food authorities in the importing country. Usually this is done through an industry organization or the representing government.

Not wishing to remain stagnant during often lengthy negotiations for structural solutions, firms find ways to accommodate their business operations, for example by using alternative trade channels or even relocating production. Firms will generally enter into second-best solutions which result in minimal disruption of their business operation, albeit at a cost. Changes to product specification and farm or manufacturing practices are commonly avoided. Rather, firms change trade routes, product labels – all rather superficial adjustments. For more structural solutions, firms are also seen to enter into arrangements with local subsidiary plants or joint ventures to circumvent trade problems.

1.4.3 Solutions for the long run

Long-term solutions entail adjustments to the current institutional global trade arrangements that seek to reduce the economic implications of internationally divergent sanitary measures.

These adjustments lie in the area of international standards, trade law, opportunities for consultations, etc. The SPS agreement under the WTO (see next chapter) provides an important benchmark for such solutions in the long term. It is argued that the instruments suggested in the agreement could and should be further exploited, and that alternative solutions are needed for the short to medium term.

1.5 Economic effects and measurement

1.5.1 Costs of compliance and economic effects on dairy export firms

Sanitary requirements generally impose economic costs on businesses and exporters. Costs can be related to adapting the product to meet foreign requirements (raising input or production costs) and conformity assessment. Henson and Loader's (2000) study on technical requirements outlines the following cost components:

- The first set of costs are those necessarily incurred by a business in complying with technical standards. These may include the costs of adapting the product to meet local requirements and/or undertaking conformity assessment procedures both prior to export and/or at the port of entry.
- The second set of costs relate to additional production costs. Firstly, economies of scale may be reduced because of the need to adapt products to multiple standards in the producer's home market and foreign markets. Secondly, capital designed to produce according to domestic standards may be less effective at producing to foreign standards.

The first category above will include personnel costs for tracking foreign legislation and negotiations, and the need for additional tests and inspections. Firms in the survey generally faced difficulties in assessing the additional transaction costs of regulatory requirements – which are often not calculated as such, but are considered as overhead. For these global players, most of them active in dozens of countries, it was particularly problematic to disentangle such expenses from their overhead costs. This comes as no surprise given that the internal organization of the firms is oriented towards operations in so many countries, each with its own consumer demands and regulations. The variable costs of compliance are often more tangible than the fixed overhead costs. Many firms incur additional expenses for testing and labelling or other conformity assessment costs. Firms provide less data on the variable production costs of meeting the quality or safety standard as such, either because they are not able to or not prepared to do so.

In all cases except a total trade ban, the decision to continue trade in the face of technical requirements is an economic one made by the firm. As recorded, the practice of dairy exporting companies is generally to comply with whatever regulations are put forward by the food and veterinary authorities of the importing country. The benefits of avoiding disrupted trade are generally perceived to outweigh the additional compliance costs. Yet the level of such compliance costs is often unknown.

When confronted with long-term requirements, firms do incorporate compliance costs in their decision-making. Often this is an investment decision, especially when investments for compliance constitute sunk costs, for example, when available machinery does not provide the flexibility required to produce at divergent standards. Other factors in the compliance decision include short and long run market prospects, whether or not discontinued trade affects subsidiary plants in export destination countries, and competitive opportunities on other markets.

A change in sanitary regulation may affect a firm's established position on a foreign market. A rebound will likely require effort in terms of production, distribution, marketing, or testing, and may be more or less complete. If sanitary measures result in a prohibitive cost of compliance, they can cause firms to exit a market or potential exporters to abandon attempts to enter a market – effectively blocking trade.

Figure 4 provides a schematic overview of the various types of costs to dairy export firms and institutions that promote or support trade.

	Nature of cost:			
	Trade loss	Trade loss	Transaction cost	Transaction cost
	Short term	Long term	Short term	Long term
			'Response'	'Solutions'
Costs for the firm	Detained shipments Markets temporarily restricted; Sudden drops in export volume;	Markets structurally restricted Loss of market position	Adapting... Products Product labels Testing Certification Verification Tracking foreign regulations Preparing compliance, negotiations, etc	Investment costs for compliance, relating to structural changes to production, distribution, marketing Recurring costs for inspection, labelling
Costs for industry organization and/or government	--	--	Preparing compliance, negotiations, etc Revising export certificates	Adjust national standards International standard-setting Bilateral agreements Dispute settlement procedures

Figure 4. Types of cost related to sanitary measures in trade, inside and outside the firm

1.5.2 Methods for quantifying economic effects of sanitary measures

So far, it has proven difficult to quantify the effects of divergent regulation given a lack of systematic information on incidence and associated costs. However, there is an increasing empirical literature that measures the extent to which trade is curtailed by NTBs, and its welfare cost. Most studies focus on the impact of NTBs on market supply, cost of suppliers, and/or price differentials between domestic and foreign supplies. Paarlberg and Lee (1998) and Krissoff et al. (1997) seek to measure the trade-prohibiting effect of technical barriers by means of a tariff equivalent. For example, Krissoff et al. compare export prices of US apples with wholesale prices in three foreign markets with distinct phytosanitary standards for imports. The share of the price gap that goes unexplained by the import duty is assumed to represent the tariff equivalent of the NTB. The authors, under strong assumptions, estimate the trade-enhancing effect of harmonization in a scenario of foreign regulation harmonized with US standards.⁵ With fewer assumptions, tariff equivalents can also be calculated directly on the basis of data on the costs of compliance derived, for example, through surveys of exporters (Deardorff and Stern, 1997). Such surveys collect information on the compliance process, and on the impact of standards on export volumes or values. Henson and Wilson (2005, p. xv) observe in the prelude to their compilation of key reference studies that “[w]hile existing efforts to quantify the trade impacts of standards have arguably suffered from a number of theoretical and empirical weaknesses, they have undoubtedly acted to make more visible the impact of standards on trade.” While tariff equivalent studies and business surveys allow a substantial level of detail, this limits the scope for comparative studies across sectors and countries. At the same time, more generic methods that do allow for analyses of greater scope suffer from the shortage of meaningful data and their insufficiently straightforward theoretical underpinning.⁶ This study applies a business survey approach for the purpose of eliciting detail on the compliance process.

Economic impact on industry or society as a whole

So far, the discussion on economic impact of sanitary measures has focused entirely on the perspective of individual export firms. It is important to also address the economic impact on industry or society as a whole.

First of all, this study has not accounted for the benefits related to sanitary measures. Some trade restrictions are legitimate measures to protect human and animal health, such that the benefits of trade restrictions outweigh the costs. In this case, their implementation clearly increases global welfare. Justified restrictions are good for consumers and producers even if they create some economic losses. Such restrictions impact consumers who desire a wide variety of products. Particularly for milk products, consumers in several markets are confronted with a ban on cheeses produced of raw (not heat-treated) milk. This loss of variety can in principle be measured as an economic loss (Tothova and Oehmke, 2006).

Second, the total impact on the export industry (in terms of producer surplus) does not equal the sum of effects of individual firms for at least two reasons. One firm's pain is another firm's gain. Trade restrictions apply often only to a subset of one or more exporters. Restrictions can therefore create temporary rents for non-affected exporters with potential long-lasting effects if the affected firms must rebuild market positions in a competitive market. Industry losses, in the global aggregate, are the net balance of gains and losses from individual firms.

Price effects of trade restrictions are another element in measuring economic impact. If trade into one a major market is restricted, products spill over into other markets, causing price effects outside the market in which trade was restricted. For example, the survey recorded a temporary restriction on exports of infant formula and animal feed into an East Asian market, for fear of zoonotic contamination. The trade impediments affected several large dairy exporters simultaneously, with substantial repercussions on the global dairy market. The affected dairy firms were left with a large quantity of supplies of ingredients for infant formula and animal feed, and forced to find outlets in other markets. Increased stocks are diverted to unrestricted markets, where they drive down price levels. In addition, downward price pressure is exerted on economic substitutes as a result of the increased competition from dairy-based goods, that are now cheaper. In the importing country, where demand for the dairy-based products is supposedly unchanged despite the fact that imports are restricted, the reduction in imports causes consumer prices to rise. Domestic producers may benefit under such a scenario.

In summary, trade restrictions create trade losses for exporting firms, although they affect certain sectors differently, and in addition generate price effects with potential implications far beyond the affected firms. Price effects may spill over into the markets for substitute products and cause redirections of trade even outside the country that is restricting trade. For these reasons, analysts rely on economic models to determine the total economic impact of trade restrictions. For example, Morgan and Prakash (2006) estimate the impact of trade restrictions following animal health outbreaks using FAO's model for projections of agricultural markets for 1 to 2 years ahead.

As discussed, the present paper uses a survey approach to explore the impact of sanitary requirements on export companies and does not assess economy-wide repercussions. Before we discuss the survey approach and results in Chapter 4, the next section sketches the global regulatory setting for sanitary requirements in trade.

2. SPS and Global Standards

This chapter discusses the provisions in the SPS Agreement of the WTO. It also provides an overview of the available set of internationally recommended standards in the public domain that are relevant to dairy trade.

2.1 SPS Agreement⁷

The agreement on sanitary and phytosanitary measures under the WTO (WTO, 1994) came into force on 1 January 1995. The SPS Agreement acknowledges countries' right to adopt an appropriate level of protection against sanitary risk, but it states that deviations from international standards, guidelines, and recommendations have to be justified on scientific grounds and be based on risk assessment. The SPS Agreement was negotiated in the Uruguay Round, which was the first round in 50 years of GATT history to agree on liberalization commitments for agricultural trade. Agricultural reform addressed mainly trade-distorting farm subsidies and quantitative restrictions. The purpose of the SPS Agreement was to provide checks and balances on unnecessary trade restrictions motivated by public health and agricultural health interests. Countries that reduce farm aid, quota, and tariffs, may be inclined to make greater use of such measures to protect domestic interests. The agreement importantly refers to three standard-setting bodies (FAO/WHO Codex Alimentarius Commission (Codex) for food safety, World Organization for Animal Health (OIE) for animal health, and the FAO's Secretariat of the International Plant Protection Convention (IPPC) for plant health, and endorses the standards, guidelines, and recommendations from these institutions as being WTO compliant. WTO members have the full range of instruments for dispute settlement (consultation rounds, panel decisions, retaliation measures) at their disposal for challenges under the SPS Agreement.

The SPS Agreement covers a number of principles that serve to minimize trade obstacles from divergent international SPS standards (Box 1). The SPS Agreement is considered to be quite successful in addressing regulatory issues in agriculture and food trade.

The requirement of a science-based risk assessment arguably exerts the strongest discipline on food regulation. Many governments have revised non-compliant national regulations in the run-up to the SPS Agreement's entry. Scientific reviews of regulations facilitated by the SPS Committee have led to the resolution of numerous conflicts prior to formal dispute settlement resolution. Out of seven WTO SPS disputes, five were ultimately decided on the basis of a missing or insufficient scientific risk assessment.⁸

Four instruments and principles in the SPS Agreement serve to minimize trade obstacles arising from divergent international standards:

Harmonization – WTO members are urged (but not required) to adopt international sanitary standards. A country that adopts the standards of designated international standard-setting organizations is presumed to be in compliance with its WTO commitments.

Science-based risk assessment – SPS measures must be based on scientific principles and sufficient scientific evidence; more particularly, measures must be based on a risk assessment. Measures should be chosen so as to minimize distortions to trade, and be no more trade-restrictive than necessary to achieve a country's "appropriate level of protection". Member countries are to avoid variation in the levels of health protection provided by their measures if the variation creates a disguised restriction on trade. Countries may adopt provisional measures to avoid risks, but they must seek information and carry out a risk assessment to justify permanent use of trade-restricting measures.

Equivalence – A WTO member must accept that the SPS measures of another country are equivalent to its own if it is objectively demonstrated that the other country's measures achieve the member's appropriate level of protection, even if the measures themselves differ.

Regionalization – A country is required to allow imports from subnational regions abroad that are free or nearly free of pests or disease.

Source: Josling, Roberts, and Orden (2004, p. 40-41)

Box 1 Instruments and principles in the SPS Agreement

Harmonization and equivalence serve the purpose of reducing transaction costs of trade because divergent standards add to the complexity and costs of shipping goods across national borders. The implementation of these principles is frustrated by the lack of international standards and the slow process of negotiating standards, both for the purpose of international harmonization and for bilateral equivalence agreements. Negotiations on regionalization are equally slow. Josling, Roberts, and Orden point to the principle of national sovereignty in determining the appropriate level of protection (or acceptable level of risk, as it is also known) which "...provides considerable leeway for countries to eliminate risk regardless of the costs to either their domestic producers and consumers or their trading partners" (p.47).

Little dispute settlement on sanitary measures in dairy trade

There have been few formal SPS disputes on dairy. There has never been a panel decision on specific dairy issues. Only one out of thirty-two formal requests for consultations on food regulation launched in the first seven years of the SPS and revised TBT agreement (1995-2002) specifically related to sanitary measures in dairy (Josling, Roberts, and Orden, p.66). In this case, Switzerland challenged Slovakia in 1998 for its use of import licensing to restrict dairy and live cattle imports due to the alleged risk of introducing BSE. The case, known as DS 133, was settled through consultations. Some SPS-related differences did not reach the stage of formal consultations. Josling, Roberts and Orden (p.47) record that the EU had to "repeatedly petition Argentine regulators before they modified trade restrictions on Belgian chocolate, German milk powder and Swedish cocoa oil butter – long after other countries had lifted bans on these products upon learning that the OIE and the World Health Organization (WHO) had reaffirmed that existing scientific data did not indicate that dairy products are BSE vectors." Respondents in our survey among dairy export firms have confirmed that such trade problems related to outbreaks of infectious animal diseases remain a concern. Some also pointed to the timeframe for formal dispute settlement as unhelpful for addressing immediate concerns.

Global Standards⁹

2.1.1 Codex Standards

Various committees of the Codex Alimentarius Commission work on dairy standards, also addressing issues well beyond the sanitary realm. There is a Codex Committee on Milk and Milk Products, which deals with all dairy related standards and cooperates with other committees on cross-cutting issues. There are standards for particular products, including milk powders and cream powder, cream, butter, cheese, and processed cheese (16 standards for individual cheese, 19 standards for cheese products), whey cheeses, milkfat products, evaporated milks, fermented milks, sweetened condensed milk, dairy fat spreads, infant formula, and whey powder. (See Figure 5 for the definitions of dairy products under the Codex and other standards in international trade.)

A Codex standard for a particular milk product will typically be comprised of the following: a description of the product and a list of essential composition and quality factors, including the food additives that may be used in production, recommendations for labelling, references to other Codex standards that specify hygiene requirements and limits for contamination (of residues of pesticides or veterinary drugs), and references to standards for methods of sampling and laboratory analysis.

The Codex standard setting process is divided into eight stages that often take several years to complete.¹⁰ Survey respondents take a large interest in the Codex process because of the economic impact of global standards, but the stakes for sanitary measures appear to be modest. Firms claim higher stakes regarding product composition standards and geographical indications, particularly for cheese exports.¹¹ Dairy companies have two routes to influence standard-setting. First, through national governments or participation in delegations, and second, through the International Dairy Federation (IDF), a global organization representing dairy farmers, dairy industry, academia, controlling bodies, and governments.¹² IDF has a right to submit draft standards in Codex.

2.1.2 OIE Standards

The relevant standards of the World Organization for Animal Health (OIE) are comprised in the terrestrial animal health code. The code aims to facilitate trade in animals and animal-derived products while avoiding unjustified trade barriers and to support countries with the control of animal diseases and prevention of zoonoses.

Relevant provisions relate to bovine diseases, milk and dairy products, and trade and veterinary export certification. The code makes recommendations for zoning and compartmentalization, which primarily involves populations of different animal health status defined by geographical features or management controls. Also, the code makes recommendations for dairy imports from countries with outbreaks of foot and mouth disease, BSE, tuberculosis, and rinderpest. For example, in the case of a BSE outbreak, OIE considers milk and dairy products as commodities that can be safely traded without additional precautionary measures. For dairy exports from FMD infected countries, OIE recommends that milk products from FMD-free herds can be safely traded if products undergo heat treatment.

The Code recognises equivalence by recommending alternative sanitary measures for many diseases and pathogenic agents, for example, by enhanced surveillance and monitoring; by the use of alternative tests, treatment, or isolation procedures, or by combinations of the above. To facilitate the judgement of equivalence, Member Countries should base their sanitary measures on OIE standards, guidelines, and recommendations. Standard-setting under the OIE follows 2-year cycles.¹³

Definitions in trade

Codex Alimentarius

(Source: Codex general standard for the use of dairy terms)

2.1 Milk is the normal mammary secretion of milking animals obtained from one or more milkings without either addition to it or extraction from it, intended for consumption as liquid milk or for further processing.

2.2 Milk product is a product obtained by any processing of milk, which may contain food additives, and other ingredients functionally necessary for the processing.

2.3 Composite milk product is a product of which the milk, milk products or milk constituents are an essential part in terms of quantity in the final product, as consumed provided that the constituents not derived from milk are not intended to take the place in part or in whole of any milk constituent.

2.4 A reconstituted milk product is a product resulting from the addition of water to the dried or concentrated form of the product in the amount necessary to re-establish the appropriate water to solids ratio.

2.5 A recombined milk product is a product resulting from the combining of milkfat and milk-solids-nonfat in their preserved forms with or without the addition of water to achieve the appropriate milk product composition.

2.6 Dairy terms means names, designations, symbols, pictorial or other devices which refer to or are suggestive, directly or indirectly, of milk or milk products.

World Organisation for Animal Health (OIE).

(Source: Terrestrial animal health code – General definitions)

Milk means the normal mammary secretion of milking animals obtained from one or more milkings without either addition to it or extraction from it.

Milk product means the product obtained by any processing of milk.

Other relevant definitions are provided by the **World Trade Organization (WTO)**, in terms of the coverage of dairy under GATT Agreement on Agriculture, and the **World Customs Organization**, which provides the standard goods classification applied by customs.

Under the World Customs Code, there is a clear demarcation between milk and milk products on the one hand and industrial goods on the other. Codex's definition of milk products provides a window to waive dairy standards, including recommended sanitary requirements, for milk-derived processed products. OIE maintains the simplest definition possible. By implication, the full range of measures recommended to reduce animal health related risk applies in full to the highly differentiated range of milk-based products.

Several goods classified as industrial products under the GATT must, when traded, be accompanied by a veterinary or health certificate from the regulatory authorities. Under the CN-classification (operated in the EU) these are the following products: lactose (CN-codes 1702 1100 and 1702 1900), casein and caseinates (350190), whey-protein concentrates (35022095), and milk protein concentrates (3504).

Figure 5 Definitions of dairy products in international trade

3. A small survey among global dairy exporters

3.1 Survey design

This study asks a limited number of leading global dairy firms to identify sanitary measures that hinder their access to foreign markets. The survey was conducted in face-to-face meetings or telephone interviews of about 1.5 hours, in which a pre-determined list of issues is addressed. In addition to the generic survey questions, respondents were invited to respond to certain issues raised by other respondents. In this way, the responses from firms are validated against each other. The questionnaire is documented in Annex 2. Interview sessions were held between August 2006 and January 2007.

A business survey of this kind has several merits and limitations. The most important merits are its comprehensiveness and flexibility in recording traders' experiences. For example, 'trade restrictiveness' has not been defined on purpose, so as to allow respondents to describe in their own words how measures restrict trade. A primary limitation of such a survey is that it differs slightly from session to session. In addition, respondents' answers may be biased so as to exaggerate a market access problem caused by sanitary measures. Alternatively, a firm may not want to divulge or downplay a problem because such information is considered too sensitive.

Respondents were chosen from:

- Five major export countries on global markets for dairy: Denmark, France, The Netherlands, New Zealand, United States
- A 'substantial' amount of top 20 dairy firms (in terms of the dollar value of global dairy sales) plus a limited number of medium-sized firms

While firm profile played an important role in the selection of respondents, the survey focused on trade in cheese and milk powders and dairy-based ingredients for food and feed. The sample includes nine firms with a total value of dairy sales of USD 31.7 billion in 2005. Seven of these firms are in the Top twenty of global dairy firms, covering 36 percent of global top 20 sales. The biggest firm in the sample reported annual sales of USD 7.2 billion (ranked nr. 3) in 2005 and the smallest firm in the sample had a turnover of USD 250 million. New Zealand, the United States, and Denmark each have one firm in the sample. France and The Netherlands each have three.

Non-response was limited due to the fact that firms were approached via the producer organizations in their country. One firm in France and one firm in the US did not participate in the survey, although they were approached through their producer organization. One producer organization in the US (operating for three cooperative firms) did not participate, for unknown reasons.

3.2 Survey results

The key message from respondents is that the biggest impact of divergent sanitary requirements in trade is related to increased complexity and trading costs. This section presents the results of the survey, by providing examples to demonstrate the economic impact on affected firms. Annex 3 provides a concise overview of the empirical evidence collected in the survey.

Sanitary measures increase the complexities in accessing foreign markets. Export firms have to comply with sanitary regulations that differ in nearly each export destination, in addition to specifications requested by importers. While exporters are technically able to comply with each requirement, they report problems in addressing the complexity of multiple sanitary standards in multiple markets. A common complaint is that regulations are too prescriptive

on how to achieve sanitary targets that such process standards are not aligned with the actual operations in the dairy farms. One company provides the example of its HACCP-based risk management system. HACCP is accepted as a fundamental core element of corporate food safety programs, but regulators often see such HACCP systems as an add-on to existing highly prescriptive systems. The dairy companies prefer a performance-based approach to regulation that provides more flexibility in terms of how to achieve certain goals.

Other complexities in trade are related to the reliance on end-product testing upon clearance of imported shipments, which raises costs and causes delay. Moreover, testing can result in trade impediments when the methods of analysis and sampling differ between countries, as is not uncommon despite the availability of global standards. Dairy companies would prefer import authorities to place greater confidence in their corporate risk control system. Such trust should lead to a reducing reliance on end-product testing.

Justified or not?

Exporters are generally not concerned with the motivations or causes underlying trade restrictions. The SPS Agreement requires that deviations from international standards, guidelines, and recommendations should be justified on scientific grounds and based on risk assessments. In practice, however, the risk assessment underlying sanitary measures is mostly not accessible to exporters, nor do they invest resources into examining the motivation of requirements. Exporters perceive sanitary policies as unjustified when these lack a scientific basis in risk assessment; lack a purpose in terms of public or agricultural health; are inconsistent or have an arbitrary impact; have a discriminatory impact in trade; or serve conspicuously protectionist purposes. The survey has recorded impediments of each type. It is important to note that this report does not address whether measures identified by exporters as unfair restrictions are justified or not. While this is an obvious shortcoming, it is not possible to cover this aspect in this type of exporter survey.

Standards involving zero-tolerance limits create instability in trade, in particular if laboratory practices are not harmonized. Several export companies encountered problems in exporting dairy products because of zero-tolerance standards for zoonotic contamination. A sudden upgrade of sanitary standards in an East Asian market affected exports from the EU, the US and New Zealand.¹⁴ The trade problem was driven by deviations from international codes for laboratory analysis on dairy products and standards that were upgraded beyond international recommendations. Tolerance levels for *Enterobacter sakazakii*, a dairy pathogen that causes particular concern in infant formulas, were raised above the Codex standard. Temporarily, the stringent tolerance limit for *E. sakazakii* in infant formula was extended to all dairy imports. In addition, exporters claimed, the methods used for laboratory analyses by the importing authorities deviated from the internationally recommended approach, and produced more contamination than tests undertaken by the exporters. The requirement appears to have a discriminatory impact in the market, and the trade impact differed widely among exporters (see Case 1).

Two European export firms reported on the use of a zero-tolerance limit for a particular veterinary medicine (chloramphenicol) as an effective import ban by an East Asian government in 2002-2003. The measure was preceded by an EU sanitary measure that restricted shrimp exports from the region, also for reasons of chloramphenicol contamination and was seen by some respondents as a retaliatory measure. EU dairy firms considered the measure as an unjustified barrier to trade and argued that scientific justification was not provided. A French exporter of bulk ingredients saw its whey trade restricted for two months (annual volume before the measure was 200,000 ton). Dutch dairy companies encountered a full export stop into the region that lasted for as long as fifteen months, affecting an annual trade value of EUR 60 million.

It appears that food safety and animal health requirements, including those based on international recommendations, are becoming more stringent over time. This is characterized by some firms as the desire of food and veterinary authorities in some countries to progressively eliminate all risk. Exporters report specific concern over the use of zero-tolerance levels or limit-of-detection (LOD) standards for microbiological and chemical contamination. LOD standards create uncertainty in trade because the actual limits of detection vary with the technological state of the testing facility.

Case 1. Zero-tolerance standards for *E. sakazakii*

A sudden tightening of *E. sakazakii* standards for imported dairy in an East Asian market yielded different effects on exporters. The upgrade was at first applied only to infant formula, exported by two companies participating in the survey. Company A's exports source a local joint venture with bulk intermediate products. It reported that its products were never tested for *E. sakazakii* upon import. Company B was exporting final products when the import standards were tightened. One consignment of 5000 tons tested positive and was subsequently rejected for clearance. The company provided test results to the authorities that showed the products were safe for consumption and organized a recall of its products from the market. Similar upheavals for future consignments were expected given the continued divergence in methods for sampling and laboratory analysis. Company B has chosen to ship its infant formula as a bulk intermediate product, sourcing a local joint-venture firm that produces the final product. While trade was subsequently unhampered, the company did lose market share and has to share the profits from its trade with a local firm. Temporarily, the stringent tolerance limit for *E. sakazakii* in infant formula was extended to all dairy imports, which created trade problems for several exporters. US exporters were able to rapidly reach a solution through the US Dairy Export Council, building on the trust and mutual understanding generated through a US-based training for inspectors of the importing country that had taken place not long before the sanitary policy was imposed. French and Dutch companies found they could not land shipments of dairy-based feed ingredients for several months until the measures were revised, with the exception of a single specialty cheese export firm that was able to demonstrate that its plant was free from this particular zoonosis.

Emergency trade restrictions often go beyond recommended length and geographical scope. Six out of nine firms in the survey reported (allegedly unjustified) trade restrictions following outbreaks of infectious animal diseases and other food safety calamities. Animal disease outbreaks are of specific concern because of their huge consequences for trade. Often, trade in meat and dairy products comes to a full stop in the case of an outbreak. Key concerns among dairy export firms are that temporary measures imposed in response to an outbreak are implemented longer than recommended and applied to a wider geographical area than recommended. The amount of trade affected under these allegedly unjustified measures amounts to USD 365 million on an annual basis, with restrictions lasting up to three months (see page 28).

OIE recommendations for trade involving countries with an outbreak of infectious animal diseases are pragmatic. On the one hand, it is asserted, using scientific evidence, that stopping dairy trade does little to reduce the risk of spreading the disease. On the other hand, countries are provided with a window to ban relevant trade for the length of the outbreak – presumably in order to support consumer confidence in the regulatory system. By implication, importing countries are recommended to resume trade (with normal precautionary measures) immediately after a country is declared free from the infectious disease.

Case 2. Emergency trade measures following animal disease outbreaks

The outbreaks of food and mouth disease (FMD) in the EU in 2001, and bovine spongiform encephalopathy (BSE) in the EU in 2001 led selected markets to ban dairy products from Denmark, France, and The Netherlands. Firms report delays of up to three months before importing countries lifted restrictions after the exporting country was declared free from the disease. In the aftermath of an outbreak, further trade restrictions are caused by requirements to declare that the exporting country or region has been free from this disease for a certain period of time – again for a number of months exceeding OIE recommendations. Firms in the survey reported such problems in particular in relation to FMD related requirements in markets in East Asia, Latin America, and the Middle East. Company A, a bulk cheese exporter in the EU, saw exports into a high-income market in East Asia impeded ‘for two to three months’ after the 2001 outbreak. Company B, another bulk exporter in the EU, reported that most countries reopened trade swiftly after the end of the outbreak, but still faced restrictions in a number of markets lasting ‘up to several months’. The temporary impediments related to the 2001 outbreak of BSE in Europe also appeared mainly in emerging markets, and respondents were better able to quantify the effects. Company B and company C, both in the same EU country, encountered animal health-related requirements into various countries, causing a delay of three months before exporters could resume an annual trade volume worth 65 million euro. Similar measures affected Company D’s exports into a Middle Eastern country, at an annual trade volume worth 300 million euro before the outbreak. Because of the very limited quantitative data provided, this presumably is a strong underestimate.

Many sanitary measures go beyond internationally agreed standards. All dairy export firms in the survey report one or more incidents where they encountered such requirements which negatively impacted their business. In most of these cases, the economic impact is determined by a lack of agreement on equivalence over sanitary safeguards (see Cases 3 and 4). In the specific instances where the mandatory requirements deviate from internationally agreed standards, firms (or the producer organizations and governments that represent them) refer to these international standards when negotiating with authorities in the importing country. In most instances, however, export firms simply seek to comply with the measures imposed. More often than not, this entails a compliance cost that is not explicitly calculated by the exporter, whose main interest is to keep trade going. Several examples indicate the variety of adjustments that the exporter must make, i.e. firms must alter their testing, or revise the content of their export certificates. If firms are unable to comply or unable to demonstrate compliance to the satisfaction of importing government authorities, they encounter losses.

Case 3. Maximum residue limits for agricultural chemicals and veterinary drugs

Two out of nine respondents recorded trade losses in relation to a Japanese policy to upgrade a positive list of allowed agricultural chemicals, and a third recorded substantial costs in demonstrating that products were compliant. Under the novel policy, the Japanese standard for maximum residue limits for 799 agricultural chemicals and veterinary drugs covered all elements appearing on similar (but unequivalent) lists of the EU, the US, and Australia/New Zealand, as well as the Codex standard. Because the novel policy would threaten nearly all dairy imports into Japan, it was notified as far as one year before it entered into force in May 2006, so that exporters would be able to adjust. To ensure compliance, firms and countries had to demonstrate that contamination levels of these chemicals in their exports did not exceed the mandatory limits. Exporters in Denmark, The Netherlands, and US were able to settle the issue before trade was affected. To the Danes, the necessary expansion of their chemical screening program came at a cost of EUR 30 to 40 thousand. Due to an ineffective response by the French, compliance was reached only after cheese and consumer dairy trade (annual value EUR 74 million) was impeded for three to four months. While the trade effects of this policy change were minimal (and

due to negligence of the exporter), there is an interesting angle to this case, which refers to the process of “response”: compliance is based on national screening programs for contaminants, but Japan does not monitor these – in that respect, market access depends on trust without an institutional basis.

Case 4. US food safety standards for Grade A products

The US sanitary standards for Grade A dairy is an example of a national standard not based on reference standards. Exports of fresh milk products including fluid milk, cream, cottage cheese, and yoghurt (Grade A products) into the US are impeded by near-prohibitive start-up and ongoing costs for certification under the USDA’s food safety program for Grade A products, the pasteurized milk ordinance (PMO). The trade-impeding impact of the Grade A system is difficult to assess. The incentive to ship fresh dairy consumer products from the EU into the US is created by the differentiated price system for milk in the US. Milk that is to be used for Grade A products receives a higher farm-gate price than milk destined for other purposes. This intervention price translates into high prices for consumer dairy products in the US. Licensing, tariff measures, and transport costs deter most EU exporters from entering the US fresh dairy market, but some have made the leap. Allegedly, a booming market for organic products will create further import demand for fresh milk products, thus further highlighting the impeding effects of the Grade A system. Due to strong demand from the European dairies, the EU has made Grade A subject of bilateral negotiations over an equivalence agreement. After three or four rounds of discussion between the USDA and the European Commission, there has not been much progress.

There is a lack of differentiation of dairy products for the application of food safety and animal health standards. While the OIE recognizes that properly treated dairy products are not vectors for animal or zoonotic diseases, importing countries nonetheless do often apply food safety and veterinary standards to such products. Most dairy firms refer to the fact that dairy trade is considered by scientific experts not to be a vector for the spread of infectious diseases (particularly animal diseases) due to necessary precautions. Milk products are only traded after heat treatment or other processing. The minimum is pasteurisation, but for most products a more intensive heat treatment is applied (milk powder, condensed milk) and/or the pH is lowered as in cheese. In addition, some products that are classified as dairy products under Codex or OIE are fully processed ingredients, e.g. nearly pure protein or fat content. In this respect, demarcations of what are dairy products are important (see Box 1, page 22). This matter could be addressed by establishing more differentiated rules for different categories of dairy products.

3.3 The economic impact of sanitary measures

All respondents indicate that licensing and tariff measures, in addition to domestic support programs, are the critical drivers in global dairy trade. Technical barriers, including sanitary measures are relevant, and most respondents expect an increase in SPS-related barriers as tariffs and licensing are reduced.

If in fact standards and regulations will become more important as conventional trade instruments are liberalized, an assessment of the reduced volumes of trade due to sanitary measures is most imperative. However, quantification of these foregone trade opportunities is most challenging to obtain. As discussed in section 2, the methodologies for quantifying trade impacts are under development at various institutes. The insights from business surveys such as the present study is a useful input for these developments, particularly where its detail on producer response is concerned.

Table 4. Trading costs based on staff involved in foreign regulations

Firm ID	Foreign sales (2005) outside EU-25 (Million euro)	Regulatory staff (FTE)	Annual wage cost ('000 euro per FTE)	Total staff cost (mln euro)	Relative staff cost (% of sales)	Comment
C1	250	n.a.	n.a.	n.a.	n.a.	No data received
C2	1302	n.a.	n.a.	n.a.	n.a.	No data received
C3	567	6	90	0.54	9.5%	5-6 FTE certification costs for all trade including intra-EU. Gross wages while other indicate salary costs.
B1	1512	2.5	50	0.13	0.8%	10 FTE support exports, 25% export certificates, 75% restitutions and proof of arrival. Wage costs estimates
B2	75	0.6	100	0.06	8.0%	Staff efforts cover more than SPS issues, also customs classification. 3/5 FTE. Wage cost are estimates
B3	1023	0.6	75	0.05	0.4%	
E1	n.a.	n.a.	n.a.	n.a.	n.a.	No data received, Statement by respondent: "Capacity related to making dairy trade go in terms of certification, laboratory analyses, negotiation not quantified because transaction costs occur all along the supply chain including at the buyer level"
A1	955	3.5	75	0.26	2.7%	Statement by respondent: "1 FTE at the firm and 2.5 FTE at the producer organization"
D1	n.a.	n.a.	n.a.	n.a.	n.a.	No data received

The economic effects of sanitary measures are highly firm-specific. Faced with similar costs of compliance, two firms may respond differently, depending on their market positions and prospects, structure of the firm, and the supply chain affected by the barrier. For example, when a subsidiary plant is cut off from supplies, the compliance decision is different than when spot markets become inaccessible. One implication for the measurement of economic effects of trade barriers is that the effects appear strongly idiosyncratic at first sight. For such analyses, the challenge will be in recognizing generic patterns in the firms' responses to a trade-impeding sanitary requirement.

All firms in the survey employ a number of staff to keep track of changes in regulations and requirements and make expenses for laboratory analysis and inspections. Some employ consultants to support a certification program. Essentially these are transaction costs required to keep trade going, but they do bite into the margins. The staffing costs only are roughly estimated to lie between 0.4 percent and 9.5 percent of the value of sales (estimates are provided in Table 4).

4. Discussion, Conclusion, and Recommendations

4.1 Discussion

This study covers an approximate 30 percent of global dairy trade in a sample of nine firms, seven of which are ranked in the Top 20 of global dairy firms, with a total coverage of 36 percent of sales by Top 20 dairies. Thus, the survey provides little insight into the impact of sanitary requirements on smaller export firms. In general, there are economies of scale in complying with food safety and quality requirements, which places large firms in a more advantageous position than smaller firms. In one particular case raised in the survey, a medium-sized exporter was forced to exit a major market as a result of prohibitive costs entailed in meeting export certification requirements, to the benefit of a top 20 company, which took over the exiting firm's market share.

While dairy trade is dominated by high-income countries, several developing countries export substantial volumes, often to other developing countries. A limitation of this survey is that it does not examine the importance of sanitary measures on trade flows from developing countries. Export firms from developing countries are likely encounter similar complexities, but may find it more difficult to achieve and/or to demonstrate compliance.

This survey provides only to a limited extent the economic underpinning of the importance of reducing the divergence of sanitary requirements in global dairy trade. The cost estimates should be considered an underestimate since only a limited number of dairy export firms were involved in the survey. Some of the largest global dairy firms such as Nestlé and Danone remained outside the survey. In addition, the level of detail in response varied greatly across firms. Most companies indicated that their companies were structured according to the need to comply with multiple requirements. Thus, companies face difficulties differentiating the additional costs of compliance from their overhead or operational costs.

The issues identified in this survey are quite likely to be relevant also for other dairy exporters. The author is inclined to generalize results from the limited sample in this study to all of dairy trade, and possibly beyond dairy to meat and meat products.

4.2 Conclusion and recommendations

This paper reports on a survey of nine Top 20 companies in global dairy trade to ascertain the trade-impeding effects of sanitary requirements related to food safety and animal health, which go beyond those agreed to in international standard setting bodies, or for which no corresponding international standards have been agreed. Based on the previous discussion, a number of conclusions come to the fore with regard to the threefold objective of this study.

1. *The first objective of the survey was to examine the trade-impeding effects of sanitary requirements related to food safety and animal health, from the perspective of exporters.*

The economic impact of sanitary measures in dairy trade derives from increased the complexity and costs of shipping products abroad. Export firms encounter a 'patchwork' of diverging sanitary requirements and other mandatory food standards. In addition, the requirements are repeatedly reported as insufficiently stable and transparent. Hence the biggest impact of divergent sanitary requirements on trade is seemingly more related to increased complexity and trading costs than to protectionist abuse. However, some exporters argued that occasionally sanitary measures are applied out of outright protectionist motives.

The SPS agreement and committee procedures could be targeted more towards trade facilitation, i.e. reducing the costs incurred from having to meet divergent sanitary measures. Reducing divergence – through harmonization of regulations under international standards or increasing equivalence agreements can substantially lower the transaction costs. The instruments for reducing trade costs that are identified in the SPS agreement could and should be exploited further.

The survey identifies wide opportunities for such trade facilitation – presumably with a large stimulating impact on global dairy trade. Model-based assessments of the gains from trade reform suggest that the welfare gains related to trade facilitation (measured as a 1.5 percent reduction of trade costs for all trade in all products) exceed the benefits from a complete package of Doha reform (Francois, Meijl, and Tongeren, 2005). Given the extensive tariff and quota policies still governing market access in the biggest dairy markets, reductions in trade costs shall effectively not result in improved market access.¹⁵ However, when current tariff and licensing procedures in trade are reduced, reducing the incidence of divergent sanitary standards may have a significant positive impact on dairy trade.

For many agricultural goods, the increasing number and depth of quality and safety requirements demanded by corporate buyers is creating bigger obstacles to trade than risk-related regulation. While the relative impact of private and legal sanitary measures was not examined in this study, it seems that in dairy trade the complexities and impediments caused by regulations are greater than those of private standards.

- Sanitary requirements pose relatively few obstacles to dairy trade between the high income countries, which comprises the lion's share of global dairy trade. In contrast, the emerging markets in Asia, Latin America, North Africa, and the Middle East are battle grounds for competition between global dairy exporters and a growing domestic dairy industry. Challenges resulting from SPS regulations come to the fore in these markets.
- All dairy export firms in the survey report one or more incidents where they encountered requirements that went beyond international recommendations with disadvantageous effects on trade. In most of these cases, the economic impact is determined by a lack of an equivalence agreement over sanitary safeguards. The practice of dairy exporting companies is generally to comply with whatever regulation is put forward by the food and veterinary authorities of the importing country, because the benefits of avoiding disrupted trade outweigh the additional – and often implicit – compliance costs. Nevertheless, there is a wide incidence of (temporary) losses for export firms. Losses occur, for example, when authorities in the exporting country have problems in endorsing required language on export certificates. In that respect, timely notification is a prerequisite for minimal trade impediments, as demonstrated by the Japanese change in rules for allowed agricultural chemicals. Less positive experiences are frequently reported, however, particularly in relation to the emerging markets. Another reason for export firm losses are when the costs of complying with the importer's requirements are too high in view of sales margins.
- Standards involving zero-tolerance limits create instability in trade and a lack of transparency, especially when laboratory practices are not harmonized globally. Occasionally, importers may exploit the resulting regulatory uncertainty to serve as a smokescreen for protectionist interests.
- Key concerns among dairy export firms are that emergency trade restrictions imposed in response to an animal disease outbreak are implemented longer and to a wider geographical area than recommended. In the aftermath of an outbreak, trade restrictions are caused by requirements to declare that the exporting country or region has been free from this disease for a certain period of time – again for a number of months exceeding OIE recommendations. Firms in the survey have particularly reported such problems in relation to BSE and FMD related requirements in markets in East Asia, Latin America, and the Middle East.

- There is a lack of differentiation of dairy products for the application of animal health standards. While OIE recognizes that properly treated dairy products are not vectors for animal or zoonotic diseases, importing countries nonetheless do often apply veterinary standards.

2. *The second objective of the survey was to explore how dairy exporters minimize trade losses and costs when confronted with what they perceive to be unjustified standards.*

Firms follow various strategies to minimize the costs from food safety and veterinary regulations, including negotiations and changing business operations.

Good communication and a deep level of trust among food authorities in trade partner countries, and between food authorities in the exporting country and the export firm appear critical in reducing transaction costs of adapting to regulatory changes.

3. *The third objective was to explore possible solutions for timely resolution of disputes over divergent standards perceived to be obstacles to trade.*

Long term solutions are adjustments to the current institutional arrangements in global trade that reduce the economic implications of internationally divergent sanitary measures. Confronted with questions on how to arrive at more structural solutions for reducing the uncertainty in trade from veterinary regulation, dairy export firms generally refer to government. In addition, there is a common preference for multilateral standards rather than bilateral agreements, even where the latter may give rise to additional rents in the short run – such as the gains in terms of temporary advantages over competitors created by a bilateral equivalence agreement. Below we explore the scope for solutions to reduce the trade barrier impacts of sanitary requirements within the framework of the SPS Agreement.

Harmonization

The regulatory framework for trade in dairy-based ingredients is dissatisfactory. There is a lack of agreed regulation in a wide range of areas including product composition, sanitary requirements, and customs classification. Milk protein products are examples of regulations lagging behind technological development. The absence of agreed standards and rules creates uncertainty. Firms and authorities are actively lobbying for global standards in the sanitary area to address the divergence between actual risk pathways for the spread of hazards to human health and animal health through international trade in ingredients and risk assumptions underlying the regulatory framework. Specific rules for dairy-based ingredients should allow differentiating food safety rules between ingredients and consumer dairy products. Due to the production methods for ingredients, the risk of transmittable diseases being present in shipments for trade is smaller than that of consumer dairy products.

The application of zero-tolerances for some residues is an emerging issue as testing technology is constantly improving. The application of zero-tolerance needs to be approached from a food safety risk perspective and not driven off the ‘test capability’. In this respect, there is an urgent need for an internationally recommended standard for laboratory analysis and sampling such as the code proposed by the International Dairy Federation.

Science-based risk assessment

Considering that traded milk and milk products are substantially processed, sanitary requirements in dairy trade are generally more stringent than necessary. With raw milk essentially a non-tradable commodity, all traded milk products have undergone one heat treatment or more which reduces the risk of transmitting bacterial and viral infectious diseases. It appears worthwhile to explore or synthesize the scientific underpinning of regulations. Epidemiological knowledge on risk scenario pathways for traded milk is not readily accessible in the public domain, in particular for animal-to-animal and animal-to-consumer transmittance of diseases. One question raised is whether the risk scenario pathways take into account what processing is done after the product is imported and before it is put on the market. Another area of interest is in what respect pathways for meat and dairy are similar or divergent – possibly motivating dairy-specific regulation, refining current regulations that address both meat and dairy. On the basis of scientific insight into risk pathways, a more specific regulatory framework for sanitary measures in dairy trade can be developed.

Equivalence

Equivalence is a potential solution as is mutual recognition of food safety systems – the key is to agree on an equivalence of outcomes and not to be prescriptive about how these are achieved.

Regulators still strongly rely on end-product testing, even though such testing does not provide an adequate account of the quality of the production process. While quality management systems such as Hazard Analysis Critical Control Points (HACCP) is accepted as a fundamental core element of food safety programs, regulators often see HACCP as an add-on to existing highly prescriptive systems and do not readily accept the outcome of performance based approaches.

Regionalization

There are suggestions for a more specific targeting of trade restrictions in case of animal health incidents. More specific regionalization or even disease-free status certification at the level of herds would allow more precise geographical targeting. Traceability from farm to factory would underlie such a system. Disease-free regions are already incorporated in OIE recommended standards for meat and dairy trade in case of FMD. There is a call to extend this to other highly infectious diseases.

Dispute settlement procedures

In theory, dispute settlement for SPS measures provides a legal check on protectionist and discriminatory sanitary measures. However, the instrument is characterized as too political and costly and its significance is limited because it is not accessible to individual firms. There has not been a single panel under the dispute settlement procedure of the WTO for consultation on SPS measures in dairy trade.

Despite the SPS agreement referring to OIE as an international standard-setting body, this survey reveals records a strong interest in more enforcement capacity of OIE's standards. This refers in the first case to mandatory OIE standards. Also, it appears to be useful to examine options for mediation of disputes involving OIE standards, e.g. in a business panel. The SPS Agreement (Article 11) explicitly gives the possibility for a panel to "establish an advisory technical experts group." Also, the text refers to the option for WTO members to "resort to the good offices or dispute settlement mechanisms of other international organizations". There is thus more effective and timely resolutions of conflicts.

As a final remark, the author wishes to express his hopes that dairy export firms will take advantage of future opportunities to go further in quantifying the economic impact of sanitary measures – in terms of compliance costs, (temporary) disruptions of market access and trade, overhead costs, and their response to divergent regulations. Having such numbers on the table will greatly facilitate the job of raising awareness on the lack of equivalence and harmonization and the resulting costs and complexities in global dairy trade.

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Annex 1. Questionnaire for dairy export firms

Background

IPC¹⁶ has commissioned a survey of key players in the dairy sector to ascertain the economic impact of sanitary requirements which go beyond those agreed to in international standard setting bodies. The results of such a survey would be discussed at a dairy roundtable to be held around the March 2007 meeting of the SPS Committee. A follow-up paper could be drafted which makes specific recommendations on how to address divergent standards.

Approach

The questions provided in this document will guide the interviews with selected dairy export firms including firms based in The Netherlands, France, Denmark, the US, and New Zealand. Given the importance to position the technical barriers within the general trade policy context, it is suggested to have the interview with the key trade policy expert and the key expert in standards and technical regulations. The number of the questions is aimed at a 2 hour session. Firms are requested to provide as much quantitative background to their statements as possible. Requests for additional information are discussed during the session. References to specific dairy firms will be avoided in the research report.

Information request

Participating firms are requested to submit a recent sales profile with respect to products and markets. The information is helpful in the preparation of the interview and use of the information will be restricted to that purpose.

Sales profile

(preferably in volume and value terms)

- products
- countries

PART 1. EFFECTS OF SANITARY MEASURES IN TRADE

Examine in-depth the trade-promoting and trade-impeding effects of sanitary requirements related to food safety and animal health, within the context of trade policies.

1. What are your key export products?
2. What countries do you currently export products to? How important are the following markets in terms of the value of current sales?
 - a. Domestic market, _____
 - b. EU market _____
 - c. non-EU market (specify key markets) _____
3. Please rank the following factors in terms of the degree to which they influence your ability to export products (for example if you consider trade restrictions to be the most important put '1' in the space provided, and so on):
 - a. Legal product/process standards: _____
 - b. Conformity assessment requirements: _____
 - c. Trade restrictions (eg. tariffs, quotas): _____
 - d. Customer requirements: _____
 - e. Demand/market conditions: _____
 - f. Border procedures _____
 - g. Other (specify): _____ _____
4. How would you describe the impact of sanitary measures in dairy trade on your ability to export products?
5. More specific, does your firm experience problems with regard to certain...
 - a. types of sanitary requirements (e.g. heat treatment, residue limits);
 - b. products (e.g. more in high value products than commodities);
 - c. export markets?
6. What factors determine that certain sanitary requirements frustrate your export performance, and why?
 - a. Lack of transparent and consistent legal requirements
 - b. Requirements go beyond OIE or Codex recommendations
 - c. Import is restricted (for how long?)
 - d. High cost of adapting the product to meet the current standard.
 - e. High costs of testing and certification.
 - f. Competitors are less affected by the requirements
7. What are the economic effects to your firm of sanitary requirements of importing countries (see figure)?
 - a. Are the (temporary) obstacles reflected in volumes exported (see figure, left panel)?
 - b. What costs do you incur in discovering the legal requirements, and what are your costs in complying with the requirements (see figure, right panel)?

Economic effects from sanitary measures in trade at the firm level consist of (potential) export losses and transaction costs

Export losses

(value terms, % of export volume lost)

- Markets (temporarily or permanently) inaccessible due to SPS measure;
- Sudden drops in export volume;
- Detained shipments

Transaction costs

(% of costs, % of export volume)

- Staff involved in regulations or compliance with specifications, negotiations, etc. (in FTE);
- Costs of adapting the following:
 - o Products
 - o Product labels
 - o Testing
 - o Certification

PART 2. EXPORTERS' RESPONSE TO SPS BARRIERS, THE ROLE OF NATIONAL AUTHORITIES AND INTERNATIONAL AGREEMENTS IN PROVIDING SOLUTIONS

(a) Explore how dairy exporters minimise trade losses and costs in case a sanitary requirement operates as an obstacle to trade.

8. Can you describe the firm's response to a trade obstacle?
9. More specific, how do negotiations proceed with authorities in the importing country?
 - a. What is negotiable: third-party verification, monitoring, inspection
 - b. What support from authorities in exporting countries?
 - c. What was the role of the OIE and the OIE standards?
10. More specific, do business operations change in response to the sanitary requirement?
 - a. Trade routes, product composition, agricultural or manufacturing practices, sourcing, etc.

(b) Explore the possible solutions, in terms of global agreements (under WTO, OIE or dairy industry), to reduce the negative economic effects from sanitary measures on dairy trade in future.

11. Does the SPS agreement under WTO provide sufficient checks and balances against protectionist use of sanitary requirements?
12. The SPS agreement refers to OIE and Codex as standard setting bodies. What solutions lie in more binding international agreements under OIE and Codex?
13. What solutions lie within the area of national policies, including enhanced equivalence or mutual recognition of standards?
14. What solutions lie in expanded opportunities for arbitration? What are the opportunities for arbitration within the private sector?

Annex 2. Respondents

Respondents from dairy export firms

Name	Firm	Country
Jorgen Hald Christensen	Arla Foods/Danish Dairy Board	Denmark
Luc Morelon	Lactalis	France
Alain Thibault	Ingredia	France
Jean-Francois Boudier	Ingredia	France
Alain Serey	Bongrain	France
Wim Kloosterboer	Hoogwegt International	The Netherlands
Werner Buck	Friesland Foods	The Netherlands
Bram Francke	Friesland Foods	The Netherlands
Ruud Krimpenfort	DMV/Campina	The Netherlands
Armand Jansen	DMV/Campina	The Netherlands
Sarah Patterson	Fonterra	New Zealand
Len Condon	Altria (Kraft)	United States
Ken Roberts	Altria (Kraft)	United States

Experts with other affiliations

Name	Affiliation	Country
Wolf Maier	EC Delegation	United States
Helen Medina	IDFA	United States
Jan Maarten Vrij	NZO	Netherlands
Gerard Calbrix	ATLA	France
Nelly Delfaut	ATLA	France

Annex 3. Overview of empirical evidence on trade-restricting sanitary requirements from exporter survey

Example of measures in this set	Exporting Country				
	A	B	C	D	E
	Product, destination market on which the measure has its impact (economic impact)				
Requirements go beyond international standards					
<i>Emergency measures</i>					
i. Trade ban maintained after country declared free of disease: FMD	Little impact from 2001 outbreak	Cheese exports to East Asian country banned 2-3 months (after end of 2001 outbreak)	All dairy, several markets (between 3 days and 3 month trade stop after end of 2001 outbreak)	No data	
ii. Trade ban maintained after country declared free of disease: BSE	All dairy, Middle East country (3 months trade stop, annual trade EUR 300 mln)	All dairy, several markets	All dairy, several markets impeded for about 3 months: 2 Latin American markets, 1 in Middle East, 1 in North Africa (annual trade value EUR 65 mln)	No data	Cheese powder, Peru (trade stop for 'several weeks')
iii. Trade ban maintained after country declared free of disease: Blue-tongue 2006		All dairy, markets affected include 2 Asian markets; brief, unspecified trade impact		No data	
<i>Measures have a wider scope than recommended</i>					
i. 'Positive list' for agricultural chemicals		Cheese and consumer dairy products, East Asian market (4 month trade stop, annual trade EUR 74 million)		No data	Unspecified trade impact on an East Asian market

Example of measures in this set	Exporting Country				
	A	B	C	D	E
ii. Veterinary risk assessment requirements		Caseinates trade impeded into a Latin Am. market since Feb. 06 - ongoing (annual volume before ban 50-70 ton)		No data	Unspecified products, 1 market in a Latin American market (trade restricted 9 months)
iii. Zero-tolerance standard E.coli	Cheese, Central American market (trade impeded)				
iv. Pre-certification (traceability) requirements	All dairy; 3 selected markets in Eurasia and Latin America (raises costs, prohibitive for smaller exporter)	All dairy; 3 selected markets in Eurasia and Latin America (raises costs, prohibitive for smaller exporter)	One firm claims trade loss in intra-EU trade of 20-30 mln per annum	No data	
National standards are not based on international reference standards					
i. Radioactivity requirements		Unspecified product, several countries in N-Africa and S-Am and C-Am (raises statement costs)	Unspecified product, several countries in N-Africa and S-Am and C-Am (raises statement costs)	No data	
ii. Sanitary standards for fresh dairy products	Near-prohibitive for all fresh dairy trade into North American market	Near-prohibitive for all fresh dairy trade into North American market	Near-prohibitive for all fresh dairy trade into North American market	Near-prohibitive for all fresh dairy trade into North American market	n.a.
International standards are applied but with divergent implementation					
Limits of detection for contaminants and pathogens are divergent across laboratories Chloramphenicol, 2002-03		2 month de facto trade ban on whey imports into an East Asian market (annual volume 200,000 ton)	All dairy, full trade stop 15 months into an East Asian market (annual trade value EUR 60 mln)	No data	

Endnotes

1. Originally, the objective included an examination of the trade-promoting effects of sanitary requirements. Sanitary standards may promote trade because they provide the leeway for importers to maintain an open-border policy with a way of 'pulling the break'. The survey recorded little response on such effects.
2. This section uses material from Wijnands and Poppe (2006).
3. Josling, Roberts and Orden (2004:22) usefully define product standards to be those that "might specify the nature of the product itself, or content attributes such as the absence of particular diseases and microorganisms," and process standards as those that "stipulate use of certain production, processing, handling or distribution technologies."
4. See Henson and Wilson (2005) for a recent overview of the literature.
5. One assumption when calculating tariff equivalents is to ignore consumer and producer responses to the price effects of the barriers. Another assumption is that it analyses the price differences between products that are considered as perfect substitutes, ignoring quality differences and consumer preferences for one or the other. One recent study that departs from this 'homogeneous product' assumption is Yue et al. (2006).
6. Flaws in the theoretical underpinning and the lack of data are a particular feature of econometric studies applied to relate trade flows to countries' stock of technical barriers, and CGE models whose indication of impact at the sector level vary with assumptions on cost structures, consumer response and adjustment mechanisms.
7. The discussion draws on the official agreement text (WTO, 1995) and interpretations in Josling, Roberts and Orden (2004).
8. In five out of seven SPS disputes between 1995 and 2002, panel rulings and decisions by the Appellate Body, the lack of science-based rationale in terms of risk reduction under a trade-restricting SPS measure provided the basis to rule in favour of the complainants: Australia-Salmon (brought by Canada), two rulings on EC-Beef hormones (brought by US), Japan-Testing requirements (brought by US) and Japan-Apples (also brought by US).
9. This section uses material from presentations by A. Bruno and S. Kahn at the international dairy roundtable, Geneva, March 2, 2007.
10. See www.codex-alimentarius.net for more information on standard setting.
11. Both issues are not related to the SPS agreement but to the Agreement on Technical Barriers to Trade (TBT). Geographical and, for geographical indications, to the Agreement on Trade-related Intellectual Property Rights (TRIPS).
12. See www.fil-idf.org.
13. See www.oie.int.
14. Threats of similar obstacles were encountered in alternative regions.
15. Francois, Meijl and Tongeren (2005) compare the welfare gains from a 50% cut of tariff barriers in global merchandise and services trade to a 1.5% reduction in trade costs in all merchandise trade, excluding the investment costs for achieving such trade facilitation. The brunt of the positive impact of trade facilitation is generated by manufactures trade. As the average tariff barrier in manufactures trade is low (5% compared to 15% in agriculture and food), a reduction in trade costs has a proportionally large positive impact on trade. At present, dairy trade is highly protected, requiring reform before the benefits of trade facilitation can materialize.
16. The International Food & Agricultural Trade Policy Council (IPC) convenes high-ranking government officials, farm leaders, agribusiness executives and agricultural trade experts from around the world and throughout the food chain to build consensus on practical solutions to food and agricultural trade problems. See www.agritrade.org for more information on IPC.

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