Changes in the Horticulture Sector in the Netherlands

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Abstract

The goal of this study is to analyse and to investigate the investment dynamics in Dutch glasshouse horticulture, and to reveal the factors underlying the changes in this sector. Insight into the effect of different factors on the investment behaviour in Dutch horticulture is socially relevant because this sector has to undergo structural changes. The Dutch glasshouse industry has to improve its environmental performance (reduce its energy use, pesticides, use and CO2 emissions). Improvement of the environmental performance can be achieved by investments in new technologies (e.g. energy saving technologies). Insights into factors that determine investment patterns are important in designing policies that aim at enhancing the environmental performance of horticulture. Also, insights into factors that affect investment patterns in the glasshouse industry are relevant for assessing future credit demand of the glasshouse industry by banks. Panel data from the Farm Accountancy Data Network (FADN) were used to describe the dynamics of the investments during 1975-1998. Inspection of investment patterns of firms demonstrates that investments are not spread over a number of years. Rather, investments are concentrated in some years, followed by some years without any significant investment activity. Another feature from inspection of data is that investment patterns differ between capital goods (e.g. machines, installations, buildings) and between sectors (vegetable, cut-flower, pot-plant). A factor analysis was used to explore the structure of the interrelationships among variables.

INTRODUCTION

Investments are a key element in structural changes in agriculture. The contribution of horticulture in the agricultural sector and economy of the Netherlands is remarkable. In 1995-1998 horticultural products formed about 37% of total agricultural production. During 1975 – 1998, horticulture was a dynamically changing sector. The size of the firms, use of labour, new mechanisms and systems, and new technologies were introduced through substantial investments.

Dutch horticulture is one of the most intensive farming systems in the world with high output levels using the latest technologies. The formation of the EU, liberalisation of world trade (WTO), targeting sustainable agriculture, create a constant pressure to change for this sector. According to Agenda 2000, agriculture must adjust in the coming years to various changes. The main changes include the restructuring of agriculture, and launching of new initiatives with accent on environmental and recreational functions of rural areas. To meet the objectives of Agenda 2000 (European Communities, 1995-2003), the Netherlands is investing 4,885 million Euros, which is partly funded by EU and mainly by Dutch government. A broad range of instruments was announced in the Agenda 2000 and one of them is investment in agriculture, which provide 35,09 million Euros for the structural improvement of glasshouse horticulture, of which the EU contributed 8,78 million Euros. The aim of the restructuring of individual glasshouse horticulture holdings is the construction of glasshouses which comply with the “ecolabel requirements”.

Another requirement to the modern horticulture sector is reducing energy use. This objection was determined in an agreement between the Dutch glasshouse sector and the Dutch government in 1997. Dutch horticulture, as an important user of energy, was obligated to reduce the energy use per unit by 65% production over the period 1980-2010.

It allows for achieving the targets in the Kyoto protocol for the reduction of glasshouse gas emissions. The main way to increase energy use efficiency is investing in energy-saving technologies. Better understanding of the main changes in the Dutch horticulture sector and the analysis of the investment dynamic is an important element in elaboration of policy to fulfil recent requirements.

Several studies were conducted, aimed at understanding the factors underlying investment decisions of producers in Dutch horticulture. Oude Lansink et al. (2001) used the probit model to analyse a panel data (1986-1998). The authors concluded that the lower age and availability of a successor have a positive effect on the probability of investing, as well as firm size, solvency, and real result. The authors also noted differences between different types of firm in investment decision-making. In other articles, authors paid attention to the influence of the different factors on the adoption of the energy-saving technologies. Bremmer et al. (2004) analysed the role of perceptions and entrepreneurial strategies in the explanation of the adoption of energy-saving technologies. Diederen et al. (2003) included uncertainty about energy prices in a model to explain the gap between the observed and expected levels of adoption. He showed that an apparently profitable technology can be delayed due to the expectation of energy price changes.

There is a gap in literature of an analysis of the long period dynamic of investments in the Dutch horticulture sector. To fill this gap the main goal of this article is formulated as the investigation and the description of the dynamic changes of investments in the Dutch horticulture sector.

We examine investment behaviour and distinguish six sections. An analysis of Dutch horticulture in the period 1975-1998 is presented in the second part of this paper. In the third part, the main stages of the factor analysis are explained. The fourth section describes the data and the principles of the gathering of this data. The fifth section represents the results of the factor analysis. Conclusions and discussions are in the sixth section of the article.

Investment Dynamics in Dutch Horticulture

The purpose of this section is to provide information on the dynamic of investments in the Dutch horticulture sector, and to look at changes in the pattern of investments by examination of data. In Figure 1, the average level of the total investments is shown. Investments were calculated in 1975-prices and transferred to thousand Euros. By analysing dynamics, we can detect three spikes of investments: in 1982, 1988 and 1993. As can be seen from the graph, the spikes appear to be cyclical. This fact allows us to assume a pattern of investments in the horticulture sector in the Netherlands: in general there is a 6 years difference between the spikes: from 1976 to 1982, from 1982 to 1988, and from 1988 to 1993. The next finding from the graph is an upward tendency of the level of the investments: from 25 thousand Euros in 1976 through 35 thousand Euros in 1982 and 1988 to 45 thousand Euros in 1993.

Comparing the spikes, we can see some similarities. These are a sharp increase for two years and a sharp decrease after each spike. Beside these similarities, there are some distinctions, i.e. in level of decreasing. After the first spike, in 1982, investments declined to the level of 1980, before an increase; for the second and third spike the reduction was only about 50% of growth. On the other hand, it is interesting to analyse the periods with the lowest level of investments. These occurred in 1978-1980, 1983, 1986-1987, 1990-1992 and 1997. As we can see, between the spikes there are 3 years of low activity. On the basis of this consideration, we can suggest that there were some reasons for the existence of spikes in the investments.

For further investigation we used two approaches: first, to explain this phenomenon by influence of the changes in the macro-situation, and second, to asses the differences inside the horticulture sector. According to the first approach, there were several possible reasons which could have affected the investments.

One of the possible explanations is WIR (WIR, 1988), which was in force between

1978 – and 1988. This was a law concerning subsidies to firms which invested more than 1760 Euros per year in new buildings and installations. This law contributed to the first peak in 1982, and it played a very important role in the occurrence of the second lump of investments, because it was announced in advance that this law would be repealed in 1988. Many firms initiated investments to get subsidies, which caused an enormous burst of investments for two years.

The second explanation relies on the influence of two oil-crises on investments in horticulture. The first increase in the price of imported oil was at the end of 1973 and the second in 1979 (Figure 2). These crises caused people to understand the importance of investing in energy-saving technology. Later this inferred to an agreement between the glasshouse industry and the Dutch government to improve energy efficiency.

In the literature (Pfann, 1996), we can find another reason to observe lumps in investments, that is the interrelation of the business cycle with the demand for investments. The author showed that the rise in demand for investments may relate to a period of high economic growth, although we could not find an interrelation between the investments in horticulture and the indicators of business-cycle in the Netherlands.

To reveal the processes which are going beyond the changes in the total investments in Dutch horticulture (Figure 1), we studied investment patterns in two dimensions: across different types of capital and across different types of firm.

For the first aspect, we used desegregated data of investment in different capital. In Figure 3 we can see similarities between patterns of investment in land and in buildings. There are three spikes: in 1983, 1989 and 1993. This phenomenon might be explained by the complementary nature of these investments: in most cases new glasshouses were built when the farm could make investments in land.

Another conclusion from this figure is that in the earlier time period (1970-1983), the investment in installations had an upward trend, as opposed to a downward trend of investment in machinery. If in the seventies, an absolute value of investment in machinery twice exceeded an invested amount of capital in installations, then from 1979 the investment in machinery fell dramatically and in 1983-1987 even had a negative value. In 1988 both types of investment increased significantly, although later the investment in installations took a leading role in investments in horticulture, fluctuating between 15 – 20 thousand Euros on average. The most important spikes of investment in installations were in 1980-1983, 1988-1989, and 1992-1995. One common feature of the investment in machinery and installations can be found in the graph: the investment appeared as a concentration of two-three peaks. This kind of peculiarity can be explained by the prolongation of the effect which caused a lump of investment due to the possibility of spreading this investment. By analysing the graphs in Figure 3, one can see the differences in the size of investments. For more detailed analysis, additional information is represented in Table 1.

From the first column of the table, we can see the number of zero investments. Most often the zero investment appears in the case of investment in land (89,0%) and buildings (60,5%), therefore when we consider aggregated data, only in 11,1% of cases, the zero investment was detected. This table also shows the presence of disinvestment. If the previous graph demonstrated negative value of the investment in machinery, then in Table 1 we can see the presence of negative values for all types of investment with the largest level (-159.4 thousand Euros) for machinery. The maximum level of the investments in installations (994.8 thousand Euros) and in glasshouses (594.7 thousand Euros) creates the suggestion that the newest and most expensive technologies were used. Due to the high level of the standard deviations, we can infer considerable heterogeneity across firms and years.

To explore the influence of firm specialisation on the investment level we considered Figure 4. Figure 4 supports our assumption about heterogeneity between different types of firm. The growing interest in investing in pot plant specialisation can be seen from the graph: if until 1990 average investments were 5-7 thousand Euros, then in 1991-1996 they were 10-15 thousand Euros. This can be explained by the fact that pot-plant firms in general had higher family income compared to others (Figure 5). In Figure 4 we can trace also a tendency to increase the amount of investments in comparison with cut flower firms.

Interesting parallels can be found by comparing the investment in different types of firm (Figure 4) with family farm income per entrepreneur (Figure 5).

As can be seen, the investments were made in years which followed increases in family income. There are two possible explanations: first, a rise in income creates positive expectations and second, they are a source for investment or collateral in case of a bank loan. In general, after a spike of investment there was stagnation or a decrease in income for a short period, followed by an increase in family income. For example, cut flower firms had a spike in 1981-1982, after an increase in family income in 1980-1981, which stayed on the same level in 1981-1982 and grew in 1983. With respect to vegetable firms, it is interesting to consider the period 1989 – 1994. The investment spike in 1989 (16 thousand Euros) occurred after doubling in family income in 1987 for vegetable firms, then a sharp reduction in investments in 1991-1992 (5 thousand Euros), and a dramatic fall in income for families in the same year, and then in 1993 a large increase in investment level, and negative income of families.

The investment behaviour of the firms influenced the changes in their size. We used DSU (Dutch Size Units) to measure the size, which is based on the standard gross margins calculated by deducting related specific costs from the gross returns per hectare (LEI). During the analysed period, a large increase in scale took place in horticulture, so if, in the beginning of the observation, the average size was about 300 DSU, then at the end it was 750 DSU. This indicator also shows a high level of heterogeneity between firms: the smallest firm in our sample had 10 DSU and the largest had 4887 DSU; the mean was 533 DSU with a 464 DSU standard deviation.

Consistent with the goal of this section, we considered the dynamics of investments and analysed differences between different types of firm as well as for different types of capital.

From the descriptive analysis of the investment in this section we can suggest that:

- the changes in oil-prices and regulation of the investments by government influenced formation of the investment patterns in the Dutch horticulture sector;
- for further analysis we need to consider individual characteristics of firms which can explain the investment behaviour; also we need to take into account heterogeneity, which can be caused by firm size, specialisation of firm (vegetable, cut-flowers, pot-plant) and type of investments (in land, building, installations, machinery).

MATERIALS AND METHODS

On the basis of the conclusions made in the second section, we intend to explore the causal relationship between factors to explain the pattern of investment in Dutch horticulture. Factor analysis meets this purpose. In factor analysis all variables are simultaneously considered and the aim is to form the factors that maximise explanation of all variables. Each factor could be considered as a dependent variable, that is a function of the entire set of observed variables.

To perform a factor analysis it is necessary to go through several stages (Hair, 1998).

In the first stage we need to identify a research goal. This can be either (1) the detection of the structure of the data or (2) the reduction of the data. The next stage consists of an examination of a correlation matrix to check the presence of a significant level of the correlation. We calculate a correlation matrix between variables, due to the utilization R-type factor analysis. For the preliminary selection of the variables, one can use a communality test. This test estimates the shared, or common, variance among the variables. The variables with communalities less than 0.50 can be interpreted as not having sufficient explanation and can be omitted from factor analysis. The third stage is deriving the factors. There are different methods to extract the factors: common factor analysis and component analysis. The distinction between them is in deriving factors from different types of variance. There are three type of variance: common, specific (or unique) and error. The common factor analysis contains common variance, and is usually performed with the objective of identifying the latent dimensions in the data. The component analysis is based on both common and unique variance, and derives a minimum set of factors which account for maximum portion of the variance in the original data set.

In the fourth stage, the number of factors to extract must be defined. The most common criteria for extraction are: (1) latent root criterion, (2) percentage of variance criterion, (3) screen test criterion. Latent root (or eigenvalue) shows an amount of variance in the original variables accounted for by each component. According to the first criterion, the factors, which have eigenvalue greater than 1 are considered as significant factors and can be extracted. For the second criterion, the cumulative percentage of total variance extracted is calculated. The numbers of factor, which account for 65-75% of total variance, can be considered as satisfactory. For the third criterion, the latent roots are plotted against the numbers of factor in descending order of extraction. This criterion can help to reveal the threshold factor after which the factors contribute little to the solution. The combination of all of the criteria can give the information for final decision about extraction of the numbers of the factors. The first factor can be considered as the first best in the explanation of the variance due to the largest proportion of the variance, second one as the second best and so on and so forth.

The fifth stage includes an interpretation of the factors. For better understanding of the factors, a factor rotation is often used. The rotation redistributes the variance between factors to achieve a simpler explanation of the factors. After rotation we can consider the factor loadings. Factor loadings are the correlation between the variables and the factors. Consequently, the loadings, with level greater than 0.50, are considered significant. In this stage the first goal of the identifying structure through data summarisation can be achieved.

As a final stage, and consistent with the second goal of data reduction, selecting surrogate variables or creating summated scales can be performed. The original set of variables will be replaced with a smaller set of new variables which can be used for modelling.

Data

The main source for investigation of changes in the horticulture sector in the Netherlands is the Farm Accountancy Data Network (FADN). The concept of the FADN of the European Union was launched in 1965 and currently the annual sample covers approximately 60000 holdings that represent 15 Member States. In the data collected from the Netherlands about 8500 farms are represented glasshouse sector. The Agricultural Economics Research Institute (LEI) is responsible for collection of data from the farms and conducting the quality control. The information collected, for each sample farm, concerns approximately 1000 variables, which give information about land and buildings, labour, livestock, costs, financial aspects, and production.

On the basis of the literature review (Diederen et al., 2003; Oude Lansink and Pietola, 2002; Oude Lansink et al., 2001) the assumptions about the preliminary selection of the variables can be made (Table 2). For our purpose 40 variables were selected. The data, used for further investigation, is an unbalanced panel data for 1975-1998 and consists of 6554 observations for 1316 farms.

RESULTS

Data reduction is postulated as the main goal for the factor analysis. The identification of the structure of observed variables was the second objective. As is mentioned above, a factor analysis summarises the information contained in a number of original variables into a smaller set of new factors with a minimum loss of information (Hair, 1998).

Understanding the structure of the variables requires R-factor analysis to identify the dimensions that are latent. In this case, factor analysis was applied to a correlation matrix of the variables to analyse a set of variables.

A visual examination of the correlation matrix was conducted for these variables to identify the variables that are statistically significant. It provided information to proceed to the next step. The correlation matrix was checked to identify the correlations which are statistically significant; communality also gave a reason to exclude some of the variables. The communality is presented in the first column of Table 3. Communality estimates the shared, or common, variance among the variables. Variables that showed low level (0.25 or lower) of communality were removed from the model (i.e. dummy for province, year of firm take over, modernity of machinery capital, indicator of business cycle). In Table 3, variables that were left for the next step are presented. This table also includes other descriptive statistics.

By analysing means, we can obtain some information about the data set. The highest level of capital is in buildings, on average 74,76 thousand Euros, and the lowest is 13,06 in machinery, but all of the capital variables differ across firms. The variable inputs such as energy, service and material costs were calculated in thousand Euros in 1975 prices. The largest costs are in materials, at 59,41 thousand Euros, and in energy at 54,07. About 43% of firms have specialisation in vegetables, 33% produce cut-flowers and 24 % pot-plants; but on average the largest output was obtained from cut-flower production, 127,65 thousand Euros, compared to vegetable firms with 115,5 and pot-plant firms with 91,1. Two variables were included to indicate individual characteristics of firms. 46% of firms have successors or belong to young owners and the average age of the head of firm is 44 years.

Several variables that give information about influence of prices were included: the ratios of different input price indexes to output price index. The changes in prices for energy took place in the same proportion as price indexes for output. The change in material and service costs was lower than the increase of output prices, which is a good ratio for producers. An unfavourable ratio can be seen for price of capital: on average changes in prices of capital were two times larger than changes in output prices. The highest ratio was for prices of land, which had 0,79 standard deviation, which indicates big fluctuation in prices for land across years. From Dutch statistics, we found that prices of farmland were rising fairly sharply. During two years (1975-1977), prices doubled, followed by a gradual decline over 5 years, and then a 30% growth over 4 years. During 1987-1998, there were no significant fluctuations in prices.

As a next step, a principal component factor analysis was performed. Factor analysis generate the factors, or latent variables, which explain as much of the variance in these variables as possible. For this analysis we do not have any prior theory about the factor structure of the data and we assume that any variable included in factor analysis is associated with any factor. We applied a principal components analysis (PCA), which is a variance-focused approach. The components reflect both common and unique (specific and error) variance of the variables. Relying on initial eigenvalues of the components, we selected those factors which had an eigenvalue greater than one. The total explained variance after the orthogonal (Varimax) rotation is shown in Table 4. We obtained 8 factors that explained 80,3% of the total variance. The first 2 components have the highest eigenvalue (5,0 and 4,8) and explain 37,6% of the total variance.

PCA seeks a linear combination of variables such that the maximum variance is extracted from the variables. It then removes this variance and seeks a second linear combination which explains the maximum proportion of the remaining variance, and so on. It results in orthogonal factors. The important step to achieve the objective of this section is an interpretation of the components. For this purpose, the rotated component matrix (Table 5) was analysed.

Each of the variables is linearly related to each component. The strength of this relationship is contained in factor loadings, which are standardised regression coefficients between the variables and the components. On the basis of Table 5, we named the components. The first factor with the highest eigenvalue is the factor of prices, which contains almost all ratios of the price indexes. The price indexes also loaded the eighth factor; these are the ratios of the price indexes on energy and land. The second factor includes capital and input volumes; we called these the 'Input factor'. The third and fourth factors are loaded by differences in specialization of firms; we can assume that pot-plant has more differences than firms specialized in vegetables and flowers (this is supported by findings in the previous section). The fifth factor was loaded by the modernity of the capital. The presence of the successor and the age of the head of the firm loaded the sixth factor, which we called the 'Time horizon factor'. Input of the labour loaded the separated, seventh factor.

For further analysis, the factor scores were constructed. The score for a given factor is a linear combination of all the measures, weighted by the corresponding factor loading. These scores can be used as independent variables to perform a regression.

CONCLUSIONS AND DISCUSSION

This study makes an investigation of the investment dynamics in Dutch glasshouse horticulture. The broad description of the changes, presented in Figure 1, over the period 1975-1998 was conducted. On this basis we could suggest the interrelation between changes in oil-prices and the investments. Government regulations also could have caused lumps of investments, i.e. announcing two years in advance the end of subsidies in 1988. Besides macroeconomic factors, the microeconomic ones were considered. The investments in different types of capital were explored separately, as well as the investments for different farm specialisations. On this basis we inferred that for the analysis of the investments, the heterogeneity must be taken into account. The above mentioned implications were used for selection of the variables for factor analysis.

Consistent with the goal of factor analysis we reduced our data and constructed eight factors, which summarise the information contained in the original variables. The first two components had the highest eigenvalues (5.0 and 4.8). They were loaded by changes in prices and inputs, and accounted for 38% of total variance. Specialisation of farms had 19% of squared loadings. Modernity of capital, used labour and farmers' individual characteristics had large scores. In common, all eight factors explained 80% of total variance of the investments in Dutch horticulture.

For future research it seems interesting to perform a regression with factors obtained from factor analysis instead of original variables.

The insights about the investment decision-making received from this study can help policy makers to develop instruments and improve the elaboration of programmes aimed to achieve modern requirements for the horticulture sector.

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Tables

Table 1. Summary statistics on the different type of investments

Investment	Zero observations	Minimum	Maximum	Mean	Std. Deviation
- in Land	89,0 %	-105.24	434.18	2.66	19.35
- in Buildings	60,5 %	-42.60	594.68	10.45	34.06
- in Installations	32,9 %	-62.10	994.83	11.67	36.67
- in Machinery	30,1 %	-159.40	171.67	2.23	12.02
Total Investments	11,1 %	-134.94	1517.36	26.27	69.87
Number of observations	6554				

Table 2. Conceptual selection of the variables for analysis

Characteristics of firm	Variables
Individual	- Year firm take over - Presence of successor - Age of the head of the firm - Enterprise form - Specialisation of the firm - Province
Input	- Capital - Land - Labour - Service costs - Energy, fuel, gas - Material costs
Output	- output for different type of firms: vegetable cut flower pot plant
Prices	- output - energy - materials - service

Table 3. Communalities, Mean and Standard deviation

Variables	Label of variables	Extraction	Mean	Std. Deviat.
Labour of owner and family, men years	LabOw	.936	2.72	24.15
Labour of personnel, men year	LabPer	.894	3.20	4.66
Capital in land	CapL	.511	60.16	65.05
Capital in buildings	CapB	.843	74.76	81.60
Capital in installations	CapIn	.808	62.73	81.69
Capital in machinery	CapM	.501	13.06	16.56
Modernity of buildings	ModB	.811	.44	.24
Modernity of installations	ModIn	.788	.39	.19
Cost of Energy	CostEn	.771	54.07	56.63
Cost of Materials	CostMat	.548	59.41	91.99
Cost of Service	CostServ	.818	32.26	33.84
Output from vegetables	OutVeg	.793	116.49	222.89
Output from cut-flowers	OutFlow	.823	127.65	268.91
Output from pot-plant	OutPotpl	.815	91.12	276.68
Specialisation in vegetables	Veget	.848	.42	.49
Specialisation in cut-flowers	Flower	.869	.33	.47
Specialisation in pot- plants	Potplant	.791	.24	.43
Age of the head of firm	Age	.819	44.41	9.59
Presence of successor or young owner	Succ	.833	.46	.50
Price index of energy /price index of output	PrEn	.694	1.00	.30
Price index of materials / price index of output	PrMat	.943	.86	.15
Price index of services / price index of output	PrSer	.901	.96	.09
Price index of land / price index of output	PrL	.786	2.41	.79
Price index of buildings / price index of output	PrB	.877	1.87	.27
Price index of installations / price index of output	PrIn	.958	1.62	.25
Price index of machinery / price index of output	PrM	.906	1.77	.45

Extraction method: Principal Component Analysis

Table 4. Total Variance Explained

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	5.013	19.282	19.282
2	4.767	18.334	37.616
3	2.422	9.314	46.930
4	2.402	9.239	56.169
5	1.853	7.128	63.297
6	1.667	6.410	69.707
7	1.462	5.623	75.330
8	1.299	4.997	80.326

Table 5. Rotated Component Matrix

	Component 1	2	3	4	5	6	7	8
	Prices	Input	Vegetable Cut Flower	PotPlant	Modern i-ty of capital	Time horizon	Labour	Energy and land Prices
PrIn	.953	.149	.032	.022	-.130	-.001	.009	.095
PrMat	.940	.156	.038	.020	-.135	.000	.013	-.123
PrB	.930	.122	.069	.012	-.011	-.041	.017	-.119
PrSer	.921	.135	.066	.010	-.043	-.025	.017	.058
PrM	.907	.161	.019	.022	-.184	.015	.009	.151
CostEn	.279	.827	-.022	-.044	.039	.036	.057	-.039
CapB	.149	.814	.010	.016	.386	.004	.048	-.079
CapIn	.211	.812	.141	.058	.265	.047	.043	-.082
CostServ	.308	.776	.142	.314	-.006	.026	.033	.017
CapL	.018	.699	-.033	-.047	-.104	-.082	-.011	.036
CapM	-.082	.628	-.073	.205	.111	-.022	.043	.195
Flower	.144	.054	.852	-.342	-.006	-.000	.015	-.056
Veget	-.080	.004	-.804	-.440	.007	-.008	-.033	.030
OutFlow	.161	.453	.724	-.257	-.009	.030	.015	.006
OutVeg	.198	.410	-.672	-.351	.062	.037	.042	-.063
Potplant	-.066	-.064	-.010	.884	-.001	.009	.022	.027
OutPotpl	.123	.333	-.040	.828	-.004	-.030	.019	-.040
CostMat	.099	.508	.063	.524	.030	-.014	-.010	-.016
ModB	-.184	.162	-.031	.004	.860	.082	-.012	-.053
ModIn	-.248	.161	-.021	-.001	.828	.115	.006	-.017
Succ	.072	.022	-.018	.007	.038	.908	.002	.023
Age	.112	.051	-.023	.027	-.132	-.886	.012	.000
LabOw	-.011	-.035	.003	-.015	-.009	-.025	.966	-.013
LabPer	.106	.599	.038	.103	.020	.034	.714	.006
PrL	.312	-.013	.029	.001	.113	-.064	.022	.818
PrEn	.312	-.066	.074	.017	.275	-.115	.043	-.705

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization

Table 6. Case processing summary for dependent variable

Investments			Percentage
m =	1	– in Land	4.4
m =	2	– in Buildings	17.0
m =	3	– in Installations	27.4
m =	4	– in Machinery	37.7

Figures

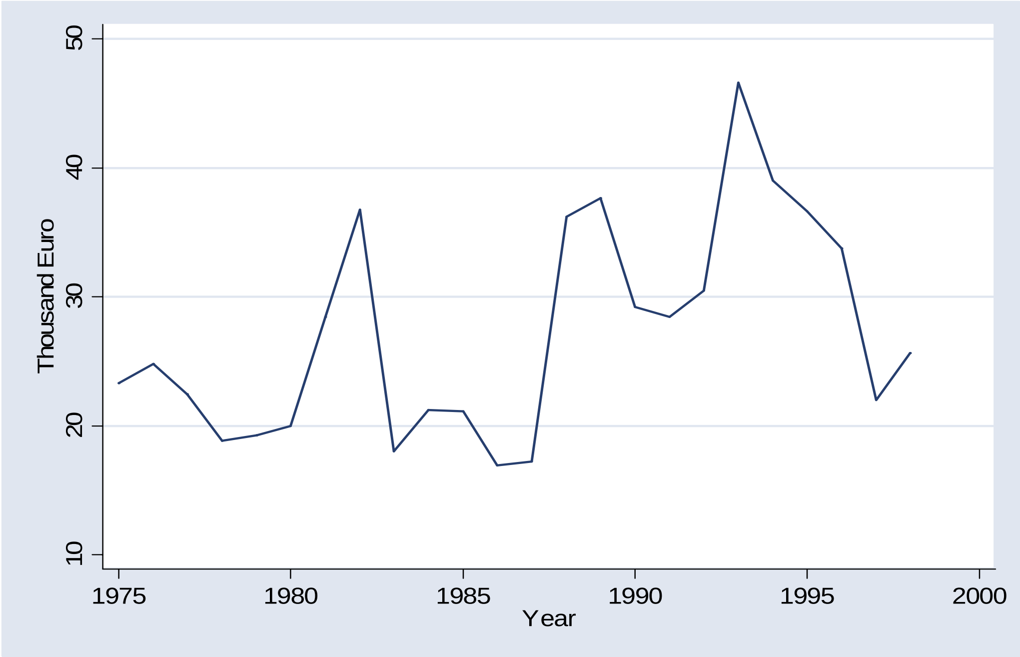

Fig. 1. Dynamics of the average investments during 1975-1998 years

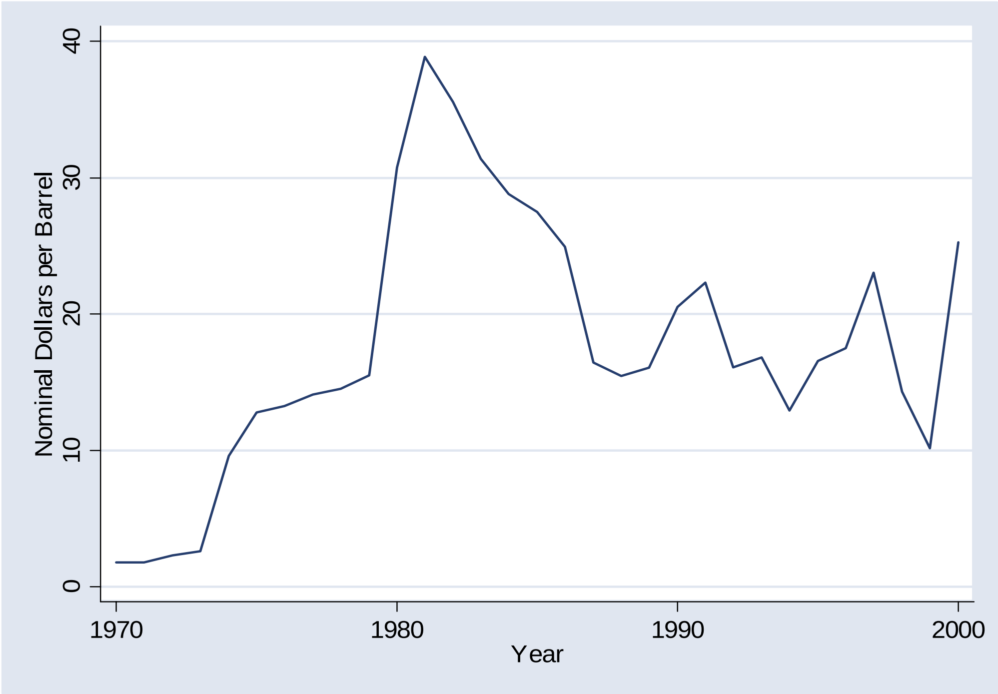

Fig. 2. Refiner Acquisition Cost of Imported Crude Oil (source EIA)

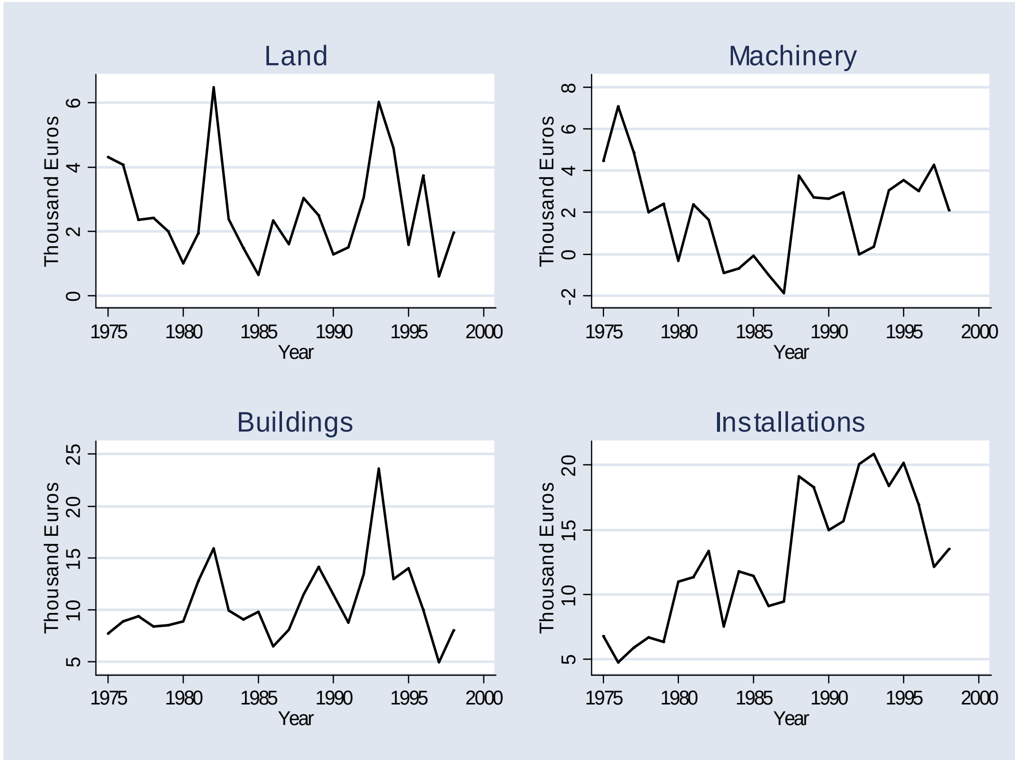

Fig. 3. Dynamics of the different types of the investments (mean) during 1975-1998

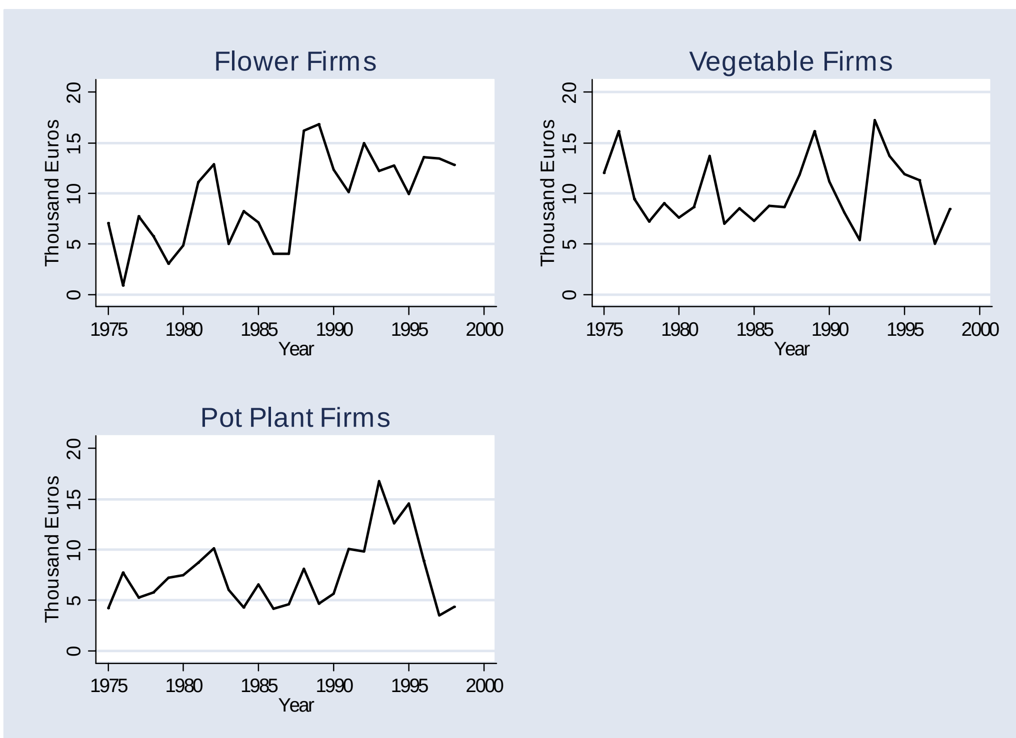

Fig. 4. Dynamics of the investments across firms during 1975-1998

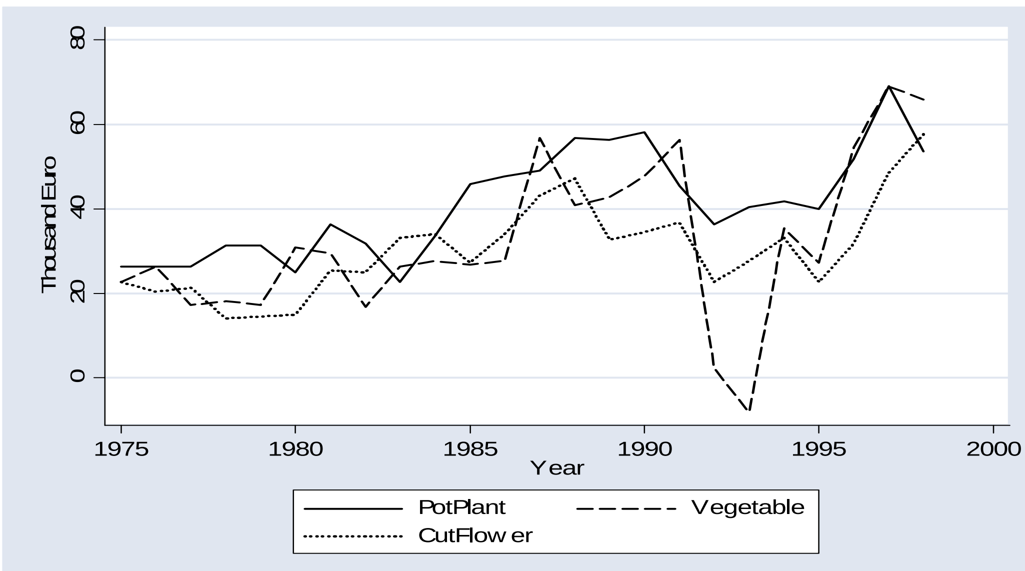

Fig. 5. Family farm income per firm, thousand Euros (source LEI)