Factors Affecting Firm Competitiveness: The Case of Greek Industry

Panagiotis Liargovas and Konstantinos Skandalis

University of Peloponnese, Department of Economics

Address for correspondence:

Panagiotis Liargovas,

University of Peloponnese, School of Economics and Management,

Department of Economics,

Terma Karaiskaki Street, 22 100 Tripolis-Greece,

Tel: 0030 2710 230130, Fax: 0030 2710 230139, E-mail: liargova@uop.gr

Abstract

The purpose of this paper is to develop and implement an adequate framework of firm competitiveness. The analysis is based on a data set of 102 Greek industrial firms listed on the Athens Stock Exchange during the period 1997-2004. The paper examines the impact of key determinants of firm competitiveness. We distinguish the explanatory variables as financial and non financial drivers of firm competitiveness. Our results show that leverage, export activity, location, size and the index for management competence significantly affect firm competitiveness. Furthermore, it is found that the relation between firm competitiveness indicators and drivers is due to effective management.

Key words

competitiveness, financial performance, panel data

1. Introduction

In the era of globalization, competition has become fiercer than ever. Reduced trade barriers, spread of technology and lower costs for communication and transportation have sharpened international competition. The economic changes in Eastern European countries, the completion of the European Union and the appearance of new economic powers in the global market have initiated specific discussion of production structures and the competitiveness of national industries. Intense competition in global and local markets requires firms to improve their competitiveness. This is especially true for smaller countries, like Greece where competitiveness can allow firms to overcome the limitations of their small home markets in order to achieve their maximum potential. This improvement not only benefits the firms themselves, but also has a direct impact on the competitiveness of an economy as a whole. A nation's standard of living is increasingly dependent on the competitiveness of its firms.[1] The international business literature is replete with empirical and conceptual works pertaining to competitiveness. However, there is still debate among several disciplines regarding how the competitiveness of these firms should be measured and what factors affect competitive performance.

The purpose of this paper is to develop and implement an adequate framework of firm competitiveness. According Lall (2001), a complete competitiveness analysis must define what competitiveness means and how it is to be measured and identify the most important factors influencing it, the interactions between these factors and how they affect the competitiveness of the subject of investigation.[2] In our paper, we offer a framework to understand the meaning of firm competitiveness and its application. Our

specific research question is: “What are the determinants of firm competitiveness in successful firms working in distressed industries?”. The structure of this paper is as follows: Section 2 provides a brief review of concepts and measures of competitiveness. Section 3 discusses the data used and describes the methodology. Section 4 provides the estimation and the empirical results, while section 5 concludes.

2. Concepts and Measures of Competitiveness

Previous studies have shown that the indicators and drivers of competitiveness have multidimensional construct and complex relationships. Competitiveness can be considered as “multi-faceted” in nature as a number of variables should be jointly adopted to measure it.[3] Economic literature examines competitiveness along two different levels: competitiveness of national economies (macroeconomic level) and competitiveness of firms/ industries (microeconomic level). Longman’s Advanced American Dictionary (2000) provides a useful initial definition of competitiveness as *“the ability of a company or a product to compete with others and the desire to be more successful than other people”*.[4] Literally, the term describes the ability of firms and industries to stay competitive which, in turn, reflects their ability to improve or protect their position in relation to competitors which are active in the same market. Therefore competitiveness of a firm can be taken as its ability to do better than comparable firms in sales, market shares, or profitability (Lall, 2001). Cook and Bredahl (1991, pp.1472 – 1473) argue that competitiveness can be viewed from a choice of geographic area, product or time. Beck (1990), states that competitiveness can be interpreted as the ability of firms to cope with structural change.

Being in line with the above strands of research we focus on the firm level of the term competitiveness. It is after all firms which compete with one another in the market place. Economy-wide conditions such as business-friendly economic policies, productivity and high levels of education might have profound impact on the competitiveness of firms. As competitive we can call the firm which can produce services or products of superior quality and lower costs than its domestic and international competitors. Competitiveness is synonymous with a firm's long-run *profit performance* and its ability to compensate its employees and provide superior returns to its owners (Buckley et al. 1988, p.176). In the context of the above, we measure a firm's competitiveness by it' s financial performance. When profitable opportunities exist, firms increase their production and sales. Thus, the existence of a good financial performance suggests a firm or industry with increasing competitiveness just as a bad financial performance suggests a firm or industry with falling competitiveness.

Various financial performance measures are often used for measuring the competitiveness of firms. For example *return on sales* reveals how much a company earns in relation to its sales, *return on assets* determines an organization's ability to make use of its assets and *return on equity* reveals what return investors take for their investments. The advantages of financial performance measures are the easiness of calculation and that definitions are agreed worldwide. Traditionally, the success of a manufacturing system or company has been evaluated by the use of financial measures (Tangen, 2003). Table 1 presents an overview of the reviewed measures of financial performance.

<< Insert Table 1 here >>

Although financial indicators are the most widely used indicators of competitiveness, several non-financial performance proxies are also important. Examples of non-financial performance indicators are the market share of a firm, the market share growth and the overall customer satisfaction.

3. Data and Methodology

The purpose of this paper is to identify the factors which affect firm competitiveness in Greece. We use data for firms listed on the Athens Stock Exchange during the period 1997-2004. Firms are assigned to an industry group if more than 60% of their annual sales are from activities within that industry, provided the database used. Our initial sample consisted of 150 firms, rated above average, as far as their creditworthiness index is concerned. This is an index directly related to economic performance, it is generally accepted and it is drown from the ICAP Hellas data base. The selected firms operated in distressed industries. A distressed industry is defined according to the same index of creditworthiness derived from the ICAP data base. The following firms were excluded from the sample:

- Firms belonging to industries with too few firms listed at the stock market (less than four firms).
- Firms involved in different activities as they could not be assigned to a particular industry.
- Banks, other financial institutions, and insurance companies, because of their special financial structure.

- Investment companies, because their incomes mainly results from the value of their holding portfolios. This value depends on the financial structure and business conditions of the firms whose stocks are included in the portfolio rather than the financial structure of the investment companies.
- Also some firms were excluded from the sample due to events such as bankruptcy or takeover.

The resulting sample for the eight year period 1997-2004 consisted of 102 firms in 15 industries.

<< Insert Table 2 here >>

We collected data for each firm from two sources. First, from the ICAP Hellas data base and second on the basis of a questionnaire. Furthermore, we validated questionnaires' financial data and export activity of firms from the ICAP Hellas data base and the "Greek Export directory 2004-2005" respectively.

Information was compiled on the following areas:

- Financial data of the firm
- Level of education of the management team members
- Shareholding percentage of the management team members
- Existence of innovation in the firm
- Average years of experience of the management team members
- Average age of the management team members
- Number of employees
- Number of employees having tertiary education
- Location of the firm

- Age of firm
- Export activity of the firm

It appeared that these 102 firms have management teams who fulfill at least three out of five criteria that are described below:

- The average age bracket of the management team is 50-60 years old.
- Most of the management team's members hold a university degree in finance or in engineering.
- The management team holds on average 34% of the company's shares.
- The management team implements innovation practices. Innovation, according to Schumpeter (1934) and other more recent researchers (Lumpkin and Dess, 1996; West & Farr, 1990), refers to the introduction of a new product or a new technique in production or a new market or a new organization structure in the firm. If any of the above has taken place within the last four years the management team is an innovator.
- The average number of experience of the members of the management team is twenty years.

We use three measures to evaluate the financial performance and, therefore, the competitiveness of a firm [5]: (a) Return on sales (ROS) or profit margin: ROS reveals how much a company earns in relation to its sales. These measures determine the company's ability to withstand competition and adverse rising costs, falling prices or declining sales in the future. (b) Return on assets (ROA): ROA is one of the most widely used financial models for performance measurements and it was developed by Dupont in 1919. ROA determines a firm's ability to make use of its assets. (c) Return

on equity (ROE): ROE measures what return investors (i.e. stockholders) are getting for their investments in the firm. In other words it tells how well the company is doing for the investor (Tangen, 2003).

We use three empirical models, one for each depended variable of the firm's competitiveness.

Based on the previous theoretical framework, we make the hypothesis that the following independent variables might affect significantly the firms' competitiveness:

1) *Leverage*: It is measured by the ratio of total debt to equity (debt/equity ratio). It shows the degree to which a business is utilizing borrowed money. Companies that are highly leveraged may be at risk of bankruptcy if they are unable to make payments on their debt; they may also be unable to find new lenders in the future. Leverage is not always bad, however; it can increase the shareholders' return on their investment and make good use of the tax advantages associated with borrowing.
2) *Ratio of Fixed Assets to Total Assets*: It measures the extent to which fixed assets are financed with owners' equity capital. A high ratio indicates an inefficient use of working capital which reduces the firm's ability to carry accounts receivable and maintain inventory and usually means a low cash reserve. This may often limit the ability of the firm to respond to increased demand for products or services. So we expect that this rate is negatively related to firm performance.
3) *Liquidity***:** It refers to the degree to which debt obligations coming due in the next 12 months can be paid from cash or assets that will be turned into cash. Measured by the current assets to current liabilities (current ratio) shows the ability to

convert an asset to cash quickly and reflects the ability of the firm to manage working capital when kept at normal levels. When liquidity is excessive the effect on financial performance is negative.

4) *Investment Ratio*: The ratio of the net investment to the total assets. Net investment refers to an activity of spending, which increases the availability of fixed capital goods or means of production. Net investment is the total spending on new fixed investment minus replacement investment, which simply replaces depreciated capital goods. This ratio helps to give a sense of how much money a company is spending on capital items used for operations (such as property, plants and equipment). Continued investment in the capital of a firm is crucial because the useful life of existing capital diminishes over time. The amount of net investment compared to such things as revenue will differ between industries and between businesses depending on how capital intensive the business is. We expect that this ratio is positively related to firm competitiveness.

5) *Size*: The total number of a company's employees is used as a measure of firm size. It is expected to correlate positively with profitability. A company's size is an important investment consideration. Firm size can affect financial performance. The size of the firm is an important factor as it influences its competitive power. Small firms have less power than large firms; hence they may find it difficult to compete with the large firms particularly in highly competitive markets. It is argued that the smaller the company, the more volatile and risky the investment.

6) *Age of the company*: measured as the number of years from the year of establishment of the firm up to 2004. It is expected to relate negatively with employment growth according to theory, but the effect on financial performance is uncertain (Agiomirgiannakis et al, 2006, p. 236). Older firms may also benefit from reputation effects, which allow them to earn a higher margin on sales. On the other hand, older firms might have developed routines which are out of touch with changes in market conditions, in which case an inverse relationship between age and profitability or growth could be observed.

7) *Location*: We test if the location of firms established in the two biggest Greek cities (Athens and Thessalonica) affects their competitiveness. Location is a dummy variable with two values, 1 for Athens and Thessalonica and 0 otherwise. We expect that firms located in Athens or Thessalonica could be better positioned (i.e. closer to their markets) to take advantage of changes in market conditions.

8) *Export performance*: It is the relative success or failure of the efforts of a firm or nation to sell domestically-produced goods and services in other nations. Exporting is a major element of international trade, and this is why it is argued constantly and consistently throughout the ages. There are two views concerning international exchange. The first, recognizes the benefits of trade. The second concerns itself with the possibility that some industries can be harmed and others can be benefited by foreign competition. We want to test if the export activity of firms affects their competitiveness. In order to find if there is such a relationship, we insert a dummy variable taking the value 1, if the firm is an exporter and 0 otherwise.

9) *Management Competence Index*: The management competence index, as a combination of financial and non-financial drivers of firm competitiveness is calculated as follows: [6]

$$management\ competence\quad index = \frac{profit}{number\ of\ \ professionals}$$

Profits are calculated before taxes for each consecutive year, between 1997-2004. As number of professionals, we keep the same number for all years (even though it is the actual figure of 2003) because we consider that there are small changes of this number over the years. If there are any changes, then these changes will have little effect to the final result of the index. According to Merikas et al. (2006, p.p. 16-17) as "professionals" we consider the personnel which fulfil two criteria:

- It processes a university degree (tertiary education)
- It is under the direct control or part of the management team.

From the above variables, the first four could be categorized as financial drivers, the next four as non-financial drivers and the last one as a combination of financial and non-financial drivers.

4. Estimation and Empirical Results

The relationship between competitive sources and performance were tested using panel regression analysis for the following reasons: First, because panel data suggests that firms are heterogenous and therefore do not run the risk of obtaining biased results. Second, because panel data gives more informative data, more

variability, less collinearity among the variables, more degrees of freedom and more efficiency. Finally, panel data are able to identify and measure effects that are simply not detectable in pure cross section or pure time-series data.

We chose the fixed effects model as an appropriate specification as we are focusing on a specific set of firms and our inference is restricted to this set of firms.[7] The panel regression model consists of three separate regressions on the same set of explanatory variables. For each performance factor, the technique of panel least squares regression was applied to estimate the multiple regression coefficients *(bj)* in an equation of the form:

$$\mathbf{Y_t\,(performance)} = b_0 + b_1 X_1(\text{lev}(-1)) + b_2 X_2(\text{lnsize}) + b_3 X_3(\text{lnage}) + b_4 X_4\,(\text{loc}) + b_5 X_5\,(\text{liquid}) + b_6 X_6\,(\text{capital}) + b_7 X_7(\text{export}) + b_8 X_8\,(\text{net\_inv}) + b_9 X_9\,(\text{lnmc\_index}) + u_t \quad (1)$$

Where $\mathbf{Y_t}$ is the measure of firm performance (ROA, ROE and ROS). "*u*" denotes a random disturbance term. The regression coefficient *(bj)* represents the expected change in the performance indicator associated with one-unit change in the z'th independent variable, i.e. competitive sources. *X_1Lev(-1), X_2 (lnsize), X_3 (lnage), X_4 (loc), X_5 (liquid), X_6 (capital), X_7 (export), X_8 (net_inv), X_9 (lnmc_index),* represent leverage, firm size, firm age, firm location, firm liquidation, firm rate of fixed to total assets, firm export activity, firm net investment ratio and firm management competence index, respectively.

We hypothesize that the described competencies, the independent variables have an influence on a firm's performance. We expected to find statistically significant support for the following hypotheses:

H1: Leverage (X_1) positively relates to performance outcome.

H2: Firm size (X_2) positively relates to performance outcome.

H3: Location (X_4) of a firm in the two biggest Greek cities positively relates to performance outcome.

H4: Export activity (X_7) positively relates to performance outcome.

H5: Net investments (X_8) positively relate to performance outcome.

H6: Management competence (X_9) positively relates to performance outcome.

Hypothesis 7, deals with the joint influence of four competencies on performance. Therefore,

H7: Management competence (X_9), Net investments (X_8), Location (X_4) and Firm size (X_2) jointly lead to positive performance outcome.

Tables 3, 4 and 5 show the estimated coefficients with their t-ratios.

<< Insert Tables 3, 4 and 5 here >>

We run three panel least squares regression, one for each dependent variable, with a time series component of 8 (eight) years, 1997-2004. The cross sectional observations were 102. The method of estimation was panel least squares and the effects specification were period fixed (dummy variables), while for the covariance matrix cross section weights (PCSE) and White cross section weights were used with no d.f correction. In all three regressions, we used the lagged value of leverage (lev(-1)), the natural logarithm of age (lnage), size (lnsize) and management index (lnmc_index). All

three dependent variables were expressed in their natural logarithm form (lnroa, lnroe, lnros), so the final estimation involved unbalanced panel data.

According to the results obtained, the panel regression models with dependent variables leverage, firm size, firm age, firm location, liquidation, fixed to total assets, firm export activity, net investment ratio and management competence index are all significant at $p<0.01$. In summary all seven hypotheses described above have been supported by the results of the statistical analysis. In more details:

An interesting result is the positive impact that an increase in the leverage of the firms has on their competitiveness when it is measured by Return on Assets (ROA) and Return on Equity (ROE). So **H1** cannot be rejected in two out of the three measures of firm competitiveness.

H2 is also supported by the results. The relationship between size and performance indicates that larger firms are more profitable, according to theory and other empirical findings (Agiomirgiannakis et al, 2006; Voulgaris et al., 2003).

H3 is also supported. As we expected, companies located in Athens or Thessalonica are benefited from their position (i.e. they are closer to their markets).

The results from the panel regression analysis show that exports positively relate to Return on Assets and Return on Sales. So we accept **H4**. [8]

H5 cannot be rejected since net investment ratio has positive influence in all three measures of competitiveness. It is very significant ($p=0.000$) for ROA and ROE but not so for ROS. This positive influence means that the amount of money a company spends on capital items used for operations (such as property, plants and equipment), which is

vital because the useful life of existing capital diminishes over time, influences positively company's performance.

It appears that management competence index is significant in all three regressions and has the correct sign. So **H6** cannot be rejected. More specifically it is shown that professionals who are managed by a team which carries all the attributes we specified, influences positively the company's competitiveness.

H7 is also supported.[9] We could argue that the results are due to management competence since the management team decides for the location of the firm, for its size and its net investments. To expand this reasoning we support the view that the relationship between the dependent variables (i.e exporting activity) and the measures of financial performance are due to management competence. For example H1 (H1: Leverage (X_1) positively relates to performance outcome) is not rejected as a result of the effective management.

There are also negative relationships between examined competencies and performance. The *age* of firm is negatively related to all three measures of competitiveness. *Ratio of Fixed Assets to Total Assets (capital)* is negatively related to the measures of performance. In other words this relationship indicates that when this ratio is high there is an inefficient use of working capital which limits firm's ability to carry accounts, to maintain inventory, and to respond to an increased demand. *High liquidity* negatively influences competitiveness performance. As we can see from the Tables it is significant at 0.01 when performance is measured by ROA and ROE. In other words when the liquidity is excessive the effect on profitability is negative.

In summary, our study incorporates an analytical framework that includes a comprehensive set of links between competitiveness indicators (Yt) and drivers (Xt). The above-mentioned theoretical and empirical framework served as a basis for the development of a generic approach of firm competitiveness analysis, shown in Figure 1.

<< Insert Figure 1 here >>

Management competence index (x_9), a combination of financial and non financial drivers, is connected with indicators and co-drivers by a specific way in order to underline the unique relation between effective management and firm competitiveness factors.

We believe that the competitiveness measurement model we develop represents a useful strategic tool for firms, because it can assist them in the analysis of their financial performance. Our approach also highlights the importance for firms of management competence. Finally, it evaluates the extent to which each explanatory variable affects the dependent variable. Therefore, this approach can be used as an additional tool to understand practical problems that arise when managers consider strategies to improve firm competitiveness.

5. Concluding remarks

In our study we presented an exploratory model of sources of firm competitiveness. We tested the general hypothesis that sources of competitiveness affect firm performance. Competitiveness of firms operating in distressed industries was measured with the use of three indicators of financial performance; return on assets, return on equity and return on sales. An econometric approach allows the data to

determine the functional relationship and the impact of leverage, size, age, location, export activity, net investment and management effectiveness on economic performance, while taking into account the heterogeneity among firms. Summarizing the results, it is found that leverage, export activity, location, size and the index for management competence are significantly correlated, as expected, with the economic performance of firms. Furthermore, we argue that the relation between firm's competitiveness indicators and drivers is due to effective management.

Notes

[1] Our view is in line with that expressed by Porter, buck in 1999. According Porter, it is the competitiveness of the microeconomic units, like firms, that explains most of the variations in macroeconomic growth. He used survey data on a sample of 52 countries to measure the quality of many aspects of the microeconomic business environment and the developments of firm strategy and operations. He used factor analysis to create a Microeconomic Competitiveness Index (MICI). He investigated the relation between a nation's score on MICI and its relative GDP per capita and found a strong correlation. The results revealed that a lot of elements of the microeconomic environment move together. In the report of 1999, MICI explained 83.3% of variance in GDP across the sample. For more details see Porter (1999, p. 35).

[2] See Lall (2001) as quoted in Henricsson & Ericsson (2005)

[3] See, for example, Depperu D. and Cerrato D., (2005); Tangen S. (2003)

[4] See Longman's Advanced American Dictionary (2000), p.278

[5] As it was discussed before, the suggested variables are very common and have been used by many other researchers. See among others Hart & Ahuja (1996); Konar &Cohen (1997); Agiomirgiannakis et al (2006).

[6] This variable has been used by Merikas at al, 2006.

[7] In fact, the fixed versus random effects issue has generated a hot debate in the biometrics and statistics literature which has spilled over into the panel data econometrics literature.

[8] There is also a slightly negative but no significant (p=0.711) relation between exporting activity and Return on Equity.

[9] For each data set of these four drivers we run three more regressions (one for each dependent variable) to compute the F-statistic in order to check the following hypothesis:

$H_0 : X_9 = X_8 = X_4 = X_2 = 0,\ \ H_8 :\ X_9 \neq 0, X_8 \neq 0, X_4 \neq 0, X_2 \neq 0$

In all three regressions Prob (F-statistic) = 0.0000 < 0.01 meaning that coefficients are significant at 99% level. So we can reject H_0 in favour of H_8. The results are available upon request.

References

Agiomirgiannakis, G., Voulgaris, F. & Papadogonas, T. (2006). Financial factors affecting profitability and employment growth: the case of Greek manufacturing. Int. J. Financial Services Management, 1, 2/3, 232–242

Athens Chamber of Commerce and Industry (Eds.), (2005). Greek export directory 2004-2005

Beck, B. (1990). Die internationale Wettbewerbsfähigkeit der schweizerischen Export-industrie. Bern–Stuttgart: Haupt Verlag as quoted in Drescher K. & Maurer O. (1999). Competitiveness in the European Dairy Industries, Agribusiness,15, 2, 163–177

Becker-Blease J. R., Kaen F.R. & Baumann H., (2005). An investigation of the small firm effect using accounting measures of profitability:does it exist? Whittemore School of Business and Economics University of New Hampshire

Bobillo A.M., Rodriguez Sanz J. A. & Gaite F. T., (2006). Innovation Investment, Competitiveness, and Performance in Industrial Firms, Thunderbird International Business Review, 48, 6, 867–890

Buckley, P. J., Christopher L. P. & Kate Prescott. (1988). Measures of International Competitiveness: A Critical Survey. Journal of Marketing Management, 4, 2, 175–200

Cochran, P. L., Wood, R. A. & Jones, T. B. (1985). The composition of boards of directors and incidence of golden parachutes. Academy of Management Journal, 28, 3, 664-671

Cook, M.L. & Bredahl, M. E. (1991). Agribusiness Competitiveness in the 1990s: Discussion. American Journal of Agricultural Economics, 73, 5, 1472 –1473

Depperu D. & Cerrato D., (2005). Analyzing International Competitiveness at the Firm Level: Concepts and Measures, Quaderni del Dipartimento di Scienze Economiche e Sociali, Università Cattolica del Sacro Cuore – Piacenza, 32

Hart, S. L. & Ahuja, G. (1996). Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance, Business Strategy and the Environment, 5, 30-37

Henricsson P. & Ericsson S. (2005, July). Measuring construction industry Competitiveness: a holistic approach, (Paper presented at the Research Week International Conference, The Queensland University of Technology, Brisbane, Australia)

Kesner, I. F. (1987). Directors stock ownership and organizational performance – an investigation of fortune-500 companies, Journal of Management, 13, 3, 499-507

Klassen, R. D. & McLaughlin, C.P. (1996). The Impact of Environmental Management on Firm Performance, Management Science, 42, 8, 1199-214

Konar, S. & Cohen, M. A. (1997). Does the Market Value Environmental Performance?, Vanderbilt University, Nashville: Owen Graduate School of Management

Lall, S. (2001). Competitiveness, technology and skills, (Cheltenham, UK: Edward Elgar Publishing)

Longman Advanced American Dictionary (2000). (Essex: Pearson Education Limited)

Lumpkin, G. T. & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. Academy of Management Review, 21, 1, 135-172

Mallette, P. & Fowler, K. L. (1992). Effects of board composition and stock ownership on the adoption of poison pills Academy of Management Journal, 35, 5, 1010- 1035

Merikas A.G., Merika A.A & Skandalis K. S. (2006, June), An effective index of management competence (Paper presented at the 15th Annual Conference of European Financial Management Association-EFMA, Madrid)

Porter M. E., (1999). Microeconomic competitiveness: Findings from the 1999 Executive Survey., (Geneva: World Economic Forum, Global Competitiveness Report)

Schumpeter A. (1934). The Theory of Economic Development, (Cambridge MA: Harvard University Press)

Tangen S. (2003). An overview of frequently used performance measures, International Journal of Productivity and Performance Management, 52, 7, 347-354

Thomas, A. & Tonks, I (1999, July). Corporate Environmental Policy and Abnormal Stock Price Returns: An Empirical Investigation. (Paper presented in the 1999 Eco-Management and Auditing Conference, Leeds)

Voulgaris, F., Papadogonas, T. & Agiomirgiannakis, G. (2003, May). Job creation and job destruction in Greek manufacturing, (Paper presented at the 2nd Annual Meeting of the EEFS European Integration and Financial Aspects, Bologna)

West, M. A., & Farr, J. L. (1990). Innovation and Creativity at Work: Psychological and Organizational Strategies, (Chichester: John Wiley & Sons)

Table 1. Measures of financial performance

Study	Financial performance measures
Cochran,Wood and Jones,1985	Return on assets (ROA), Return on Equity (ROE), Net profit margin, Firm's assets
Kesner,1987	ROA, ROE and lagged total returns to investors
Mallette and Fowler,1992	ROE
Opler & Titman, 1994	Growth in sales, Growth in profitability and stock returns
Klassen & McLaughlin,1996	Stock market returns
Hart & Ahuja,1996	Return on sales (ROS), ROA, ROE
Konar & Cohen,1997	ROA, ROE
Thomas & Tonks,1999	Monthly excess stock market returns over the risk free rate.
Becker-Blease et al., 2005	EBITDA margin, EBIT margin, EBITDA as a percent of total assets, EBIT to total assets.
Merikas et al., 2006	Sales growth, Growth in profitability, Stock returns annual percentage change
Agiomirgiannakis et al., 2006	ROA
Bobillo et al., 2006	Sales, Net profit margin

Table 2. Firms by Industry

INDUSTRY	No. OF FIRMS
Construction	13
Printing-publishing	6
Computers	7
Transport	3
Retailing	6
Food and drink	16
Basic metals	10
Elastics& plastics	5
Non-metallic ore &cement	5
Clothing	2
Machines-equipment	3
Metallic products	2
Refineries	1
Private hospitals	1
Wholesaling	22
Total number of Firms	**102**

Table 3. Determinants of Return on Assets

LnROA			
	Coefficient	**t-Statistic**	
Lev(-1)	0.028 ***	3.387	
Lnsize	0.053 ***	3.557	
Lnage	-0.076 **	-1.856	
Loc	0.277 ***	8.559	
Liquid	-0.117 ***	-6.418	
Capital	-2.03 ***	-10.784	
Export	0.367 ***	13.393	**R-squared:** 0.452
Net_inv	1.111 ***	7.902	**F-statistic :** 37.612
Lnmcindex	0.12 ***	9.009	**Prob(F-statistic):** 0.000

Table 4. Determinants of Return on Equity

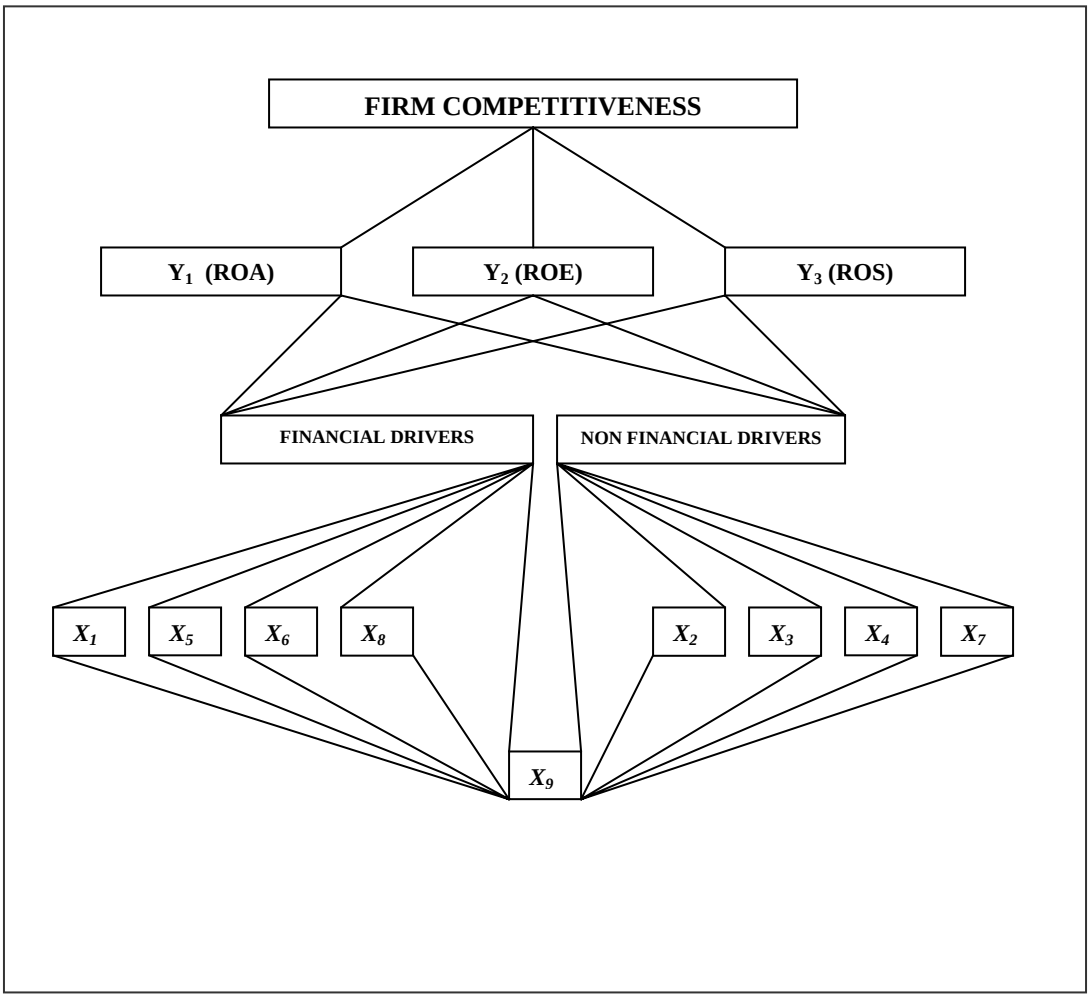
LnROE			
	Coefficient	**t-Statistic**	
Lev(-1)	0.053 ***	3.059	
Lnsize	0.168 ***	16.339	
Lnage	-0.232 ***	-3.986	
Loc	0.176 ***	4.122	
Liquid	-0.141 ***	-8.672	
Capital	-1.817 ***	-16.749	
Export	-0.008	-0.37	**R-squared:** 0.639
Net_inv	0.657 ***	4.505	**F-statistic :** 81.470
Lnmcindex	0.488 ***	11.956	**Prob(F-statistic):** 0.000

Table 5. Determinants of Return on Sales

LnROS			
	Coefficient	**t-Statistic**	
Lev(-1)	-0.043 **	-2.256	
Lnsize	0.009	0.438	
Lnage	-0.257 ***	-5.975	
Loc	0.212 ***	3.884	
Liquid	-0.005	-0.336	
Capital	0.015	0.1	
Export	0.115 **	2.221	**R-squared:** 0.309
net_inv	0.083	0.515	**F-statistic :** 20.336
Lnmcindex	0.077 ***	4.532	**Prob(F-statistic):** 0.000

* Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level

Figure 1. A Generic Approach of Firm Competitiveness



Institutional Changes and Trend Behaviour of the European FDI inflows

Smaragdi Irini

Katrakilidis Konsatntinos
Department of Economics
Aristotle University of Thessaloniki

Varsakelis Nikolaos
Department of Economics
Aristotle University of Thessaloniki

Abstract

This paper investigates whether major economic and institutional changes in Europe, such as *Internal Market Program and European Monetary Union*, have caused significant impacts and changed the behavior of FDI inflows in twelve members of the European Union, from USA and Japan. The empirical methodology employs the Lee and Strazicich (1999, 2004) approach, LM unit-root test, for one and two structural breaks. The results provide evidence that FDI inflows are stationary series with one or two structural breaks that coincide with IMP and EMU inauguration dates.

Keywords: Stationarity, FDI inflows, structural changes, European Union

1. Introduction

In 1986, in Luxemburg and Hague, was signed an action plan, the *Internal Market Program (IMP) or "Single European Act (SEA)"*. The goal of this act was to remove remaining barriers between countries, increase harmonization, thus increasing the competitiveness of European countries. A second major event took place in Maastricht in 1992 when "*The Treaty of European Union (TEU)"* was signed. It led to the creation of the European Union and was the result of separate negotiations on monetary and on political union. From 1st January 1999 euro became the official currency in the eleven participating countries. The SEA and the TEU caused a reaction, called "Fortress Europe". This is the term that was given to the concept of the EU members' efforts to keep non EU- goods and businesses out of the Union's member- states in order to be pretected from the impact of globalization.

These changes, in combination with the enlargement that has been achieved, gave an impetus and motivations to the EU and non-EU multinational companies to increase trade and investment. Foreign Direct Investment (FDI) inflows to the EU experienced an impressive growth in the second half of 1980s and 1990s. Although with considerable time lag, many and especially US and Japanese transnational corporations, in response to the EC -92 program, sought to position themselves strategically in the EU. The three members of the Triad (USA, Japan, EU) were the protagonists in the flow of international investment (Pournarakis Efthimios and Nikos Varsakelis, 1997). This surge of investment could, also, be a temporary phenomenon, triggered and sustained by the "Fortress Europe" syndrome.

An examination of the Foreign Direct Investment data, from USA and Japan, for the period 1980-2000 reveals that FDI inflows in European countries rose significantly (Tables 4and 5 figures 1 and 2). Actually, there has been an increase in the total FDI inflows in 1989 and in 1999, few years before the market integration and before the monetary union. More specifically for the period 1985- 1989, the growth rates of flows from USA and Japan towards EU became 23.4% and 46% respectively (UNCTC, World Investment Directory, 1991).

In the case of the United States, the transnationals have already had a strong presence in the EU since 1960s. This can explain the relative low rates of FDI inflows in the late 1980s and 1990s (Table 5. However, the US inward foreign direct investment in the EU was positively influenced by the developments that led to the EC – 92 program. US multinationals enjoyed a competitive advantage compared to their Japanese and European competitors, since they were in a position to capitalize on their experience and make the most of the advantage of market union to address the benefits of competition from the national level to the European level. This competitive advantage constitutes a major factor in the formation of their globalization strategies during the 1990s. On the other hand, Japan's importance as a source of FDI outflows has increased dramatically in the 80's with an impressive acceleration rate (table 4during the period 1985- 1990 and Japan became the most important overseas investor. This represents a new strategy being adopted by Japanese multinationals to become regional insiders in the Triad. Over the previous decades Japan relied mainly on exports from Japan to USA and European economies. After 1989, Japanese investment inflows in EU-12 followed the general trend of decline in world FDI flows (Table 4.

Such structure-wise changes in Foreign Direct Investment strategies have been in the centre of new developments in international economic relations and are depicted by the shifting of FDI flows towards EU. These changes in the behavior of FDI can be further studied through the investigation of the integration properties of FDI inflows and the dates, in which they occurred.

More specifically, following the above, this study attempts to address the following issues:

- To investigate whether Foreign Direct Investment inflows could be characterized as a unit root (non- stationary) process or as a trend stationary process with shifts in the level and /or slope in a deterministic trend. In case the results suggest stationarity about a broken trend, there are important implications for de-trending the data series and modeling co- movements between foreign direct investments and other related economic variables. It is known that the existence of a possible unit root in the considered variable may induce the problem of spurious regression and this may lead to misleading inferences when research efforts focus on economic modeling and forecasting in the framework of cointegration analysis and Granger causality.
- To detect possible structural breaks and identify the break dates with major economic and institutional events in order to evaluate their importance for the FDI inflows in EU.
- To identify if the effect of such major changes could be considered to have resulted either simply jumps in the level or changes in the growth path of the FDI inflows or perhaps both of the above.

In the context of empirical analysis, we employ a LM-type test that allows testing the unit root hypothesis in the presence of one or two endogenously determined structural breaks in the intercept and/ or the slope. Namely we use the LM unit root test proposed by Lee and Strazicich (1999, 2004).

The paper is organized as follows: The second section of the paper introduces the theoretical framework of our analysis based on international literature. In section 2 we present the methodology, while in section 4 the data and the empirical results are reported. Section 6 discuss the findings concludes.

2. Theoretical Issues

Regional economic integration significantly changes the international business environment. It accelerates the free movement of capital, goods, services and labor, the internalization of the production and role of multinational companies (MNEs). Unifying Europe, with these characteristics, was the endmost objective of the European Community by its foundation. Tariffs and quotas were abolished, the intra European technical barriers were removed and a common external tariff on imports from third countries introduced (Mark I integration[1]). In 1985, the Internal Market Program (IMP) or EC-92 Program was initiated by the European Commission with the intention to abolish the remaining non-tariff barriers on trade between the countries members by 1992.

The EC- 92 program eliminated all non-tariff barriers and increased competition and productivity in national and European markets. Thus, European economic integration is expected to harmonize the conditions of production and lower the cost of intra- EU trade. This process will encourage European- based firms to exploit intra- regional product and process specialization (Dunning, 1997), exploit economies of scale, decrease the price levels and costs and generate growth (UNCTC, 1990). Baldwin (1989) showed that the one-time efficiency gained from EC-1992 program will be multiplied into a medium-run growth bonus because of its dynamic effects

[1] It has been often referred to this period that began in 1957 and extended until the mid- 19080s as Mark I integration. The 1992 Program is often known as Mark II integration and is reckoned from 1985 onwards.

such as more innovation, faster productivity gains, greater investment and higher output growth. The theory on economic integration is based on the study of Balassa (1961). It is originally developed from traditional trade theory, which assumes perfect competition and whose main concern is the location of production of goods. (Imbriani & Reganati, 1994).

In order to understand how economic integration may exert an impact on transnational activities and FDI, it is necessary to understand the underlying forces affecting the decisions of multinational firms.

The theoretical framework developed by the literature on FDI can be divided into two categories, the *theory of multinationals* and the *new trade theory*.
In the first one, it is widely accepted notion that in order a firm to invest overseas it must possess firm- specific advantages over its competitors. Such advantages are mainly by economies of scale or superior production technology (Hymer, 1976). At the same time Buckley and Cason (1985) observed that when multinationals decide to serve foreign markets, there must be an "internalization" advantage over other alternative modes of business. Dunning (1998) argued that the mechanism by which such an increase occurred can be described by the OLI paradigm. The OLI paradigm is based on the hypothesis that a firm will engage in foreign- value activities if and where three conditions are satisfied. These are the firm specific Ownership advantages of foreign relative to domestic investors, the Locational advantages of particular host countries and the Internalization advantages of FDI as compared with alternative means of serving foreign markets.

According to *new trade theory*, trade and gains from trade arise independently of any pattern of comparative advantage because firms achieve scale economies and pursue strategies of product differentiation, relying in the assumption of perfect competition (Markusen, 1995).

The decisions of multinationals to invest abroad is theoretically and traditionally related to a number of variables such as the market size and growth (Buckley and Casson, 1981), the natural resources, distance and proximity of the host country. Also, labor costs and labor skills, agglomeration effects, policy towards foreign investors, exchange rate variability and infrastructure are some of the main determinants of foreign investments (Pournarakis and Varsakelis, 1997, Pain and Barrel, 1999).

After underlying the effects of IMP and the forces that affect the MNEs decisions, it is necessary to proceed to their potential interactions. Yannopoulos (1990a,b) proposed the combination of the framework of the OLI paradigm with the theory of international integration. He distinguished four types of investment reactions by multinational firms identifying the static and dynamic effects of economic integration with the possible strategic responses of multinationals which intend to expand their production internationally:

- A defensive import-substituting investment result from locational advantages generated by tariff elimination and represents a firm's response to maintain its market share.
- Offensive import-substituting investment seeks to take advantage of the opening up of the markets.
- Reorganisation investment refers to the increase of intra EU-FDI trade and FDI flows as a consequence of the advantageous cost conditions in the unified European market.
- And Rationalised investment and refers to investment undertaken in order to take advantage of the effect of improved efficiency.

Dunning (1997b) argued that, in the framework of the FDI traditional determinants, the IMP could be responsible for shifts in the parameters of the variables. He set four hypotheses regarding the effects of IMP on FDI.
First, the EC- 1992 program has a positive effect on inward FDI. Rugman and Verbeke (1985) expected that non- EU companies will establish themselves in the EU before 1992 in order to avoid potential barriers to entry and forced to change their strategies. Norman (1995) observed that the improved market accessibility is increasingly encouraging companies to adopt a pan-European view. He, also, noted that US, EU, as well as Japanese multinationals can be characterized by similar observations. Pain and Lansbury (1997) claimed that the initial stage of liberalization could cause a rise in investment flows, as firms move in order to make use of the new opportunities.

Second, IMP will have ambivalent effect on the geographic distribution of FDI within EU (Dunning, 1997b). Clegg (1996) investigating the effects of European economic integration of US FDI points out that demand conditions determine the location of production because the large size of the market leads to the reduction of transaction cost. According to Venables (1996, 1998), economic integration leads to a process of agglomeration of industries, because firms are likely to locate close to each other. This, subsequently, leads to regional specialization of economic activities.
On the contrary, Culem (1988) claimed that EU market size did not attract US inward FDI.

Third, IMP will have an ambivalent effect on foreign ownership of activities in the EU. It is likely to observe an increase in investments in sectors where firm level economies of scale dominate the plant level economies of scale. In those sectors, IMP is likely to enable multinationals to spread better the extra- plant fixed costs and reduce the costs of co-ordinating foreign production. This is in line with the prediction of Brainard (1993a).

The last hypothesis, considers the fact that some sectors are likely to be affected more by the IMP than others. Therefore, the effects of the IMP on trade and FDI are, to some extent, sector-specific. Similar conclusions can be found in other studies investigating the effects of European integration on FDI, such as in the articles by Pain and Lansbury (1997), by Yannopoulos (1990 a, b) and by Young et al. (1991). In the last one is underlined that it is important to distinguish between first-comers and later- comers (Japanese).

Dunning and Robson (1987) studied the interaction between transnationals and regional integration concluding in four issues: the impact of the integration on the rate of inflow of FDI and on the location of FDI within the region, the validity of the orthodox integration analysis in presence of multinational enterprises and the policy implications of multinational firms in regional grouping.

The role of wages, the difference in tax regimes that followed the IMP, the improvement of communications and transportation brought countries closer and were considered important factors, regarding the effects of the IMP on FDI. Also, the development of the financial markets and the exchange liberalization, during 1980s, increased predictability and enhanced investor confidence (Culem, 1988).

Similar views about the motivation behind increased FDI inflows in the EU have been empirically investigated by other researchers, but due to lack of availability of long- range data their attempts were limited to only few countries (Yannopoulos (1990), Eden (1994) and Vernon (1994)). Neven & Siotis (1996) found evidence of significant FDI inflows in EU in anticipation

of a barriers- free Europe. Buigues & Jacquemin (1994) concluded that non-tariff barriers were a significant determinant for Japanese FDI inflows, but a minor one for US FDI in EU. More generally, Balaubramanyam & Greenaway(1992, 1993) and Yamada & Yamada (1996) examined the impact of European integration and pointed out that Japanese FDI inflows into EU have been positively influenced by the EC- 92 program.

It is clear from a comprehensive review of the academic literature that the economic integration tends to increase FDI within and into the European region. However, the effects of regional integration on FDI as a result of the Internal Market Program (IMP) are likely to vary significantly according to different home and host countries, industrial sectors and types of FDI. Thus, the examination of the change in the parameters of FDI inflows, that may have been caused by the IMP is a matter of great importance. Consequently, we impose the following hypothesis:

H_1 : "Is the IMP a reason for shifts in the parameters (one or two structural breaks) of the Foreign Direct Investment inflows from USA and Japan the period before the implementation of 1992 Program?".

European Monetary Union (EMU) constitutes a major institutional change of the world economy. One of the main objectives of it was to encourage cross-border investment in the EU economies, by removing the exchange-rate uncertainty that was believed to discourage such investment (Commission, 1990,ch. 1). The designers of the EMU expected that the single currency would be a powerful motivation to cross- border investment and also hoped that, the creation of a strong single currency would encourage extra-EU investments (Commission, 1990, ch. 7). The main aims of monetary union are to avoid limitations and government interventions in the area, to reduce fluctuations and to increase national income (Balassa, 1961).

Two of most attractive and reassuring implications of EMU is economic stability and the continuous improvement of business environment by reducing the exchange rate risk macroeconomic uncertainty. On the other hand, one of the disadvantages of EMU is the reduction of the flexibility of the countries – members, which leads to the elimination of the incentives each country offered and the fiscal tightening among them.

Monetary integration affects FDI decision through different channels. First, EMU reduces macroeconomic instability, even with the cost of the loss of a policy instrument (Lane, 2006). The European Central Bank (ECB), established in 1999, has successfully minimized inflation and may better responds to shocks than non-coordinated monetary policies. Second, the EMU may, also, help to avoid destabilizing speculation, increase transparency and reliability of rules and policies. These effects are important since uncertainty about future returns may discourage investments (Dixit and Pyndick, 1994).
Eliminating intra – EU exchange rate volatility, monetary integration increases the certainty value of expected profits of risk adverse firms, promotes intra-EU FDI, reduces trade costs and favours vertical FDI. This means that firms can split their production and locate their activities in different countries according to international differences in factor prices or other locational advantages. If it is the case of horizontal FDI, the removal of exchange rate volatility may decrease FDI and increase trade flows as a substitute. Furthermore, since FDI stands for tariff-jumping and the threat of protectionism rises with a stronger currency, the indication of the euro as new currency in the world economy constitutes an important element to evaluate the effect of monetary union on FDI in Europe.

Finally, a single currency could encourage intra-EU FDI by facilitating comparison of international costs and by reducing transaction costs, such as currency change costs and domestic costs of maintaining foreign currency knowledge.

The literature on this subject is, however, still quite scarce and focuses mainly on the exchange rate mechanism within the European Monetary System. Molle and Morsink (1991b) examined the effect of Monetary Union on FDI and concluded that exchange rate risk discourages FDI. Thus, EMU by reducing the variability of exchange rate is expected to increase the FDI flows. In similar conclusion reach Aizenman (1992) and Goldberg and Kolstad (1995) arguing that fixed exchange rates regime is more conductive to FDI than the flexible exchange rate. Froot and Stein (1991) and Klein and Rosengreen (1992) tried to explain the importance of exchange rate and wealth for foreign direct investment, respectively. Both articles concluded that a weaker real exchange rate leads to an increase in the inflow of FDI and, on the contrary, a stronger real exchange rate reduces FDI inflows.
According to the study of OECD (1992), investors are attracted by the prospect of a large unified market, with stable exchange rate, monetary discipline and lower costs.
José de Sousa and Julie Lochard (2006) indicated that EMU affects positively the decision of euro members to invest inside the euro-zone. Other recent empirical studies document a positive effect of EMU on trade (Micco et al., 2003).

Concluding the previous discussion, monetary union tends to increase FDI within and into the European region. Thus, the examination of the change in the parameters o FDI inflows that may have been caused by the EMU is a matter of great importance. Consequently, we impose the following hypothesis:

H_2: *"Is the EMU a reason for shifts in the parameters (one or two structural breaks) of the Foreign Direct Investment inflows from USA and Japan the period before the implementation of the single currency?"*

3. Methodological Issues

To investigate if the integration properties and previous major shocks have permanently or transitorily effects on FDI inflows towards EU, an advanced and contemporary test is performed. Actually, the null hypothesis of one or more unit roots and the existence of possible structural breaks are tested. Rejection of a unit root supports the alternative of a stationary series in which shock effects are temporary and endogenously generated.
Following a shock, a stationary series reverts to its trend or mean. Contrary to this, following a shock a non-stationary series has no tendency to revert to its trend or mean.

The importance of allowing for structural breaks in unit root tests is well documented in the literature. Whereas Perron (1989) assumed that the break point was exogenously given, following literature has allowed for the break point to be determined from the data.

Perron's approach identified three models to account for possible structural breaks either in the level of the trend function, or in the slope, or in both the trend level and the slope of the examined series.
The three models of structural change that are considered are the following:

- Model A, which is known as "Crash model" and allows for a one time change in intercept under the alternative hypothesis.

- Model B, which is known as “Changing growth” and allows for a change in trend slope under the alternative hypothesis.
- Model C , which is known as “Growth path” and allows for a shift in intercept and change in trend slope under the alternative hypothesis.

Perron (1989) noted a potential loss of power when using conventional unit root tests in the presence of structural break(s). He showed that failure to allow for an existing structural break reduces the ability to reject a false unit root. To counter this loss of power, Perron proposed including dummy variables that allow for one known structural break in the unit root test. Zivot and Andrews (1992) suggested adopting a minimum statistic that determines the break point where the unit root t- test statistic is minimized. Zivot & Andrews (1992) and Perron (1997), among others, proposed unit root tests that allow for a structural break to be determined “endogenously” from the data. Lumsdaine and Papell (1997) extended the Zivot & Andrews one-break test for two breaks.

The most important issue regarding these endogenous break unit root tests is that they omit the possibility of a unit root with break. If a break exists under the unit root null two undesirable results can follow. First, the tests will exhibit size distortions such that the unit root null hypothesis is rejected too often and second, the break is incorrectly estimated.

Lee and Strazicich noted the problems on these tests and proposed an alternative approach for one and two- break unit root test.

Lee and Strazicich (1999b) performed simulations and found that the one-break Zivot & Andrews tests, as well as, the two breaks Lumsdaine and Papell test are subject to the same spurious rejections in the presence of any break(s) under the null. Also, these tests most often select the break point where bias is maximized.

To avoid the possibility of spurious rejection, in this research, we employed the one and two break(s) LM unit root test proposed by Lee and Strazicich (1999b) using the two models for structural break proposed by Perron, namely model A and model C. These tests have the property that their test statistics are unaffected by whether or not there is a break under the null. Therefore, results using these LM tests are more reliable, since the rejection of the null is not spurious.
The methodology of the minimum LM tests can be summarized as follows[2].

<u>One break test</u>

According to the LM principle, unit root test statistic is obtained from the following regression :

$$\mathbf{\Delta y_t = \delta' \Delta Z_t + \varphi S_{t-1} + \varepsilon_t} \qquad \mathbf{(1)}$$

where Δ is the difference operator, δ are the coefficients from the regression of Δy_t on ΔZ_t , $S_t = y_t - \psi_\chi - Z_t \delta$ is the detrended series, t= 1,2,,T, ψ_χ is the restricted MLE of ψ_χ,where $\psi_\chi=\psi+X_0$ given by $y_1–Z_1 \delta$,ε_t is the contemporaneous error term and is assumed to be independent and identically distributed with zero mean and finite variance (i.i.d., $N(0, \sigma^2)$).

[2] See Lee & Strazicich (1999, 1999b) for amore detailed discussion of the one and two break minimum LM unit root test.

ΔZ_t is described by [1, B_t] in model A and [1, B_t , D_t] in model C, where $B_t = \Delta D_t$ and $D_t = \Delta DT_t$. Thus, B_t and D_t correspond to a change in intercept and trend under the alternative and to a one period jump (permanent) change in drift under the null hypothesis, respectively. The unit root null hypothesis is described by $\varphi = 0$ and the LM t-test statistic is given by:

τ = t-statistic testing the null hypothesis $\varphi = 0$

ΔS_{t-j} j=1,2,…,k is included in order to correct for possible serial correlation in equation (1), as in the standard ADF test.
The location of the break (T_B) is determined by searching all possible break points for the minimum (the most negative) unit root test statistic as follows :

$$Ln\, f\,\tau(\lambda) = lnf\,\tau(\lambda)$$

,where $\lambda = T_B / T$.

Two break test

The *two break minimum LM test* is based on the Lagrange Multiplier (LM) unit root test suggested by Schmidt and Philips (1992) and can be seen as an extension of the one break minimum LM test developed by Lee and Strazicich (1999b).

The two break minimum LM unit root test can be described as follows. According to the LM principle, a unit root test statistic can be obtained from the following regression.

$$\mathbf{\Delta y_t = \delta' \Delta Z_t + \varphi S_{t-1} + \Sigma \gamma_t \Delta S_{t-1} + \varepsilon_t} \qquad \mathbf{(3)}$$

, where Δ is the difference operator, δ are the coefficients from the regression of Δy_t on ΔZ_t , $S_t = y_t - \psi_\chi - Z_t \delta$ is the detrended series, t= 1,2,..,T, ψ_χ is the restricted MLE of ψ_χ where $\psi_\chi = \psi + X_0$ given by $y_1 - Z_1 \delta$, ε_t is the contemporaneous error term and is assumed to be independent and identically distributed with zero mean and finite variance (i.i.d., $N(0, \sigma^2)$), Z_t is a vector of exogenous variables contained in the data generating process.

The unit root null hypothesis is described in equation (3) by $\varphi = 0$ and the test statistic is a t-statistic for this null, which is defined by:

$$\mathbf{\tau = t\text{-statistic for the null hypothesis } \varphi = 0} \qquad \mathbf{(4)}$$

To endogenously determine the location of two breaks ($\lambda_j = T_{Bj} / T$, j = 1,2), Lee & Strazicich use a grid search to determine the combination of two break points where the t- statistic in (4) is at a minimum. Therefore, the critical values correspond to the location of the breaks.
The critical values of the t-statistic for 1%, 5% and 10% level of significance, over all possible break dates are calculated and tabulated by Lee Strazicich (1999b) (Table 3). If the t- statistic exceeds the associated critical value, then the null hypothesis that the FDI inflows are integrated processes without an endogenous structural break is rejected in favor of the alternative hypothesis that FDI inflows are trend stationary with one or two endogenous breaks at one or two distinct unknown dates. The estimated break dates are the values of T_B for which the absolute value of the t- statistic for a is minimized.

To implement this test, Lee & Strazicich first determined the number of augmentation terms ΔS_{t-j} j=1,2,…,k, to correct for possible serial correlation in equation (3).

This paper uses the one and two break minimum LM test to endogenously determine one or two structural breaks in the FDI inflows. It also, tests for a unit root. The minimum LM test is free of problems such as spurious regression and bias relating to break point estimation, and is invariant to both the magnitude and location of the break. The FDI inflows are tested in 12 countries – members of European Union.

4. Data and Empirical results

Data

The data employed in the empirical analysis include annual FDI inflows from USA and Japan into twelve countries- members that entered the European Union until 1986 and cover the period until 2005.
More specifically, the data sample includes the FDI inflows from Japan and USA towards Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, Spain and United Kingdom (U.K.).
Data for FDI inflows from Japan comes from JETRO (Japanese Trade and Investment Statistics). Data for FDI inflows from USA comes from BEA (Bureau of economic analysis). All series are measured in billion of $.

Empirical Results

Results of testing Foreign Direct Investment inflows from USA and Japan towards 12 states of European Union are shown in Tables 1 and 2. They reveal that in most EU states the null hypothesis of a unit root is rejected.

We observe that when the one break minimum LM unit root test is applied in model A and C (table 1), the LM t-statistic is significant in 10 of 12 states of EU, regarded the Japanese inflows, and present a structural break in the period 1980- 1992, with some exceptions whose performance could be attributed to the unavailable wide range of data. The null is rejected at 10% for Belgium, Denmark, France, Greece, Ireland, Luxemburg, Portugal and Spain and for Belgium, Denmark, France, Greece, Italy, Ireland, Netherlands, Portugal, UK and Spain in models A and C, respectively.

The corresponding results, considering USA inflows, are less significant in 10% level of significance. However, they present a structural break in the period 1987- 1993. In this case a structural break is observed in the FDI flows towards Luxemburg, Netherlands and Spain in the period 1987- 2000, few years before the EMU.

In table 2 the results form the application of the two break minimum LM test are detected. Although the Min t-statistics, obtained from Model A, are not significant at 10% level for the majority of the FDI inflows in EU, either from Japan or from USA, the corresponding Min t-statistics presented in model C are significant to reject the null hypothesis of a unit root. We should notice that most of the t- statistics that test the significance of the dummies that are introduced to capture the trend's changes appear significant for Japanese FDI inflows, as well as the ones come from USA. This could constitute an implication that a larger sample of annual FDI inflows could perform better.

Examining more carefully model C (table 2), we see that Japanese inflows present structural breaks during the period 1980- 1992, apart from the investments targeting the markets of Belgium and France , which present a structural break in 2000 and in 1997, respectively. Observing USA inflows, we see that they have a common characteristic: FDI outflows from USA towards each EU country present a shift in the period 1986- 1992 and then a second one during 1993- 2001. This means that the FDI inflows from USA in EU have hanged significantly few years before the IMP and the EMU.

Consequently, the results support the alternative hypothesis for the majority of the data. Thus, FDI inflows from Japan and USA are stationary series. Following a shock, FDI inflows revert to their trends implying that shocks have transitory effects. It can be noted that FDI inflows from Japan surged during 1980s suddenly, while US affiliates have a long investment history in Europe. This may explain why the null hypothesis is more strongly rejected in the case of Japan inflows than in that of USA.

The periods 1985- 1992 and 1993- 2001 can be characterized as special due to the fact that constitute the most important epochs, since they include the years between the initiation of the Internal Market Program and the European Monetary Union until their implementations, respectively. Therefore, the concentrated structural breaks that are detected during these periods are of major importance, since they reveal that *the two major institutional changes in Europe have affected endogenously the behavior of Foreign Direct Investment inflows from the two greater world investors the last decades, USA and Japan, towards European Union. Thus, a change in the US and Japanese MNEs strategies is likely to be attributed to the institutional changes, IMP and EMU, that took place in Europe.*.

5. Discussion and Conclusions

The second half of 1980 and 1990 a big wave of foreign investments towards EU-12 was observed (tables 4 and 5). The effects of IMP and EMU, with the enlargement that has been achieved, on trade, policies, production, rules and other significant factors in the European states, as they have been developed in the theory, gave an impetus and motivations to the EU and non-EU multinational companies to increase trade and investments (Yannopoulos (1990a), Neven & Siotis (1996), Aristotelous and Fountas (1996)).

It is implied that the effects of IMP and EMU meet the most important traditional determinants of Foreign Direct Investment. The abolition of existing import tariffs and other trade costs, the likely exploitation of economies of scale, the low labor costs and the stability of exchange rates are some of the most important incentives. This changing regulatory framework in combination with the possibility of future difficulties in exporting to the region from outside the EU, due to the “Fortress Europe” syndrome, can explain the rapid growth of foreign investments stocks and flows that come from USA and Japan the second half of the two decades.

Since it is clear from the literature that the economic integration tends to increase FDI within and into the European region, the examination of the change in the parameters of FDI inflows that has been caused is a matter of great importance. Thus, we investigated the integration properties of FDI inflows from Japan and USA and the potential existence of one or more endogenously determined structural breaks(s). We tested whether Foreign Direct Investment inflows could be characterized as a unit root (non- stationary) process or as a trend stationary process with shifts in the level and /or slope in a deterministic trend. The results suggest stationary FDI inflows that

following a shock, they revert to their trends implying that shocks have transitory effects. It is essential to note that the shocks are mostly observed in the periods 1985-1992 and 1995- 2001.

Through this investigation and the derived results, we can imply that a change in the intercept of the testing model in the inflows could indicate a jump in the level of the FDI inflows due to the changing regulatory framework (e.g Germany, Italy, Portugal, Spain etc.). Furthermore, it could be considered as a kind of policy evaluation. In some EU- countries, that host FDI from USA and Japan, holds the case of a change in the slope of the trend function (e.g. Belgium, Germany, Ireland etc.). This indicates a different growth path thereafter, and could be assessed as indication of effective policy measures.

BIBLIOGRAPHY & REFERENCES

1. Aizenman Joshua, 1992, "Exchange Rate Flexibility, Volatility, and the Patterns of Domestic and Foreign Direct Investment ", NBER Working Papers No 3953.
2. Balassa, Bela, 1961, "The theory of economic Integration", Homewood, IL : Irwin Inc.
3. Balasubramanyam V. N. & David Greenway, 1992, " Economic integration and foreign direct investment : Japanese investment in the EC", *Journal of Common Market Studies*, 30 (2): 175- 193.
4. Baldwin R. E. 1989, "The growth effects of 1992", *Economic Policy* 9, 247-82. (Eds.), Handbook of International Economics, Vol. III, Elsevier Science B.V., Amsterdam 1995, 1597-1644
5. Barrell Ray, Nigel Pain. (1999). " Domestic Institutions, Agglomerations and foreign direct investment in Europe". *European Economic Review* 43:925- 934
6. BEA (Bureau of economic analysis)
7. Brainard S.L. , 1993a, " Asimple theory of multinational corporations and trade with trade – off between proximity and Concentration", *NBER Working Papers* 4269.
8. Buckley P. and Casson M., 1985, "The economic theory of multinational etnterprise", *London: Macmillan*
9. Buigues P. and Jacquemin A., 1994, "Foreign Investment and Exports to the European Community", In M. Mason and D. Encarnation (eds.). *Does Ownership Matters*. Oxford: Clarendon Press.
10. C. Katrakilidis, K. Mattas, K. Polymeros, 2005, "Structural changes and trend behavior of the European Cotton", *International Journal of Economic Research*, vol. 2, 207- 215.
11. Christopher Taylor, 2007**, "**Foreign direct investment and the euro: the first five years", *Cambridge Journal of Economics***,** doi:10.1093/cje/bel044
12. Clegg J. (1996) US Foreign Direct Investment in the EU - The Effects of Market Integration in Perspective. In F. Burton, M. Yamin and S. Young (eds.), *International Business and Europe in Transition.* New York: St. Martin Press.
13. Commission of the European Communities 1990. One market, one money, European Economy, vol. 44, October
14. Culem C. G., 1988, "The locational Determinants of Direct InvestmentsM among Industrialized Countries", *European Economic Review* 32, 885- 904.
15. Dixit, A. and R. Pindyck, 1994, Investment under uncertainty, *Princeton University Press* (NJ, Princeton).
16. Dunning John H., 19971a, "The European Internal Market Program and inbound Foreign Direct Investment ", *Journal of common market studies*, 35 (1):1-30.
17. Dunning John H., 1997b, "The European Internal Market Program and inbound Foreign Direct Investment ", *Journal of common market studies*, 35 (2):189-223.
18. Dunning, John H, Robson, Peter, 1987, "Multinational Corporate Integration and Regional Economic integration", *Journal of Common Market Studies*, Dec87, Vol. 26 Issue 2, p103, 23p.
19. Dunning. J. H. 1998. "Globalization and the new geography of foreign direct investment". *Oxford Development Studies*. 26:47- 69.
20. Fritz Breuss, 2001, " Macroeconoomic effects of EU enlargement for old and new members".
21. Froot K. A. and Stein J. C., 1991, "Exchange rates and Foreign Direct Investment: an Imperfect Capital Markets Approach", *Quarterly Journal of Economics*, 1192-217.
22. Giovanna Serge, , "European Economic and Monetary Union and Foreign Direct Investment: A survey of the theoretical and empirical literature.", http://www.econ.kuleuven.be/ces/discussionpapers/Dps00/DPS0009.pdf

23. Goldberg L. S. and Kolstad C. D., 1995, “Foreign Direct Investment. Exchange Rate Variability and Demand Uncertainty”, *International Economic Review* 30, 855-73.
24. Hymer S. H. 1976, “The International Operations of National Firms: A Study of Direct Foreign Investment” *Cambridge* (Mass.): MIT Press
25. Imbriani Cesare and Reganati F., 1994, “ International Production and economic Integration: Toward economic convergence”, *Economica Internazionale*, 47 (4): 333-349.
26. José de Sousa and Julie Lochard, 2006, “Does the single currency affect FDI ? “, University of Paris
27. JETRO (Japanese Trade and Investment Statistics)
28. Junsoo Lee, Mark C. Strazisich, 2004, “ Minimum LM Unit Root Test with one structural Break”, Department of Economics, *Appalachian State University*, *Working Papers*, No 04-17.
29. Klein M.W. and Rosengren E., 1992, “The Real Exchange Rate and Foreign Direct Investment in the United states: Relative Wealth vs. Relative Wage Effects”, *NBER Working Paper* 4192.
30. Lane, P., 2006, “The Real Effects of EMU”, *IIIS Discussion Paper*, 115.
31. Lee J. and M. Strazicich, 1999b, “Minimum Lm Unit Root Tests”, *Working Paper*, University of Central Florida.
32. Lumsdaine R., Papell D., 1997, “Multiple Trend Breaks and the Unit Root Hypothesis”, *Review of Economics and Statistics”*, LXXIX, 212- 218.
33. Markusen J. R., 1995, “The boundaries of Multinational Enterprises and the Theory on International Trade” *Journal of Economic Perspectives* 9/2, 169-89.
34. Micco, A., Stein, E. and G. Ordonez, 2003, “The Currency Union Effect on Trade: Early Evidence from EMU”, *Economic Policy 37*, 315-356.
35. Molle W. T. M. and Morsink R. L. A., 1991b “Direct investment and monetary integration”, *European Economy*. Special Edition No. 1.
36. Neven D. and G. Siotis, 1996, “ Technology sourcing and FDI in the EC : An empirical evaluation”, *International journal of industrial Organization”*, 14(5):543- 560.
37. Norman G. , 1995, “ Japanese foreign direct investment. The impact on the European Union”, In N.M. Healey (ed.), *The economics of the New Europe. From Community to Union* (pp. 223- 237). London:Routledge.
38. Pain N. and Lansbury M., 1997, “Regional Economic Integration and Foreign Direct Investment: The Case of German Investment in Europe”, *National Institute Economic Review* 160/2, 87-99.
39. Perron P. , 1989, “The Great Crash, the Oil Price Shock and the Unit Root Hypothesis”, *Econometrica 57, 1361- 1401*.
40. Perron P., 1997, “Further Evidence on Breaking Trend Functions in Macroeconomic Variables”, *Journal of Econometrics*, 355- 385.
41. Pournarakis Efthimios D. and Nikos C. Varsakelis,1997, “Foreign Direct Investment in the European Union: integrating or disintegrating effects?”
42. Pournarakis Efthimios D., 1994, “Inward FDI activity in the European Union: integrating or disintegrating effects?”, *Discussion paper series* University of Athens, Faculty of economics.
43. Rugman A. M. and Verbeke A., 1985, “Competitive Strategies for non European Firms”, In B. Bürgenmeier and J. L. Mucchielli (eds.), *Multinationals and Europe 1992* (pp.22-35). London: Routledge.
44. UNCTC, 1990, “Regional economic integration and transnational corporations in the 1990s : Europe 1992, North America and Developing countries”, New York: United Nations.

45. United Nations, “World investment Report”, 1991, 1992, 1993, 2004.
46. Venables A. J., 1996, “Localization of Industry and Trade Performance”, *Oxford Review of Economic Policy* 12/3, 52-60.
47. Venables A. J., 1998, “The Assessment: Trade and Location”, *Oxford Review of Economic Policy* 14/2, 1-6.
48. Vernon Raymond, 1994, “ Multinationals and governments:Key sectors in the NAFTA”, *Multinationals in North America*, Calgary: University of Calgary Press.
49. Yamada, Tadashi &Tetsuji Yamada, 1996, “ EC integration and Japanese foreign direct investment in the EC”, *Contemporary Economic Policy”*, 14:48-57
50. Yannopoulos G. N. 1990a, “Foreign Direct Investment and European Integration: The Evidence from the Formative Years of the European Community”, *Journal of Common Market Studies* XXVIII/3, 235-59.
51. Yannopoulos G. N. 1990b, “The Effects of the Single Market on the Pattern of Japanese Investment”, *National Institute Economic Review* 134, 93-7.
52. Zivot E. and W. K. Andrews, 1992, “Further Evidence on the Great Crash, the Oil Price Shock and the Unit Root Hypothesis”, *Journal of Business an Economic Statistics,* 10, 251- 270.

Appendix

Table 1. ONE BREAK MINIMUM LM UNIT ROOT TEST

MODEL A: FDI(t) = [S(t-1), (lags..omitted), 1, B(t)

	Lags	Min t- statistic	Date	T-statistic dummy B(t)
Japan- Belgium	0	-5.4875*	2000	1.2321
Japan- Denmark	0	-6.4766*	1980	-0.9517
Japan- France	0	-5.1359*	1985	1.5038
Japan- Germany	2	3.5001*	1989	2.6051*
Japan- Greece	0	-5.7438*	1977	1.5697
Japan- Ireland	0	-6.4855*	1990	0.6927
Japan- Italy	0	-3.0327	1988	5.5936*
Japan- Luxemburg	0	-3.2192*	1986	-1.4801
Japan- Netherlands	2	-2.7	1986	1.1999
Japan- Portugal	0	-4.1327*	1997	-2.2976*
Japan- Spain	0	-5.0808*	1981	2.1823*
Japan- U.K.	3	-2.128	1971	3.07278
USA- Belgium	0	-4.6375*	1993	-6.6331*
USA- Denmark	0	-5.7597*	1992	-2.2288*
USA- France	0	-2.6849	1992	0.999
USA- Germany	0	-2.2948	1991	0.8727
USA- Greece	0	-2.7165	1973	1.8661
USA- Ireland	0	-5.2082*	1988	-0.1918
USA- Italy	2	-3.2569	2000	-3.60658
USA- Luxemburg	0	-6.128*	1997	-0.1325
USA- Netherlands	0	-6.2611*	1993	-1.5741
USA- Portugal	0	-3.9643*	1992	-3.6244*
USA- Spain	2	-3.9087*	1998	-3.4825*
USA- U.K.	0	-3.049	2000	-1.7229

Model C: ZFDI(t) = [S(t-1), (lags..omitted), 1, B(t), D(t)]

	Lags	Min t-statistic	Date	T-statistic dummy B1(t)	T-statistic dummy B2(t)
Japan- Belgium	1	-6.621*	2000	-1.448	3.9338*
Japan- Denmark	0	-6.6326*	1985	-1.2449	1.6881
Japan- France	0	-6.3381*	1984	-0.9933	3.5001*
Japan- Germany	2	-3.6955	1987	-0.9142	2.2497*
Japan- Greece	0	-6.0591*	1998	1.8183	-1.3479
Japan- Ireland	0	-8.8905*	1990	2.6868*	-2.9609*
Japan- Italy	0	-4.3774*	1988	6.1699*	-1.3667
Japan- Luxemburg	1	-3.8962	1985	2.0666*	-2.2465*
Japan- Netherlands	0	-5.0796*	1985	3.2592*	-3.2285*

Japan- Portugal	1	-5.7948*	1985	-1.2068	3.385*
Japan- Spain	0	-6.0637*	1983	4.2889*	-1.9023
Japan- U.K.	2	-5.464*	1989	4.8436*	-5.0441*
USA- Belgium	0	-4.7066*	1993	-7.15318	-0.1728
USA- Denmark	0	-6.2475*	1991	1.852	-5.0167*
USA- France	0	-3.5487	1990	1.7494	-2.6192
USA- Germany	5	-5.1686*	1992	3.861*	-5.5816*
USA- Greece	0	-3.554	1982	-0.6387	-2.2967
USA- Ireland	2	-6.8363*	1992	3.8914*	-5.8171*
USA- Italy	2	-3.8204	1992	1.7252	-3.7403
USA- Luxemburg	0	-6.8139*	1992	1.6807	-2.4822
USA- Netherlands	0	-7.7033*	1992	1.9827	-4.2042*
USA- Portugal	2	-4.5476*	1991	1.7645	-3.2894*
USA- Spain	3	-4.4784*	1998	-2.7236*	-1.4073
USA- U.K.	0	-4.259*	1988	1.5286	-0.8531

Table 2 TWO BREAKS MINIMUM LM UNIT ROOT TEST

Model A : FDI(t) = [S(t-1), (lags..omitted), 1, B1(t), B2(t)]

	Lags	Min t- statistic	Date	Date	T-statistic dummy B1(t)	T-statistic dummy B2(t)
Japan- Belgium	0	-5.7451*	1988	2000	1.0286	1.1337
Japan- Denmark	2	-1.8154	1974	1979	0.3042	-1.6111
Japan- France	0	-5.0014	1983	1985	0.3856	1.3448
Japan- Germany	0	-2.9888	1986	1989	1.2818	2.4388
Japan- Greece	0	-5.5944*	1977	1982	1.4432	-0.9673
Japan- Ireland	2	-3.8207	1970	1992	0.3925	-3.9565
Japan- Italy	0	-3.6446	1988	1991	5.9867	-1.0559
Japan- Luxemburg	2	-1.0573	1983	1986	2.6922	-2.6451
Japan- Netherlands	2	-2.6303	1980	1986	-0.2102	1.2198
Japan- Portugal	0	-6.1523*	1986	1988	6.1061	-4.8403
Japan- Spain	0	-5.592*	1978	1981	1.3357	1.9686
Japan- U.K.	3	-1.3908	1973	1992	-1.2769	-0.2873
USA- Belgium	2	-2.2556	1993	1996	-7.5249	-2.0294
USA- Denmark	0	-6.0359*	1992	1999	-3.2357	-1.436
USA- France	0	-2.6538	1992	1998	1.0482	-0.8099
USA- Germany	1	-2.2324	1990	1993	2.4506	-13.0689
USA- Greece	0	-2.821	1982	1993	-1.2396	-5.4968
USA- Ireland	1	-2.0721	1984	1986	0.4424	0.6607
USA- Italy	2	-1.1965	1986	1993	1.529	-6.8239
USA- Luxemburg	3	-4.5062	1992	2001	1.4421	0.9466
USA- Netherlands	0	-2.035	1985	1999	0.6586	-1.2669

USA- Portugal	0	-4.2705	1987	1991	0.9906	-3.6855
USA- Spain	3	-3.4743	1985	1992	0.7669	-3.4009
USA- U.K.	0	-2.9333	1991	2000	1.3001	-1.5415

Model C : FDI(t) = [S(t-1), (lags..omitted), 1, B1(t), B2(t), D1(t), D2(t)]

	Lags	Min t-statistic	Date	Date	T-statistic dummy B1(t)	T-statistic dummy B2(t)	D1(t)	D2(t)
Japan- Belgium	2	-7.5356*	1988	2000	0.7532	-2.5623	0.7659	5.1921*
Japan- Denmark	0	-7.2821*	1985	1988	-2.4592	-1.1685	3.0998*	-1.9285
Japan- France	1	-10.6879*	1984	1997	-2.2053	-5.2637	6.5412*	6.5989*
Japan- Germany	1	-4.5381	1986	1990	-0.1909	0.7269	4.0571*	-6.7194*
Japan- Greece	1	-8.3395*	1977	1980	-2.2035	1.6921	5.5205*	-5.8504*
Japan- Ireland	3	-10.4286*	1983	1990	-4.0703	6.98	7.5495*	-9.5787*
Japan- Italy	2	-5.8788*	1987	1992	-2.1972	0.5468	5.5944*	-5.6518*
Japan- Luxemburg	2	-6.098*	1982	1987	2.8457	2.2615	3.3508*	-3.8934*
Japan- Netherlands	3	-16.0829*	1981	1988	-10.5947	6.4066	15.5716*	-16.0892*
Japan- Portugal	1	-9.8418*	1985	1989	-4.8481	1.6118	7.5322*	-6.5133*
Japan- Spain	3	-4.1689	1980	1995	-2.5466	-1.4483	3.6882*	-1.6745
Japan- U.K.	2	-5.8879*	1983	1993	-0.6468	5.2646	1.9049	-5.1528*
USA- Belgium	2	-6.1693*	1990	1994	-0.5692	2.8499	2.2197*	-3.7621*
USA- Denmark	3	-4.0333	1992	1997	-1.8118	2.6685	-0.6366	-1.4654
USA- France	2	-3.2661	1986	1993	0.0226	-15.5109	2.9046*	-1.0645
USA- Germany	0	-8.3973*	1991	1994	0.6928	0.1475	0.8076	0.7819
USA- Greece	0	-4.5197	1972	1994	-0.728	-0.7277	2.3022*	-2.3613*
USA- Ireland	3	-8.1923*	1992	1996	5.2287	-5.7452	-5.3994*	8.294*
USA- Italy	1	-4.9773	1988	1994	-0.532	1.249	2.3778*	-1.6172
USA- Luxemburg	3	-6.7686*	1998	2001	-0.0547	-3.2855	0.9575	1.188
USA- Netherlands	3	-6.3332*	1988	2001	0.3663	-0.3494	2.1566*	1.0664
USA- Portugal	3	-6.8462*	1983	1990	0.0837	3.8836	-0.2063	-6.7465*
USA- Spain	3	-5.6101*	1987	1993	-0.6344	-0.4361	2.5123*	-0.0615
USA- U.K.	0	-5.7124*	1990	1994	-0.2666	-0.4681	2.0001*	-0.0852

* Significant at 10 % .

Table 3 Critical Values of the One- break Minimum LM test

Model A

1%	5%	10%
-4.239	-3.566	-3.211

Model C

λ	1%	5%	10%
0.1	-5.825	-5.286	-4.989
0.2	-5.07	-4.47	-4.2
0.3	-5.15	-4.45	-4.18
0.4	-5.05	-4.5	-4.18
0.5	-5.11	-4.51	-4.17

Critical Values of the Two- break Minimum LM test

Model A

1%	5%	10%
-4.545	-3.842	--3.504

Model C

	.4	.6	.8
.2	-6.16, -5.59, -5,28	-6.40, -5.74, -5.32	-6.33, -5.71, -5.33
.4	-	-6.46, -5.67, -5.31	-6.42, -5,65, -5.32
.6	-	-	-6.32, -5.73, -5.32

Table 4 Total FDI inflows from Japan towards EU-12 in the period 1984- 2000

Countries/ Date	Belgium	Denmark	France	Germany	Greece	Ireland	Italy	Luxemburg	Netherlands	Portugal	Spain	U.K.	TOTAL
1984	71	1	117	245	9	1	22	315	452	0	140	318	1691.121
1985	84	1	67	172	35	81	32	300	613	0	91	375	1850.941
1986	50	1	152	210	0	72	23	1092	6651	3	86	984	9323.571
1987	70	6	330	403	0	58	59	1764	829	6	283	2,473	6280.251
1988	164	2	463	409	1	42	108	657	2359	7	161	3,956	8329.653
1989	326	24	1136	1083	0	133	314	654	4547	74	501	5,239	**14031.48**
1990	367	7	1257	1242	4	49	217	224	2744	68	320	6,806	13305.07
1991	222	6	817	1115	1	102	322	266	1,960	10	378	3,588	8786.173
1992	281	3	456	769	0	113	216	68	1,446	12	332	2,948	6644.46
1993	135	0	545	760	4	469	188	44	2,175	57	207	2,527	7110.852
1994	858	0	418	727	0	343	172	14	1,050	2	184	2,169	5937.696
1995	366	0	1619	549	0	356	123	107	1,492	4	51	3,454	8121.138
1996	89	4	503	571	0	397	109	416	1,099	5	318	3,438	6948.239
1997	88	0	1736	732	0	566	139	29	3,295	8	232	4,118	10943.07
1998	195	0	522	569	0	414	112	34	2,146	5	126	9,784	13906.74
1999	126	33	1134	652	0	576	49	38	10,387	48	534	11,718	**25295**
2000	276	0	331	320	0	49	58	142	2,764	0	33	19,176	23149.21

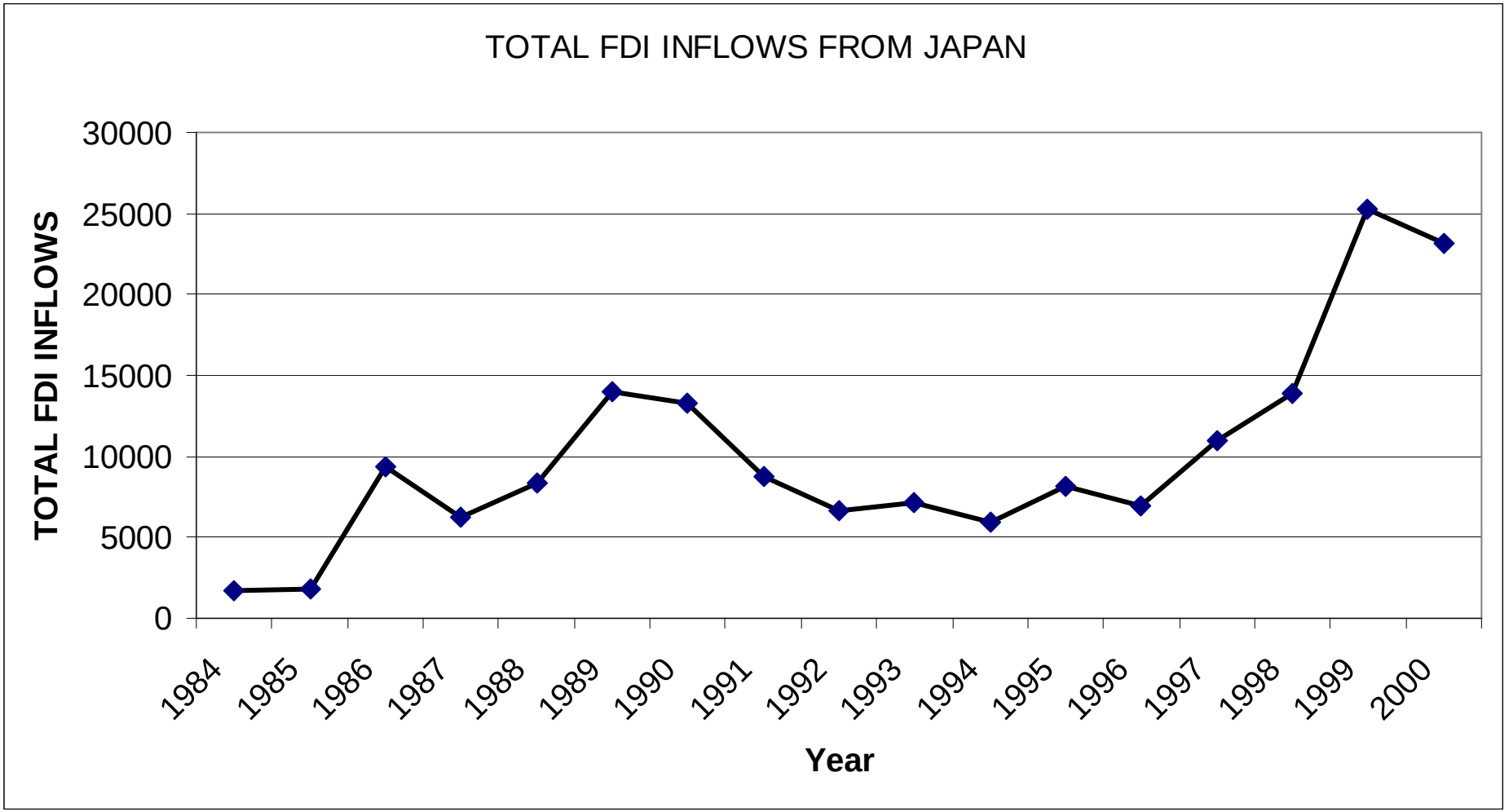


Figure 1 Total FDI inflows from Japan towards EU-12 in the period 1984- 2000

Table 5 Total FDI inflows from USA in the period 1980- 2000 towards EU-12

Year/ Country	Belgium	Denmark	France	Germany	Greece	Ireland	Italy	Luxemburg	Netherlands	Portugal	Spain	U.K.	TOTAL FDI INFLOWS FROM USA
1980	6259	1266	9347	15415	347	2319	5397	652	8039	257	2678	28460	80436
1981	6288	1377	9132	15841	346	2701	5275	655	8813	299	2876	30316	83919
1982	5549	1155	7391	15463	412	2031	4316	1098	7660	277	2350	27537	75239
1983	5087	1275	6613	15451	315	2517	4335	1240	6917	222	2331	28086	74389
1984	5202	1263	6434	15055	239	2964	4745	493	6207	210	2224	29265	74301
1985	5619	1383	7747	17176	179	3762	6137	795	7552	243	2407	34066	87066
1986	5568	1164	9323	21476	129	4412	7745	957	12203	302	2882	36974	103135
1987	7719	1120	12335	25128	164	5530	9726	874	15507	528	4334	46489	129454
1988	7839	1182	13567	22784	216	6063	10046	1122	16765	583	5220	51734	137121
1989	7710	1524	16443	23673	210	4665	11221	1560	19160	675	6500	67722	161063
1990	9464	1726	19164	27609	282	5984	14063	1697	19120	897	7868	72707	180581
1991	10611	1940	21569	32411	306	6471	15085	1734	20293	1034	8088	79819	199361
1992	11381	1676	25157	33003	372	7607	13015	2031	20700	1290	8757	85176	210165
1993	11697	1735	24312	36811	410	9019	12748	5611	20911	1264	6689	109208	**240415**
1994	2004	360	2634	2863	50	0	2646	517	7605	252	1551	9615	30097
1995	2750	0	5196	3349	0	695	2506	0	9386	137	158	13830	38007
1996	1349	454	4463	1956	92	1954	416	1041	6308	245	1183	16421	35882
1997	-46	14	2971	2464	69	2266	123	2444	12450	86	204	22961	46006
1998	932	415	4323	3051	6	7891	-910	4084	22213	-16	1821	29094	72904
1999	1431	1318	2111	5658	32	4741	3729	4535	13320	782	5689	47265	**90611**
2000	-1508	1621	1967	3811	106	9823	6404	2474	961	532	2249	28317	56757

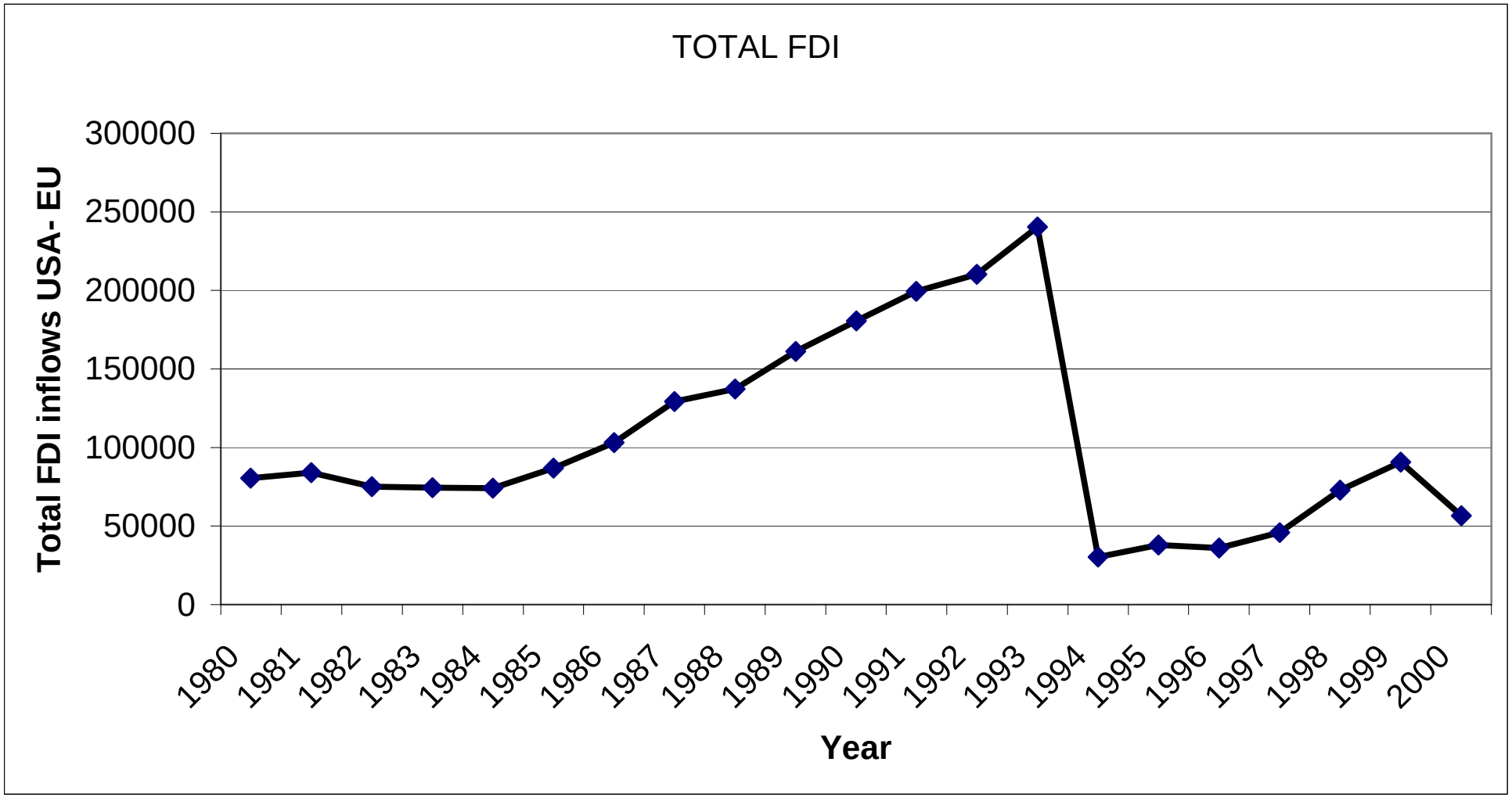


Figure 2 Total FDI inflows from USA **in the period 1980- 2000 towards EU-12**