

Analysing major determinants of European FDI into the Mediterranean countries

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Abstract

Foreign direct investment (FDI) is known as a very relevant driver of economic growth and has found increased attention in recent trade research. Existing theories differ, however, in their conclusion regarding the relation between trade in goods and FDI: they appear to be either complements or substitutes depending on assumptions of the applied theory and specific country conditions. Benefits resulting from these different relationships are relevant when evaluating the effects of existing regional trade areas as established by the Euro-Mediterranean Partnership for the individual member countries.

This paper serves as a base for in-depth empirical analyses of the connection between trade and FDI flows in the agribusiness sector in the context of the Euro-Mediterranean partnership. It contributes to the limited literature in this area by providing an overview on relevant theories and their conclusion on the relationship between trade and FDI. Determinants implied by the single theories are identified and reasonable proxies derived for the carried out econometric analysis. The empirical analysis provided in this paper is based on those determinants and reveals that FDI and trade in agricultural goods are likely to be complementary between the EU15 and the Mediterranean countries. For a better interpretation of the relevant determinants and the results received through the econometric analysis, a further analysis between the EU15 and the Mercosur countries is carried out. Finally, further research needs in this new area of trade analyses are identified for the specific case of the Euro-Mediterranean Partnership.

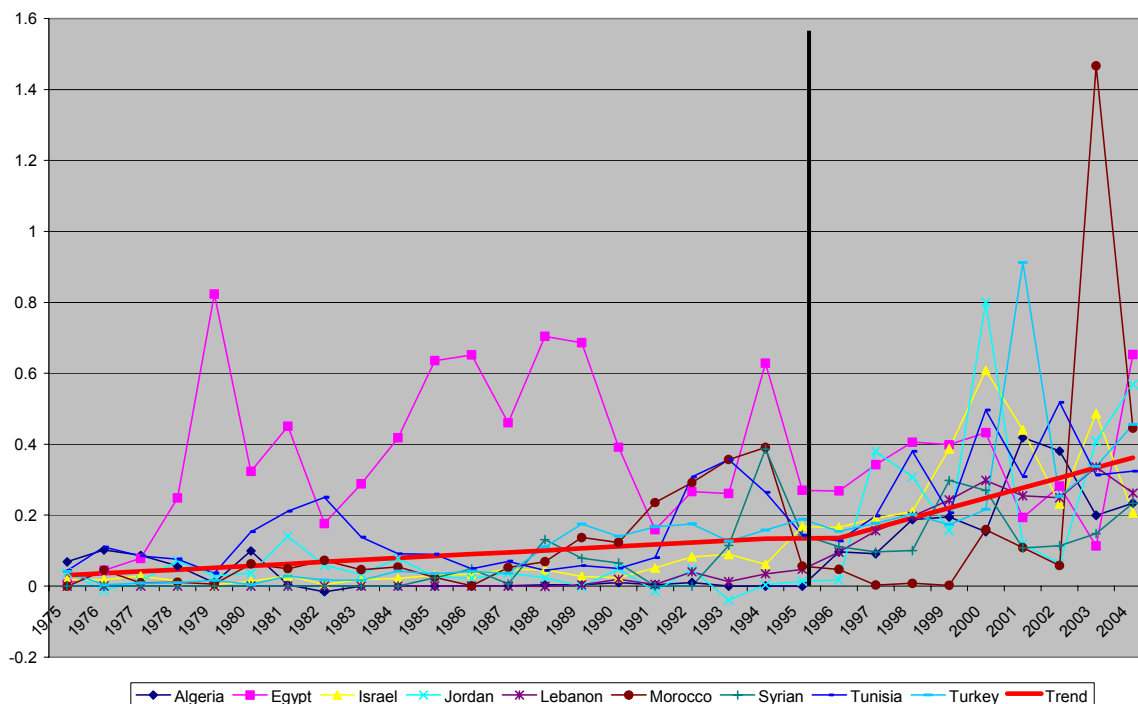
Keywords: Foreign Direct Investment, Trade, EU-Med Partnership

1. Introduction

The European Mediterranean Association Agreements (EMA) celebrated their 10th anniversary in 2005 and the related process of integration was analysed by numerous studies mainly focussing on affected trade flows (e.g. Grethe et al., 2005; Cioffi and Dell'Aquila, 2004; Augier et al., 2004). So far hardly any analyses exist on Foreign direct investment (FDI) carried out by the European Union, another indicator relevant for economic development in the Mediterranean countries. Different opportunities distinguished by the degree of control exist for companies to become involved in foreign production activities: If the investor owns at least 10 per cent of the foreign enterprise then the investment is a FDI. If less than 10% is controlled, a portfolio investment is in place. The investor therefore does not need to have absolute control over the enterprise but needs to be able to influence or participate in the management of the enterprise (OECD, 1996, p.8). FDI is considered to have a positive impact on economic growth and its consideration may alter conclusions on traditional trade analyses as trade flows and FDI can either be positively or negatively interlinked. A substitutional (negative) relationship appears mainly when horizontal (market seeking) FDI is undertaken, i.e. to serve customers in the foreign market. Vertical FDI locates parts of the production chain in foreign countries leading to a generally complementary (positive) relationship with trade flows (Head and Ries, 2004, Eurostat, 2005).

The role of FDI for international trade in general has long been recognised. "..., approximately two-thirds of global trade is influenced [...] by past FDI decisions" (Sauvant and Roffe, 1999). In the agricultural and food industry FDI is a very important activity as well: In 2003 the overall amount of EU15 investments in these sectors was 4.2 Bn € (Eurostat, 2006). Significant shares of these investments go to Mediterranean countries and EU-based Multinational Enterprises (MNEs) are the major foreign investors in this region. Figure 1 outlines the development of the European agribusiness FDI flows into the Mediterranean countries. For a better delineation a trend line has been included which shows the average increase up to 1995 and since 1995 (where the EMA was put into place) of European FDI flows into the Mediterranean countries' agribusiness sector.

Figure 1: EU15 FDI outflows into the different Mediterranean countries (Bn €)



Source: Own compilation based on the WDI (2007).

Since the introduction of the EMA the flows from the EU15 have increased as can be seen in the Figure 1. But still the FDI flows into the Mediterranean Countries are low compared to other European regional partnerships (e.g. with the Mercosur countries) outside of the EU15 even though the trade and investment barriers are highly liberalised (Quefelec, 2003).

This paper intends to serve as a base for in-depth empirical analyses of FDI in the agribusiness sector in the context of the European-Mediterranean partnership. Furthermore, only few researchers have viewed the agricultural and food sector and even less have empirically analysed European FDI outflows to single host countries. The empirical analysis on major determinants of European FDI flows into the Mediterranean countries will be taken out through a multiple linear regression model. The analysis will be underlined through a comprehensive literature review and secondly for a better clarification and interpretation of the relevant determinants an econometric analysis will also be undertaken with the Mercosur countries being the host countries of European FDI. Therefore, this is an extension to the already existing empirical studies.

The structure of the paper is as follows: in *section two* an overview on the different relevant theories regarding the relationship between trade and FDI is given. Furthermore, relevant determinants for FDI are derived from the examined theories. An overview over already undertaken empirical analysis of determinants relevant for FDI flows in general is given in the *third section*. The *fourth section* is dedicated to

the empirical analysis of determinants relevant for European FDI outflows into the Mediterranean and Mercosur countries. Methodology, used data and received results are described. The *fifth section* concludes by summarising the results of the econometric analysis and identifying further research needs for analysing the role of FDI in the Euro-Mediterranean Partnership.

2. Theoretical Background

In order to analyse the existing relationship between FDI and trade appearing in the Euro-Mediterranean Partnership, it is important to understand the general relationship between trade and FDI and the underlying determinants. Table 1 gives an overview over the relevant theories and the derived determinants influencing FDI. The theory on FDI is not unified but rather distributed among three different branches of theories: (1) the theory of international trade mainly dealing with origin and destination of goods as well as returns to factors; (2) the theory of the firm explaining the structure of firms also across borders; and (3) the theory of international capital markets targeted at explaining international financing and risk-sharing arrangements. Only the combination of these three strings of literature allows for a satisfying identification of the relevant determinants for the occurrence of FDI and its relationship to trade. Each of the three strings offers a certain perspective contributing to the overall picture and providing specific determinants.

Table 1: Overview on theories relevant to FDI

Relevant theory	Major targeted dimension	Determinants of FDI
International trade theory	International allocation of production	- Availability of resources (raw materials, labour, capital)
	- Comparative advantages	- Productivity level
	- Consumer tastes	- so far no specific studies on the consumer preferences
Theory of the firm	Optimal size of an MNE	- Degree of market inefficiencies
	- Transaction costs	- Ability to overcome market inefficiencies
	- Internalisation of imperfect markets	- Market growth rate
	- Ownership & location-specific advantages	- Market size and per capita income
Theory of international capital markets	Ideal structure of an MNE	- Productivity level
	Origins of finance	- Risk diversification
	- Funding - Risk-bearing	- Risk of sales
		- Risks of equity
		- Interest rate
- Exchange rate		

Source: Own compilation.

2.1. Theory of international trade

The focus of the theory of international trade lies on the optimal international allocation of production and the resulting directions of trade flows. This implies optimal location of each type of asset used in production. In this section capital assets are treated as a factor influencing trade, whereas section 2.3. focuses on the mechanism behind capital flows.

Most models trying to analyse the appearance of FDI are based on the Heckscher-Ohlin (HO) model distinguishing two countries, two goods and two factors where trade is driven by differences in factor endowments. The basic assumptions of the HO model are constant returns to scale, identical technologies across countries, identical and homothetic tastes, free trade in goods (but not in factors) (Feenstra, 2004). Investigating the role of capital mobility in the two-sector HO model, Mundell (1957) sets up an extreme case where capital is perfectly mobile and labour completely immobile. He first concludes that FDI and exports are substitutes. Secondly, efficiency in world production is achieved if *either* goods or factors move freely. A main problem of Mundell's approach is that the model is non-monetary and static. Monopolistic competition as well as multiple factors, goods and countries are not taken into account (Mundell, 1957, p.335). The main determinant for FDI is the availability of resources in specific countries (factor endowments). Therefore, it can be derived that the more similar two countries become the more appropriate it is that horizontal FDI is undertaken. Market size and the proximity of two markets identify horizontal FDI. Contrary to Mundell, Markusen (1983) finds empirical evidence for the hypothesis that FDI and exports have a complementary relationship. In his HO based analysis he considers the elimination of barriers to factor movements between countries in the absence of protection of goods. Exports and FDI appear in a complementary way if differences in production technology, product market distortion (production taxes, monopoly, increasing returns to scale) or factor market distortion exist. Regarding factors determining vertical FDI the difference in labour endowments between the two countries can be seen as a major determinant. Vertical FDI appears if this difference encourages. The less similar the market of two countries the mostly vertical FDI is to appear.

With the appearance of the New Trade Theory the assumption of constant returns to scale is eliminated and the firm starts to play a major role as considered actor. One of the first who introduced this generalisation mathematically was Krugman (1979) by considering market structure as an important parameter for firms' decisions on FDI. The appearing trade is referred to as intra-industry trade as the varieties of the products are both imported and exported and thereby vertical FDI is addressed (Feenstra, 2004). Brainard (1993) introduces transportation costs and economies of scale at the plant level. He concludes that the substitutional relationship of exports and FDI depends on the trade-off between the proximity advantages (e.g. reduction of transaction costs) and scale advantages from concentrating production in a single location (Brainard, 1993).

Regarding trade costs as a proxy for transaction costs in an international context it becomes apparent that horizontal FDI is enforced if trade costs increase. To consider the decision to set up an overseas affiliate, Helpman et al. (2004) linked the degree of intra-industry firm heterogeneity and the prevalence of subsidiary sales (due to FDI) relative to export sales. Relying on the existing literature they recognise that firms can service foreign buyers through a variety of channels in a substitutional way. The determinants for FDI are expanded by adding the firm heterogeneity in productivity at an intra-industry level (Helpman et al., 2004).

2.2. Theory of the firm

A major objective of this theory is the identification of the optimum size and structure of firms within an international environment as described by Casson (1982). The main determinant for placing affiliates abroad and getting involved in FDI are existing market inefficiencies (time-lags between initiation and completion of activities, monopolistic market structures and asymmetric information) and their overcoming.¹ Certain costs of internalisation (e.g. resource cost of fragmentation, communication cost and administrative cost) appear which may outweigh the potential benefits. Relevant costs to be minimized are transaction costs. The more complex transactions get through bounded rationality, uncertainty, opportunism and specific investments the more efficient it gets to integrate the transactions in the firm (Williamson, 1975). Over borders this leads to a substitutional relationship between exports and FDI. Trade costs as a proxy for transaction costs again can identify horizontal FDI in the same way as already derived through the theory of trade. Dunning (1977) considers the same substitutional relationship when supplementing the internalisation advantage by two more dimensions – ownership and location-specific advantage – in his OLI-Paradigm (ownership, location, internalisation). This paradigm states that FDI will only occur if all three dimensions appear. Head and Ries (2004) identify an empirical pattern showing that both types of possible relation (substitution and complementarity) between trade and FDI can appear depending of the firm specific productivity level. This determinant for possible relationships links the theory of trade again with the theory of the firm.

¹Externalities are not taken into account as they cannot be overcome by private actors.

2.3. Theory of international capital markets

Capital has already been addressed in the trade theory as a relevant factor explaining trade. The theory of international capital markets rather focuses on how capital flows are generated. Especially when looking at dynamic trade models the reaction of capital markets become an important determinant for FDI.

The theory consists of two main models: (1) Up to the 70ies the Capital-Asset-Pricing-model (CAPM) dominated the theory (Nowak, 1994). It explains the value of individual investments taking risk into account. Risk is distinguished by market risk, as general sensitivity of any asset (non-diversifiable risk) and the specific risk of each investment (diversifiable risk). The market risk includes all risks for the value of an investment due to changes in market determinants (interest rate, exchange rate, consumer prices, the usual risk of sales and equity risk). The specific risk of an investment focuses more on firm and product specific risks like the product life cycle or strikes in certain sectors. Both the market and the specific risk characteristics are determinants for FDI. The relationship between FDI and exports implied in the CAPM is a substitutional. (2) The Arbitrage-Pricing-theory (APT) is a more general approach than the CAPM as the individual risk for undertaking investments can be considered here in a multidimensional way: The APT focuses on the international allocation of relevant investment risks between firms and thereby defines the investment flows among countries. A main part of the theory is the complexity of decisions under uncertainty and risk (Loistl, 1990). According to Casson (1982) it distinguishes between three economic activities involved in the creation and exploitation of foreign assets: funding, ownership and utilisation. To fund an asset the consumption has to be postponed in order to produce the asset. Ownership includes risks as changes in the economic environment can alter the future value of the asset. Utilisation (hiring) bears risks as the productivity of the asset can be subject to transitory changes. As in the CAPM model, the APT implies risk diversification incentives as well as interest rates and the exchange rate as determinants for FDI. Again a substitutional relationship between exports and FDI is followed by this model.

2.4. Towards a unified theory

Up to 1996 the two branches of literature focusing either on vertical or on horizontal FDI were remained separately. One branch saw multinationals as only undertaking horizontal FDI which is know to be relevant for investments among developed countries. The other assumed multinationals to only undertake vertical FDI which according to empirical studies mainly appears for investments into developing economies.

Markusen et al. (1998) developed a knowledge-capital model which tried to include all the different aspects of the FDI theory in one model. Hence, multinationals are allowed in the model to undertake investments that are either horizontal or vertical and not all firms in the model do the same kind of FDI. The findings of the model were that vertical FDI dominates production when the countries differ significantly in relative factor endowments (such as labour endowments) and differ in size. In contrast to that, horizontal FDI occurs when countries are similar in size and relative endowments. Further for vertical FDI to appear, trade costs should be moderate to high (Markusen et al., 1998). In further work (Carr et al., 2001), this model has been specified further, stating an econometric base for analysing determinants of FDI.

3. Recent empirical studies on FDI

Based on the theoretical framework, studies have been undertaken to empirically verify the impact of the determinants identified in theory on FDI flows. An overview of past studies on the estimation of FDI determinants which do not all explicitly focus on the agribusiness sector, shows the estimated results for the different determinants used (Table 2). Table 2 only states the most common and significant determinants of the studies as determinants vary in the single papers according to the case studies analysed. Studies that focus on the agricultural or/and food sector are marked green. Furthermore, the identified determinants can be grouped according to whether they indicate if horizontal or vertical FDI appears.

Horizontal FDI is mainly identified through the joint market size (SUMGDP), the distribution index of the GDP (DISGDP) and the consumer price index (CONPRI). The sum of GDP of the host and the home country, one of the dominating determinants used, stands as a proxy for the common market size. It identifies the impact of the common market on FDI flows (Awokuse, 2006). As for most of the studies it has a positive effect on the investment flows, meaning that market seeking (horizontal FDI) is undertaken. Secondly, the distribution index should have a positive effect on FDI flows as the similarity of two markets makes it easier for foreign investors to invest in the host countries (Gast, 2007). The more similar two countries the lower the implementation costs when producing in the host country as the structures are already known. With the inclusion of the consumer price index (CONPRI) of the host and the home country the internal price changes are reflected (Gast, 2007). Increasing FDI flows through increasing consumer prices in the host countries identify horizontal FDI as market seeking is realised.

Vertical FDI is indicated mainly through the determinants trade costs (TCOST) and difference in education (SKILLDIFF). The trade costs of the host as well as the home country are used to measure the national protectionism or efforts to prevent importation of competitive products (Carr et al., 2001). A negative impact on FDI indicates that FDI flows are reduced when trade costs increase. This indicates a complementary relationship between trade and FDI as trade flows also decline if trade costs increase. The coefficient of the difference in the education of the employees between the host and the home country (SKILLDIFF) can either be positive or negative according to literature. A significant positive SKILLDIFF coefficient provides empirical evidence for vertical FDI since it implies that an increase in the difference of education and hence in the difference in wages paid between the two countries encourages vertical MNEs behaviour in search of lower production costs, especially lower wages (Gast, 2007).

The exchange rate (ER) which relates to the external price changes of a country is also often referred to (Marchant et al., 2002). The latest studies include a further variable which indicates the degree of investment liberalisation in the single host countries (InvestLib). The influence mainly appears to be positive on FDI flows meaning that a higher liberalisation of the investment policy of a host country leads to higher FDI flows. Both variables influence the height of the FDI flows but cannot predict whether vertical or horizontal FDI appear.

Table 2: Overview of existing empirical analysis of FDI determinants

	Singh & Jun (1995)	Barrell & Pain (1996)	Brainard (1997)	Burnham & Epperson (1998)	Gopinath (1999)	Carr et al. (2001)	Marchant et al. (2002)	Bouoiyour (2003)	Egger & Pfaffermayr (2004)	Awokuse (2006)	Gast (2007)
SUMGDP	+	+		+	+	+	+	+	+	+	+
DISGDP											+
TCOST home			+			-				-	
TCOST host			+			+				+	
CONPRI home					+						-
CONPRI host		+								+	+
SKILLDIFF		+			+	+	-	+	-	-	+
ER	-				-		+	-		-	+
InvestLib										+/-	+

Note: cross is positive, significant determinant of FDI; dash is negative, significant determinant of FDI; no sign means not applicable.

Source: Own compilation.

4. Empirical Methodology

The relationship between trade and FDI implied by the single theories guide the subsequent empirical assessment. The main determinants identified through the analysis of the theory of FDI will enter in the estimation of FDI determinants undertaken by a multiple linear regression. The empirical model is primarily based on the knowledge-capital-model developed by Markusen et al. (1998). It serves as a starting point, as

the method and the resulting influences of the determinants are well known. From there, new and further development of this method is also taken into account. The regression is modelled in GAMS and solved by using the OLS method. It appears the most stable algorithm for this kind of problem regarding past studies. The goodness-of-fit is confirmed with the R-squared as well as the adjusted R-squared. It measures the proportion of the total variation in FDI that is accounted for by variation in the regressors. The statistical significance of the estimated parameters is tested by the T-Test. In a regression analysis using panel data, autocorrelation of the residuals can be a problem and leads to an upward bias in the estimation of the statistical significance of coefficient estimates. This will be tested using the Durbin-Watson Test (von Auer, 2005). The regression analysis is undertaken by dividing the host countries into two host country groups: a) Mediterranean countries and b) Mercosur countries. This extension is done to give an in-view into the behaviour of European MNEs in different host countries.

4.1. Determinants of FDI flows

For choosing the variables included in the model the Akaike Information Criterion is used. It measures the goodness-of-fit of an estimated model (von Auer, 2005). Following Gast (2007), the estimated model specification is given by:

$$FDI_{i,j,k} = f(SUMGDP_{i,j,k}, SUMGDP_AGR_{i,j,k}, DISGDP_{i,j,k}, TCOST_{j,k}, CONPRI_{j,k}, SKILLDIFF_{i,j}, DISGDP_{i,j,k} * SKILLDIFF_{i,j}, ER_{j,k}, InvestCost_{j,k}, FDI_{i,j,k-1})$$

The subscripts i and j index the home and host countries, k stands for the years included in the regression model. The dependent variable ($FDI_{i,j,k}$) is the flow of foreign direct investment out of the home country into the host countries. $SUMGDP_{i,j,k}$, as an independent variable, is the joint market size of the home and host countries. As an extension the $SUMGDP_AGR_{i,j,k}$ is included to show the size of the joint agribusiness market size. It is measured the same way as the $SUMGDP_{i,j,k}$ except that it only includes the agribusiness market. As proxy for the similarity of the joint markets Carr et al. (2001) use the squared difference in real GDP between parent country and host country. Gast (2007) uses a distribution index ($DISGDP_{i,j,k}$) according to Egger and Pfaffermayr (2004). The distribution index is also applied in this analysis as it seems more stable in the econometric analysis. The variable $TCOST_{j,k}$ states trade costs in the host countries including transaction costs as well as costs appearing from applied trade barriers. Internal changes of the welfare situation in the host countries are determined through the independent variable consumer price index

($CONPRI_{j,k}$) of the host countries. It outlines the changes of the internal price level over time. The difference in the education level of the employees in the home and host countries is stated through the variable $SKILLDIFF_{ij}$. It stands as proxy for the different heights of wages paid wherefore the level of education is positively correlated with the wages. $DISGDP_{i,j,k} * SKILLDIFF_{ij}$ implies the interaction between the two determinants and should negatively affect FDI flows as their impact as single variables is the opposite direction. Differences in the markets discourage horizontal FDI while skill-labour differences vertical FDI encourage. In contrast to former studies the cross effect between the distribution index and the skill differences is analysed and not the effect between the sum of GDP and the skill differences as the impact appears to be more stable and significant. Furthermore the exchange rate of the host countries ($ER_{j,k}$) is included. This variable indicates the external welfare changes in the host countries over time. The variable $InvestCost_{j,k}$ states the investment costs in the host countries occurring when investments are undertaken. The costs include costs appearing from applied investment barriers as well as transaction costs. The lag variable ($FDI_{i,j,k-1}$) which indicates the impact of last years FDI flows on the height of this years flows is included to reflect the dynamic involved in FDI flows more precisely. It appears to be appropriate that former FDI's will affect this years FDI decisions as procedures are known and transaction costs can therefore be reduced.

4.2. Data

The data set used is a panel of eighteen countries (one home country and seventeen host countries) covering the period from 1960 up to 2005. The home country is Europe (EU15). The host countries of the Mediterranean countries are Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Syrian, Tunisia and Turkey. For the Mercosur countries the host countries are Argentina, Brazil, Paraguay, Uruguay, Venezuela, Chile and Bolivia. All data is obtained from the World Bank "World Development Indicators" (2007). The data is selected when being fed into the model by a filter that only leaves data in the model if for a certain year and country data exist over all included variables. This leads to a reduction of the possible data quantity. Therefore the amount of observations is reduced to 98 for each of the two regressions (Table 3). FDI level, as the dependent variable, can be denoted by three measures, FDI stock, FDI flow or level of affiliate sales. Following Gast (2007), FDI is measured in terms of FDI flows (measured in U.S. Dollars) from the home

country into the host countries. The use of FDI flows is preferable as it is consistent with theory. The sum of GDP is measured as the sum of the home and host GDP. GDP is measured in constant 2000 U.S. Dollars.

$$SUMGDP_{i,j,k} = GDP_{i,k} + GDP_{j,k}$$

For the SUMGDP_AGR the share of the agricultural and food sector of the GDP is measured. Again GDP is measured in constant 2000 U.S. Dollars. In this study the distribution index by Egger and Pfaffermayr (2004) is applied to the agricultural share of GDP of the home and host countries.

$$DISGDP_{i,j,k} = 1 - \left(\frac{AgrGDP_{i,k}^2}{AgrGDP_{i,k} + AgrGDP_{j,k}} \right) - \left(\frac{AgrGDP_{j,k}^2}{AgrGDP_{i,k} + AgrGDP_{j,k}} \right)$$

Trade costs in the host countries are constructed as 100 minus the agricultural GDP share of imports and exports of the food and agricultural sector. This is consistent with Awokuse (2006). The skilled-labour variable is measured as the average level of education in a certain year of the home country subtracted by the average level of education in the same year of the host countries.

$$SkillDiff_{i,j} = \frac{\sum_k Skill_{i,k}}{k} - \frac{\sum_k Skill_{j,k}}{k}$$

The data for the exchange rate of the host countries is taken from the United Nations Statistics Division (unstats.un.org, 2007). In this analysis investment costs are included in the same way as the trade costs have already been included. They are constructed as 100 minus the agricultural GDP share of FDI inflows and FDI outflows in the food and agricultural sector. The determinant InvestCost_Host indicates whether European FDI reacts to changes in the investment environment of the host countries. The predicted sign is negative as higher investment costs in the host country should lead to a reduction of FDI in the host countries as the investments become more expensive.

5. Estimation Results

The OLS-Solver appears to be a sensible solver for this problem statement regarding the past studies displayed in section 3. Furthermore, tested with the Durbin-Watson-Test no autocorrelation is assessed.

The empirical results from the estimation of the regression equation are presented in Table 3. For a better comparison the predicted signs of the single variable coefficient are shown. Standard errors are stated underneath the single results of the estimated coefficient. Whether the single variable suggests if the FDI

flows that are carried out into the host countries are vertical or horizontal is stated next to the relevant determinant.

Table 3: Empirical results

Model	Predicted Sign	Mediterranean countries	Mercosur countries	All countries
SUMGDP	+	0.026 *** horizontal 0.004	-0.026 vertical 0.086	0.021 0.028
SUMGDP_AGR	+	-0.022 *** vertical 0.004	0.011 horizontal 0.067	-0.019 0.024
DISGDP	+	0.096 *** horizontal 0.027	0.508 . horizontal 0.262	0.192 *** 0.036
TCost_Host	+	-0.003 * vertical 0.001	0.018 horizontal 0.022	0.003 0.008
CONPRI_Host	+/-	-0.015 *** vertical 0.003	0.012 horizontal 0.069	-0.032 0.022
SKILLDIFF	+/-	0.081 *** vertical 0.021	0.542 . vertical 0.287	0.196 *** 0.035
DISGDP*SKILLDIFF	-	-0.074 *** vertical 0.019	-0.492 . vertical 0.258	-0.169 *** 0.031
ER_Host	+/-	-0.097 0.086	-0.004 0.026	-0.004 0.012
INVESTCost_Host	-	-9.47 *** 0.773	-32.226 *** 0.882	-33.202 *** 0.462
FDI(k-1)	+	0.0003 0.001	0.052 . 0.027	0.014 0.009

Significance level: ' ' 10%, '**' 5%, '***' 1%, '****' 0.1%

Observations	98	98	196
R ²	0.987	0.815	0.988
Adjusted R ²	0.986	0.794	0.986
DW	1.885	1.815	1.59

Source: Own compilation.

It appears that most of the determinants follow the sign predicted. As can be seen, the majority of the determinants are significant at a 5 percent level for the Mediterranean countries. Regarding the total sum of GDP, it becomes apparent that for the Mediterranean countries it is positive significant at a 0.1 percent level. The positive influence when relying on the knowledge-capital-model would indicate horizontal FDI. For the analysis on the Mercosur countries the SUMGDP is negative indicating vertical FDI at first sight but it is not significant at any level. In this study the SUMGDP_AGR is negative at a 0.1 percent significance level for the Mediterranean countries. This can be explained through the assumption that the negative impact of the SUMGDP_AGR suggests that it is not the target of European MNEs to seek the market but to reduce production cost and seek efficiency in the agribusiness sector. According to Awokuse (2006), this appears if vertical FDI is undertaken. On the other hand the SUMGDP_AGR is positive for the Mercosur countries but not significant. DISGDP has a positive impact on FDI flows for the two analyses. This indicates that the similarity of the host and home countries making it easier for MNEs to invest in the host countries. This corresponds with the theoretical approach drawn by Gast (2007) concluding the horizontal FDI is undertaken.

An aspect that points out that vertical FDI is mainly undertaken between the EU15 and the Mediterranean Countries is the coefficient for trade cost. It appears to be negative for the Mediterranean countries. Considering the deduction of Carr et al. (2001) of the trade theory (with increasing trade costs trade flows decrease) FDI outflows decrease likewise which indicates vertical FDI. In contrast to the results of the Mediterranean countries, increasing trade costs in the Mercosur countries lead to an increase of FDI flows. Regarding the knowledge-capital-model (Carr et al., 2001) and Awokuse (2006) this indicates horizontal FDI. From the results for the Mediterranean countries, FDI outflows decrease at an 0.1 percent significant level if the consumer prices in the host countries increase. This underlines the assumption that vertical FDI is undertaken. Would the target of the host country be to gain more profits through market seeking then the consumer prices should have a positive effect on the investment flows as appearing for the Mercosur countries. Effectiveness is sought in the case of the Mediterranean countries, meaning vertical FDI appears (Gast, 2007). Vertical FDI flows into the Mediterranean countries are furthermore underlined through the positive coefficient of SKILLDIFF. Following the above mentioned studies, MNEs try to reduce production costs if the coefficient is positive wherefore they seek efficiency which means that vertical FDI is undertaken (Awokuse, 2006).

The coefficient of the exchange rate of the host countries is negative implying that a reduction of the host exchange rate against the Dollar would mean a revaluation of the host countries currency. This then leads to a reduction of FDI flows as it becomes more expensive to invest in these countries (Gast, 2007). For the two regression analysis the coefficient of the InvestCost_Host is negative and significant at a 0.1 percent level. These findings are consistent with previous studies as high investment costs reduce the height of FDI flows. The lag variable FDI_{k-1} has the estimated sign as predicted meaning that there is a positive impact of last years FDI flows on the next years FDI flows.

The fit of the models is expressed through the R-squared and the adjusted R-squared. Both variables are high for the Mediterranean countries (with $R^2 = 0.987$ and the adjusted $R^2 = 0.986$) and the Mercosur countries (with $R^2 = 0.815$ and the adjusted $R^2 = 0,794$).

6. Conclusions

Theory on FDI is developed widely even though a unique theory does not yet exist. Still important aspects for the agricultural and food sector like e.g. trade and investment barriers have only been included recently

and not comprehensively. The derived determinants have been empirically analysed and depending on the case study different results have been generated. Still only few studies exist on FDI and trade for the food sector and according to my knowledge none of those refer to the Euro-Mediterranean Partnership. In the empirical study the agricultural and food sector is reconsidered when viewing the European FDI flows into the Mediterranean countries. For a better understanding and interpretation of the received results the analysis was also undertaken for the Mercosur countries being the major host countries outside the EU15. The analysis of the two regressions (Mediterranean and Mercosur countries) shows that although there are determinants that indicate vertical as well as horizontal FDI flows the EU15 mainly undertakes vertical FDI into the Mediterranean countries and horizontal FDI into the Mercosur countries. As this is one of the first empirical studies focusing on the European FDI outflows into the Mediterranean countries in the agribusiness sector, it has to be discussed whether the chosen determinants are the appropriate ones in this context or if other determinants e.g. distance or income tax rate have to be considered as well when explaining FDI flows. The finding that vertical FDI is mainly undertaken between the EU15 and the Mediterranean countries gives a first in-sight on the relationship between FDI and trade, as vertical FDI flows leads to a complementary reaction of trade flows when following theory. In a further analysis where trade flows should be included in the model this has to be verified.

In this first step of analysis the political influence was excluded. A rather wide range of political interventions as trade policy, investment policy and competition policy are the most relevant policy areas having first an influence on FDI and secondly are addressed explicitly by the EMA: (1) Trade policy mainly influences via preferential market access the trade flows and thereby FDI. (2) Investment policy explicitly rules cross-border capital mobility and thereby influences FDI. (3) Competition policy and FDI are simultaneously interlinked as the policy impacts on the attractiveness of markets for FDI and in turn FDI by large MNE may affect competition on the market potentially inducing policy reaction. The inclusion of such political aspects should be carried out in further research analysis.

Specific impacts of regional trade agreements exemplified by the EU-Mediterranean partnership should then be derived from the previously undertaken analysis for understanding the impact of different trade and investment barrier levels.

7. References

- Auer von, L.** (2005): *Ökonometrie – Eine Einführung*, 3. Auflage, Berlin, Springer.
- Augier, P., Gaziorek, M., Laitong, C.** (2004): The Impact of Rules of Origin on Trade Flows, *International Trade*, EconWPA.
- Awokuse, T.** (2006): The Determinants of US Outgoing FDI in the Food-Processing Sector: Role of Knowledge Capital, *Dep. of Food and Resource Economics*, Newark: 2006.
- Brainard, S.** (1993): A Simple Theory of Multinational Corporations and Trade with a Trade-off between Proximity and Concentration, Cambridge: NBER Working Paper no. 4269.
- Burnham, J., Epperson, J.** (1998): A Profile of Foreign Direct Investment by the US Fruit and Vegetable Industry, *Agribusiness*, 14(5): 379-388.
- Carr, D., Markusen, J., Maskus, K.** (2001): "Estimating the Knowledge-Capital Model of the Multinational Enterprise," *The American Economic Review*, 2001, 91(3), pp. 693-708.
- Casson, M.** (1982): The Theory of Foreign Direct Investment, in Buckley, ed., *International Investment*, Hants.
- Cioffi, A.; Dell'Aquila, C.** (2004): The effects of trade policies for fresh fruit and vegetables of the European Union, *Food Policy*, 29(2): 169–185.
- Dunning, J.** (1977): Trade, location of Economic Activity and the MNE: A Search for an Eclectic Approach, in B. Ohlin, P. Hesselborn and P. M. Wijkman, ed., *The International Allocation of Economic Activity*, Holmes and Meier Publishers: New York.
- Egger, P., Pfaffermayr, M.** (2004): Distance, Trade and FDI: A Hausman-Taylor Sur Approach, *Journal of Applied Econometrics*, 2004, 19(2), pp. 227-246.
- Eurostat** (2005): European Union foreign direct investment yearbook 2005, Luxembourg: Theme.
- Eurostat** (2006): Eurostat Database "Balance of payments".
- Feenstra, R.** (2004): *Advanced international trade: theory and evidence*, New Jersey: Princeton University Press.
- Gast, M.** (2007): *Determinanten ausländischer Direktinvestitionen: OECD-Länder als Investoren und besondere Aspekte der Ernährungswirtschaft*, Wien: Lang, 2007.
- Gopinath, M., Pick, D., Vasavada, U.** (1999): The Economics of Foreign Direct Investment and Trade with an Application to the U.S. Food Processing Industry, *American Journal of Agricultural Economics*, 1999, 81(2), pp. 442-452.
- Grethe, H., Nolte, S., Tangermann S.** (2005): Evolution, Current State and Future of EU Trade Preferences for Agricultural Products from North-African and Near-East Countries, *Journal of International Agricultural Trade and Development*, 2(1): 109-133.
- Head, K., Ries, J.** (2004): Exporting and FDI as Alternative Strategies, *Oxford Review of Economic Policy*, 20(3): 409-423.
- Helpman, E., Merlitz, M., Yeaple, S.** (2004): Export versus FDI with Heterogeneous Firms, *American Economic Review*, 94(1): 300-316.
- Krugman, P.** (1979): Increasing Returns, Monopolistic Competition, and International Trade, *Journal of*

International Economics, 9:469-479.

Loistl, O. (1990): Zur neueren Entwicklung der Finanzierungstheorie, *Die Betriebswirtschaft*, 50: 47-84.

Marchant, M., Cornell, D., Koo, W. (2002): "International Trade and Foreign Direct Investment: Substitutes or Complements?" *Journal of Agricultural and Applied Economics*, 2002, 34(2), pp. 289-302.

Markusen, J. (1983): Factor Movements and Commodity Trade as complements, *Journal of International Economics*, 14: 341-356.

Markusen, J. and Venables, A. (1998): Multinational Firms and the new trade theory, *Journal of International Economics*, 46(1998): 183-203.

Mundell, R. (1957): International Trade and Factor Mobility, *American Economic Review*, 47(3): 321-335.

Nowak, T. (1994): Faktormodelle in der Kapitalmarkttheorie, Münster.

OECD (1996): OECD Benchmark Definition of Foreign Direct Investment, Paris.

Pfaffermayr, M. (1996): Foreign Outward Direct Investment and Exports in Austrian Manufacturing: Substitutes or Complements? *Weltwirtschaftliches Archiv*, 132(3): 501-521.

Quefelec, S. (2003): European direct investment in the Mediterranean countries, Eurostat.

Sauvant, K., Roffe, P. (1999): Investment-Related Trade Measures, Geneva.

Singh, H., Jun, K. (1995): *Some new Evidence on Determinants of Foreign Direct Investment in Developing Countries*, Washington: World Bank, 1995.

Williamson, O. (1975): *Markets and Hierarchies: Analysis and Antitrust*, The Free Press.

World Bank (2007): **World Development Indicator Series**, <http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20398986~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html>, (subject to fee).