Intra-firm organization and profitability

Evidence from transnational corporations

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Abstract

Purpose – By conducting a field research in affiliates of foreign transnational corporations (TNCs) established in Greece, this paper aims to investigate whether a different tendency of intra-firm organization has a different impact on their profitability and earnings management policy.

Design/methodology/approach – The original sample consists of 82 affiliates of foreign TNCs. Using a cut off point (25 percent) indicative of intra-firm pattern, these affiliates are divided into two categories: foreign subsidiaries with a high intra-firm trade degree (or with intra-firm trade >25 percent of their total trade) and foreign subsidiaries with a low intra-firm trade degree (or with intra-firm trade ≤ 25 percent of their total trade) correspondingly. The paper utilizes two econometric tests over the period 1999-2002: first, a logit model is employed to identify possible accounting-based performance differences related to differential degrees of intra-firm trade. Second, the popular cross-sectional discretionary accruals model initiated by Jones is applied in order to detect differences concerning earnings management policy between the two groups of affiliates. Based on the internalization theory of TNC, the main hypothesis is that the foreign affiliates with high intra-firm trade degree are more likely to affect their profitability, and due to institutional specific characteristics of Greece (e.g. relatively high tax rates), they appear to have smaller profits in comparison to the other subsidiaries.

Findings – Contrary to initial predictions, the impact of intra-firm trade on the profitability of foreign affiliates did not prove statistically significant. Results concerning the earnings management policy are similar. TNCs in general are found not to manipulate their reported earnings figure more than a neutral sample of 847 domestic companies.

Research limitations/implications – The list of explanatory variables is not an exhaustive one. In further quantitative work, more complex econometric methods should be used to support findings.

Practical implications – Findings are of particular interest for a multiple set of stakeholders/investors active in global markets as well as for regulators in attempting to ensure the coordination of tax policies among countries. Specifically, it is important for stakeholders and investors to know to what degree the integration of the subsidiary units (they have invested in) affects their performance and differentiates the manner that profits are managed. In addition, the regulators seek to define in detail the factors that make up profits on the inside of multinational enterprises so that they can practice their policies more effectively. Moreover, the findings may be applicable to other smaller countries which resemble the Greek setting.

Originality/value – The paper presents two novelties. First, it discloses original information regarding the internalization of trade activities of foreign affiliates located in Greece; such information is quite rarely found in literature. Second, it is one of the first studies which combines income policy of TNCs to their intra-firm transactions.

Keywords Transnational companies, Organizational earnings, Profit, Greece

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1. Introduction

According to the United Nations Publication (2005), the universe of transnational corporations (TNCs)[1] is large, diverse and expanding. By the early 1990 s, there were an estimated 37,000 TNCs in the world, with at least 170,000 foreign affiliates. By 2004, the number of TNCs had risen to approximately 70,000 with at least 690,000 foreign affiliates. The role of TNCs in the world economy has thus continued to grow, as reflected in the expansion of foreign direct investment (FDI) stock and in the operations of foreign affiliates.

Internalization theory explains the phenomenon of FDI and TNCs suggesting that the TNC is always a creature of internal markets. Via the internalization of firm-specific advantages[2], the TNC is developed in global markets, thus creating subsidiaries in secondary countries through Greenfield FDI, i.e. new plants, or cross-border acquisitions[3]. Intra-firm trade is inextricably linked to the internalization process. As internalization and, in extension, FDI increased, so did the number and complexity of intra-firm transactions (Lall, 1978; Helleiner and Lavergne, 1979; Sazanami, 1996; Andersson and Fredriksson, 2000; Ma *et al.*, 2000; Grossman and Helpman, 2004; Kimura and Ando, 2005). This leads to a high proportion of the international flow in the markets for goods and services and management and technology to take place within firms. Transactions of this type are usually realized as a consequence of central commands (planning systems) rather than in response to price signals[4]. Hence, intra-firm trade is the reflection in commodity exchange of the existence of TNC. There are numerous reasons for the development of this trade such as economies of scale, lowering of fixed costs, avoidance of transaction costs, security considerations (with respect to both to prices and access to supplies), need for secrecy, accounting policies, avoidance of taxes, regionalization agreements (EU, NAFTA, etc.) and abolition of protectionism[5].

The growth of intra-firm trade (from the purchasing of intermediate products to the sale of final goods) may influence the efficiency and the profitability at which firm specific advantages of TNC are utilized at international level. For instance, within the global business network, foreign subsidiaries in different countries are important providers of key inputs for the TNC network as they possess specific knowledge of their own that adds to the firm's overall core abilities. Trade flows, intermediate inputs in particular, are traded intensively within the TNC thus creating a high-level of geographic interdependence as well as improving its overall accounting performance. Under these conditions, intra-firm trade influences the global business profitability as well as the management and redistribution of earnings among the individual subsidiaries located in different host countries. In particular, at the accounting reporting level, TNCs which internalize product markets may have more opportunities, compared to their competitors, to manipulate cross-border costs and revenues in a way that enables them both to minimize the payment of taxes and to maximize their profits shifting them outside the host countries that have a relatively high-tax rate. This process may reduce the profits of the foreign subsidiaries in the corresponding locations, thus offsetting the positive income effect deriving from the exploitation of specific advantages of the parent company.

Though there is a vast amount of literature on the accounting consequences of intra-firm trade, the focus is largely on different determinants, mechanisms and techniques of transfer pricing emphasizing on how TNCs employ these techniques to

avoid paying income taxes (Borkowski, 1997; Cravens, 1997; Armstrong, 1998; Oyelere and Emmanuel, 1998; Avila and Ronen, 1999; Borkowski, 2001; Clausing, 2003; Kind *et al.*, 2005). The question concerning the impact of variations of intra-firm trade trend on profitability and earnings management policy has been ignored up to now due to its interdisciplinary nature and to difficulty of collection of primary data. Evidence for internal transactions is largely fragmentary, circumstantial, and highly firm, industry and/or country specific.

This paper contributes to the literature by using an original sample of 82 subsidiaries of foreign TNCs established in Greece, on the basis of a questionnaire (see Appendix) and by complementary *in situ* interviews in these firms. The primary survey sheds light on the TNC's internal organization of production and exchange. It shows the reasons for the realization of intra-firm exchanges. In this way it clarifies if they are mostly the product of accounting motives (e.g. tax motives) or not (e.g. specialization advantages). Moreover, the field research illustrates that foreign subsidiaries show a remarkable differentiation as far as their intra-firm trend is concerned. As a result, the separation between subsidiaries with a high-degree of intra-firm trade (>25 percent of their total trade) and subsidiaries with a low-degree of intra-firm trade (≤ 25 percent) arises easily. The econometric analysis of this study which is realized with the assistance of a logit model and a cross-sectional discretionary accruals model is based on the categorization just mentioned. The analysis in question covers:

- the total of intra-firm trade;
- intra-firm imports; and
- intra-firm exports.

The main hypothesis of this paper is that the internal organization of production and exchange by the TNC affects the profitability and earnings management policy of its subsidiaries located in Greece. In particular, we make the hypothesis that the foreign subsidiaries due to their internalization advantages have more opportunities to manipulate income via intra-firm payments and earnings management policies. Specifically, given that Greece has specific institutional characteristics (e.g. high-tax rates[6]), the foreign subsidiaries with a high-intra-firm trade degree are expected to report lower levels of earnings, compared to those affiliates whose international trade is based on the market mechanisms.

Greece is a case-study of particular interest for three reasons. Firstly, the country has attracted many important FDIs following its economic integration in Europe during the last decades, primarily in terms of cross-border acquisitions. As a result, the income policy of the corresponding TNCs is an interesting object for further investigation. Secondly, European integration has contributed to a more intensive specialization. As far as TNCs are concerned, European integration has lessened the need to maintain fragmented systems of branch plants in relatively closed national markets, lowering in this way, the burden of fixed costs. In addition, regional integration has also diminished the need of spreading risk by means of international diversification in segmented markets and has created additional scope for the realization of economies of scale and economies of scope within transnational business systems. This has led to a further expansion of intra-firm trade in the EU to which Greece is actively participating. Thirdly, recent international literature

(Leuz *et al.*, 2003; Bhattacharya *et al.*, 2003) documents that earnings management policy is more pronounced in Greece than in other countries. The extent of earnings management is found to be greater in the Greek case probably because of the greater opportunities for creative accounting practices offered by:

- contradictions existed among the Greek laws with respect to the settlement of some accounting matters;
- high rates of income taxes;
- unsophisticated users of accounts; and
- weak corporate governance.

This paper is of interest because it looks into the foreign trade of TNCs outside the scope of conventional trade theory which does not distinguish between inter-firm trade ("arm's length" transactions) and intra-firm trade. As a result, there still remains a major gap in the international trade and TNC literature with respect to the fact of firms' internalization of inputs and outputs markets and the accounting role of intra-firm trade. The purpose of the paper is to fill this gab.

The remainder of the paper is as follows. Section 2 develops a theoretical background and formulates our hypotheses. Section 3 gives details concerning the field research and the nature of intra-firm organization in Greece. Section 4 demonstrates the variables used in the study, tests the hypotheses and discusses the results. The final section concludes the study.

2. Theoretical background and formulation of the hypotheses

The theoretical analysis is based on the internalization theory of TNC. This theory suggests that TNCs can increase value and profit by internalizing markets across national confines for the firm specific advantages they possess (Coase, 1937; Williamson, 1975; Buckley and Casson, 1976; Rugman, 1980; Dunning, 2000). The theory starts from the fundamental insight that market imperfections and, in extension, internalization strategies of TNC may determine its profitability. In particular, the existence of monopoly rents associated with internalization is, *inter alia*, due to imperfections in the product, factor and financial markets. If markets were perfect without any asymmetries and imbalances, firms would transfer their firm-specific assets internationally via market mechanisms such as export and licensing rather than through FDI (Dunning, 2000).

The market imperfections paradigm of FDI presumes market failures, namely, structural and transactional market failure (Dunning and Rugman, 1985). Structural failure emphasized by Hymer (1960), gives rise to monopoly rents as a result of the existence or the creation of barriers to entry in an imperfect market environment[7]. National and international market imperfections both allow a TNC to acquire its monopoly advantage in its domestic environment and to exploit it through foreign production. In other words, Hymer considers that a main source of advantages for a TNC derives from oligopolistic market structure and behavior. By contrast, in conditions of perfect competition, firms do not possess market power; they produce homogenous products and have equal access to all productive factors. In such a perfect world there would be no such FDI since no advantage could accrue for the prospective TNC. Hence, the development of FDI and the increase of its profitability is a by-product of imperfect markets.

In turn, transactional failure reflects the inability of market mechanism to organize transactions efficiently and less costly. Some of the transactions' costs of using the market are: the cost of finding a relevant price; the cost of defining obligations of both parties to a contract; the risk associated with accepting such contracts; the taxes to be paid on market transactions; the asymmetrical information between buyer and seller, etc. TNCs appear where it is less costly to allocate international resources internally than use the market. In this way, a TNC is able to capitalize on the possession of its unique advantages.

The main idea here has been to apply the theory of "market failure" to explain foreign activities of enterprises, using the principles first expounded by Coase (1937) and extended by Williamson (1975), Buckley and Casson (1976) and Rugman (1980), in their analysis of information of markets and the economics of vertical integration[8]. Vertical integration refers to the tendency of a firm to internalize, by bringing under common ownership and centralized management, production, marketing or accounting functions directly connected to its own activity, while involving a substantial trade in intermediate and final products between different parts of the same TNC[9]. The analysis of vertical integration provides a number of plausible reasons for the internalization of commodity trade such as specification of products, divisibility of production process, unexploited capacity and scale economies, avoidance of negotiating and transaction costs and control over specific information and knowledge which allows a TNC to appropriate a fair return for its costly knowledge expenditures (Lall, 1978; Dunning, 2000).

International flows of goods, services and technologies are determined by a central TNC decision-making on the basis of a global optimization strategy. However, the benefits of increasing profitability taking the form of monopoly rent may accrue entirely to the TNC, but may not be necessarily reflected in the performance of all its subsidiaries. For example, intra-firm transactions could be used through various accounting techniques such as transfer pricing and earnings management policies for tax-avoidance purposes. In particular, TNCs which have developed an internal division of labor and are profit maximizers, may wish to increase the extent of intra-firm trade simply in order to enlarge the scope for using different accounting techniques to remit profits or evade taxes. In this case, TNCs will seek to shift any pre-tax profits they earn away from countries with high rates of corporation tax to countries with low rates of corporation tax (tax heavens, etc.)[10].

This approach could be a realistic option in the case of Greece due to its following specific institutional characteristics: the current tax rate on business profits in the country is relatively high (32.5 percent during the study period). In fact, Roumeliotis (1977), in his analysis of the foreign TNCs in Greece, argues that there was evidence of substantial overpricing of imports and underpricing of exports. More specifically, the author found that in the metal, chemical and pharmaceutical industries overpricing ranged from 5 to 230 percent of the estimated market price. Correspondingly, the internal export prices in the aluminum industry were 1-19 percent below the comparable world price. Furthermore, TNCs might prefer to reduce declarable income in Greece where labor unions enjoy a powerful social status. In this way, a reduction in the (publicized) profitability of their subsidiaries, aims to mollify demands by labor unions for higher wages. Moreover, Greece is a small economy often with highly concentrated industries and product markets. In such an environment, the declaration

of a high rate of return on capital might be regarded by the domestic authorities as a sign of monopoly pricing. Hence, an accounting mechanism of reduction of declared profits may also be used to justify price increases in regulated markets. Finally, the local state has a strong presence in the economy, *inter alia*, via corporate taxes, subsidies, etc. Consequently, the deliberate making of accounting losses aims to support requests for government financial support. Based on the aforementioned arguments, the hypothesis is made that due to their internalization advantages affiliates with intra-firm trade have more possibilities to manipulate income via cross-border intra-firm payments and earnings management techniques. More specifically, this can be achieved in the following ways:

H1. Foreign affiliates with a high-degree of intra-firm trade show less profitability as opposed to foreign affiliates with a low-degree of intra-firm trade.

H2. Foreign affiliates use intra-group transactions to manage earnings as compared to those affiliates with a low-degree of intra-firm trade.

3. Field research

As a starting point for this research paper, we conducted a comprehensive survey addressed to controllers or financial managers of affiliates of industrial TNCs operating in Greece. Our objective was to obtain insights concerning their intra-company transactions due to the unavailability of other data source containing such kind of information. We, therefore, developed a one-page long questionnaire with eight questions (Appendix), an initial version of which was assessed in a pre-test of five firms so as to minimize induced biases and maximize the response rate. Two mechanisms were used in order to carry out the survey. First, telephone contacts were conducted with 156 target companies[11] in order to identify details of possible participants. The second step was to e-mail the survey to the companies in question. About 82 questionnaires were gathered (yielding a final response rate of 52.6 percent) by personal collection from the work place of the participants, where private discussions took place adopting a non-structured interview approach. The combination of these methods enabled us to:

- discover new patterns of behaviour and new explanations for known patterns such as the characteristics of TNC intra-firm trade on issues that are relatively hard to document from archival data; and
- clarify some of our queries regarding the quality of published financial statements which were obtained from the database of *ICAP Greek Financial Directories* (a standard source of these kind of data for Greek firms).

The evaluation of primary data has led to the following, concerning the internalization of commodity trade (Table I): intra-firm imports are far more popular than intra-firm exports. More specifically, 78 percent (64 out of 82) of foreign affiliates internalize their imports and only 25.6 percent (21 out of 82) internalize their exports (columns 3 and 6, respectively). The intra-firm tendency in imports is more than triple the size of that concerning exports (60.4-17.4 percent – columns 2 and 5)[12]. This tendency of low-intra-firm export can be attributed to the fact that a large number of subsidiaries (45 percent) have insignificant exports, i.e. less than 20 percent of their sales[13]. These exports are destined mostly to neighboring markets such as the Balkans and the Middle East through externalization mechanisms in terms of "vent for surplus."

Table I.
Tendency for intra-firm trade (intra-firm imports to total imports/intra-firm exports to total exports) by industry

Industry	NACE	Value in percent (1)	Percent (2)	Intra firm imports Tendency for intra firm imports Number of TNCs (3) 0 percent	1-25 percent	26-50 percent	51-75 percent	76-100 percent
Foods	151-158	4.1	20.0	2		3	1	
Beverages	159	0.0	0.0	2				
Tobacco	16	0.0	0.0	1				
Textiles	17	1.0	21.3	2				
Clothing	18	1.6	81.5		1			4
Leather-footwear	19	0.0	0.0	1				
Wood-cork	20	–	–	–	–	–	–	–
Paper	21	5.8	40.2	1				1
Printing-publishing	22	0.0	0.0	1				
Petroleum and coal products	23	4.2	79.0	1				3
Chemical products	24	48.1	71.0	1	1	3	4	18
Rubber products and plastics	25	1.2	8.3	2	1			
Non-metallic minerals	26	0.6	3.6	1	1			
Basic metals	27	15.5	45.0				1	
Metal products	28	0.9	5.8	2	1	1	1	1
Machines and equipment	29	2.2	22.0	1				2
Electrical machin. and appl.	31/32/33	12.4	38.7		6	2	2	4
Transportation	34/35	2.2	85.0					1
Furniture – other industries	30/36	0.2	100.0					1
Total manufacturing	*15-36*	*100.0*	*60.4*	*18*	*11*	*9*	*9*	*35*
					64			

(*continued*)

Industry	NACE	Value in percent (4)	Percent (5)	Intra firm imports Tendency for intra firm imports 0 percent	1-25 percent	26-50 percent	51-75 percent	76-100 percent
				Number of TNCs (6)				
Foods	151-158	2.9	26.2	4			2	
Beverages	159	0.0	0.0	2				
Tobacco	16	7.6	50.0			1		
Textiles	17	25.9	38.3	1				1
Clothing	18	11.1	74.1				2	3
Leather-footwear	19	0.2	2.0		1			
Wood-cork	20	–	–	–	–	–	–	–
Paper	21	0.0	0.0	2				
Printing-publishing	22	0.0	0.0	1				
Petroleum and coal products	23	0.0	0.0	4				
Chemical products	24	3.5	7.9	26	1			
Rubber products and plastics	25	5.2	39.7	1		1		1
Non-metallic minerals	26	0.0	0.0	2				
Basic metals	27	0.0	0.0	1				
Metal products	28	4.0	3.1	4		1	1	
Machines and equipment	29	0.0	0.0	3				
Electrical machin. and appl.	31/32/33	39.6	37.2	8	3	1		2
Transportation	34/35	0.0	0.0	1				
Furniture – other industries	30/36	0.0	0.0	1				
Total manufacturing	*15-36*	*100.0*	*17.4*	*61*	*5*	*4*	*5*	*7*
					21			

Source: Field research

Table I.

Further, there is a gradual decrease of resource seeking investments (Dunning, 2000) which are based on the exploitation of low-production costs in the host economy and stimulate export activities in the developed European markets.

Intra-firm trade is Europe-centered due to the enhancement of the presence of European TNCs, in comparison to their non-European competitors, after the accession of Greece to the European Union. Moreover, non-European TNCs and, in particular US TNCs, have established a regional intra-firm network at a European level which has incorporated their subsidiaries located in Greece. As a result, intra-firm trade of these subsidiaries with the parent company in the USA is insignificant (Table II).

The survey showed that intra-firm transactions are used aiming to maximize regional (European) TNC's profits in several ways: first, TNCs supply their subsidiaries in Greece with intermediate goods so as to make the most out of specialization advantages and, as a consequence, to achieve economies of scale (86 percent of firms, Table III). This pattern is frequently encountered in the chemical, pharmaceutical and electric equipment industries which are technology intensive incurring very high R&D costs[14]. In this case, the parent company manages to pay off R&D expenses as well as overhead costs for management, administration and marketing (77.3 percent of firms, Table III) and to achieve profit maximization (68.9 percent). At the same time, the parent company protects production know-how from its competitors (65 percent of firms, Table III) and ensures quality of intermediate inputs used by its affiliate units

Table II.
Structure of intra-firm trade by nationality of TNCs

Nationality of TNCs	Intra firm imports from the: Parent company (percent)	Intra firm imports from the: Other related companies (percent)	Intra firm exports to the: Parent company (percent)	Intra firm exports to the: Other related companies (percent)
European TNCs	90.6	9.4	88.1	11.9
Non-European TNCs	3.6	96.4	13.0	87.0
Total	*70.5*	*29.5*	*78.2*	*21.8*

Source: Field research

Table III.
Reasons for intra-firm trade

Reasons for TNCs intra-firm imports	Percent	Reasons for TNCs intra-firm exports	Percent
Advantages of specialization/economies of scale	86.0	Exploitation of global sales & marketing network of parent company/TNC as a whole	96.0
Amortization of R&D expenses	77.3	Exploitation of low production costs	56.8
Profit maximization of parent company/TNC as a whole	68.9		
Know-how protection against competition	65.0		
Quality control of intermediate inputs	59.9		
Accounting motives (e.g. avoidance of tax payments)	25.1		

Source: Field research (following the multiple-response analysis procedure)

(59.9 percent of firms, Table III)[15]. Moreover, 25.1 percent of the subsidiaries are envisaging intra-firm trade in order to develop accounting techniques for tax-avoidance purposes (Table III). Adoption of transfer pricing policies in the high-tech industries has long been detected by Roumeliotis (1977).

In turn, it is worth noting that the majority of affiliates without intra-firm trade do not make their imports at pure arm's length relationships. More specifically 77 percent of those affiliates reported that their imports were made after intervention of the parent company which recommended supply sources. In this way, competitive prices and quality of the inputs of the subsidiary units are ensured.

At intra-firm export level, this survey showed that the global marketing and sales network of a TNC plays a major supportive role in the promotion of the affiliate units finished products (96 percent of firms, Table III). In turn, parent companies exploiting differences of factor endowments take advantage of the low-production cost of the country and enhance their international competitiveness (56.8 percent of firms, Table III).

The above analysis presented the characteristics of intra-firm trade and provided a way to separate subsidiaries with intra-firm trade from those who mainly realize arm's length transactions. As a result, there emerged two types of subsidiaries: on one extreme of the spectrum, there are affiliates that transact (buy or sell) only, or largely, with outsiders. On the other extreme, there are affiliates with (primarily) internal transactions. We will now examine empirically whether there are statistically significant differences, in these two groups of subsidiaries, regarding profitability and earnings management policy.

4. Econometric results

4.1 Testing hypothesis 1 (H1)

4.1.1 Variables. Financial ratios, although they have been heavily criticized in the accounting literature, provide a meaningful quantitative representation of the results of internal decisions and external conditions for a given firm. Therefore, over the last years, a considerable amount of research has been devoted in analyzing the predictive power of financial ratios as measures of corporate performance and viability.

Following the financial ratio categorization framework proposed by Courtis (1978), nine financial ratios along with an accounting measure indicative of firm size and a manually calculated variable (total accruals) were selected for each company when applicable (Table IV)[16].

Category	Independent variables	Variable description
Profitability variables	GRI/SAL	Gross income divided by net sales
	OPI/SAL	Operating income divided by net sales
	EBT/SAL	Net income pre tax divided by net sales
Liquidity variables	CA/CL	Current assets to current liabilities
	TAC	Total Accruals
Leverage variables	TL/EQ	Total liabilities to Shareholder's equity
	EQ/CE	Shareholder's equity to capital employed
Asset management variables	RECDAY	(accounts receivable × 365)/sales
	PAYDAY	(accounts payable × 365)/purchases
	INVDAY	(inventories × 365)/cost of sales

Table IV.
Ratios definitions

The selection of variables was also based on prior evidence with emphasis on the Greek-related literature (Voulgaris *et al.*, 2000). This process yielded a total of 11 (yearly) data-observations per company for the years 1999-2002. In order to avoid the well-recorded fluctuations of financial data due to business cycles, the mean of each financial variable for the period 1999-2002 was constructed.

Table V shows descriptive statistics for the whole sample (Panel A) and its three different specifications according to the research design of the study: affiliates with:

- intra-firm total trade (intra-firm imports + intra-firm exports);
- intra-firm imports; and
- intra-firm exports (Panels B, C and D, respectively).

Unlike what one might expect, no great variations are shown among subgroups for most of the variables considered. An interesting point, as it emerges from the mean values of total assets for the whole sample (€83 millions) and for the sub-samples (around €55 millions or even less at €37 millions), is that larger affiliates tend to disregard intra-firm trade. For the whole sample gross margin is on average 26.3 percent of total sales while the median is 24.9 percent. The average net profit pre tax is 5.04 percent not far from the mean operating income (5.49 percent) highlighting the weak contribution of extraordinary items in those firms' overall performance. It is worth noting that affiliates with intra-firm exports orientation are compared favorable to all others in terms of their operating profitability (mean value 5.71 percent). In terms of financial leverage sample firms seem not to rely heavily on external financing (total liabilities to shareholder's equity 2.3 percent) while at the same time they operate at good liquidity conditions (mean current ratio is 1.58 percent). Foreign affiliates, in general, receive payment on sales after an average of 126 days (the median is 107.5 days). It takes on average 88 days to sell inventory (median is 80 days) and there is an average waiting period of 81 days to pay their purchases (median is 65 days) thus creating a positive average cash conversion cycle of 133 days (number of days accounts receivable + number of days inventory − number of days accounts payable). Finally, with the only exception being affiliates with intra-firm exports, sample firms report positive mean accruals (€1.2 millions).

4.1.2 Econometric model. In order to test the validity of the *H1* and to identify possible differential profitability characteristics between the two groups of foreign affiliates, a binary choice model is used.

Logistic regression models are conceptually similar to linear regression models; however, unlike the latter, their response variable is discrete, the distribution of both variables and residuals is non-normal whereas the relationship between the response variable and the regressors is S-shaped rather than linear.

Logistic regression uses as link function of dependent (dichotomous) with independent variables the model:

$$\ln\left(\frac{P(Y=1)}{1-P(Y=1)}\right) = \beta_0 + \beta_1 X_1 + \cdots + \beta_n X_n.$$

This type of model is used to explain a phenomenon represented by a response or dichotomous variable y (which in this case has two categories[17]: 1 for affiliates with intra-firm trade >25 percent and 0 for affiliates with intra-firm trade ≤ 25 percent)

Variables	Mean	Median	TrMean	SD	SE Mean	Minimum	Maximum	Q1	Q3
Panel A: full sample, N = 82									
TOTAL ASSETS	82,973,846	33,543,717	52,069,338	1.88×10^8	20,794,508	1,051,558	1.52×10^9	14,029,540	85,260,230
GRI/SAL	26.32	24.91	25.52	15.23	1.68	3.25	71.88	14.95	34.6
OPI/SAL	5.49	5.1	5.44	9.47	1.05	−35.84	32.5575	0.45	9.86
EBT/SAL	5.046	4.405	5.098	8.199	0.905	−27.85	30.595	0.935	9.808
TL/EQ	2.362	1.59	2.01	2.465	0.272	0	12.99	0.963	2.79
EQ/CE	0.8066	0.875	0.8245	0.186	0.0205	0	1	0.7375	0.93
CA/CL	1.5787	1.395	1.5131	0.7261	0.0802	0.53	4.05	1.0875	1.895
RECDAY	126.34	107.5	121.47	75.25	8.31	1	346	73.75	160
PAYDAY	80.6	65	77.47	59	6.52	0	250	32.5	115.25
INVDAY	88.32	80	83.14	54.91	6.06	2	304	51.5	104
TAC	1,229,515	−255,158	−234,538	23,707,380	2,618,042	-5.6×10^7	1×10^7	−2,192,705	435,367
Panel B: foreign affiliates with intra firm total trade, N = 50									
TOTAL ASSETS	55,667,008	42,494,226	48,220,517	61,767,293	8,735,214	1,113,757	3.92×10^8	17,429,219	80,758,296
GRI/SAL	25.52	26.18	25.16	13.26	1.88	3.35	54.75	14.03	32.73
OPI/SAL	4.69	2.26	4.97	9.34	1.32	−35.84	22.07	0.47	9.86
EBT/SAL	4.46	3.24	4.64	7.91	1.12	−27.85	21.91	0.56	9.87
TL/EQ	2.815	2	2.443	2.714	0.384	0	12.99	1.053	3.363
EQ/CE	0.7934	0.86	0.8184	0.1889	0.0267	0	0.99	0.7475	0.91
CA/CL	1.5264	1.31	1.452	0.6841	0.0968	0.69	3.71	1.05	1.8825
RECDAY	118.3	106.5	114.16	61.78	8.74	25	304	73	146.25
PAYDAY	81.94	72	79.16	60.75	8.59	0	211	36	122.25
INVDAY	91.04	95	87.43	49	6.93	10	297	51.5	106.75
TAC	78,827	−245,930	−237,504	7,242,967	1,024,310	-1.5×10^7	27,212,514	−2,192,705	756,630

(*continued*)

Table V.
Descriptive statistics for period 1999-2002

Variables	Mean	Median	TrMean	SD	SE Mean	Minimum	Maximum	Q1	Q3
Panel C foreign affiliates with intra firm imports, N = 53									
TOTAL ASSETS	53,057,186	34,846,615	45,387,752	61,919,484	8,505,295	1,113,757	3.92×10^8	16,858,142	77,984,719
GRI/SAL	26.93	25.75	25.89	15.3	2.1	3.35	71.88	15.05	33.24
OPI/SAL	4.5	3.46	4.89	9.31	1.28	−35.84	22.07	0.29	9.91
EBT/SAL	4.23	3.59	4.81	8.05	1.11	−27.85	21.91	0.55	9.87
TL/EQ	2.705	1.84	2.344	2.583	0.355	0	12.99	1.075	3.42
EQ/CE	0.7826	0.86	0.8034	0.1999	0.0275	0	1	0.705	0.92
CA/CL	1.5609	1.38	1.4968	0.6815	0.0936	0.58	3.71	1.065	1.9
RECDAY	122.13	107	118.38	62.54	8.59	25	304	77.5	151
PAYDAY	79.92	64	75.83	62.51	8.59	0	250	32	115.5
INVDAY	89.04	92	85.26	48.78	6.7	10	297	53	104
TAC	822,926	−218,887	327,395	7,419,476	1,019,143	-1.5×10^7	27,212,514	−2,058,215	1,070,710
Panel D foreign affiliates with intra firm exports, N = 16									
TOTAL ASSETS	36,569,077	20,551,519	33,367,423	38,615,571	9,653,893	1,113,757	1.17×10^8	14,846,267	46,515,233
GRI/SAL	20.14	20.55	19.88	11.52	2.88	3.35	40.5	9.58	29.41
OPI/SAL	5.71	4.01	5.3	7.66	1.92	−4.13	21.3	0.4	8.79
EBT/SAL	4.8	4.63	4.65	4.63	1.16	−1.6	13.39	0.66	8.32
TL/EQ	1.95	2	1.884	0.991	0.248	0.55	4.28	1.148	2.71
EQ/CE	0.81	0.87	0.8264	0.1826	0.0457	0.4	0.99	0.7725	0.935
CA/CL	1.704	1.58	1.619	0.773	0.193	0.88	3.71	1	2.218
RECDAY	99.8	104.5	97.9	44.3	11.1	25	201	69.3	126.8
PAYDAY	71.8	44.5	68	64	16	5	192	23.3	97.8
INVDAY	114.7	109.5	107.6	62.8	15.7	31	297	92.8	139
TAC	−2,417,090	−438,780	−1,745,137	5,054,181	1,263,545	-1.5×10^7	1,070,710	−2,143,266	−87,055

Table V.

using a series of independent or explanatory variables. The *i*th parameter of βi represents the effects of a unitary variation of *Xi* on the odds, all other repressors *Xj* being assumed constant.

In this sense, a common set of independent[18] variables (financial ratios) is utilized in the following three successive combinations of sample firms, for each of the years 1999 to 2002. Thus, under a common model design, we have a set of three separate regressions with ten explanatory variables run for each of the four sample years:

(1) foreign affiliates with a high-degree of intra-firm total trade ($n = 50$) vs foreign affiliates with a low-degree of intra-firm total trade ($n = 32$) – *Model 1*;

(2) foreign affiliates with a high-degree of intra-firm imports ($n = 53$) vs foreign affiliates with a low-degree of intra-firm imports ($n = 29$) – *Model 2*; and

(3) foreign affiliates with a high-degree of intra-firm exports ($n = 16$) vs foreign affiliates with a low-degree of intra-firm exports ($n = 66$) – *Model 3*.

The sequential logistic regression results for *H1* are shown in Table VI.

Separate tests examining the null hypothesis that individual coefficients are zero can be calculated by analogy with the *t*-test of the conventional multiple regression model. A joint test of the null hypothesis that all the parameters associated with the explanatory variables are equal to zero is a χ^2 statistic *G*-based on the maximized likelihood ratio. This hypothesis is rejected at level 5 or 10 percent in five out of 12 models implying that some models do not provide a statistically significant explanation of an affiliate's intra-firm trade policy orientation.

Indeed, Models 1, 2 and 3 (at every panel) indicate that there is no association between the intensity of various kinds of intra-firm trade and the majority of accounting measures used in this study. More specifically, the indicative of profitability variables do not exert a statistical significant impact, even if, the negative sign of the non-significant coefficients reveals that the more profitable the affiliate is the more the probabilities that it will not rely on intra-firm trade. The variable of total liabilities to shareholder's equity (TL/EQ) proved statistically significant with a positive sign in almost all cases (Models 1 and 2)[19] indicating that higher leverage tends to represent intra-firm trade schemes adopters. In many cases, the sign of the firm's size coefficient (LGSIZE) despite its relatively small effect is surprising.

To summarize, *H1* – within the group of foreign affiliates the strategy of realizing intra-firm trade affects profitability – did not receive empirical support.

4.2 Testing hypothesis 2 (H2)

Empirical testing of the *H2* necessitates a measurement of the degree of earnings management adoption for the sample of foreign subsidiaries.

The main approaches that have been used in the literature to evaluate the existence of earnings management can be broadly classified into three categories. First, a study of aggregate accruals and the use of regression models to calculate expected and unexpected or discretionary accruals (Healy, 1985; Jones, 1991; Dechow *et al.*, 1995). Second, a focus on specific accruals, such as the provision for bad debts, or on accruals in specific sectors, such as the claim loss reserve in the insurance industry (McNichols and Wilson, 1988; Petroni, 1992; Beaver and Engel, 1996). Third, an investigation of discontinuities in the distribution of earnings (Burgstahler and Dichev, 1997; Degeorge *et al.*, 1999; Holland and Ramsay, 2003).

Variables	Model 1 ($n = 82$) FTNC-IF-T	Model 2 ($n = 82$) FTNC-IF-I	Model 3 ($n = 82$) FTNC-IF-E
Panel A – 2002			
Constant	1.115	3.812	−0.405
LGSIZE	2.64×10^{-8}	6.26×10^{-9}	-4.32×10^{-9}
OPI/SAL	−0.0240	0.1264	−0.047
EBT/SAL	−0.0564	−0.2732	0.0548
TL/EQ	−0.0003	0.7314*	−0.0563
EQ/CE	−2.131*	−4.561	−0.796
CA/CL	−0.3697	0.306	0.4134
RECDAY	−0.00708	−0.00373	−0.01249*
PAYDAY	0.003874	0.004973	0.000752
INVDAY	−0.00419	−0.00192	0.009935
TAC	5.14×10^{-8}	4.92×10^{-8}	6.72×10^{-8}
	$G = 18.778$	$G = 22.316$	$G = 15.132$
	p-value = 0.043	p-value = 0.014	p-value = 0.127
Panel B – 2001			
Constant	2.618	1.989	1.208
LGSIZE	3.23×10^{-9}	3.64×10^{-11}	-2.4×10^{-7}
OPI/SAL	−0.0022	0.0671	−0.0052
EBT/SAL	−0.1575	−0.5504	0.369
TL/EQ	0.7788*	0.4789*	−1.43341
EQ/CE	−1.428	−3.1251	−0.767*
CA/CL	−0.2017	0.7619	−0.0310
RECDAY	0.09090	−0.0384	−0.0098
PAYDAY	0.00044	0.05494	0.1879
INVDAY	−0.0176	−0.00065	0.0834
TAC	3.42×10^{-9}	2.63×10^{-9}	1.52×10^{-9}
	$G = 21.666$	$G = 21.991$	$G = 19.325$
	p-value = 0.154	p-value = 0.088	p-value = 0.127
Panel C – 2000			
Constant	1.537	2.637*	1.792
LGSIZE	1.11×10^{-11}	6.51×10^{-8}	-4.51×10^{-10}
OPI/SAL	−0.2330	−0.0065	−1.9192
EBT/SAL	−0.01496	−0.4012	0.0567
TL/EQ	1.3154*	0.4789*	−1.5996*
EQ/CE	−0.0941	−0.4689	−0.03341
CA/CL	0.0006	1.7910	−0.3791
RECDAY	0.00050	−0.0020	−0.0439
PAYDAY	0.4807	0.3947	0.5506
INVDAY	−0.6039	−0.05824	0.8701
TAC	9.91×10^{-10}	5.10×10^{-8}	6.37×10^{-7}
	$G = 16.037$	$G = 22.851$	$G = 13.112$
	p-value = 0.228	p-value = 0.092	p-value = 0.159
Panel D – 1999			
Constant	4.463	3.808	5.541*
LGSIZE	1.32×10^{-11}	2.20×10^{-11}	-1.57×10^{-8}
OPI/SAL	−0.0111	−0.682	−0.0001
EBT/SAL	−0.874	−0.9015	−0.057
TL/EQ	0.0796*	0.0707*	−1.2976
EQ/CE	−1.573	−1.571	−0.457

(*continued*)

Table VI.
Results of logit analysis for the period 1999-2002

Variables	Model 1 ($n = 82$) FTNC-IF-T	Model 2 ($n = 82$) FTNC-IF-I	Model 3 ($n = 82$) FTNC-IF-E
CA/CL	-2.054^{*}	1.029	-0.0507
RECDAY	0.09090	-0.005	-0.254
PAYDAY	0.00044	0.0097	0.2992
INVDAY	0.00003	-0.0671	0.34697
TAC	6.73×10^{-9}	4.83×10^{-9}	4.64×10^{-9}
	$G = 45.397$	$G = 20.638$	$G = 25.946$
	p-value $= 0.095$	p-value $= 0.157$	p-value $= 0.264$

Notes: *significance at 5 percent; **significance at 1 percent. FTNC: dummy variable for foreign affiliates of TNCs. FTNC-IF-T: dummy variable for foreign affiliates of TNCs with a high degree of intra-firm total trade. FTNC-IF-I: dummy variable for foreign affiliates of TNCs with a high degree of intra-firm imports. FTNC-IF-E: dummy variable for foreign affiliates of TNCs with a high degree of intra-firm exports

Table VI.

The standard model used by prior research in attempting to identify discretionary or abnormal accruals is based on Jones (1991). Total accruals are regressed on variables, which are expected to vary with non-discretionary accruals while the unexplained portion (i.e. the residuals) is interpreted as discretionary accruals. Many Jones-style models have been used either in a time-series firm-specific framework, or estimated in the cross-section for each industry.

This paper, which applies the level of discretionary accruals to proxy for the extent of earnings management, uses a cross-sectional modified Jones model (Dechow *et al.*, 1995), belonging to the first out of the three categories mentioned above. The model assumes that the change in revenues less the change in accounts receivable is free from managerial discretion (i.e. credit sales are assumed to be discretionary). To estimate discretionary accruals, we first need to compute total accruals (TAC) as:

$$(\Delta\text{Inventory} + \Delta\text{Debtors} + \Delta\text{Other current assets}) - (\Delta\text{Creditors} + \Delta\text{Other current liabilities}) - \text{Depreciation}$$

Having already calculated (TAC) our model is specified as:

$$\frac{\text{TAC}}{A_{t-1}} = \alpha\left(\frac{1}{A_{t-1}}\right) + \beta_1\left(\frac{\Delta\text{REV} - \Delta\text{REC}}{A_{t-1}}\right) + \beta_2\left(\frac{\text{PPE}}{A_{t-1}}\right) + e \quad (1)$$

where TAC = total accruals for firm i in year t = (range from 1999 through 2002); A_{t-1} = total assets for firm i in year $t-1$; ΔREV = change in net revenues for firm i in year t; ΔREC = change in accounts receivables firm i in year t; PPE = gross property, plant and equipment for firm i and year t; e = error term in year t for firm i; $i = 1 \ldots N$, firm index; and $t = 1 \ldots T$, year index (ranges from 1999 to 2002).

Following the industry NACE classification (Table I) all firms are classified into ten industries. To obtain meaningful cross-sectional estimates of regression parameters, we require that at least eight firms exist for each industry and foreign affiliate in each of the years 1999-2002. Then, for each of the years and industries, we estimate regression parameters in equation (1) using cross-sectional observations from a sample of 847 independent domestic firms which operate in Greece. Discretionary or abnormal accruals are determined as the prediction error terms that are the difference between the predicted accruals using the parameter estimates from equation (1), and reported

accruals for each test sample of foreign affiliates following industries' categorization. Specifically, discretionary accruals are the prediction errors of the above accrual model where a, b_1, b_2 are parameter estimates of α, β_1, β_2 in equation (2):

$$|\mathrm{DAC}_{it}| = \frac{\mathrm{TAC}}{A_{t-1}} - a\left(\frac{1}{A_{t-1}}\right) + b_1\left(\frac{\Delta\mathrm{REV} - \Delta\mathrm{REC}}{A_{t-1}}\right) + b_2\left(\frac{\mathrm{PPE}}{A_{t-1}}\right) \quad (2)$$

The estimation results (not reported here) show that the coefficients are generally in the expected sign[20].

Following prior research, we use the absolute value of unexpected accruals equation as a proxy for financial reporting quality. According to Reynolds and Francis (2000), the magnitude of absolute value of unexpected accruals measures a company's success in managing earnings either up or down, depending on year specific situations. A significant value of absolute DAC is considered as earnings management.

Table VII reports on the mean, median, standard deviation, maximum and minimum of absolute discretionary accruals of various sub-samples of foreign affiliates according to their intra-firm trade pattern for the entire sample period.

Absolute discretionary accruals	2002	2001	2000	1999
Panel A – all foreign affiliates, N = 82				
Mean	0.032	0.496	1.003	0.467
t-test	1.51	1.17	1.48	0.96
Median	0.044	0.354	1.184	0.519
Standard deviation	13.54	20.04	11.79	22.46
Minimum	0.001	0.002	0.023	0.007
Maximum	24.17	21.55	18.37	16.09
Panel B – foreign affiliates with a high degree of intra firm total trade, N = 50				
Mean	0.145	0.387	0.841	0.228
t-test	1.11	0.85	1.31	0.99
Median	0.084	0.396	0.755	0.211
Standard deviation	9.74	18.36	14.50	19.07
Minimum	0.001	0.001	0.002	0.009
Maximum	16.78	20.21	20.09	31.14
Panel C – foreign affiliates with a high degree of intra firm imports, N = 53				
Mean	0.234	0.291	0.665	1.338
t-test	1.62	0.76	0.95	0.88
Median	0.304	0.335	0.467	1.215
Standard deviation	11.03	16.71	15.67	17.56
Minimum	0.006	0.017	0.002	0.009
Maximum	19.35	24.29	25.79	26.92
Panel D – foreign affiliates with a high degree of intra firm exports, N = 16				
Mean	0.307	0.668	1.514	0.885
t-test	1.37	0.79	1.53	0.85
Median	0.283	0.791	1.387	0.787
Standard deviation	11.06	18.45	19.22	20.67
Minimum	0.050	0.001	0.006	0.003
Maximum	13.12	15.66	40.09	17.43

Table VII.
Absolute value of DAC for foreign affiliates over time

Notes: This table reports on the mean, median standard deviation, maximum and minimum of absolute discretionary accruals. All values are expressed as a percentage of lagged total assets; *significance at 5 percent; **significance at 1 percent

Contrary to our hypothesis, the model indicates a statistically insignificant level of abnormal accruals for all (four) specifications tested in all years in question. More specifically, the mean absolute DAC for the whole sample (Panel A) seem to fluctuate from an insignificant level of 0.467 percent in 1999 to a roughly significant (*t*-test value 1.51) level of 0.032 percent by 2002. The time-series pattern of median absolute DAC exhibits a similar trend with a peak in the year 2000 and a subsequent fluctuation by 2002. The situation is slightly different in the case of affiliates with intra-firm imports (Panel C) where the mean absolute DAC decline monotonically over time to reach the level of 0.234 percent at the end of the study period. These results could be viewed as evidence that no association between the intra-firm trade and earnings management policies is found to exist. Unfortunately the results are not directly comparable with those of other similar studies since this is the first empirical study which combines intra-firm trade to earnings management.

Nevertheless, from a different perspective, these results could be attributed to either of the following two factors:

(1) either the tax-avoidance motivation cannot mitigate affiliates managers' efforts to enhance the performance of their division (thus acting at the expense of the overall TNC performance); or

(2) domestic companies which constitute the control (independent) sample are managing their earnings in a comparable to foreign affiliates extent and as a consequence the results of the model are biased.

This last point can be easily supported with results provided by studies undertaken by Leuz *et al.* (2003) and Bhattacharya *et al.* (2003) documenting Greece's "championship" in earnings management adoption.

In any case, more reliable results in testing *H2* could be obtained by applying an alternative famous approach in detecting earnings management as proposed by Burgstahler and Dichev (1997): the investigation of discontinuities (particularly around zero) in the frequency distribution of earnings for all tested firms[21]. This approach overcomes major problems inherent in measuring unexpected accruals. Specifically, Guay *et al.* (1996) demonstrate that accruals derived from five alternative models reflect considerable imprecision while Bernard and Skinner (1996) argue that abnormal accruals estimated using Jones-type models reflect measurement error due, in part, to the systematic misclassification of normal accruals as abnormal accruals. In this conjunction, Dechow *et al.* (1995) show that these types of expected accrual models (including the popular "modified Jones" method) are poorly specified when the earnings management event is associated with unusual performance.

Finally, the results of this study might have been affected by the specific nature of intra-firm organization of foreign subsidiaries located in Greece. This organization is rather geographically limited, concerned with a few European countries, and one-sided since the greatest bulk of internal transactions take place with the parent company. However, a new quality of the intra-firm integration requires the growth of efficiency seeking FDI which aim to rationalize the TNC activities by optimizing the intra-firm division of labor and by establishing the organizational framework in which a large number of semi-finished products at different degrees of processing, technological intensity and added value are exchanged internally between related subsidiary units

("worldwide sourcing" strategy). Such a strategy could clearly set new terms for the shaping of the performance of the corresponding subsidiary units.

5. Conclusion

By utilizing an original sample of 82 subsidiaries of foreign TNCs located in Greece, the possibility of accounting-based performance differences and differentiated earnings management policies for the period 1999-2002 being attributed to intra-firm organization of production and exchange was investigated. Undertaking such a research in the Greek context was tempting given that Greece as an insider country with relatively concentrated ownership, weak investor protection, and less developed stock market exhibits higher levels of earnings management than other countries. The TNC internalization theory, according to which a TNC develops in response to imperfections in the goods and factor markets and constitutes a device for the formation and exploitation of internal markets and in particular of commodity markets, was used as a theoretical background.

Based on a combination of field interviews and a survey instrument for identifying possible intra-firm trade patterns leading foreign affiliates to differential performance, we document weak empirical support of intra-firm trade impact on profitability (*H1* rejected). A possible explanation for this latest inference could be the fact that from all foreign affiliates constituting the sample only 25 percent of the respondents stressed the role of accounting motives (e.g. avoidance of tax payments) as a reason for intra-firm trade evolution whereas the majority of them underlined the significance of non-accounting motives such as specialization of production and economies of scale at the European level (Table III). Moreover, the fact that in affiliates without intra-firm trade imports are made after intervention of the parent company, which has established long-term cooperation with particular external suppliers, leaves space for the development of transfer pricing policies and more specifically for policies related to overpricing of imports. This element is in accordance with Roumeliotis's (1977) findings according to which the overwhelming majority of multinational firms in Greece adopt transfer pricing policies.

It should also be noted that the results of the survey might have been different if the foreign subsidiaries located in Greece had developed a wider and more advanced, in terms of quality, intra-firm organization scheme. In this case, different terms would probably apply regarding the shaping of their performance.

With reference to the *H2* and unlike our predictions no association was found between differential degrees of intra-firm trade and earnings manipulation (*H2* rejected). A probable interpretation for this finding can be provided by the fact that firms active in Greece, according to international literature (Leuz *et al.*, 2003; Bhattacharya *et al.*, 2003), come first in applying earnings management, a fact that most probably affects both the firms constituting the main sample (affiliates) and the ones constituting the neuter sample (domestic) and as result no statistically significant differences seem to exist between them. However, future research could re-examine this issue by employing more suitable econometric methods for detecting earnings manipulation through the use of an extended list of variables.

Nevertheless, to our knowledge, this study was the first to analyze accounting aspects of intra-firm organization so contributing to the body of existing literature (e.g. earnings management literature). Moreover, it provides original information

regarding intra-firm trade, a subject there are not many empirical studies focus on. Furthermore, this study may constitute a valuable tool for international investors and tax regulators, as they want to know the factors performance is shaped by, inside TNCs. Finally, findings may also be applicable to countries which resemble the Greek setting.

Notes

1. We use the term TNC as does the United Nations Organization for multinational enterprises, even for enterprises from emerging economies (www.unctad.org/wir).
2. According to the industrial organization theory (Hymer, 1960; Dunning, 2000), specific advantages such as specific knowledge in production, distribution, marketing, etc. and the ability to supply differential products combine to the firm's core abilities, and altogether help to create monopolistic market positions nationally and internationally.
3. The possession of firm-specific advantages alone would not explain why a firm should engage in foreign production, since it could exploit its unique advantages by, say, licensing a foreign producer (i.e. externalization). To clarify this, theorists of international business have turned to the ideas of Coase (1937), who introduced the concept of internalization. It means, since the market is costly and inefficient for undertaking certain types of transactions, companies may reject the market and organize these transactions within the firm itself.
4. These transactions are recorded at prices, which can be arbitrarily established and do not necessarily have anything to do with market prices (transfer pricing).
5. For instance, a TNC which uses a few subsidiaries for the supply of the regional European market, instead of a small production unit in each national market, takes advantage of a reduction in fixed costs and rise in profitability.
6. Because TNCs operate in multiple locations, they are likely more sensitive to differential tax policies.
7. These departures from perfect competition may occur, firstly, in goods markets and include product differentiation, brand names, special marketing skills, etc. Secondly, there may be departures from competition in factor markets, taking the form of special managerial skills, differences in access to capital markets and technology protected by patents and copyrights. Thirdly, imperfect competition may be reflected in the existence of internal or external economies of scale. Finally, government policies concerning taxes, tariffs, interest rates, exchange rates, etc. may also create imperfect markets.
8. The "Coase economies" of information and knowledge advantages which occur under vertical integration can be contrasted with the "Cave economies" of product differentiation advantages.
9. A part of this trade is composed of intermediate inputs leading to backward integration and the rest part of it is trade in final products causing forward integration.
10. This global accounting reporting policy may contribute to a reduction of the global tax burden of the TNC and improve control over the performance of and to coordinate cash and income flows from its foreign affiliates.
11. These companies were identified after an extensive research carried out in the foreign commercial-industrial chambers.
12. Intra firm imports are characterized by a small industrial differentiation (chemistry, basic metals and electric appliances represent 76.0 percent of the total activity – column 1) comparable to that of intra firm exports (electric appliances, textile and garments representing 76.6 percent of the total exports – column 4).

13. It is important to underline that after the Greek economy was integrated into the European Union (as of 1981), "the new generation of FDI" which occurred through acquisitions, has enhanced the local market orientation of foreign affiliates (Georgopoulos and Preusse, 2006).
14. Also, Buckley and Casson (1976) have shown that internalization advantages tend to be greatest in technology intensive sectors. Lall (1978) found that an important factor which affects the pattern of intra firm imports of US-affiliates abroad is the technological intensity of semi-finished products.
15. Intra-firm inputs are very costly and highly specific. That is, the more specific is an intermediate input to the firm concerned, the more will it tends to rely on internal rather than external supplies.
16. As shown, besides profitability variables, measures of liquidity, leverage and asset management were also included since it is likely to enhance our understanding of sample firms' overall performance.
17. This model may be extended further to the case in which the response variable has more than two categories. In this case we have an example of multinomial logistic regression (Hosmer and Lemeshow, 2000).
18. The Pearson correlation results show that the gross margin ratio is highly correlated with the operating margin (correlation coefficient 0.833) and, therefore, were excluded from the econometric analysis.
19. Contradictory results are those of Model 3 where, for all years considered, the negative signs of the coefficients indicate that intra-firm exporters do not rely heavily on external financing.
20. The expected sign for property, plant and equipment is a priori negative, the expected sign for change in revenue or change in revenue net of accounts receivable is more difficult to establish a priori (Jones, 1991) while the expected sign for performance is positive.
21. However, the application of this method necessitates a vast amount of data not available here.

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Appendix. Questionnaire

Company name: No.

A. Exports

1. Please fill in the percentage of your company's exports towards:
   - European Union (approximately) ..... percent
   - East Europe and Balkans (approximately) ..... percent
   - Middle East και N. Africa (approximately) ..... percent
   - Other countries/regions (approximately) ..... percent

   100 percent

2. Please fill in the percentage of your company's exports (for year 2003) towards:
   - Parent company (approximately) ..... percent
   - Subsidies (approximately) ..... percent
   - Other companies (approximately) ..... percent

   100 percent

3. To how many subsidiaries (if any) is your company exporting? ..... (number)
   Are these subsidiaries operating within European Union? ..... (Yes/No)

B. Imports

4. Please fill in the percentage of your company's imports from:
   - European Union (approximately) ..... percent
   - East Europe and Balkans (approximately) ..... percent
   - USA (approximately) ..... percent
   - Other countries/regions (approximately) ..... percent

   100 percent

5. Please fill in the percentage of your company's imports (for year 2003) from:
   - Parent company (approximately) ..... percent
   - Subsidies (approximately) ..... percent
   - Other companies (approximately) ..... percent

   100 percent

6. From how many subsidiaries (if any) is your company importing? ..... (number)
   Are these subsidiaries operating within European Union? ..... (Yes/No)
7. Which factors are you considering as crucial for the implementation of intra-firm imports?
8. Which factors are you considering as crucial for the implementation of intra-firm exports?

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