Euro introduction and export behaviour of Italian firms

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by

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Abstract

Recent literature has focused on the importance of extensive and intensive margins of trade in the case of the Euro adoption. Using a unique dataset taken from ISTAT firm level data, we study the effects of euro introduction on Italian manufacturing firms. We focus our analysis on the period 1996-2004, covering three years before and six years after the euro introduction. We estimate a gravity equation using difference-in difference estimation techniques. Firm-level evidence shows that the euro had indeed a positive influence on Italian exports, mainly channelled through the intensive margin, whereas the extensive margin was not significantlyimportant. This result suggests that the positive effect of euro introduction on trade flows is essentially owed to a reduction of variable trade costs. The reduction of fixed-entry costs would have a role, allowing the entry of new exporting firms in foreign markets. However, these latter are smaller and less productive and exporting a small number of products; as a result, their contribution to total export value is quite low.

This result seems in line with the well known stylised fact on small average size of Italian firms. The lower is the average firm size, the lower is the probability to benefit of a downward shift of fixed entry costs in foreign markets induced by the common currency.

Keywords: Trade, Euro, Export Margins, Instrumental variables; JEL codes: F14, F15, C21, C23, C26

1. Introduction

One of the advantages expected from the creation of EMU is the positive impact of the single currency on intra-area trade flows: to zeroing the exchange-rate uncertainty - it was the argument - would have eliminated trade costs due to currency volatility and promoted greater price transparency. The gain in efficiency would have translated in lower trade prices and in larger export (and import) volumes.

This expectation was underpinned by the strand of literature originated by the seminal work of Rose (2000), who predicted significant pro-trade effects coming from joining a common currency. Against this backdrop, the findings of subsequent studies carried out for the Euro area were generally disappointing. Empirical analyses concerning the first years of the European single currency showed a modest, though statistically significant, effect (see Baldwin et al. 2008, for a critical survey of these works). Morevoer, the impact was shown to be unevenly distributed across Member Countries and sectors. On theoretical grounds, different sectors may have benefited heterogeneously from euro adoption due to technological and market-structure characteristics; at national level, differences in specialisation might have given rise to "winners and losers" in the export contest put in motion by the EMU process.

More recently analyses on the trade effect of a single currency benefited from the contribution of the "new-new trade theory" (Bernard et al. 2003, Melitz 2003, Melitz and Ottaviano 2008, Chaney 2008) that shoved more and more scholars into micro-level investigations of this topic. Empirical models focusing on the exporting behaviour of firms are developed using firm-level data , aiming at disentangling more precisely the effects that may be expected from a Monetary Union (Baldwin 2006). According to these works (specifically, those adopting the Melitz-framework), the adoption of a single currency may induce cuts in two different kinds of trade costs: variable trade costs and fixed-entry costs. The distinction is important because the reduction in each kind of cost may activate different margins of adjustment at the firm-level. Whereas a reduction of variable trade costs is accompanied by an increase of the value of exports of already exporting firms, the lowering of fixed-entry costs may lead to a rise of the number of exporters, due to the entry of new (less productive) firms into export markets. It arises that two different margins of trade can move on the inception of a common currency: an intensive and an extensive margin. The change in the intensive margin was the only one allowed for by the earlier approach. The adjustmentof the extensive margin is "new" for theory (not for empirics)[1]. It rises from the consideration that firms are heterogenoeus in productivity and that there are market-specific fixed costs of exporting: two innovations brought in by the new theoretical approach.

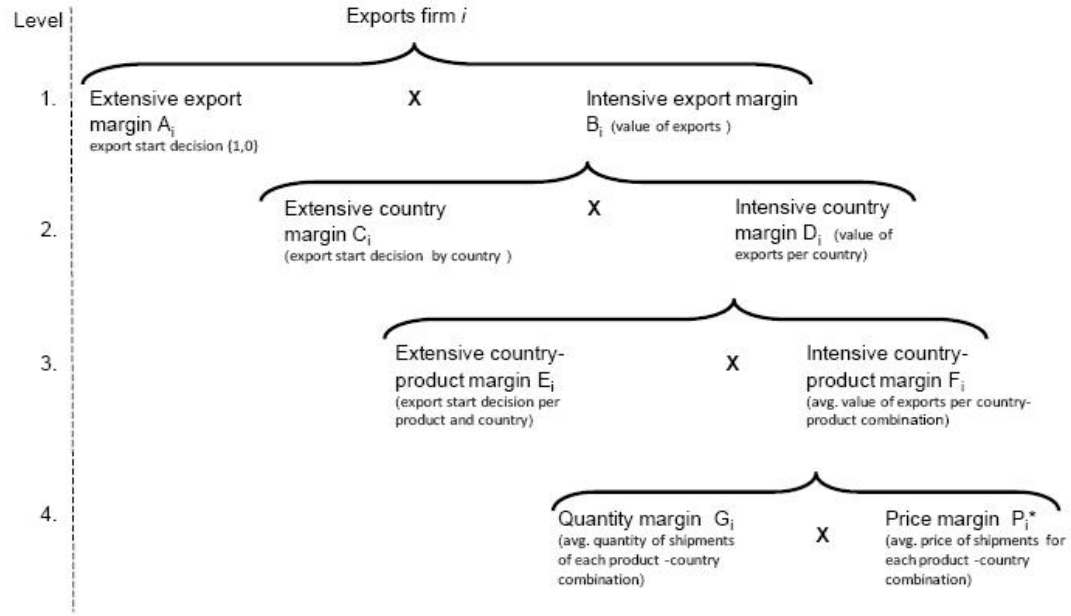
In a Melitz-based framework, the size of the movements of the two margins in response to trade-liberalisation shocks varies according to the degree of substitution

[1] A form of extensive margin can actually originate also from monopolistic competition models with identical firms. It derives from the home-bias effect: larger countries are home of a larger number of producers/varieties than smaller ones (Krugman, 1981). Yet, firms in these models are all equal and show no-difference in their export status: in the integrated economy they are all exporters.

between goods. Particularly, it has been shown (Chaney 2008) that high elasticity of substitution makes the intensive margin more sensitive to shifts of trade barriers, while the extensive margin is less. This theoretical finding suggests that the trade impact of single currency is a potential source of geographic differentiation and is related to the sectoral compositions of national outputs: industries facing high degree of product substitution will react differently along the two margins compared with other producers.

It should be also considered that exporters may be multi-product firms that serve multiple markets. As a result, the adjustment of the extensive margin may involve the range of both products and markets. A whole taxonomy of firm's decision to export can be decomposed in terms of choice of export markets, variety of goods, export prices and quantity (Kox 2012).

Figure 1. The structure of export decision (export margins)



Source: Kox 2012

Figure 1 shows that the decision structure has four levels. At each level it is possible to distinguish a participation decision (extensive margin) and a decision concerning both quantity and price (intensive margin).

To investigate extensive and intensive margins, researchers need rich firm-level datasets including both market and product disaggregations. Currently, this class of dataset, however, are available only for a limited number of countries and, to our knowledge, it is not yet available for Italy, which is the case we intend to study.[2] Former empirical evidence, obtained using aggregate and sectoral information, suggests that the effect of the euro introduction on Italian exports towards the Euro-area is generally not-significatnt (De Nardis, De Santis and Vicarelli 2008a and 2008b). Hints

2 Only data for France Belgium and Hungary are available; see section 3 and Fontagnè et al. (2009)

coming from new theory spur more investigation. Specifically, the use of firm-level data allows to investigate specific issues. Firstly, is this empirical evidence affected by aggregation bias? Secondly, does it conceal heterogenous reactions in the population of exporters? And if so, which are the producers that gained from the trade impact of the EMU creation and which are those unaffected? A firm-level analysis could allow to answer some of these questions and supporting the aggregate result with aditional empirical evidence: it is what we intend to do in this paper.

This kind of analysis for Italy is finally possible using information drawn from a dataset based on microdata referring to several firm-level surveys collected by the Italian National Institute of Statistics (Istat). It is obtained merging firm-level data on external trade flows (detailed at both market and product level) with balance-sheet information and structural businesses' characteristics (firm size, geographical localization, sector economic activity).

The paper is organised as follows. Section 2 surveys the empirical literature on the extensive and intensive margin of trade, with a special attention to the available studies on the euro effect. Section 3 illustrates the structure of the dataset used for study of the Italian case; furtermore, some descriptive analyses are reported. Section 4 discusses the empirical strategy and reports estimation results. Conclusions and summary are in section 5.

2 Empirical studies on the extensive and intensive margins of trade

The lack of bilateral trade data at the firm level has been the major difficulty in identifying effects on the extensive and intensive margins of trade. Several studies use country-level data with high level of sectoral/product disaggregation.

The empirical evidence on the relevance of margins of trade varies according to countries (i.e., advanced vs. emerging economies) and time spans. Among recent studies using country-level data, Hummels and Klenow (2005) have found that the extensive margin accounts (in 1995) for 60 percent of the larger amount of exports of richer (and larger) economies with respect to the less advanced (and smaller) ones. This percentage decreases to 33 percent in the case of emerging economies between 1970 and 1997 (Evenett and Venables 2002). Results obtained by Felbermayr and Kohler (2006) show that extensive margins played an important role in the growth of world trade over the 1950-1970 period and also in the mid 1990s, while greater support was provided by the intensive margin in the years thereafter. These findings are partly confirmed by Helpman et al. (2008): the majority of trade growth in 1970-97 is attributable to the intensive margin rather than to the extensive one. Furthermore, trade

liberalisation seems to have increased the importance of extensive margins: according to Felbermayr and Kohler (2007), WTO has promoted trade at the extensive margin while the intensive one should not benefit of such agreements.

Besedes and Prusa (2011) decompose export growth into three components (establishing new partners and markets, having relationships to survive or persist, and deepening existing relationships) associating extensive margin to the first channel, while the intensive margin is related to the second and third channel. They found that differences along the extensive margin have very little impact on long-run export growth. By contrast, the developing countries may achieve significantly higher export growth by improving their performance with respect to the two key components of the intensive margin (survival and deepening).

As regards the euro's impact on trade, few studies have analysed the role of extensive and intensive margins. Baldwin and Di Nino (2006) and Flam and Nordstrom (2006) use country-level bilateral trade data with a product disaggregation at the HS6 level. Both studies adopt a gravity approach and show that, following the euro adoption, the number of goods exported by the Member Countries increased. This is considered as an evidence of the influence of the common currency on the extensive margin. This effect is estimated greater than the impact on the intensive margin, which is found anyway positive and statistically significant.

A richer information set covering both firm and product-level data is used by Berthou and Fontagnè (2008 and 2009), who analyse the effect of EMU on French firms' exports over the period 1998-2003. The intensive and extensive margins of French exports are defined, respectively, as the value of exports per variety and as the number of varieties exported to each destination country. These authors estimate two distinct gravity equations for each margin. They find a positive effect of the euro on the extensive margin of French exports, while the results on the intensive margin are either not significant or even negative in some years.

Nitsch and Pisu (2008) use Belgium firm level data on exports providing breakdwon of export flows in terms of firm, product (detailed at 8-digit level) and destination market. Their results show a clear evidence of a pro-trade effect of the euro along the extensive margins: the increase in the number of exported varieties is due to both new firms entering the export market and to an expansion of the range of goods exported by incumbent firms.

Baldwin et al. (2008) report similar studies for non-EMU countries like Hungary and Sweden. Even if pro-trade effetcs of the euro should mainly concern nations that share the common currency, several variants of the trade-creation mechanism would allow for potitive effects on export coming from non-euro zone countries.

As for Italy, to our best knowledge there aren't studies analysing the impact of the euro inception on the behaviour of individual exporters. This is mainly due to the lack of firm and product-level information for the relevant period. Castellani et al. (2010) analyse the behaviour of Italian firms both on export and import sides using a dataset

combining firms' balance-sheet information with foreign trade data. This paper is rich of evidence, including insights on concentration of Italian trade flows along the country and sector (not product) extensive margins. These authors only cover a pre-euro period (1993-97). In this study we try to fill this gap of evidence.

3 ISTAT micro-level dataset on Italian manufacturing exporting firms

3.1 The dataset

The focus of our analysis is to evaluate the effects of the adoption of the single currency in terms of both intensive and extensive margins of trade for a representative sample of Italian exporters. To this aim, the main structural features of firms (size, turnover, productivity), their exporting performance and the structure of their involvement in international trade (i.e., export turnover, destination areas, number of destination markets, number of exported products) should be considered. All these information are not completely available in a single data source. The dataset used for the empirical analysis is obtained through the integration of two firm-level datasets provided by the Italian National Statistical Institute (Istat).

First of all, the reference statistical source providing infomation on structural firms' characteristics (value of production, turnover, operating costs, wage and salary, value added, tangible and intangible fixed assets) is represented by the Micro.3 database (Grazzi et al., 2009). It may be considered as a collection of cross-sections bound together over a wide time interval (1989-2006). As a relevant charateristic, it recovers homogeneous definitions for some specific variables of interest which composition is changed over time[3].

The main building blocks of Micro.3 are represented by two specific enterprises surveys (SCI census, PMI survey), which collect the most relevant balance sheet/income statements information on the Italian firms. Balance sheet/income statement data are mainly drawn by the census of Italian firms (SCI census). Currently, it covers all companies which size is larger than 100 employees (until 1998, the reference universe was represented by all firms with at least 20 employees). PMI survey collects infomation on the universe of small and medium enterprises (SMEs), which cover more than 98% of the total of Italian companies active across all sectors of economic activity (more than 4.1 mln of firms). As a result, PMI is built as a "rotating" sample survey and it currently covers the subset of firms which size is below 100 employees (below 20 employees in the years prior 1998, consistent with the changes of the coverage of the SCI census). PMI datasets essentially includes the variables

3 Specifically, the structure of the Income Statement follows the Value-Added method in the period 1989-1997 and the form of the standard annual report in 1998-2001 (according to the Fourth Council Directive). For the interval 2002-2004, the balance sheet variables include the "Assets" but there is no information on the debt structure.

appearing in the firms' Income statement; the survey does not gather any information from the balance sheet statement.

In Micro.3 dataset, the coverage of small enterprises (firms with size below 20 employees) is significantly underepresented, as they roughly account for about 2% of overall companies. Furthermore, small firms are not represented at all in the period between 1995 and 1997. Micro.3 is then integrated with annual information drawn from Istat PMI databases (for each year of the period 1996-2005). After the merging of new information, the share of small enterprises rose to about 10% of the overall firms (per each year).

Micro.3 also includes some data drawn from custom trade statistics (FT). FT is a census type statistics (based on information drawn from administrative data) and represents an harmonized source about imports, exports and trade balance. It tracks the value and quantity of goods traded by Italian firms with both EU (intra-EU trade) and non-EU operators (extra-EU trade). Micro.3 is linked to firm-level information concerning exports and imports.

However, since the paper is focused on the margins of trade, the external trade information already included in Micro.3 is not satisfactory for our empirical purposes. Information for both the scale (export turnover) and the scope (number of destination markets and product mix) of Italian exporters can be drawn by the trade custom data. FT provides, as a very distinctive feature, "within the firm" information regarding each company's involvment in international trade. Specifically, for each firm and for each time period, FT contains information on the value and the volume of goods traded (exported, imported) by each pair of product/destination market.

We manage this information as follows. First, the structure of export flows towards each destination market (extensive margin) is held at the most detailed level. Second, export flows by firm/destinations are aggregated with respect to firm's scope (an additional extensive margin) so that only the information on the number of products by firm/destination market is retained[4]. Overall, the revised structure of FT dataset is as follows: *i*) firm-level exports towards each specific destination markets are available; *ii*) the number of product exported is provided for each pair of firm/destination market; *iii*) data on import are excluded from the dataset.

Data from both FT and Micro.3 databases is matched at firm-level. The firm-level linkage of Micro.3 (augmented with PMI information) to external trade data does not introduce any selection bias since FT covers the universe of internationalized companies (including SMEs) and it almost completely overlaps with Micro.3. In FT dataset, the international trader is uniquely identified by the VAT code. By contrast, each enterprise in the Micro.3 dataset is identified by the ISTAT "company-code", an identifier assigned to the firm when the production unit is surveyed in the Italian business register

4 The number of products is computed according to the 8-digit code of the Combined Nomenclature (CN), the classification system adopted in the FT database.

(Statistical Register of Active Enterprises, ASIA). This register provides a unique association between the VAT code and the Istat company code for the same enterprise[5].

The dataset covers a 9 year period from 1996 to 2004. First of all, this time span is divided into a sequence of three time_intervals, 1996-1998 (pre-euro period), 1999-2001 and 2002-2004 (post-euro periods). Each of them is then collapsed to form a single average period by summing up the yearly information on the intensive margin, and averaging the yearly infomation on the extensive margins. For comparison purposes, Table 1 presents the figures of some key variables by classes of employees, namely the average firm size, the distribution employees, valued added and labour productivity, the average incidence of export on total turnover. The comparison with the figures drawn from Istat corresponding universe (computed as the average for the time period 2002-2004) indicates that the dataset used in this study provides a reliable representation of the of Italian exporting firms, especially in terms of firm size and labour productivity. Specifically, the datatset provides consistent representation of the enterprises with more than 19 employees in terms of all the indicators considered in Table A1 (see Appendix). A likely under-representation of the SMEs (firms belongin to the first two size classes in Table A1) seems to emerge in terms of the distribution of number employees and valued add and also if the average export share is considered.

3.2 Some descriptive analysis

Tables A2, A3, and A4 (see Appendix) reports some descriptive caracteristcs of Italian exporting firms included in our dataset.

First of all, data include a very large number of exporting firms (43,000 in the first time period, around 49,000 in the following two). Due to the fact that same firm can enter and exit from foreign markets in each period, only a part of them (around 21,000) is always exporting in foreign markets in the whole time period. We have to keep in mind this when we compare the total number of firms across time periods.

From the structure of our data, it is possible to draw some evidence, in line with expectations. First of all, in each of the three-years aveage period considered, the number of firms exporting only one product is considerable in absolute terms but it is by far a small share of the total number of firms (ranging between 16 and 20% in the three time intervals considered). Firms exporting more than 10 products cover a relevant share of the total (between 37 and 43%) and their share of export value is largely predominant (between 90 and 93%).

5 A set of production units common to Micro.3 and FT database is obtained as follows. First, ASIA and FT databases are matched using the VAT code in order to obtain pairs of VAT-Istat codes for each trader. Secondly, FT and Micro.3 are then matched using the “company-code” as common information. It should be considered that the relation between Micro.3 and FT is of the type one-to-many, since for any record in Micro.3 (firm i in year t) it is possible to identify more than one correspondence in FT, due to the greater detail of export flows (for firm i in year t) by destination markets. The matching procedure allows to dropping out the subsample of companies entirely focused on domestic market and to select a sample of exporting firms.

In each one of the three time periods considered, as the number of exported products increase, there is an increase in the (average) number of destination markets followed by an increase in firm size (in terms of average number of employee).
Comparing the three time periods considered, between the first and the second time interval we observe an increase in the total number of exporting firms (from 43,000 to about 49,000 units) while the corrisponding increase in the number of destination markets and size seems to be not so relevant.
However, in the third time period (compared to the second one), while there is a stability in the total number of firms, we observe a puzzling increase in the average number of destination markets associated with a decrease in average firm size. We argue that, one the one hand, this evidence could be partially explained by the increase of firms exporting one single product (from 8,766 to 10,224 units); single product exporting firms show a smaller size compared with the corresponding average of the previous period (it decreases from 44.1 to 37.7 employees) while the average number of destination markets remains fairly the same. On the other hand, larger multi-product exporting firms (more than 10 products) increase, from the second to the third period, their average number of destination markets (from 22 to 25). This latter effect has more than balanced the reduction of number of destination markets due to the entrance of new small-sized (single-product) exporting firms.
In a second group of tables (Tables B1-B4, see Appendix) we focus only on firms exporting in the second time span (1999-2001), which is especially relevant as it represents the period where the effect of the Euro introduction on firm exports should be expected. In tables B1 and B2 we split firms exporting in the 1999-2001 (49,725, see table A3) into two groups: "new" firms (i.e. the firms exporting only in the second time span, Table B1) and "persistent" firms – firms exporting both in 1996-1998 and 1999-2001, Table B2). First of all, it is worth to notice that there is a large number of new exporting firms (over 21,000) with respect to the "persistent" ones (over 27,000).This finding is consistent with the evidence already stressed and related to the whole sample. Disentangling this two groups in terms of their structural characteristics, new exporting firms show smaller size, lower productivity and lower number of destination markets compared with the "persistent" firms. Indeed, a large share (around 30%) of the total of firms entering in foreign markets for the first time is represented by single product exporters; those exporting from 1 to 3 products represent more than 50% of total new exporters. The same evidence could be drawn when we look at firms exporting only towards Eurozone markets. (Table B3 and B4). Again, size, productivity, number of destination markets are much lower for new exporting firms with respect to the incumbent one, i.e., the businesses already present in Eurozone markets. Last but not least, their contribution in the value of total export is quite low (around 13%)[6].

6 This share is calculated as the total sum of export value of new firms towards Eurozone Markets (n table B3) on the total sum of export value of all the firms exporting towards Eurozone markets (sum of the values n Table B3 and B4).

All in all, from this descriptive analysis it is possible to notice that a large number of Italian firms could have benefited from lower fixed-entry costs due to the euro introduction; in line with theoretical models, these firms are smaller and less productive, and also exporting a lower number of products. Also their contribution to the total value of export is quite low. These evidences are of some interest to interpret the empirical results concerning the significance of a trade effect coming from euro introducion. That is the object of the following part of this paper.

4. Empirical analysis

4.1 Estimation technique, model specification

To test the trade-creation effect of the single currency on exporting firms we use difference-in-difference (DID) techniques. The euro introduction can be considered as a treatment to which some countries are exposed while some others are not. In this paper, DID techniques is used to detect the causal relationship between the treatment (the euro introduction) and the outcome (a positive trade effect through an increase in export turnover). As our dataset consists only of Italian firms, we cannot control for the euro effect on Italian exporters vis-à-vis a control group of (untreated) exporters of a non-Member country. However, we are able to do this distinction on the side of destination markets by exploting the fact that some destination markets of Italian exporters are part of the single-currency area, while some others are not. In other terms, the euro introduction could have benefited firms exporting flows towards the eurozone markets with respect to flows directed to countries that didn't join the common curency. These latter are adopted as control group in the framework of DID estimates.[7]

The choice of the control group is relevant for DID estimates. "Non treated" countries (belonging to the control group) should be as more similar as possible to the "treated" ones. The rationale is that countries in the latter group should differ from that in the former group only for the treatment itself.

Results are sensitive to the choice of control group. In our estimates, we use two different control groups: a broader one, including all European countries not joining the single currency, and a more restricted one, only including UK, Sweden and Denmark.

7 A similar application of DID estimation is applied to the case of French firms by Berthou and Fontagnè (2008).

As for the empirical strategy, we use a panel data technique. The main reason supporting this choice is that it enables us to control for the correlated time invariant heterogeneity[8].

We performed a Hausman specification test to check for the presence of correlation between explanatory variables and individual effects. The results show that the null hypothesis of zero correlation was rejected: for our purposes, the fixed effects model (FEM) seems more reliable than the random effects model (REM)[9].

We estimate a gravity-like equation. Our aim is to verify whether the introduction of euro had a positive effect on firm-level trade and whether this effect passed through intensive and/or extensive margins. To this aim, we firstly estimate the effect of euro introduction on firms'export performance using firm-level total export as dependent variable. Then, if a positive and statistically significant effect emerges, we test the channel through which this effect is achieved using both the extensive and intensive margins as dependent variables. We define the extensive margin as the number of products exported by each firm on each destination market in a given year (product extensive margin) and the intensive margin as firm's average value of exports in terms of exported products.

For each dependent variable (overall firm-level export value and both margins of trade), the estimated equation takes the following form:

$$\text{Ln}(Z_{ijkt}) = b1\text{Ln}(GDP_{jt}) + b2\text{Ln}(Dist_{ij}) + b3\text{Ln}(Prod_{it}) + b4\text{Ln}(ERi_{jt}) + b5\ duEURO_{jt} + b6\ size_{it}\ 1\text{-}19 + b7size_{it}\ 20\text{-}49 + b8size_{it}\ over\ 50 + e_{ijkt} \quad (1)$$

where

- Ln is natural logarithm; i is Italian exporting firm; j is the destination market; k is the exported product; t is time;
- Z is the outcome variable which represents both the overall export value by firm-product-market (Exp) and the margins of trade (extensive or intensive, Mar)
- GDP is gross domestic product of the importing countries, which is a proxy for size of the destination markets involved in bilateral trade;

8 OLS estimator suffers from heterogeneity bias in a gravity setting. The two most widely used panel data models are the random effect model (REM) and the fixed effect model (FEM): both estimators can control for heterogeneity. REM models require that unobserved bilateral effects are .i.id.. and orthogonal to the remaining part of the error term. Regressors have to be uncorrelated with individual effects, error terms for all cross sections and time periods. If the orthogonality conditions hold, REM yields more efficient estimates than FE estimator. If the explanatory variables are correlated with the unobserved individual effects, FEM is consistent.

9 The test statistic of 83.34 is greater than the chi-squared critical value with 6 degrees of freedom at the 0.001 significance level; therefore the null hypothesis that the REM is consistent is rejected.

- Dist is the great circle distance (in log terms) between i and j[10]; this formula approximates the shape of the earth as a sphere and calculates the minimum distance across the surface;
- Prod is value added per employee; in the specification;
- ER is the average of bilateral nominal exchange rate between lira (euro since 1999) and destination market national currency (an increase of bilateral exchange rate indicates an appreciation of the Italian currency);
- Size is a control for firm size, proxied by the number of employee: small (from 1 to 19), medium (from 20 to 49) and large (over 50);
- duEuro is a dummy variable denoting the period following euro introduction. It represents the variable of interest, capturing the effect of euro introduction on firm margins.

According to equation (1), we expect our dependent variables to be positively influenced by the importing countries' GDPs, appoximating total real expenditure in destination countries, and by firm's productivity. A negative effect is expected to come from the distance variable, as it approximates transport (trade) costs and from exchange rates, indicating an appreciation of Italian currency. Following theoretical and empirical predictions, we expect a negative effect on margins if firm size is small, positive in the case of large firms. As the euro effect is concerned, the impact is expected o be positive to the extent that the introduction of the common currency determines appreciable reduction of both trade costs and market-entry costs.

4.2 Estimation results

In Tables 1-2 we report the results of the estimates of equation (1) for both exports value and the two margins of trade. Equation (1) is estimated using FE estimator; we report OLS results for a comparison purposes. In general, controlling for heterogeneity by the inclusion of fixed effects, the size and signs of parameters changes substantially. In the case of DID estimates, we use two different countrol groups: EU3 (UK, Sweden and Denmark) and a wider group including also all the other European countries not joining the common currency. As expected, results, are sensitive to the choice of control group, particularly in the case of FE estimates. We consider the choice

10 Required to calculate great circle distances are the longitude and latitude of the capital or "economic center" of each economy in the study. The following formula is then applied to obtain the distance measured in miles: Dij = 3962.6 arccos([sin(Yi) · sin(Yj)] (6)+ [cos(Yi) · cos(Yj) · cos(Xi − Xj)]),where X is longitude in degrees multiplied by 57.3 to convert it to radians and Y is latitude multiplied by −57.3 (assuming it is measured in degrees West).

of the more restricted control group as the most appropriate to the purposes of the study. Firstly, countries of the group EU3 may be considered to be similar to the eurozone Member States in terms of their geographical location. Furthermore, they completely shared with them the European integration process undertaken in last decades and basically differ from euro countries because they decised not to join the single currency[11]. It follows that our comments are focused on FE results obtained using EU3 as a control group in DID estimates.

Tab. 1 The impact of euro introduction on trade

Dependent variable: firm export value by product/market

	Control group: EU3 (Uk, Sweden, Denmark)		Control Group: EU3 + other Europe)	
	OLS	FE	OLS	FE
Ln (GDP_{jt})	.635***	.267***	.555***	.357***
	(.004)	(.031)	(.004)	(.031)
Ln ($Dist_{ij}$)	-.149***		-0.426***	
	(.014)		(.009)	
$duEURO_{jt}$	.001	.035**	.060****	.082***
	(.021)	(.016)	(.017)	(.013)
Ln (ERi_{jt})	.101***	-.393***	.094***	-.293**
	(.002)	(.153)	(.002)	(.145)
Ln ($Prod_{it}$)	.578***	.260***	.557***	.251***
	(.006)	(.010)	(.006)	(.009)
$size_{it}$ 1-19	-.933***	-.313***	-.884***	-.298***
	(0.036)	(.035)	(.033)	(.032)
$size_{it}$ 20-49	-.123***	-.020	-.115***	-.027
	(.035)	(.031)	(.032)	(.028)
$size_{it}$ over 50	1.166***	.247***	1.135***	.244***
	(.035)	(.031)	(.032)	(.029)
n. observation	402001	399050	461940	458593
R square	.17	.02	.17	.03

Looking at results, both exports value (Table 1) and margins (Table 2) of Italian manufacturing firms are positively affected by total real expenditure (GDP) of destination markets[12]. Also the influence of productivity (firm's value added per employee) is in line with theoretical prediction: the more productive is the firm (the lower is the marginal cost it is endowed with), the larger are its exports values and its export margins. In all the estimates, the coefficient is highly statisticaly significant. Firm size matters in determining both total firm export value and their margins: a small

11 Destination countries treated by euro introduction in 1999 are Austria, Finland, Germany, Italy, Ireland, The Netherlands, Spain, Portugal, Belgium and Luxembourg. The latter two countries correspond to the same destination market in terms of FT data.

12 Bilateral trade is negatively affected by transport costs (geographical distance): In FE estimates this variable is wiped out because is time-invariant; however, it's negative sign is correctly detected in OLS estimates

size has a negative impact on exports while a larger size has a positive effect. The exchange rate coefficient shows the expected sign: an appreciation of the currency leads to a decrease in exports. However, it is not statistically significant in the case of the extensive margin equation.

Tab. 2 The impact of euro introduction on margins of trade

Tab 2.a Dependent variable: intensive margin

	Control group: EU3 (Uk, Sweden, Denmark)		*Control Group: EU3 + other Europe)*	
	OLS	FE	OLS	FE
Ln (GDP_{jt})	0.510***	0.127***	0.464***	0.063***
	(0.004)	(.031)	(0.003)	(.029)
Ln ($Dist_{ij}$)	-0.064***		-0.162***	
	(0.013)		(0.008)	
$duEURO_{jt}$	0.019	.034**	0.041***	.026**
	(0.02)	(0.016)	(0.015)	(.012)
Ln (ERi_{jt})	0.074***	-0.296**	0.071***	-.417***
	(0.002)	(0.137)	(0.002)	(.130)
Ln ($Prod_{it}$)	0.454***	0.220***	0.430***	.206***
	(0.005)	(0.010)	(0.005)	(.009)
$size_{it}$ 1-19	-.642***	-.247***	-.61***	-.228***
	(.032)	(.032)	(.029)	(.029)
$size_{it}$ 20-49	-.044	-.026	-.045	-.033
	(.031)	(.027)	(.028)	(.025)
$size_{it}$ over 50	.860***	.165***	.820***	.151***
	(.031)	(.028)	(.028)	(.025)
n. observation	402001	399064	461938	458593
R square	0.12	0.02	0.12	0.01

Note: Robust Standard errors in brackets; *** p<0.01; ** p<0.05; * p<0.1

As for the euro-dummy coefficient, our variable of interest, the results reported in Table 1 show that the introduction of euro had a positive effect on firm's export performance; its magnitude seems in line with those reported in recent empirical literature on the euro effect on trade at both macro and sectorial level.

This positive effect seems to be channelled by an increase in the average value of total export (the intensive margin, Table 2a) but not by the number of exported varieties (extensive margin, Table 2b). In this latter case, the coefficient of the variable relating to the introduction of the euro is positive but not statistically significant (while it is significant if we use the broader control group). It is worth to notice that, in both cases, this is an average effects in relation to all Eurozone destination markets.

This finding – a positive effect of the common currency on Italian exports mainly channelled through the intensive margin – points a difference with respect to the

evidence available for the other European countries, where the impact along the extensive margin would have been dominant (see Berthoù and Fontagnè 2008 for the case of French firms; Nitsch and Pisu 2008 for Belgian exporters).

Tab. 2.b Dependent variable: estensive margin

	Control group: EU3 (Uk, Sweden, Denmark)		*Control Group: EU3 + other Europe)*	
	OLS	FE	OLS	FE
Ln (GDP_{jt})	0.124 ***	0.140***	0.091***	.1401***
	(0.002)	(.013)	(0.002)	(0.013)
Ln ($Dist_{ij}$)	-0.085***		-0.264***	
	(0.006)		(0.004)	
$duEURO_{jt}$	-0.019*	.001	0.018**	0.055***
	(0.01)	(0.062)	(0.008)	(0.005)
Ln (ERi_{jt})	0.026 ***	-0.09*	0.022***	-.096*
	(0.001)	(0.06)	(0.001)	(0.058)
Ln ($Prod_{it}$)	0.123***	0.039***	0.127***	.0392***
	(0.003)	(0.005)	(0.003)	(0.005)
$size_{it}$ 1-19	-.292***	-.065***	-.271***	-.065***
	(.016)	(.014)	(.015)	(.013)
$size_{it}$ 20-49	-0.08***	-.005	-.07***	.005
	(.015)	(.012)	(.014)	(.011)
$size_{it}$ over 50	.306***	.082***	.315***	.082***
	(.016)	(.012)	(.014)	(.012)
n. observation	402001	399050	461940	458593
R square	0.06	0.04	0.06	0.04

Note: Standard errors in brackets; *** p<0.01; ** p<0.05; * p<0.1

A possible explanation of this Italian peculiarity should be related to descriptive evidence shown in paragraph 3.2. The lowering of fixed entry costs due to euro introduction benefited a large number of exporting firms: in the 1999-2001 period, the share of "new" exporting firms was quite relevant. In line with theory, these latter show much lower productivity with respect to firms already exporting towards eurozone markets. Their contribution to the change in the total number of products exported is low, because a relevant part of them exported only 1 or 2 varieties; it follows that also their contribution to the total export value is modest. In other words, it is possible that the well-known structural characteristics of Italian firms in terms of size (and productivity) and, additionally, the nature of single-product exporters of new entrants exporters is reflected in the lack of statistical significance of the euro effect for the extensive margin. This intuition seems to be confirmed by the role of size directly detected from empirical results: small and mediun firm group proxies show a negative and statistically significant coefficients, while the sign of larger group proxy is positive.

The inclusion of firm productivity among regressors could cause endogeneity problems, affecting the results. In fact, it is well known that export performance and productivity growth might be determined by common factors[13]. We suppose that there are some unobseverd effects related to firm specific characteristics and firm size that affect both firm productivity and it's export performance. In particular, we identify a source of the simultaneity bias in the efficiency of i-th firm as it could benefit from the presence of more productive firms in the same sector of activity and with similar characteristics such as size (peer effects). It can be assumed that these peer effects induce productivity dynamics that are correlated with export activity. To test for such factors, we follow the standard approach developed in the recent literature by using linear-in-means regression specification. This approach allows to define an instrument that is correlated with firm productivity and uncorrelated with export performance.

In particular, following the empirical strategy adopted in Chetty el al. (2011), we build a leave-out-mean peer score measure as :

$$\Delta\pi_{sk}^{-i} = \pi_{sk}^{-i} - \pi_{k}^{-i} \tag{2}$$

where:

$$\pi_{sk}^{-i} = \frac{1}{N_{sk} - 1}\sum_{j \neq i} \pi_{jsk}^{-i} \tag{3}$$

and

$$\pi_{k}^{-i} = \frac{1}{N_{k} - 1}\sum_{s}\sum_{j \neq i} \pi_{jsk}^{-i} \tag{4}$$

where π is firm level productivity, i is firm, s is the 3-digit sector of activity, k is firm class size of employees, N is the number of firms in sector s and with size class k.

We use (2) as in instrument in an instrumental variable approach to test if results reported in Tables 2a and 2b (i.e. the effect of euro introduction on extensive and intensive margins) are affected by the presence of endogeneity. We report our results in table 3.

In the testing procedure, we reject the assumption of of weak instruments (Stock and Yogo) at the 5%, accept the null for the test of underidentification (Anderson correlation) and reject the null for the overidentification test (Sargan).

Also after having controlled for endogeneity coming from the inclusion of firm productivity, the empirical findings confirm a significant positive effect due to the adoption of the single currency on the intensive margin while the impact on the intensive margins remains not statistically significance [14].

13 As an example, R&D expenditure is an activity that could strengthen firm level exporting performance and raise average productivity at the firm level. For a survey, see Wagner (2007).

14 Note that results on productivity obtained with IV regressions are not directly comparable with those reported in tables 2a and 2b where estimates included constant term. For a comparison, we follow a two-step control function approach: in this case, the magnitude of the productivity coefficient is smaller than the one estimated in the FE regressions.

Tab. 3. Instrumental variables estimates, FE (control group: EU3)

	Intensive margins	*Extensive margins*
Ln (GDP_{jt})	0.103***	0.137***
	(0.035)	(0.016)
Ln ($Dist_{ij}$)		
$duEURO_{jt}$	0.029*	-0.000
	(0.017)	(0.007)
Ln (ERi_{jt})	-0.226	-0.0426
	(0.158)	(0.0743)
Ln ($Prod_{it}$)	0.893***	0.741***
	(0.390)	(0.154)
$size_{it}$ 1-19	-0.324***	-0.194***
	(0.102)	(0.043)
$size_{it}$ 20-49	-0.133***	-0.072***
	(0.040)	(0.018)
$size_{it}$ over 50	0.115***	0.058***
	(0.043)	(0.019)
n. observation	200781	200781
Underidentification Test	122.562 (Chi-sq(4) P-val =0.0000)	171.885 (Chi-sq(3) P-val = 0.0000)
Sargan statistic	0.872 (Chi-sq(3) P-val = 0.8322)	0.989 (Chi-sq(2) P-val = 0.6099)

Note: Standard errors in brackets; *** p<0.01; ** p<0.05; * p<0.1

5 Conclusions

Our work is positioned in the strand of empirical literature spurred by "new-new trade theory" and studying the impact of the euro on firms' export flows of Member countries, along the intensive and extensive margins of trade. Due to data constraints,

these studies suffer from lack of homogeneity and cover only a few euro area countries. We add fresh evidence to this literature by considering the Italian case.

We use a new dataset obtained merging firm-level data collected by the Italian National Institute of Statistics (Istat) provind information on Italian manufacturing firms. We find that the single currency induced no significant effect on Italian export flows along the extensive margin of trade. On the contrary, it gave an impulse through the intensive margin. The latter is such to determine a positive overall effect of the single currency on firms' exports. This result confutes former aggregate evidence of a "no-impact" of the euro on Italian exports. We interpret this as a confirmation of the importance to properly control for firm heterogeneity to uncover behaviours otherwise concealed in aggregate analysis.

Referring to Melitz-model, the finding of a role of the intensive margin and of no significant effect of the extensive margin would suggest that in the case of Italy the positive impact of the euro is mainly caused by the reduction of variable trade costs; cuts of fixed-entry costs are instead notsignificant. This result is in line with the well known stylised fact on the structural characteristics of Italian firms. Low average size, low productivity and single-product firms benefited of a downward shift of fixed entry costs on foreign markets induced by common currency; but their contribution to total value of export is too low to turn statistically significant. This evidence is partly at odds with the few results available for European countries, where the extensive margin is found to play a dominant role.

REFERENCES

Anderson, James E. and Eric van Wincoop (2003), "Gravity with Gravitas: A Solution to the Border Puzzle," American Economic Review, March 2003, 93, 170-192

Baldwin R. (2006), "In or Out: Does it Matter? - An Evidence-based Analysis of the Trade Effects of the Euro", CEPR June.

Baldwin R. and Di Nino V., (2006)" Euros and zeros: The common currency effect on trade in new goods", HEI Working Paper No: 21/2006.

Baldwin R., F. Skudelny and D. Taglioni (2005), "Trade effects of the euro: evidence from sectoral data," ECB Working Paper Series No. 446, February.

Baldwin R., V. Di Nino, L. Fontagnè, R.A. De Santis, D. Taglioni (2008), "Study on the Impact of the Euro on Trade and Foreign Direct Investment", European Economy Economic Papers n.321, May.

Bernard B., Eaton J., Jensen J. B. And Kortum S (2003), "Plants and Productivity in International Trade", American Economic Review 93, pp. 1268-1290.

Berthou A. And Fontagnè L., (2008), "The Euro and Intensive and Extensive margins of Trade: Evidence from French Firm Level Data", CEPII working paper, n.06, april.

Berthou A. And Fontagnè L., (2009), "How Do Multi-Product Exporters React To a Change in Trade Costs?", forthcoming, Scandinavian Journal of Economics

Besedes T. and Prusa T.J., (2011), "The Role of Extensive and Intensive Margins and Export Growth", Journal of Development Economics, Volume 96, Issue 2, November, pag.371-379.

Castellani D, Serti F. and Tomasi C. (2010), "Firms in International Trade: Importers and Exporters Heterogeneity in the Italian Manufacturing Industry", *The World Economy*, Volume 33, Issue 3, pages 424-457.

Chaney T. (2008), "Distorted Gravity: The Intensive and Extensive Margins of Internationale Trade", American Economic Review, 98, pp. 1707-1721.

Chetty R., J. Friedman, N. Hilger, E. Saez, D.W. Schanzenbach, D. Yagan (2011), "How Does Your Kindergarten Classroom Affect Your Learning? Evidence From Project Star", Quarterly Journal of Economics, vol. 126, Issue 4, November.

Crinò R. and Epifani P. (2008), "Productivity and Export Intensity of High-Income and Low-Income Countries", mimeno Università Bocconi.

de Nardis, S., De Santis R., Vicarelli C. (2008a) "The Single Currency's Effects on Eurozone Sectoral Trade: Winners and Losers?", Economics, The Open Access, Open Assesment E-Journal, vol. 2, 2008-17.

de Nardis, S., De Santis R., Vicarelli C. (2008b) "The Euro's Effect on Trade in a Dynanmic Setting ", European Journal of Comparative Economics, vol. 5, n. 1, pp. 73-85.

de Nardis S. e Pappalardo C. (2009), "Export, Productivity and Product Switching: The Case of Italian Manufacturing Firms" , ISAE working paper, n. 109.

Evenett, S. J. and Venables A.J. (2002), "Export Growth in Developing Countries: Market Entry and Bilateral Trade Flows", University of Bern working paper, mimeo.

Felbermayr, G J. and Kohler W. (2006), "Exploring the Intensive and Extensive Margins of World Trade," Review of World Economics, 142(4):642–674.

Felbermayr, G. J. and Kohler W. (2007), "Does WTO Membership Make a Difference at the Extensive Margin of World Trade?" CESifo Working Paper No. 1898.

Flam, H. and H. Nordstrom (2006), "Euro effects on the intensive and extensive margins of trade", CESifo Working Paper Series n. 1881.

Fontagnè L, Mayer T. and G. I. P. Ottaviano (2009), "Of Market, Product and Prices: The Effect of Euro on European Firms", Intereconomics, May/June

Grazzi M., Sanzo R., Secchi A. and A. Zeli (2009), ISTAT-MICRO.3. A New Integrated System of Business Micro-data 1989–04, Documenti ISTAT n. 11/2009

Hausman J.A. and W.E.Taylor (1981), "Panel Data and Unobservable Individual Effects", Econometrica, 49, 6, 1377-98.

Helpman, E., Melitz M. and Rubinstein Y. (2008), "Estimating Trade Flows: Trading Partners and Trading Volumes," The Quarterly Journal of Economics, vol.123, Issue 2, May.

Hummels, D. and Klenow P. L. (2005), "The Variety and Quality of a Nation's Exports," American Economic Review, 95(3):704–723.

Kluger M. and Verhoogen E. (2008), "The Quality-Complementarity Hypothesis: Theory and Evidence from Columbia", NBER Working Paper Series, n. 13214.

Kox H.L.M. (2012), "Export Decision of Services Firms Between Agglomeration Effects and Market Entry Costs", CPB Discussion Paper n.211.

Krugman, Paul R. "Intraindustry Specialization and the Gains from Trade." Journal of Political Economy, 1981, 89(5), pp. 959 –973.

Melitz M. J. (2003), "The impact of trade on intraindustry reallocations and aggregate industry productivity", Econometria, 71, pp. 1695-725.

Melitz M. J. and Ottaviano G.I.P. (2008), "Market Size, Trade and Productivity" Review of Economic Studies 75, pp. 295-316.

Micco A., Stein E. and G. Ordoñez (2003). "The Currency Union effect on Trade: Early Evidence from EMU", *Economic Policy*, 18(37), 317-356.

Nitsch V. and M. Pisu, (2008), " Scalpel Please! Dissecting the Euro's Effect on trade", mimeo.

Rose A. (2000), "One Money, One Market: Estimating the Effect of Common Currencies on Trade", Economic Policy, 15 (30), 7-46.

Wagner, J. (2007), "Exports and Productivity: A Survey of the Evidence from Firm-level Data", The World Economy, vol. 30(1), pages 60-82.

Walsh K. (2006), "Trade in Services: Does Gravity Hold? A Gravity Model Approach to Estimating Barriers to Services Trade", mimeo.

STATISTICAL APPENDIX

Table A1. – Exporting firms - Comparison with the Istat universe (averages 2002-2004)

Classes of employees	*Firm size (a)*		*Employees (b)*		*Value added (b)*		*Value added per employee (a)*		*Export share (c)*	
	Sample	Reference Universe	Sample	Reference Universe	Sample	Reference Universe	Sample	Reference Universe	Sample	Reference Universe
1-9	3.38	4.3	1.0	6.8	0.6	4.9	35.42	36.3	43.05	27.2
10-19	13.34	13.9	2.9	10.6	1.9	8.0	39.7	38.3	18.42	28.5
20-49	29.45	30.4	19.6	17.1	14.7	15.6	45.46	46.6	26.01	27.5
50-249	90.18	99.5	28.2	29.6	24.9	30.8	52.91	53.0	33.75	35.2
250 and over	987.57	744.5	48.4	35.8	57.8	40.7	63.42	57.8	31.18	39.4
Total	27.7	30.6	100.0	100.0	100.0	100.0	38.49	50.9	36.04	35.4

(a): average; (b) frequency; (c) percentage.

Tab.A2 Descriptive statistics, 1996-1998

number of product	*number of firms*	*Sum of export value*	*n. of markets/firm*	*size (n. of employee, average)*
1	7,034	634278.4	1.49	33.92
2	3,919	1084006	2.56	38.79
3	2,832	1113420	3.58	43.80
4	2,185	1000203	4.47	41.03
5	1,790	1078786	5.37	39.87
6	1,713	1317847	6.37	40.72
7	1,401	1302617	7.37	41.21
8	1,291	1508545	8.22	43.92
9	1,150	1242415	9.15	44.45
10	1,051	1590901	10.48	39.72
over 10	19,112	1.48E+08	22.41	96.84
Total	43,478	1.60E+08	7.40	64.48

Tab.A3 Descriptive statistics, 1999-2001

number of product	*number of firms*	*Sum of export value*	*average n. of markets*	*size (average of employee)*
1	8,766	1030716	1.46	44.12
2	5,276	1550054	2.71	41.01
3	3,783	1761686	3.89	39.41
4	2,842	1954254	4.84	36.68
5	2,351	1906942	5.96	45.42
6	2,041	1835406	6.97	39.05
7	1,763	2026543	8.07	40.69
8	1,595	2125505	8.95	45.98
9	1,364	2221096	10.51	59.23
10	1,246	2645743	11.18	52.21
over 10	18,698	1.67E+08	22.41	104.30
Total	49,725	1.86E+08	7.90	67.33

Tab.A4 Descriptive statistics, 2002-2004

number of product	*number of firms*	*Sum of export value*	*average n. of markets*	*size (average of emplyee)*
1	10,224	658022.3	1.33	37.66
2	4,651	1269494	2.52	37.41
3	3,260	1268884	3.65	39.30
4	2,577	1586047	4.78	42.02
5	2,088	1622838	6.21	41.60
6	1,763	1462147	6.96	40.89
7	1,618	1514664	7.92	43.19
8	1,373	1683920	8.69	47.89
9	1,245	1923119	9.61	41.52
10	1,151	1793516	11.21	42.26
over 10	19,997	1.88E+08	25.89	103.79
Total	49,947	2.02E+08	12.85879	47.05

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Tab B1. "New" firms: firms exporting in 1999-2001 but not in 1996-1998

number of product	*number of firms*	*Sum of export value*	*average n. of markets*	*size (average of employee)*	*Productivity (v. added per empl.)*
1	6,469	509063.07	1.30	39.87	29.80
2	3,266	410772.14	2.26	30.49	29.07
3	2,074	467092.15	3.23	29.18	33.43
4	1,391	576378.94	3.96	28.92	31.38
5	1,054	495452.95	5.10	27.93	30.88
6	887	451086.19	5.55	27.68	34.33
7	714	440544.96	6.76	25.02	33.30
8	610	383993.77	7.22	134.52	31.98
9	483	419230.10	8.10	48.00	36.96
10	458	484269.56	9.21	32.31	35.52
over 10	4,561	23617049.07	15.75	61.16	41.24
Total	21,967	28254932.90	5.80	42.30	33.19

Tab.B2. "Persistent" firms: firms exporting both in 1996-1998 and 1999-2001

number of product	*number of firms*	*Sum of export value*	*average n. of markets*	*size (average of employee)*	*Productivity (v. added per empl.)*
1	2297	521652.54	1.93	56.09	41.59
2	2010	1139281.93	3.47	58.10	44.50
3	1709	1294593.91	4.71	51.82	44.68
4	1451	1377875.07	5.69	44.13	48.37
5	1297	1411489.27	6.67	59.65	42.93
6	1154	1384320.22	8.06	47.80	52.91
7	1050	1590265.80	8.98	51.35	43.91
8	985	1741510.82	10.03	55.93	49.77
9	881	1801865.98	11.84	65.40	47.44
10	788	2161473.80	12.33	63.78	50.90
over 10	14136	143279048.80	24.23	118.23	52.03
Total	27758	157703378.14	15.41	87.14	49.02

Tab. B3. "New" firms exporting only towards eurozone markets

number of product	*number of firms*	*Sum of export value*	*average n. of markets*	*size (average of employee)*	*Productivity (v. added per empl.)*
1	2,556	197418.34	1.36	26.22	28.81
2	1,424	170443.97	2.25	27.41	29.08
3	836	227332.94	3.44	21.54	35.48
4	520	157497.10	3.75	22.18	30.41
5	365	150050.63	4.74	27.57	28.09
6	324	212225.61	4.94	25.04	34.08
7	249	138979.11	5.73	25.68	33.82
8	217	139999.62	6.82	25.83	31.40
9	162	112485.23	7.67	25.60	35.02
10	177	146718.37	8.19	32.24	33.00
over 10	1,607	4789172.09	13.51	45.36	40.99
Total	8,437	6442323.02	5.00	29.45	32.53

Tab B4. "Persistent" firms exporting only towards eurozone markets

number of product	*number of firms*	*Sum of export value*	*average n. of markets*	*size (average of employee)*	*Productivity (v. added per empl.)*
1	1,029	255552.72	1.93	42.93	38.99
2	923	414711.25	3.41	49.32	44.54
3	702	401493.91	4.42	44.06	43.41
4	573	410725.34	5.45	42.13	48.01
5	489	605716.99	6.70	48.31	41.13
6	412	470380.09	7.31	40.79	67.50
7	388	491727.33	8.01	48.00	45.15
8	355	511776.24	8.69	70.57	51.43
9	303	622910.19	10.84	44.09	48.57
10	281	634348.11	10.98	80.74	45.71
over 10	4,507	37383236.95	20.50	108.49	52.16
Total	9,962	42202579.14	12.31	75.68	48.74