# The Euro adoption's impact on extensive and intensive margins of trade: the Italian case.

By Sergio de Nardis*, Carmine Pappalardo* and Claudio Vicarelli*

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## ABSTRACT

The recent theoretical literature has focused on the importance of extensive and intensive margins of trade in the case of the Euro adoption. But few works have investigated the effects of the euro introduction on the extensive and intensive margins of trade. All these studies have used disaggregated bilateral flows data (6 digit). However, not even the finest level of disaggregation in the publicly available trade data is enough to single out individual products.

We try to fill this gap by using a unique dataset taken from ISAE surveys on Italian manufacturing firms. From this quarterly survey it is possible to obtain information about both the structural characteristics (geographical location, industrial sector of activity, number of employees) and exporting behaviour of firms. In particular, among other things, firms declare their export turnover (as a share of total turnover) and their exporting markets both in the EU (Germany, France, Benelux, UK, other EU countries) and extra-EU areas (USA and other extra EU countries).

We concentrate our analysis on the period 1997-2001, covering the two years before and the three years after the euro introduction., In line with large part of the empirical literature on bilateral trade, we estimate a gravity equation using a Hausman and Taylor estimator (HT).

Our results show that the introduction of the euro has not had any effect on export turnover. This evidence seems to match other empirical findings on Italy, both at aggregate and sectoral level. However, interaction terms between the euro dummy and the group of "entering firms" (firms that started to export after the euro introduction) and that of "persistent firms" (firms that exported in the euro area before and after 1999) are positive and statistically significant, showing a positive effect of the common currency on extensive and intensive margins of trade. Indeed, the magnitude of the coefficient of the former is higher than the latter: in the Italian case, empirical findings for the Euro area as a whole seem to be confirmed.

In our view, the euro introduction has had a positive effect on the extensive margin: a small group of firms benefited from it by starting to export in the Eurozone market. However, the total size of this group is very small; this finding may be due to the average small size of Italian manufacturing firms and to their scarce presence in the ICIR sectors (Imperfect Competition and Increasing Return sectors). Following theoretical indications, these latter are sectors that may have benefited more from the euro introduction: firms usually have lower marginal costs and they can easily cover the fixed costs of export activity if these costs are reduced, as they are when a common currency is introduced.

## 1. Introduction

One of the main advantages expected to arise from the creation of EMU was its positive impact on intra-area trade flows and on foreign direct investments deriving from the elimination of trade costs related to exchange rate volatility, economic exchanges in different currencies, and a greater price transparency.

For the Euro area as a whole, empirical analyses on the first few years of existence of the euro have generally reported a modest, though statistically significant, effect. However, this effect has not been widespread either among members (in some countries it is not statistically significant) or among sectors. On theoretical grounds, different sectors may have benefited from euro adoption in a heterogeneous way; at national level, the differences among manufacturing specialisation may have given rise to "winners and losers" of EMU process.

More recently, increasing attention has been paid to this topic at a micro level. Economic models have been developed which focus on firms' exporting behaviour: a decrease in fixed entry costs, as happens when a common currency is adopted, on the one hand may lead to the entry into export markets of new and less productive firms ("extensive margins"), and on the other, may increase the value of exports of firms already exporting abroad ("intensive margins").

Few studies have investigated the effects of the euro introduction on the extensive and intensive margins of trade. All of them have used disaggregated bilateral flows data (6 digit), finding that the number of exported goods increased after the introduction of euro, and thus confirming the effects of euro on extensive margin. However, these results cannot be exhaustive. In fact, as Baldwin himself stressed, "...the ideal dataset would be to have partner-specific export data by firm" Not even the finest level of disaggregation in the publicly available trade data is enough to single out individual products.

We try to fill this gap by using a unique dataset taken from ISAE surveys on Italian manufacturing firms. From this quarterly survey it is possible to obtain information about both the structural characteristics (geographical location, industrial sector of activity, number of employees) and the exporting behaviour of firms. In particular, among other things, firms declare their export turnover (as a share of total turnover) and their exporting markets both in EU and extra-EU countries.

The paper is organised as follows The second and the third sections describe the theoretical framework and conduct a short survey of previous empirical works. The fourth section describes the dataset; the fifth section presents the empirical strategy and the estimated equation. Section six sets out the estimates results. Conclusions follow.

## 2. Theoretical framework

We assume as reference the Melitz (2003) model characterised by CES consumers' preferences, fixed entry costs to selling in new markets, and firm-level heterogeneous marginal costs. In this model, higher marginal cost translates, through a mark-up rule, into higher price, and this, given (constant) demand elasticity, determines lower revenue and hence lower profit. Therefore not all firms are able to export; only those endowed with suitable technology (marginal cost) find it profitable to sell abroad.

Using the subscripts o, d, j to indicate variables that "come" from country o, "go" to country d, and refer to variety j, the profit of a firm located in o and selling a variety j to destination market d is

$$\pi_{o,d,j} = \tau_{o,d}^{1-\sigma} \left( \frac{\sigma}{\sigma-1} w_o a_{o,j} \right)^{(1-\sigma)} \frac{B_d}{\sigma} - w_o F_d \qquad (1)$$

where $a_{o,j}$ is the amount of labour required to produce 1 unit of variety j and $w_{o,j}$ is the per capita wage, so that $w_o a_{o,j}$ is marginal cost; $\tau_{o,d}$ is the (iceberg-like) transport cost incurred by the firm in transferring variety $j$ from $o$ to $d$; $\sigma > 1$ is the constant elasticity of substitution between varieties; $B_d = E_d / E_d^{1-\sigma}$ is real total expenditure of the consumers of country ($E_d$ being the nominal expenditure of country $d$); $w_o F_d$ is the fixed cost of entering market $d$; $\tau_{o,d}^{1-\sigma} \left( \frac{\sigma}{\sigma-1} w_o a_{o,j} \right)^{(1-\sigma)} \frac{B_d}{\sigma}$ represents variable (or operating) profit in selling to destination d.

The non negative profit condition entails that exporting firms are only those that have a marginal cost such that

$$\pi_{o,d,j} = \tau_{o,d}^{1-\sigma} \left( \frac{\sigma}{\sigma-1} w_o a_{o,j} \right)^{(1-\sigma)} \frac{B_d}{\sigma} - w_o F_d \geq 0 \qquad (2)$$

From which the cutoff marginal cost, $w_0 \bar{a}_{o,j}$, is derived

$$\tau_{o,d}^{1-\sigma} \left( \frac{\sigma}{\sigma-1} w_o \bar{a}_{o,j} \right)^{(1-\sigma)} \frac{B_d}{\sigma} = w_o F_d \qquad (3)$$

Given this condition, the value of exports of a firm located in o to destination d is

$$X_{O,d,j} = \begin{cases} \tau_{o,d}^{1-\sigma} \left( \frac{\sigma}{\sigma-1} w_o a_{o,j} \right)^{(1-\sigma)} B_d \Rightarrow a_{o,j} \leq \bar{a}_{o,j} \\ X_{o,d,j} = 0 \Rightarrow a_{o,j} > \bar{a}_{o,j} \end{cases} \qquad (4)$$

A fall in the bilateral transport cost, $\tau_{o,d}$ , or in the fixed entry cost, $F_d$, stimulates bilateral exports. The drop in $\tau_{o,d}$ favours both the intensive margin (more foreign sales by incumbent exporters) and the extensive margin (more firms can realize variable profits greater than the fixed entry cost); a decrease in $F_d$ stimulates only the extensive margin (less efficient firms start exporting because the fixed entry cost has diminished). Movements in the extensive margins identify the pro-trade effects, coming from trade liberalization, that Baldwin (2006) defines as "new goods" hypothesis.

The former expression suggests a firm-level gravity-like equation, where sales of variety j from the firm located in o to market j depend negatively on the transport cost and positively on destination market (real) expenditure.

### 3 A short survey of empirical studies on extensive and intensive margins of trade

The role of extensive and intensive margins of trade has been investigated by many studies, but the great heterogeneity of countries (advanced and emerging economies) and the time span analysed have led to very different results in regard to the quantitative impact of these two factors on trade growth.

Among more recent studies, Hummels and Klenow (2005) have found that extensive margins account for 60 percent of exports by the larger economies; this percentage decreased to 33% in the case of emerging economies between 1970 and 1997 (Evenett and Venables (2002)). The results obtained by Felbermayr and Kohler (2006) show that extensive margins played an important role in the growth of world trade between 1950-1970 and again in the mid 1990s, while greater support was provided by intensive margins in the years thereafter. These findings have been confirmed by Helpman et al. (2007): the majority of trade growth between 1970 and 1997 was attributable to the intensive margin rather than to the extensive margin. Trade liberalisation seems to have increased the importance of extensive margins: Felbermayr and Kohler (2007) find that the WTO has promoted trade at the extensive margin even if it may not have done so at the intensive one.

Besedes and Prusa (2007) decomposed these margins into three components (establishing new partners and markets, having relationships survive or persist, and deepening existing relationships) and found that differences along the extensive margin have very little impact on long-run export growth. By contrast, by improving their performance with respect to the two key components of the intensive margin (survival and deepening), developing countries have achieved significantly higher export growth.

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) used product-level bilateral trade data at the HS6 level. Both studies adopted a gravity approach.

The common theoretical framework is the "new goods" hypothesis. The results have shown that after euro adoption, the number of goods exported increased, which is evidence of the effect of the common currency on the extensive margin. Indeed, this effect has been greater with respect to the intensive margin, which is equally positive and statistically significant.

However, even if a high level of disaggregation of trade data is used, it is not possible to single out individual products and investigate how and whether firms' behaviour changed after the Euro introduction. Firm-level data are needed for this purpose. More recently, a study by Berthou and Fontagnè (2008) has analysed the micro effects of EMU by using a database on French firm level exports over the period 1998-2003. Defining the extensive and intensive margins of French exports as the value of exports by variety and the number of varieties exported to each destination

country, Berthou and Fontagnè estimated two gravity equations with the two margins as the dependent variable. They found a positive effect of the euro on the extensive margin of French exports, while the results on the intensive margin were not significant, or even negative in some years.

In line with this very recent trend, we use a unique firm level dataset for Italian manufacturing firms to investigate firms' export behaviour before and after the euro introduction. The main characteristics of this dataset are described in the next section .

## 4. ISAE surveys on Italian manufacturing exporting firms

The empirical exercise was carried out using firm-level data drawn from the ISAE surveys on the exporting firms in the Italian manufacturing sector. Data were gathered on a quarterly basis covering the basic information on firms' structural features (geographic location, industrial sector, number of employees). Additionally, a restricted set of variables, which allowed investigation of behaviours specific to exporting firms, was available in the form of the qualitative assessments of entrepreneurs: These referred to i) the change of total turnover in the current period and its very short-run prospects, ii) the pricing to the destination countries evaluated, for each product, as the ratio between the price applied on both external and internal markets, iii) the obstacles to exports, grouped into price and non-price factors, which potentially affect firms' exporting performances.

The share of the exported turnover (in terms of the firm's overall production at current prices) was the reference quantitative information in our dataset and was the dependent variable in the subsequent empirical analysis. Its breakdown with respect to exporting markets was particularly detailed when the European destinations were concerned, more aggregated in the case of extra EU markets.

Specifically, the empirical exercise was carried out on the sub-sample of manufacturing firms observed in each quarter of the time interval 1997-2001. The information selected was averaged on a yearly basis to obtain a balanced panel consisting of 823 production units per each period (corresponding to about ¼ of the original sample size) and of 4115 observations as a whole. To enable the estimation of a gravity model applied to the study of exports decisions, the dataset was augmented with some external variables, particularly GDP figures at constant prices for each destination market and, a measure of distance from each country as a proxy for the costs related to internationalisation. The structure of the database, including the means and the standard deviations for the main variables, is reported in table 1.

The database still preserved the firm's exporting frequency on a quarterly basis, a variable which can be considered an additional (discrete) proxy for the propensity to export at firm-level: the higher the absolute frequencies, the greater the firm's vocation to export, irrespective of the incidence of turnover obtained by selling the production abroad.

We used this information especially to identify a broad taxonomy of manufacturing firms.

Table 1. – Structure of the dataset – (1997-2001).

| | Mean | Standard deviation | Min | Max |
|---|---|---|---|---|
| Export propensity | 0.57 | 0.50 | 0 | 1 |
| | | | | |
| Taxonomy of manufacturing firms | | | | |
| Entering | 0.04 | 0.20 | 0 | 1 |
| Leaver | 0.03 | 0.18 | 0 | 1 |
| Persistent | 0.53 | 0.50 | 0 | 1 |
| Domestic | 0.40 | 0.49 | 0 | 1 |
| | | | | |
| Relative export frequency in main destination markets | | | | |
| Germany | 0.46 | 0.50 | 0 | 1 |
| France | 0.43 | 0.50 | 0 | 1 |
| Benelux | 0.34 | 0.47 | 0 | 1 |
| Other UE countries | 0.51 | 0.50 | 0 | 1 |
| UK | 0.35 | 0.48 | 0 | 1 |
| Other Western European countries | 0.41 | 0.49 | 0 | 1 |
| USA | 0.30 | 0.46 | 0 | 1 |
| Extra UE countries | 0.49 | 0.50 | 0 | 1 |
| | | | | |
| Incidence of exports on total turnover by destination markets (%)* | | | | |
| Total | 31.3 | 27.7 | 0.1 | 100.0 |
| Germany | 6.7 | 12.1 | 0.0 | 90.0 |
| France | 4.3 | 7.1 | 0.0 | 76.5 |
| Benelux | 1.4 | 3.3 | 0.0 | 53.2 |
| Other UE countries | 4.6 | 6.3 | 0.0 | 51.2 |
| Euro zone | 17.0 | 18.5 | 0.0 | 99.8 |
| UK | 2.3 | 5.5 | 0.0 | 53.3 |
| Other Western European countries | 1.9 | 3.6 | 0.0 | 49.5 |
| USA | 4.1 | 10.6 | 0.0 | 100.0 |
| Extra UE countries | 5.9 | 10.2 | 0.0 | 95.5 |

Source: ISAE business surveys.  (*): Figures calculated on the sub-sample of exporting firms.

Firstly, the entire time interval was split into two sub-periods: the two year period 1997-98 prior to the adoption of the euro as the common currency unit; and the subsequent 1999-2001 three-year period. With reference to each of the two sub-samples, we considered a exporting firm to be a sample unit exporting for at least one quarter to one or more destination markets. Secondly, we classified firms into four types: persistent ("11" group, comprising almost 53% of the panel), the firms selected as exporters in Eurozone countries in both sub-periods, respectively prior to and following the euro introduction;  entering ("01" group, comprising 4.2% of the panel), the subset of production units which sold their production exclusively on the domestic market in the period 1997-98 and significantly increased their frequency of exporting to eurozone markets after euro adoption; leavers ("10" group, representing 3.3% of the sample), those firms which stopped the exporting activity (observed in the previous two years) subsequently to the introduction of the common currency; domestic (group "00", amounting to about 40% of the sample), the sub set of non-exporting firms, i.e. those sampling units which were neither entrants nor leavers.

### 5.1 Empirical strategy

We used a panel data technique for the empirical strategy. A major reason for this choice was that it enabled us to control for the correlated time invariant heterogeneity.[1]

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).[2] However, FEM suffers from the major shortcoming that it is unable to provide estimates of time invariant regressors.

In order to overcome this problem we decided to use a Hausman and Taylor estimator (HT). The HT method is a 2SLS random effect model that allows one to deal with correlation between regressors and unobserved individual effects. Using an HT estimator makes it possible to estimate parameters of time invariant regressors.

The HT model in a general and bilateral form is as follows:

$$Y_{ijt} = \alpha_0 + \beta_1 X_{1ijt} + \beta_2 X_{2\,ijt} + \delta_1 Z_{1ij} + \delta_2 Z_{2ij} + e_{ijt} \qquad (5)$$

$$e_{ijt} = \mu_{ij} + v_{ijt} \qquad (6)$$

where $\alpha_0$ is the constant term, $\mu_{ij}$ is the unobserved individual effect, $v_{ijt}$ is the white noise error term, $X_1$ are the time-varying variables uncorrelated with $\mu_{ij}$; $X_2$ are the time-varying variables correlated with $\mu_{ij}$; $Z_1$ are time-invariant variables uncorrelated with $\mu_{ij}$; $Z_2$ are time invariant variables correlated with $\mu_{ij}$.

$\mu_{ij}$ is the part of $e_{ijt}$ including all the bilateral characteristics not specifically modelled in $X_1$, $X_2$, $Z_1$ and $Z_2$. It also includes the unobserved trade resistance variables, both bilateral and country-specific:

$$\mu_{ij} = \eta_{ij} + k_i + \lambda_j \qquad (7)$$

where $\eta_{ij}$ are the bilateral specific effects, $k_i$ and $\lambda_j$ are importer and exporter country characteristics.

The presence of $X_2$ and $Z_2$ causes correlation with unobserved individual effects. The HT model uses variables already included in the model to instrument $X_2$ and $Z_2$.[3]

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[1] OLS suffer 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 can control for heterogeneity. Their assumptions are different. REM models require that unobserved bilateral effects are ~ n.i.i. and orthogonal to the remaining part of the error term. Regressors have to be uncorrelated to individual effects and error terms for all cross sections and time periods. If the orthogonality conditions hold, the REM yields more efficient estimates than FE estimators do. If the explanatory variables are correlated with unobserved individual effects, the FEM is consistent.

[2] The test statistic of 467.66 is greater than the chi-squared critical value with 6 degrees of freedom at the 0.001 significance level (22.46); therefore the null hypothesis that the REM is consistent is rejected.

[3] In detail, X2 can be instrumented by deviation from the group means of X2; Z2 can be instrumented by deviation from the group means of X1.The model is identified as long as the number of variables in X1 is greater than the number of variables in Z2.

In the empirical literature, different selection procedures are used to select the variables correlated with $\mu_{ij}$. It is possible to select instruments on the basis of economic intuition (Hausman and Taylor (1981)) or by following different procedures.[4] We will discuss this issue further in section 6.

## 5.2. Equation

In line with most of the empirical literature on trade flows, we estimated a gravity equation. The main differences with respect the usual specification were the following:

1) The dependent variable in the estimates was the firm's bilateral export turnover, as share of total turnover, varying from 0 (firm does not export) to 100 (firm exports its total production), 2) exporting firms were only Italian firms, while importing countries were the main Eurozone countries (Germany, France, Benelux, and other main EU and extra EU markets) (see section 4);

The time span was 1997-2001, covering the two years before and the three years after the euro introduction. The panel was balanced; the dataset contained more than 32.000 observations.

We introduced three sets of variables into the gravity equation: i) standard gravity variables, ii) the euro dummy and the "firm groups" dummies, built as explained in section 4, and their interaction terms to capture the effect of euro introduction on extensive and intensive margins of trade, iii) a set of year dummies to control for all the time characteristics not captured in the specification and the average number of employee for each firm over the period 1997-2001, a variable to control for the size of firms.

As for standard gravity variables, as usual in the gravity framework, we used bilateral distance as a proxy for transport costs and the sum of the importer's and exporter's GDP as proxies for the "mass".

The estimated equation took the following form:

*Ln ET$_{ijt}$ = b1LnSumGDP$_{ijt}$ + b2 LnDist$_{ij}$ +b3  duEURO$_{jt}$ + b4FirmEmp$_i$ +b5 InterEuro01$_i$ +*

*b6 InterEuro10$_i$ + b7 InterEuro11$_i$ + b8 TIME + e$_{ijt}$*          (8)

where:

i)      *Ln* is the natural logarithm, *i* is the exporting firm, *j* is the importing country and *t* is the year
ii)     *ET$_{ijt}$* is the export turnover of firm i to market j at time t, expressed as a share of firm total turnover (varying from 0 to 100),
iii)    *SumGDP$_{ijt}$*  is the sum of the gross domestic product of the exporting and importing countries, a proxy for the "mass", i.e. the size of the countries involved in bilateral trade;

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[4] See for instance Walsh (2006)

iv) *Ln Dist$_{ij}$* is the great circle distance between i and j[5]; this formula approximates the shape of the earth as a sphere and calculates the minimum distance across the surface.

v) *duEURO$_{jt}$* is the dummy Euro, taking value 0 if exports are directed towards Eurozone countries from 1999, 0 otherwise

vi) *FirmEmp$_i$* is the average number of employees for each firm i with respect to the period 1997-2001;

vii) *InterEuro01$_i$* is the interaction term between duEURO and group 01, as defined in section 4,

viii) *InterEuro10$_i$* is the interaction term between duEURO and group 10,

ix) *InterEuro11$_i$* is the interaction term between duEURO and group 11,

x) *TIME* is a set of time dummies.

We expected bilateral export turnover to be positively influenced by: i) the sum of the importing and exporting countries' GDPs. In gravity models, trade flows are positively influenced by the "mass" proxied by the sum of GDP; ii) the size of the exporting firm. The larger the exporting firm, the greater should be its ability to exploit economies of scale and to afford the sunk costs of exporting activity; iii) Euro dummy. The introduction of the common currency should have boosted export flows through elimination of the costs related to economic exchanges in different currencies and through greater price transparency.

We expected bilateral import flows to be negatively influenced by: i) distance. According to the standard gravity model, bilateral distance is a proxy for transport costs and cultural proximity between two countries.

The main task of the empirical analysis was to estimate the effect of euro adoption on the exporting behaviour of Italian manufacturing firms. The availability of information about export destination markets was crucial for disentangling the effects of euro introduction on intensive and extensive margins: the start-up of a firm's export activity in coincidence with the euro introduction (export turnover share became positive) would show the existence of extensive margins; the increase in export turnover of firms already present in Eurozone markets due to introduction of the common currency would show the effects of this latter on intensive margins.

To this end, our main variables of interest were the euro dummy and the interaction terms between the latter and the "entering firms" group (group 01) and the "persistent firms" group (group 11).

## 6. Estimates results

We estimated our equation (8) using an HT estimator. As said, the choice of variables correlated with residuals is crucial in this kind of model. We tested several variables potentially correlated with unobserved individual effects. The choice of the feasible set of instruments

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[5] 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).

depended on the deviation of the estimates from FE estimates.[6] The basic idea was that the narrower the gap with FE estimates, the lower the correlation of the independent variables with residuals.

Indeed, to test the appropriateness of the choice of variables correlated with unobserved individual effects, we performed a Sargan Hansen over-identification test based on comparison between the HT and Within estimators.

The main empirical results are shown in table 2. We identified HT1 as our preferred version: the sum of GDP, the euro dummy and the average number of employees were the most important sources of correlation between the explanatory variables and unobserved specific effects.[7] The Sargan Hansen over-identification test did not reject the hypothesis of legitimacy of our choice of instruments.

Table 2. The impact of euro introduction on export turnover

| Number of obs: 32920 | Time span 1997-2001 | | | | |
|---|---|---|---|---|---|
| Number of groups 6584 | | | | | |
| | | | Hausman-Taylor[8] | | |
| | within | GLS | HT1 | HT2 | HT3 |
| Ln $SumGDP_{ijt}$ | 1.093*** | 1.108*** | 1.093*** | 1.088*** | 1.117*** |
| LnDIST$_{ij}$ | - | -1.024*** | -1.035*** | -1.029*** | -3.729*** |
| $duEURO_{jt}$ | 0.031 | 0.137*** | 0.031 | 0.031 | 0.132*** |
| $FirmEmp_i$ | - | 0.000*** | 0.032*** | 0.029*** | 0.000*** |
| $InterEuro01_i$ | 1.048*** | 0.980*** | 1.048*** | 1.047*** | 0.936*** |
| $InterEuro11_i$ | 0.282*** | 0.421*** | 0.282*** | 0.283*** | 0.315*** |
| $InterEuro10_i$ | -0.215 | -0.284 | -0.214 | -0.214 | -0.212 |
| $TIME$ | yes | Yes | Yes | yes | Yes |
| Constant | -13.67*** | -6.53*** | -10.16*** | -10.16 | -9.78*** |
| Hausman test $\chi_2$ (6) | | 450.40 | | | |
| Sargan-Hansen Over-Identification Test | | | $\chi_2$ (5) = 0.131 | $\chi_2$ (10) = 4.103 | $\chi_2$ (7) = 716.418 |

Regressors in $Z_{ij}$ included but with unrecorded coefficients:
*** significant at 1% , ** significant at 5%, * significant at 10%.

As for the gravity standard variables, the estimates results have the expected signs and are statistically significance: export turnover of Italian manufacturing firms is positively affected by the "mass" of export destination markets and it is negatively affected by transport costs (geographical distance).

Also firm size, proxied by the average number of employees, seems to confirm the theoretical prediction: the larger the firm, the greater its export turnover, which confirms that export capacity is

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[6] FEM results were taken as benchmarks: the within estimator is a consistent estimator of parameters, controlling for any source of correlation between regressors and unobserved individual effects.

[7] Coefficients are very close to within estimates coefficients, see table 2. We prefer this version with respect HT2, that is very similar but differs a little more from within estimator coefficients.

[8] HT1: instruments (LnSumGDP, FirmEmp, duEuro); HT2: (FirmEmp, duEuro); HT3: (LnSumGDP, distance).

strictly linked to the possibility of exploiting scale economies through better management and efficiency.

According to the prevailing empirical evidence, the Euro dummy is potentially correlated with unobserved individual effects at firm-level. This relates to the fact that at least a sub-sample of exporting firms have adjusted their exporting strategy so to as to take proper account of the effects of euro adoption (changing, for example, the set/quality of goods produced and the number of destination markets). If account is not taken of this source of bias (as in HT3), the Euro dummy coefficient is estimated as positive and statistically significant, as in the case of random effect estimates (see GLS column), and also the magnitude of the coefficient is very similar. In other terms, if one does not suitably control for the correlation with unobserved individual effects, the coefficients estimate of the Euro dummy may be upward biased, and one would have estimated a global significant impact on international trade due to Euro adoption.

The Euro dummy coefficient is indeed statistically not significant. This result shows that exports by the Italian manufacturing firms in our sample did not benefit from euro adoption. This evidence seems in line with other empirical findings, both on aggregate and sectoral level, showing no evidence of a positive impact on Italian exports by euro adoption.[9] However further information on the effect of the common currency can be drawn from interaction terms between euro dummy and "entering" and "persistent" firm groups. The positive signs of these variables indicate their contribution to growth in export turnover: in the former case, the positive effect of the common currency works through extensive margins; in the latter, the positive contribution derives from an increase in intensive margins.

The magnitude of the interaction term coefficient between the Euro dummy and "entering firms" is much greater than the coefficient between the Euro dummy and "persistent" firms. Also in the Italian case, previous empirical findings, both at macro and micro level, seem to be confirmed: extensive margins seem to have had a greater role than intensive margins in explaining export growth.[10]

But how can the fact that euro adoption is not statistically significant be reconciled with the evidence of a positive effect deriving from extensive and intensive margins? This dichotomy seems to show that the positive impact of the euro on export turnover has not been so large as to be statistically significant for all the firms in the sample. In other words, on the one hand a positive impact has been exerted on export turnover by "persistent" and "entering" firms; on the other, the group of non exporter firms has remained very large: the adoption of the euro has not changed the export behaviour of these firms, which have not benefited from the reduction in fixed exporting costs. Only a very small number of firms in our sample changed their status by switching from non exporting to exporting activity; those that did change their status, however, gave positive support to the growth of export turnover, confirming the importance of extensive margins of trade. Also the positive contribution from intensive margins does not seem large enough to be evident for the sample of firms as a whole.

The characteristics of Italian manufacturing firms probably play a role in this result: the size and export specialisation of firms may partially explain this phenomenon. According to theoretical indications, the introduction of the common currency may have affected trade to a greater extent in those sectors where it is easier to exploit scale economies and the high differentiation of products.

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[9] See ISAE(2007), de Nardis et al. (2008a, 2008b).

[10] At micro level, recent empirical work by Berthou and Fontagnè (2008) reaches the same result for France.

The scarce presence of Italian firms in some of these sectors has probably reduced, ceteris paribus, the possibility of benefiting from the (limited) trade increases due to the common currency.

Table 3. Disentangling Group 01 by a sectors classification à la Pavitt

| Number of obs: 32920 | Number of groups 6584 |
|---|---|
| Time span 1997-2001 | |
| | HT1 |
| Ln $SumGDP_{ijt}$ | 1.085*** |
| LnDIST$_{ij}$ | -1.027*** |
| $duEURO_{jt}$ | 0.033 |
| $FirmEmp_i$ | 0.032*** |
| Inter_traditional*Group01 | 1.237*** |
| Inter_scale_intensive*Group01 | 1.030*** |
| Inter_science-based*Group01 | 0.376 |
| Inter_spec._suppliers*Group01 | -0.657 |
| $InterEuro11_i$ | 0.280*** |
| $InterEuro10_i$ | -0.216 |
| $TIME$ | Yes |
| Constant | -10.563*** |
| Sargan-Hansen Over-Identification Test | $\chi_2(11)=$ 0.307 |

To test this hypothesis directly, we grouped our firms according to a classification à la Pavitt. Four different dummy variables (traditional, scale intensive, specialised suppliers, science based) were built. They took value 1 if the firm belonged to sectors classified in these groups, 0 otherwise. We then built the interaction term between each of these groups and the "entering firms" group (group 01), because we were mainly interested in disentangling the switching firms by sector. The results are shown in table 3.

As expected, among "entering" firms, a positive contribution to export turnover growth was made by those belonging to scale intensive sectors. It is interesting that also firms in the traditional goods sector contributed positively to export turnover. This result is not surprising, however, considering the characteristics of these goods in the Italian case, where they are usually highly differentiated vertically (quality) and horizontally (brand etc.). This evidence seems in line with other empirical findings.[11]

Also as regard firm size, its importance was tested directly by the empirical analysis. The findings confirm that the small size of Italian manufacturing firms, a well known stylised fact, may have impeded them – through the difficulty of exploiting economies of scale and greater efficiency – from taking the opportunity of internationalisation offered by the reduction of transaction costs.

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[11] See Baldwin et al. (2005)

## 7. Conclusions

Empirical evidence on the effects of euro adoption on intra-area trade flows has, in general, shown a positive and statistically significant impact, but one limited in size, and lower that expected. Further effects of common currency adoption have been: i) a heterogeneous impact on member states' export flows, with some countries seeming not to benefit from the common currency; ii) a positive impact also on some economies that opted out of eurozone membership (no trade-diversion effects); iii) the lack of any price convergence despite the increasing integration demonstrated by a rise in intra-area trade flows. All these facts have increased doubts regarding the effects of decreasing fixed transaction costs on a (modest) increase in euro-area trade flows. Various factors may have played a role. The recent theoretical literature has stressed the importance of so-called "new goods" in explaining trends in bilateral trade since euro introduction: goods that were previously produced and traded only in domestic markets by less competitive firms, i.e. firms unable to afford fixed export costs, have been sold also in foreign markets since 1999, when these fixed costs were reduced by euro introduction..

In this paper we investigated these aspects in regard to the Italian experience. The availability of original firm level data taken from ISAE surveys has enabled us to disentangle exporting and non exporting firms in Eurozone markets before and after 1999. We have thus been able to investigate the "new goods" hypothesis at a micro level, shedding light on a reality more complex than that depicted by aggregate approaches. We can summarize our findings thus:

i)   The euro has had a positive impact on export turnover of Italian manufacturing firms mainly through the entry into Eurozone markets of firms which did not export before 1999; this result confirms the importance of the "new goods" hypothesis and, more in general, previous evidence on the importance of so called "extensive margins" of trade.

ii)  Also firms already exporting in eurozone markets before 1999 have contributed to export turnover growth; in line with other findings, the impact of "intensive margins" has been lower than that of "extensive margins".

iii) Firm size and sector have influenced the entry of "new" firms into EMU markets since euro introduction: larger firms operating in scale intensive sectors or producing highly differentiated goods have probably benefited from fixed costs reductions by starting to sell abroad after 1999

iv)  Despite the positive impact of extensive and intensive margins on export turnover, the euro introduction has not boosted export flows of Italian manufacturing firms as a whole. This finding may be due to the fact that the majority of the firms in our sample did not export to EMU markets before 1999 and did not change their behaviour after 1999, more than off-setting the positive impact deriving from "entering" and "persistent" firms.

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