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Lionel Fontagné*, Thierry Mayer** and Gianmarco I. P. Ottaviano***

Of Markets, Products and Prices: The Effects of the Euro on European Firms

The introduction of the euro was initially expected to boost trade by an enormous percentage. Following many downward revisions of original estimates the current consensus estimate amounts to an increase of about 5 per cent. In view of the initial high expectations this is often seen as a dismal result. It is, however, based on aggregate data and may therefore hide important microeconomic gains that arise even for a given level of trade flows. This paper uses detailed product and firm level data to shed light on these hidden gains.[1]

It is common wisdom among economists and policymakers that exchange-rate volatility and transaction costs associated with multiple currencies depress trade. The foundations of this belief mostly rest on the historical observation that trade grew substantially during the "classical gold standard" at the turn of the 20th century and led Mundell to claim the main microeconomic benefit of a currency union would be trade creation among member countries.[2]

After forty years, this claim seemed to find conclusive empirical confirmation when Rose estimated that a common currency would boost trade by more than 200%.[3] Since then, that huge number has been constantly revised downwards reaching the current consensus estimate of not more than 5%. This estimate is often cited as a somehow dismal result given initial expectations. It is, however, based on aggregate data and may therefore hide important microeconomic gains that arise even for a given level of trade flows.

The first type of hidden microeconomic gains is the increased availability of different varieties of both final and intermediate products. The single currency may have helped new exporters to enter the Eurozone markets. It may also have helped existing exporters to increase the number of products exported and the number of destinations they export to. If richer product variety comes together with an offsetting reduction in average shipments per product, then aggregate exports would not change.

A second type of hidden microeconomic gains is the compression of prices. Tougher competition associated with enhanced transparency and lower transaction costs, may have led to a synchronised price fall in markups and prices across the Eurozone. With little impact on relative prices, one would not expect aggregate trade flows to change much either.

This paper uses detailed product and firm level data to shed light on these hidden gains. Unfortunately, statistical information of adequate detail and quality is currently available to us only for Belgium, France and Hungary. This nonetheless allows us to look at the effects of the euro from two complementary angles: that of two Eurozone countries and that of a European outsider.

In terms of hidden gains from product variety, we find that, with respect to other EU policies, the introduction of the euro has had:

- a small positive differential effect on trade through the overall number of products traded ("extensive margin");
- a larger positive differential effect on firms' average export per product ("intensive margin");
- no trade diversion effect towards the Eurozone on European trade flows along either margin.

In terms of hidden gains from price compression, we find that, after the introduction of the euro:

* Paris School of Economics, University of Paris 1 and CEPII.

** Paris School of Economics, University of Paris 1, CEPII and CEPR.

*** Bocconi University DEEB-KITeS, FEEM, Bruegel and CEPR.

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[2] Robert A. Mundell: A Theory of optimum currency areas, in: American Economic Review, Vol. 51, 1961, pp. 657-665.

[3] A. K. Rose: One money, one market: the effect of common currencies on trade, in Economic Policy, Vol. 15, 2000, pp. 7-46.

- the volatility of export prices has fallen in the Eurozone, mostly thanks to the removal of exchange rate volatility;
- export price variations in the Eurozone have been mainly driven by the pricing strategies of new exporters;
- export prices are smaller inside than outside the Eurozone due to the pricing strategies of both incumbent and new exporters;
- Eurozone exporters reduced the dispersion of their export prices to markets in the Eurozone relative to markets outside the Eurozone, mainly thanks to weakened price discrimination within the Eurozone by incumbent exporters.

To sum up, while the common currency has affected both product variety and export prices, the additional microeconomic gains of the euro with respect to other EU policies seem to have been channeled more through price compression than through enhanced product variety.

The Microeconomics of the Euro Effects

Has the euro affected the competitiveness of European firms? Has it altered their internationalisation strategies?

Types of Countries: Treatment vs. Control

The analysis of the microeconomic effects of the euro requires tackling a difficult counterfactual question: What would have happened to European firms if the euro had not been introduced? This implies identifying a benchmark against which to evaluate the actual behaviour of firms. The simplest approach, and the one adopted also in the present paper, is to compare the behaviour of firms between countries that have adopted the euro and those that have not. We call the firms in the former countries the "treated group" and firms in the latter countries the "control group". The reason for these names is that, just like in a medical experiment, the firms in the treated group have received some "medicine" (in our case, the euro) while those in the control group have not received it, or in medical terms have been given a "placebo".

Of course, to identify the impact of the euro, the firms in the two groups should differ only in terms of that specific treatment. Hence, before inferring anything about the euro effects, one has to net out any relevant difference not directly attributable to the common currency. For example, one should keep in mind that the introduction of the euro is part of a larger programme, contained in the Treaty on European Union (a.k.a. the Maastricht Treaty) and called the Economic and Monetary Union (EMU). In this respect, it is advantageous that EU countries are members of EMU, but only a subset of them have adopted the euro as their own currency. This allows us to compare the behaviour of firms among four types of countries:

Table 1
Treatment and Control

EZ countries	Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain
NonEZeu countries	Denmark, Sweden, United Kingdom
NonEZeurope countries	Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Norway, Poland, Slovakia, Slovenia, Switzerland

- those that are in the EMU and use the euro
- those that are in the EMU but do not use the euro
- those that are in Europe but are not in the EMU and do not use the euro
- those that are not in Europe, are not in the EMU and do not use the euro.

More precisely, due to data coverage, we identify as our "treated group" the firms belonging to the countries that in 1999 adopted the euro as their common currency. We call these countries "EZ", a mnemonic for "Eurozone". We then take three control groups. The one closest to the treated group – and thus the best control group to spot the impact of the euro – includes firms belonging to what we call "NonEZeu" countries, namely those countries that in 1999 belonged to the EU but did not adopt the euro. The second control group, called "NonEZeurope", refers to European countries that in 1999 did not belong to the EU. This can be used to investigate the impact of the EMU. The last control group will include countries sampled from the rest of the world and can be used to separate the impact of Europe-specific developments from global trends. The detailed composition of the three groups of countries is shown in Table 1.

The Microeconomic Effects of the Euro

The microeconomic effects of the euro (if any) originate from the reduction of various sorts of transaction and hedging costs between EZ countries promoting international trade and competitive pricing in the area.

In particular, there are six channels through which the reduction in transaction costs may work. The first four channels concern trade flows:

1. Through the export participation channel some non-exporters become active in international markets.
2. Through the market coverage channel exporters start to serve a larger number of foreign countries.

3. Through the product variety channel exporters start to sell a larger number of products in foreign markets.
4. Through the export intensity channel exporters increase the sales of each product in each foreign market in which it is sold. Accordingly this channel *per se* does not affect the distribution of firms across the different models of export behaviour.

The next two channels concern the reaction of prices to lower transaction costs:

5. Through the pure transaction cost channel a fall in the costs associated with exporting activities is directly translated into lower export prices.
6. Finally, through the competition channel increased arbitrage opportunities for customers due to lower transaction costs force firms to reduce their markups and limit their ability to extract value by quoting different prices in different countries (a practice called "pricing to market" or simply PTM). This maps into lower export price levels and lower price dispersion across national markets.

The possibility for firms to switch to exporting models characterised by the supply of a larger number of products to a larger number of countries depends on the potential impact of the euro on two types of transaction costs. On the one hand, the euro may have reduced export costs. In this case we would expect an increase in the number of exporters and in incumbent exporters' average number of destinations served. On the other hand, the euro may have made it less costly for firms to manage and export richer ranges of products, some of which possibly customised to specific national markets. This would map into an increase in firms' average number of products exported.

Is This Real?

In a recent report Baldwin et al. provide an assessment of the existing evidence on the microeconomic effects of the euro based on the comparison between the treated and control groups described in Table 1.[4] Their general conclusion is that trade flows have been indeed affected by the introduction of the euro but, at the same time, we are still far from a clear understanding of the relative importance of the different channels highlighted in the previous section.

The main findings of the report can be summarised as:

Fact 1: After the introduction of the euro aggregate trade flows between EZ countries increased by 2%, exports from nonEZ countries to EZ ones decreased by 1% and exports from EZ countries to nonEZ ones increased by 3%.

What is the relative importance of the first four channels described above in driving the increase in intra-EZ trade flows?

Figure 1 describes the decomposition of a country's aggregate exports taking into account the numbers of exporters, products exported and markets served. Inspecting the figure reveals that the microeconomic effects of the euro channelled through export participation materialise in changes along the "firm extensive margin" (number of exporters – N). Those channelled through product variety materialise in changes along the "geographic extensive margin" (average number of destinations per exporter – G) and the "product extensive margin" (average number of exported products per exporter across destinations – Z). Those channelled through export intensity materialise in changes along the "product intensive margin" (average value of exports per product and exporter across destinations, henceforth simply called "intensive margin" – I) and these could be due to underlying changes in either average quantity exported or average export price per product and exporter across destinations.

Trade Effects of the Euro[5]

Did euro adoption increase trade between Eurozone members? Did it divert trade away from European countries outside the Eurozone? We address these questions zooming on the different margins of adjustment highlighted above: number of exporters, number of markets served per exporter, number of products per exporter, exports per product/exporter, value of exports by shipment.

Data and Method

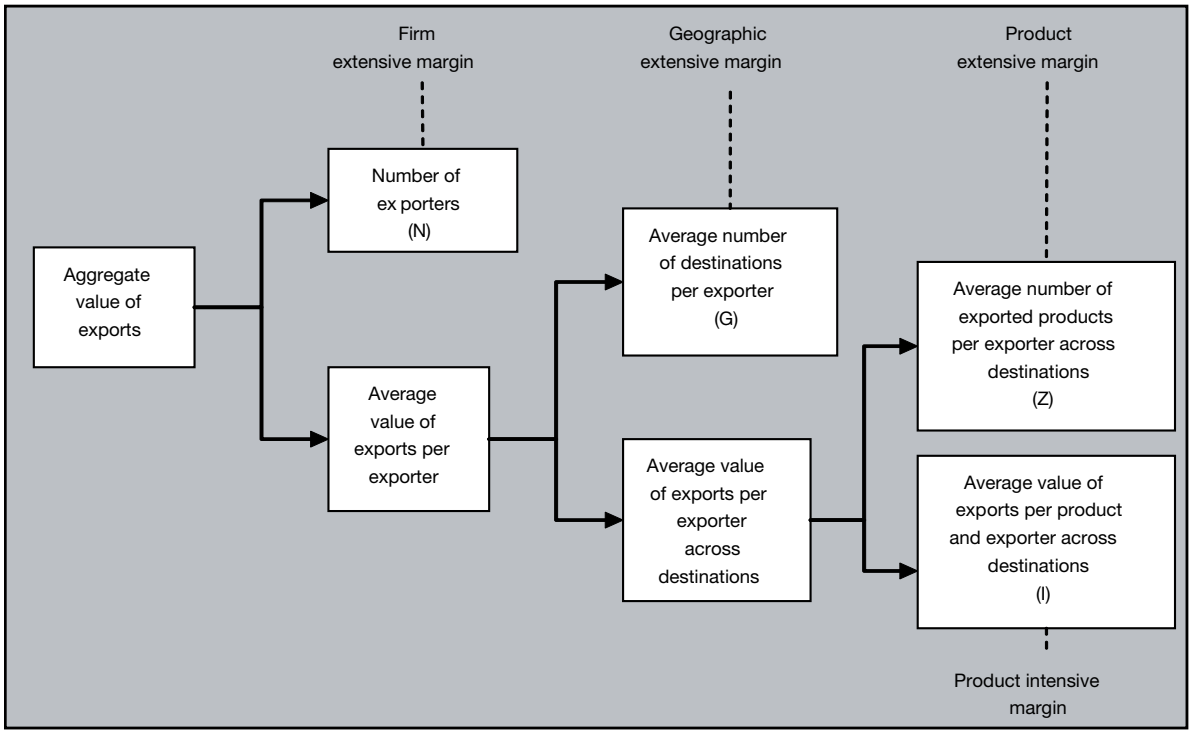
For each exporter, we have the information of the value of exports detailed by product CN8 category (10,000 product categories). From these data, we can compute the number of exporters on each market, the average number of products exported by a firm on each market, and the average value of exports by product.[6]

[4] R. E. Baldwin, V. di Nino, L. Fontagné, R. A. De Santis, D. Taglioni: Study on the Impact of the Euro on Trade and Investment, in: European Economy, Economic Papers, No. 321, 2008.

[5] This part is based on an early draft version co-authored by Antoine Berthou. It also includes figures that have generously been provided by Balázs Murakozy and László Halpern for Hungary and by Mauro Pisu for Belgium.

[6] The methodology used in this section is based on A. Berthou, L. Fontagné: The Euro and the Intensive and Extensive Margins of Trade: Evidence from French Firm Level Data, in: CEPII Working paper, No. 2008-06, May, 2008.

Figure 1
The Margins of Adjustment of Aggregate Exports



Among the datasets currently available to us such level of detail is available only for two EZ countries (Belgium and France) and for one nonEZeurope country (Hungary).[7] This nonetheless provides enough variation to perform the treatment-control comparisons described above. The idea is to compare the dynamics of two different subsets of exports: trade flows that are "treated" by the effects of the euro, and trade flows that are not "treated" by the effects of the euro. This gives four groups of trade flows:

- flows between EZ countries
- flows from EZ to nonEZ countries
- flows from nonEZ to EZ countries
- flows from nonEZ countries.

Any effect of the euro on intra-Eurozone trade should translate into a different evolution of French and Belgian trade margins to EZ destinations when compared with: (i) the evolution of Belgian and French trade margins with respect to nonEZ countries; (ii) the evolution of Hungarian trade margins with respect to all destinations. The time frame we cover is 1998-2003, preceding euro adoption on the one hand and EU enlargement on the other hand.

From Products to "Varieties"

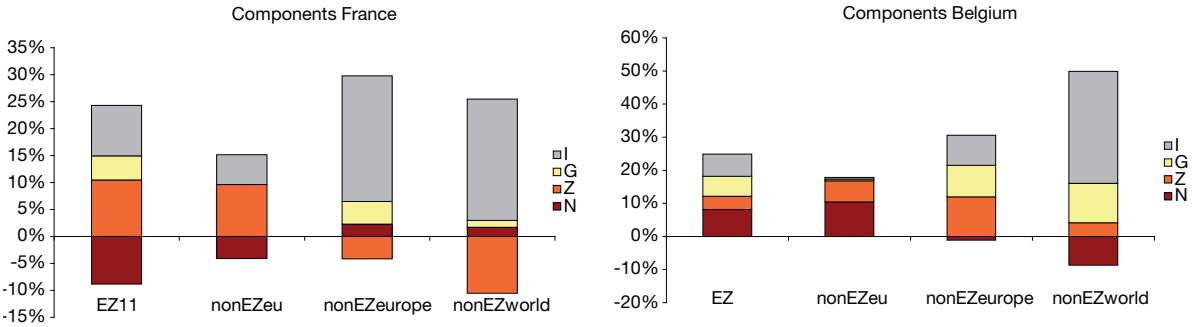
A crucial issue is to define the unit of analysis, i.e. the "thing" that firms ship. This concept is obvious from the point of view of the individual firm. It is less obvious when one has to classify products as different based on statistical categories. Following Berthou and Fontagné,[8] we call "variety" the thing that firms ship and we define a "variety" as an (HS8) product category exported by a single firm. Two firms exporting products within the same product category will accordingly be considered as exporting different varieties.

Using the export data for individual firms, we compute the intensive and extensive trade margins defined in Figure 1 at the variety level distinguishing between four types of destination countries: EZ, NonEZeu, NonEZeurope and the rest of the world (which we call "nonEZworld"). The "variety-level intensive margin" corresponds to the average value of exports by variety, for each destination within a region. The variety-level extensive margin corresponds to the average number of varieties that are exported at least once within a region,

[7] See Table 1 for definitions of the different types of countries.

[8] A. Berthou, L. Fontagné, op. cit.

Figure 2
Variations in the Components of Aggregate Exports (1998-2003)



Sources: National customs, EFIM calculation.

times the number of destination countries for each variety within the region.

Trade Margins and their Components

For Belgium, France and Hungary we compute the intensive and extensive margins of exports distinguishing among different types of destination: EZ, nonEZeu, NonEZeurope and nonEZworld. Since each destination type is composed of several countries, we have to take into account the number of countries within the type to which varieties are shipped. Accordingly, we compute the extensive margin of exports to a certain destination type *R* as the number of varieties exported at least to one destination in *R* multiplied by the average number of destinations in *R* those varieties serve.

Concretely, call N^R the number of exporters and Z^R their average number of varieties exported to destination type *R*. The total number of varieties exported – at least once – to *R* equals N^R x Z^R. Some varieties are possibly exported to several destinations in *R* and we call G^R the average number of destinations by variety exported to destination type *R*. The extensive margin of exports can then be expressed as $E^R = N^R \times Z^R \times G^R$. Finally, let us call I^R the intensive margin of exports (defined above as the average value of exports per variety) and V^R the total value of exports to destination type *R*; the following decomposition holds:

$$V^R = E^R \times I^R = N^R \times Z^R \times G^R \times I^R$$

i.e. total exports equal the number of exporters *times* the average number of varieties they export to destination type *R times* the average number of destinations in *R* each variety serves *times* the average value of exports per variety.

Trade Effects of the Euro within the Eurozone

We are now ready to assess the impact of the euro on the different components of aggregate trade flows. We will see how the various components and the trade margins reacted to the introduction of the common currency in 1999. First we look at Belgium and France. Next we will look at Hungary.

After Treatment: Changes in the Components

In 1998 French and Belgian firms exported a larger number of varieties and served a larger number of countries in the future Eurozone than elsewhere. How have the various components of total exports reacted to the introduction of the euro? Are the small effects observed at the macro level hiding large opposing effects at the micro level?

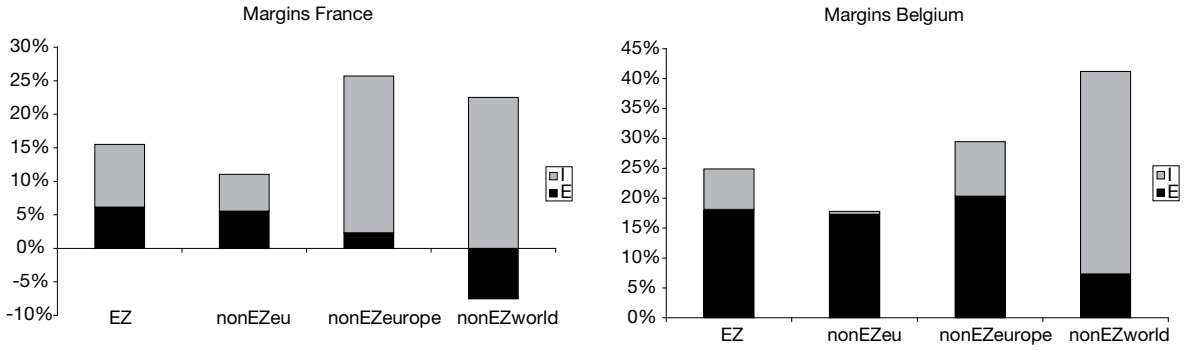
The variations in the different components over the period 1998-2003 are shown in Figure 2. The left panel is devoted to France. The right panel concerns Belgium. Results differ according to destination types.

EZ and nonEZeu destinations: In the case of France, the number of firms exporting to EZ destinations decreased significantly over the period, while the average number of products exported per firm and the average number of destinations per variety increased. For these destinations there is also a positive variation of the intensive margin.

In the case of Belgium, the number of firms, the number of products exported per firm, and the number of destinations per variety increased. The intensive margin also increased to some extent, but at a much lower rate than the extensive margin.

Accordingly, after the introduction of the euro, more Belgian firms export more products to more destinations within the Eurozone. Fewer French firms export

Figure 3
Variations in the Intensive and Extensive Margins (1998-2003)



Sources: National customs, EFIM calculation.

more products to more destination markets within the Eurozone.

Comparing with nonEZeu destinations, we conclude that after the introduction of the euro, changes observed *within the European Union* do not clearly differ between countries in the Eurozone and countries outside the Eurozone.

Destinations located outside the EU15: The picture for French exports to nonEZeurope and nonEZworld destinations is clearly different from the ones just described. The number of exported products decreased, while there are only small positive variations in the number of exporting firms and in the number of destinations per variety.

In contrast to France, in the case of Belgium the right-hand chart reveals a decrease in the number of exporters, especially to destinations outside Europe.

Thus, after the introduction of the euro, fewer Belgian firms export more products to more destinations outside the EU. More French firms export fewer products to more destinations outside the EU.

We summarise our findings from Figure 2 as:

Fact 2: After introduction of the euro, the number of product varieties exported and number of markets served by Eurozone firms have grown faster in the EU15 than in the rest of Europe and the rest of the world.

After Treatment: Changes in the Margins

Figure 3 reports the net variations of the intensive and extensive margins for France and Belgium over the period 1998-2003. In so doing they now combine the three components of the extensive margin: number of exporting firms, number of products exported, number of destinations.

The figure shows that the share of the increase in the total value of exports due to the extensive margin is higher for destinations that are better integrated with France and Belgium. In particular, the left-hand chart points out that the extensive margin contributes to nearly half of the growth of French exports to EZ and nonEZeu destinations, while its contribution is only marginal for nonEZeurope destinations, and even negative for nonEZworld destinations. In the case of Belgium, the right-hand chart indicates that the extensive margin contributes to more than two thirds of the growth of total exports for EZ, nonEZeu and nonEZeurope destinations, while it contributes only marginally to the growth of exports to nonEZworld destinations. Conversely, both charts show that the changes in the intensive margin were more important for destinations outside the EU and even more so for those outside Europe.

Hence, we can highlight:

Fact 3: After the introduction of the euro, changes in the total value of Eurozone exports have been mainly driven by the extensive margin in the case of Eurozone destinations and by the intensive margin in the case of non-European destinations.

Treatment vs. Control

Assessing the effects of the euro requires comparing the dynamics of the trade margins between the "treatment group", i.e. French and Belgian exports to EZ destinations, and the "control group", i.e. French and Belgian exports to nonEZ destinations. Since the two groups should differ only in terms of EZ treatment, before inferring anything about the euro effects, one has to net out any relevant difference not directly attributable to the common currency. In this respect, the best control group should consist of nonEZeu countries: as both EZ and nonEZeu countries belong to the EMU, different

behaviours of the two groups may indeed reveal the impact of the euro.

Through this specific lense, Figure 2 and Figure 3 tell clearer stories. Starting with the latter, Figure 3 shows that for both Belgium and France the differential behaviour between EZ exports to EZ countries and EZ exports to nonEZeu countries is essentially due to the reaction of the intensive margin.

Accordingly, we have:

Fact 4: The comparison between EU15 destinations inside and outside the Eurozone reveals that the impact of the euro on trade flows within the Eurozone has been positive and mainly channeled through an increase in the average value of exports per product.

Figure 2 shows that the little differential action in the extensive margins between EZ and nonEZeu countries hides different behaviours in some of their components. In the case of France, the average number of EZ destinations per variety increased while the average number of nonEZeu destinations per variety did not change. This effect is offset by the opposing movement in the number of exporters, which falls much more to EZ than to nonEZeu destinations. Also for Belgium, the average number of EZ destinations per variety increased but its impact on the extensive margin is nullified by the rise in the average number of products exported per firm, which is smaller to EZ than to nonEZeu destinations.

Hence, we can state:

Fact 5: The comparison between destinations inside and outside the EU15 reveals that the impact of the euro on trade flows within the EU15 has been positive and mainly channeled through an increase in the average number of products exported per destination by each firm.

Whether this impact is due to the common currency *per se* or to its interaction with other concomitant EU policies remains an open issue.

Trade Effects of the Euro Outside the Eurozone

After analysing the dynamics of the trade margins for exports from two EZ countries, Belgium and France, one can take the reverse angle and investigate the evolution of those margins for a nonEZeurope country, Hungary, over the same period 1998-2003.[9] This reveals:

Fact 6: There is no evidence that the euro has diverted trade flows from European countries outside the Eurozone to countries inside the Eurozone.

[9] Hungary joined the EU in 2004.

Price Effects of the Euro[10]

Did euro adoption affect the pricing behaviour of European firms? Did it change the level and the dispersion of prices in the Eurozone? We address these questions from the point of view of export prices zooming on the implications for price discrimination of the different price channels highlighted above.

Data and Method

To understand the effect of the euro on the level and dispersion of prices, we rely on unit values of exports. In so doing, we compare results obtained from two distinct samples. The first one covers the whole universe of products exported by French firms, which should directly be affected by the monetary integration. The second sample covers a census of Hungarian firms. As above, this allows us to highlight the effects of the euro on EZ and nonEZ countries. In both cases, we use the individual dimension of the data to systematically distinguish composition effects from changes in firms' pricing strategies.

We will present two different exercises that allow us to study the level and evolution of export prices across destinations in the EZ group, the nonEZeu group and the rest of the OECD. Note that the control group outside the EU is slightly different from that used to determine the trade effects. We want to be able to compare both evolutions and levels of prices inside and outside the EZ. For the level comparison, it is quite important to have control groups that are comparable in terms of income per capita, to make sure that the unit value of a specific good exported pertains to a comparable variety, in particular in terms of quality levels. The nonEZoecd group therefore replaces the nonEZeurope and nonEZworld control groups used above. The nonEZoecd group contains Australia, Canada, South Korea, USA, Hungary, Iceland, Japan, Mexico, Norway, New Zealand, Poland, Slovakia, Czech Republic, Switzerland and Turkey.

First, we compare price levels across different regions by computing a statistic based on the level of unit values. For bilateral export prices to be comparable across firms, we have to control for product-specific determinants of prices. Our approach consists in normalising bilateral unit values by the mean price charged by the firm over the whole set of destination markets (that we restrict to OECD countries, as stated above). We call this statistic the "price deviation with respect to the OECD mean". Averaging over goods for a given country/region provides us with information about the average price

[10] This part is based on a commissioned background CEPII working paper written by Isabelle Méjean and Julien Martin. It also includes figures that have generously been provided by Balacz Murakozy and Lazlo Halpern for Hungary.

gap with respect to the overall mean. This allows us to see whether prices are higher or lower, on average, in a given country/region.

Second, we also try to identify the consequence of the euro on the dispersion of French export prices in the Eurozone. To this end, we use a second statistic that is very similar to the one used to compare price levels across countries. The only difference is that the bilateral unit value is normalised by the average price in the area under consideration. We look at the average dispersion of prices in the Eurozone and in the rest of the OECD by comparing, on the one hand, the average price gap of Eurozone unit values with respect to the Eurozone mean and, on the other hand, the average price gap of unit values in the rest of the OECD with respect to the rest of the OECD mean. This comparison amounts to comparing the standard deviation of prices in each sub-sample.

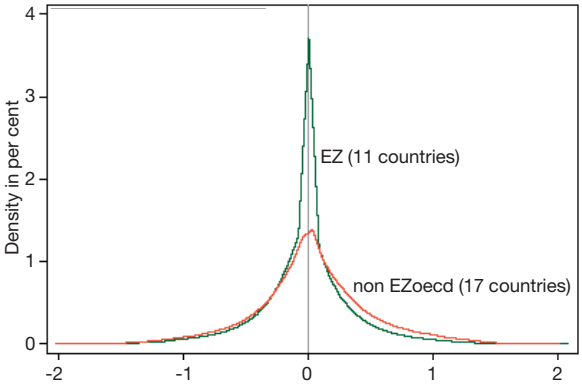
Deeper investigation allows us to separate composition effects from changes in pricing strategies. We compare results obtained on the whole sample of bilateral flows and sub-samples of "intensive" and "extensive" flows. We describe as intensive a bilateral flow (identified by a firm number, a product category and a destination market) that is present in the data over the whole period. The extensive sub-sample is the set of such bilateral flows that cover less than eleven years. This includes new bilateral relations (i.e. new firms and new destination markets served by a given firm) as well as disappearing flows (i.e. exits of firms or products from some markets). The comparison allows us to distinguish the dynamic of prices at the intensive and the extensive margins.

Price Levels

To investigate the differences in average price levels, we first construct a reference price for each firm, which is the average export price to all OECD countries. We then compute price deviations with respect to that reference for EZ destinations, nonEZeu destinations and the rest of the OECD, nonEZoecd. We therefore obtain absolute firm-level price deviations with respect to the price set by an average exporter to all OECD destinations.

Figure 4 illustrates the frequency ("kernel density") of price deviations measured in 2000 using the French sample. For both EZ countries and the rest of the OECD, there are many positive and negative (sometimes large) price deviations. In both samples, the average price gap in the Eurozone is always negative, meaning that prices are on average smaller than the reference price, once individual determinants of prices are controlled for. On the other hand, it is positive or close to zero for both nonEZeu countries and nonEZoecd.[11] The French export price level is about 2% higher in the rest of the OECD than in the Eurozone. The corresponding gap for Hungarian prices is smaller, around 1%, but still positive.

Figure 4
Distribution of Price Differentials with Respect to the OECD Mean, 2000



kemel = epanechnikow, bandwidth = 0.0145

Distribution of the log of the price gap calculated as the log of a price (country, product and firm specific) divided by the average price of this good over OECD countries.

Hence, we write:

Fact 7: Export prices from Eurozone countries are on average lower to other Eurozone countries than to the rest of the OECD even after controlling for market size, proximity and wealth.

Furthermore, deeper investigation comparing the set of firms/products that are present for the whole period to other flows reveals:

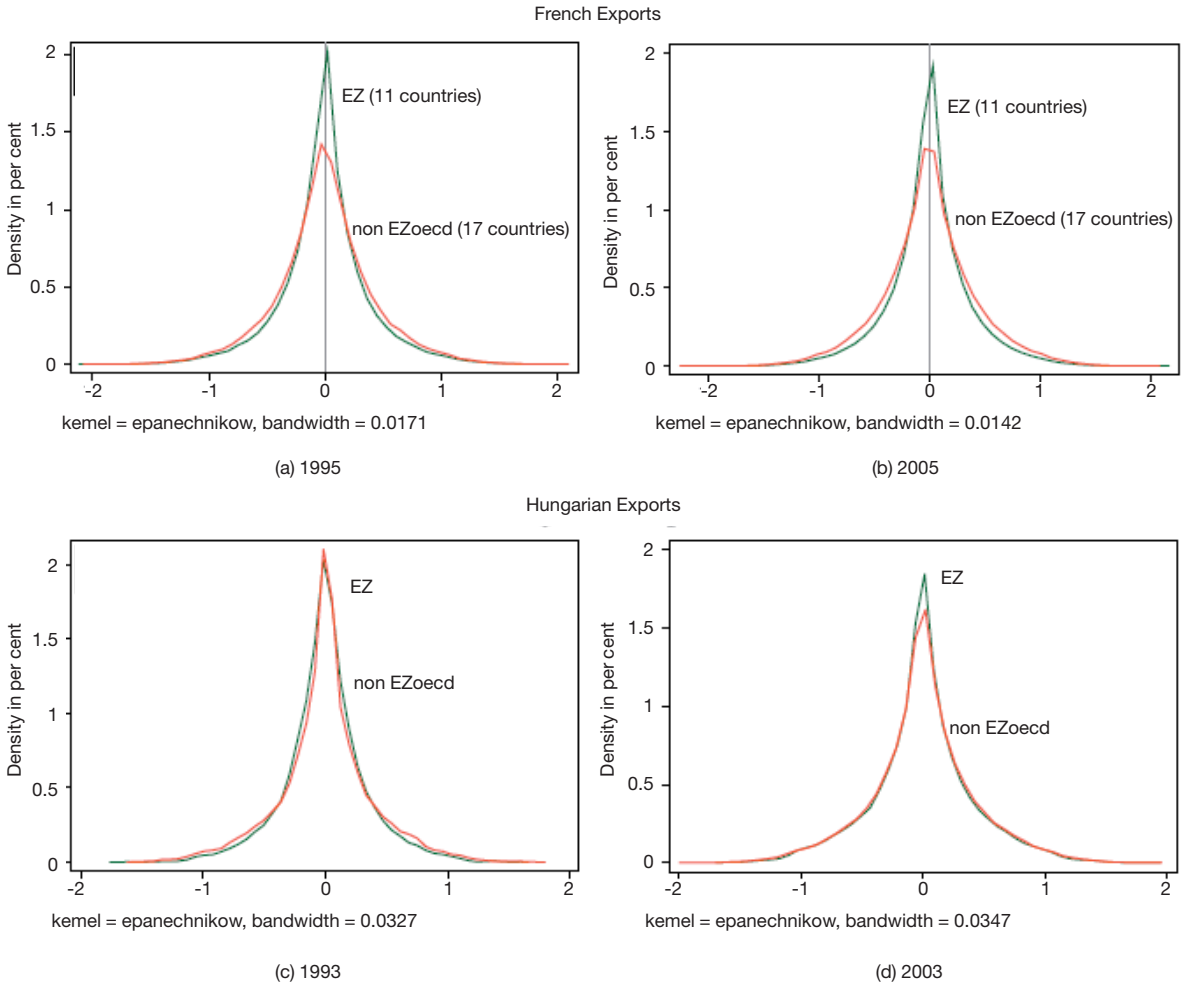
Fact 8: In the Eurozone export prices are on average lower than in the rest of the OECD at both the intensive and the extensive margins.

Price Discrimination

Has the introduction of the euro affected the magnitude of price discrimination across EZ markets? To answer this question we compare the dispersion of French export prices to the Eurozone to their dispersion to the rest of the OECD. We also zoom inside the Eurozone, looking at price deviations across its destinations. Fi-

[11] This result can be verified for France in Figure 5. The right tail of the "kernel density" is thinner for the EZ sample while positive price deviations are more likely in the rest of the OECD. This explains why, on average, prices are lower in the euro area.

Figure 5
Distribution of Price Deviations



Distribution of the log of the price discrimination calculated as the log of a price (country, product and firm specific) divided by the average price of this good over countries of the considered area.

nally, we compare the results for France with those for Hungary.

Our measure of price dispersion is based on the average export price gap with respect to the firm-specific mean export price to each type of destination. This slightly differs from the price discrepancy computed above because here the reference price is the average in each specific destination type, while before the reference was the whole OECD. We use these price ratios to compare the dispersion of prices to EZ destinations with that in an appropriate control group.

Figure 5 illustrates the distribution of the (log of the) price deviation to EZ destinations and to the rest of the OECD: for France in 1995 and 2005 (panels (a) and (b)); and for Hungary in 1993 and 2003 (panels (c) and (d)).

With deviations in log, the distributions are centred around zero. A positive (negative) deviation means a price above (below) the average price of the area. A distribution more concentrated around zero indicates a smaller dispersion of prices. In panels (a) and (b), distributions are more concentrated around zero in the Eurozone than in the rest of the OECD. This means that price differentials for French products across EZ countries are on average lower than across countries of the rest of the OECD. Moreover, comparing the two panels, obtained from 1995 and 2005 data respectively, reveals that this gap has not been strongly affected by the introduction of the euro.

Panels (c) and (d) show that the gap in the magnitude of price dispersion between EZ and nonEZoecd destinations does not appear in the case of Hungary.

In particular, the "degree of price discrimination" – as measured by the (inverse of the) density of price gaps around zero – towards EZ destinations is comparable between French and Hungarian exporters. On the other hand, price discrimination towards nonEZoecd destinations is stronger by French than Hungarian exporters.

Accordingly, we have:

Fact 9: Exporters from the Eurozone price discriminate less among markets in the Eurozone than among markets outside the Eurozone. Exporters from outside the Eurozone have no bias in terms of price discrimination between the two types of markets.

Both negative and positive country-specific deviations become smaller over time suggesting that the magnitude of price discrimination in the Eurozone follows a dynamic process. Has the introduction of the euro affected this process? To answer this question we follow the by now familiar treatment-vs.-control approach using nonEZeu or nonEZoecd countries as control groups. As above, the nonEZeu countries are probably the better control group as they have been subject to the same European integration process as EZ countries. However, nonEZeu is a control group with a very small set of quite specific countries, which justifies taking the largest nonEZoecd as an alternative to check the robustness of our results. Table 2 summarises the corresponding results.

Table 2 shows that before 1999 price discrimination by French exporters in the Eurozone was about 5% weaker than in the rest of the OECD and 3% stronger than in the rest of the EU15. The same pattern characterises Hungarian data: about 1.5% weaker in the rest of the OECD and 3% stronger in the rest of the European Union. The table also shows that after the introduction of the euro in 1999, price discrimination by French exporters in the Eurozone loses strength with respect to both control groups, becoming about 7% weaker than in the rest of the OECD and 1.5% stronger than in the rest of the EU15. There is, in contrast, no (statistically significant) change in price discrimination by Hungarian exporters whatever the control group.

Overall, we can state:

Fact 10: After the introduction of the euro, Eurozone exporters reduced the dispersion of their export prices in the Eurozone relative to markets outside the Eurozone. This was not the case for exporters belonging to countries outside the Eurozone.

Furthermore, deeper investigation, again comparing incumbent exporters to the group of entrants and exiters, reveals that:

Table 2
Impact of the Euro on French and Hungarian Price Discrimination

Control Group	nonEZoecd	nonEZeu
French exporters		
Mean price deviation EZ vs. control group before 1999	-5.1%	3.0%
Mean price deviation EZ vs. control group after 1999	-6.8%	1.6%
Hungarian exporters		
Mean price deviation EZ vs. control group before 1999	-1.5%	3.1%
Mean price deviation EZ vs. control group after 1999	-1.5%	3.1%

Note: calculations based only on statistically significant estimates.

Fact 11: The reduction in price dispersion of Eurozone exporters to Eurozone markets after the introduction of the euro is mainly due to weakened price discrimination by incumbent exporters.

Conclusions

The limited impact of the common currency on aggregate trade flows hides important additional microeconomic gains with respect to other EU policies. These may be channeled through price compression or a richer variety of final and intermediate products. While there is convincing evidence supporting the relevance of the former channel, the evidence in favour of the second is mixed.

Our findings suggest that the introduction of the euro has indeed increased price transparency and price competition in the Eurozone. The limited impact in terms of richer product variety explains why the trade effects of the euro have been subdued at the aggregate level.

In particular, there is little evidence that the euro had any additional effect on the export participation of European firms with respect to other EU policies. There are two ways of reading this result. On the one hand, it may be that the Single Market had already achieved its full potential in terms of firms' participation so that the introduction of the common currency did not make any difference. On the other hand, it may as well be that several obstacles to the full accomplishment of European integration are still in place notwithstanding the euro and other EU policies. However, the fact that EU exporters are still a very small fraction of EU firms or, equivalently, that most firms still serve only their domestic markets, strongly supports the idea that the latter reading is more likely to be the right one.