Direction des Études et Synthèses Économiques

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Document de travail

Institut National de la Statistique et des Études Économiques

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Série des documents de travail
de la Direction des Études et Synthèses Économiques

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NOVEMBRE 2015

The authors would like to thank Éric Dubois, Corinne Prost and Jean-Luc Tavernier. We are grateful to Charlotte Emlinger (Cepii) for discussing the first draft of this paper and to the participants of the Fourgeaud seminar held at the French Treasury and the seminar at the French National Institute for Statistics and Economics Studies (Insee). We also thank Irène Grialou for her help. Working papers reflect the opinions of the authors and do not necessarily express the views of the Insee, the European Commission or Banque de France. All remaining errors are the sole responsibility of the authors.

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Compared performances of French companies on the domestic and foreign markets

Abstract

In France, the balance of trade has deteriorated almost continuously since the late 1990s to the early 2010s. Many studies have focused on losses in export market share. But how does the performance of French companies stand up on the domestic market?

An examination of the macroeconomic data shows that the performance of companies in France has declined fairly sharply in exports, but that this decline has been rather smaller on the domestic market. At the firm level, a given company's export performance and domestic market performance have a tendency, albeit slight, to move in opposite directions. This may be due to factors such as a deliberate company strategy to target a specific market or the presence of production constraints. However, our analysis shows that a positive demand shock in the domestic market in which the company is present, resulting in a rise in domestic sales, then leads to an increase in exports. This complementarity seems to be driven by small companies and could reflect the existence of liquidity constraints. Increased sales in one market could lessen these constraints, by facilitating funding for company development in the second market. Strong domestic demand during the pre-crisis period in France is therefore not an explanatory factor of losses in export market share.

Keywords: Export dynamics, domestic sales, demand shocks, liquidity, production constraints

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Performances comparées des entreprises françaises sur le marché domestique et à l'étranger

Résumé

En France, le solde commercial s'est dégradé de la fin des années 1990 au début des années 2010. Si de nombreuses études insistent sur les pertes de parts de marché à l'exportation, qu'en est-il de la performance des entreprises en France sur le marché domestique ?

L'examen des données macroéconomiques montre que les performances des entreprises en France reculent assez nettement à l'export, mais de manière moindre sur le marché domestique. À un niveau microéconomique, les performances à l'exportation et sur le marché domestique d'une entreprise donnée ont une faible tendance à évoluer dans des sens opposés. Cette substitution entre les marchés peut résulter d'une stratégie délibérée des entreprises de cibler un marché ou de la présence de contraintes de production. Cependant, un choc positif de demande sur le marché intérieur sur lequel l'entreprise est présente, se traduisant par une hausse des ventes domestiques, entraîne une hausse des exportations. Cette complémentarité semble portée par les petites entreprises et pourrait refléter l'existence de contraintes de liquidité. Une progression des ventes sur un marché permettrait d'affaiblir ces contraintes, en facilitant le financement du développement de l'entreprise sur le deuxième marché. La bonne tenue de la demande intérieure sur la période pré-crise en France n'est donc pas un facteur explicatif des pertes de parts de marché à l'exportation.

Mots-clés : Dynamique des exportations, ventes domestiques, choc de demande, liquidité, contraintes de production

Classification JEL : F10, F44, L20

Contents

Introduction

In France, the balance of trade has deteriorated almost continuously since the late 1990s to the early 2010s. From a surplus in 1999, France began to show a deficit in 2005, which widened until 2011, before an improvement over the next two years. Many studies have focused on losses in export market share. But how does the performance of French companies stand up on the domestic market?

An examination of the macroeconomic data shows that the performance of companies in France has declined fairly sharply in exports, but that this decline has been rather smaller on the domestic market. This difference in dynamics may be the result of the positioning of French companies in terms of products, the way in which they are able or not to cover the scope of domestic and foreign demand. It may also be due to the behaviour of French exporting companies which may have preferred the domestic market over foreign markets.

To take the microeconomic study further, data from individual companies in the manufacturing sector are analysed. At first sight, a given company's export performance and domestic market performance have a tendency, albeit slight, to move in opposite directions. This may be due to factors such as a deliberate company strategy to target a specific market or the presence of production constraints. However, our analysis shows that a positive demand shock in the domestic market in which the company is present, resulting in a rise in domestic sales, then leads to an increase in exports, something which had already been noted in previous studies covering an earlier period. This complementarity seems to be driven by small companies and could reflect the existence of liquidity constraints. Increased sales in one market could lessen these constraints, by facilitating funding for company development in the second market. Strong domestic demand during the pre-crisis period in France is therefore not an explanatory factor of losses in export market share.

The paper is organized as follows. Section I gives a macroeconomic review of the French trade balance situation and presents measure of exports and domestic performances. Section II introduces the literature related to interlinkages between domestic and exports sales performances. Section III details the construction of our database and the methodology used to harmonize products and activities nomenclatures, whereas Section IV presents the panel regression results. Section V develops and comforts these results with two robustness tests conducted on sub-samples of firms.

I - Over the last fifteen years, France's foreign trade balance has deteriorated by almost four percentage points of GDP

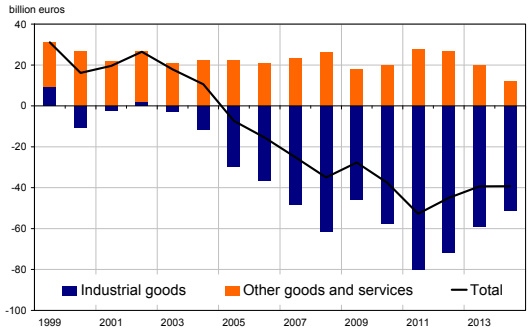
In France, trade in goods and services has deteriorated almost continuously since the end of the 1990s (*see figure 1a*). From a surplus of €31.1 billion in 1999, France started to show a deficit from 2005, and this widened until 2011. In the last three years, however, this deficit has come down, settling at €39.2 billion in 2014. All in all, over these last fifteen years, France's foreign trade balance has deteriorated by €70.3 billion (cumulated loss in nominal terms, representing 3.3% of 2014 GDP).

I.1 The deterioration of foreign trade is due almost exclusively to industrial goods, especially energy products

This deterioration is due mainly to trade in industrial goods which recorded a €51.2 billion deficit in 2014 against a €9.3 billion surplus in 1999.[1] Trade in other goods and services has seen much smaller and sometimes negative variations over the period, apart from trade in agricultural products.

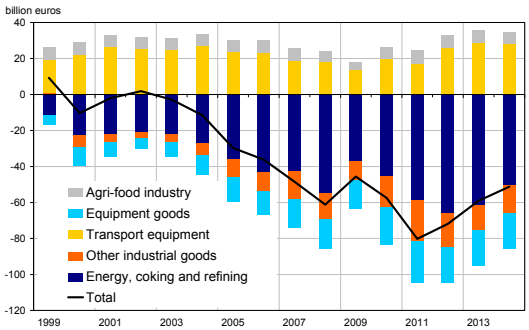
At a more detailed level, the deterioration in the trade of industrial goods masks a range of very differing dynamics (*see figure 1b*). Of the €60.5 billion deterioration between 1999 and 2014, €39.1 billion was the result of energy products alone. Trade deficits in capital goods and in other industrial products both increased by about €15 billion. The trade surplus in agro-food goods was maintained overall, while the surplus in transport equipment fluctuated then eventually improved and reached €10 billion.

Lastly, this improvement in the trade surplus for transport equipment also masks two diverging dynamics, between the automobile industry on the one hand and the manufacture of other transport equipment on the other. While trade in both types of goods recorded a surplus of around €9 billion in 1999, the automobile industry went on to deteriorate strongly, even recording a deficit since 2008, while the surplus for other transport equipment increased by three and a half times over the period in question, reaching €32 billion in 2013.



Source: Insee, national accounts, base 2010.

a. All goods and services



Source: Insee, national accounts, base 2010.

b. Industrial goods

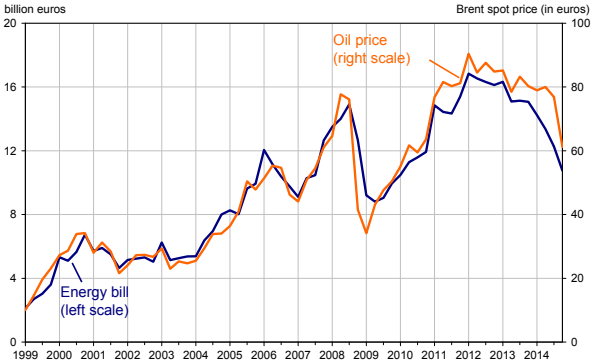
Figure 1. France foreign trade balance

[1] The balance of industrial goods (€-51.2 billion in 2014) is obtained by subtracting imports including cost, insurance and freight (CIF) from exports measured free on board (FOB); hence the value of imports from a country that does not border France includes insurance and transport costs linked with bringing goods to the French border. When the balance is measured in this way it is skewed slightly downwards. It is therefore not directly comparable with the balance for all goods and services (€-39.2 billion in 2014) which includes a "CIF-FOB" adjustment to correct this bias, but which is applied overall to all products. Changes in the balance of industrial goods can nevertheless still be interpreted.

I.2 The main contributory factor is the rise in the price of oil

How can we account for this deterioration in the trade of industrial goods? Once again, the underlying factors differ according to the type of goods, especially between energy products and manufactured products.

The increase in the energy bill, which designates the import-export balance for energy products, is closely linked to the increase in the price of oil in euros (*see figure 2*). Indeed, in 2014 natural hydrocarbons, which notably include crude oil, accounted for three-quarters of this bill, with refined petroleum products and coke accounting for the remaining quarter. So in the space of 15 years, the price of a barrel of oil (*Brent Spot Price FOB*) was multiplied by four and a half, increasing from €17 in 1999 to €74 in 2014. Thus over the same period, France's energy bill increased by €39 billion: it reached just over €50 billion in 2014, the equivalent of the trade deficit for all industrial goods.



Sources: Insee, national accounts, base 2010; U.S. Energy Information Administration.

Figure 2. Quarterly energy bill and oil price

I.3 Traded volumes of manufactured products have also contributed to this deterioration

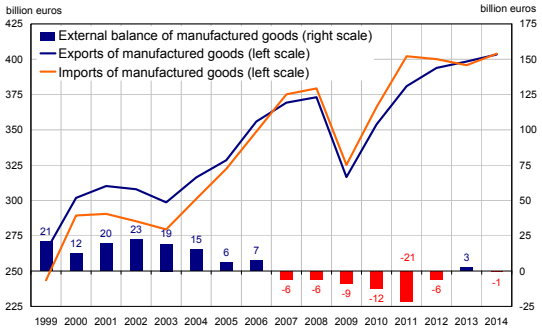
Although less pronounced, the deterioration in trade in manufactured goods remained substantial, at €21 billion over the period 1999-2014 despite a very strong improvement in 2012 and 2013. This was the automatic result when the growth in imports was more dynamic than the growth in exports (*see figure 3a*).

To account for this effect in more detail, we examine foreign trade coverage ratio, defined here as the ratio of the trade balance to imports (*see Box 1*). If it is zero, then exports are equal to imports. If it is positive (resp. negative), there is a trade surplus (resp. deficit).

In the case of manufactured products, the cover ratio deteriorated by 8.3 percentage points (pp) of imports. Whereas it largely showed a surplus in 1999 (at 8.2 pp), it went on to display a slight deficit in 2014 (of 0.1 pp). Three sub-periods can be defined: (*i*) between 1999 and 2002, it was stable overall; (*ii*) between 2002 and 2007, it fell back fairly sharply and entered into negative territory; (*iii*) since 2007, it has fallen moderately then bounced back to a level close to equilibrium.

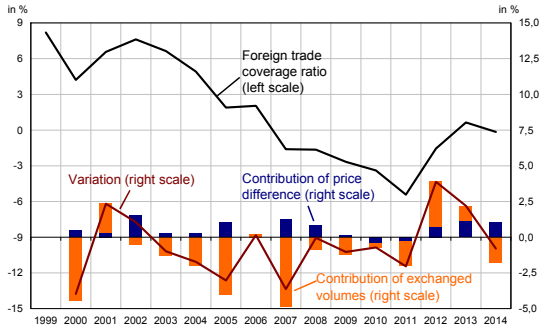
This deterioration is associated mainly with a very adverse change in trading volumes (contribution of -16.6 points) while the difference between export and import prices, also called terms of trade, alleviated this downturn (+8.3 points, *see figure 3b*).[2]

[2] However, this favourable change in the terms of trade in the manufacturing sector was by no means sufficient to compensate for the increase in energy prices over the period. All in all, the terms of trade contributed -5 points to the foreign trade coverage ratio for all industrial goods.



Source: Insee, national accounts, base 2010.

a. Exports, imports and trade balance



Source: Insee, national accounts, base 2010.

b. Foreign trade coverage ratio

Figure 3. Focus on manufactured goods

This analysis is nevertheless more complex than this accounting breakdown would suggest. Companies can indeed vary their margins in response to fluctuations in their competitiveness in different markets (especially in exchange rates, in markets outside the Eurozone). These types of margin-driven behaviour, which may be more or less significant depending on the strength of the competition, cushion the effect of shocks on sales, but as they affect companies' investment capacity, they may have consequences in terms of non-price competitiveness.

I.4 Losses are concentrated in capital goods and other industrial products, and in relation to trade with China and Germany

An analysis by major product type and destination provides more detail about the strengths and weaknesses of the French economy over this period. Between 1999 and 2014, the coverage ratio of all industrial goods (including energy goods) declined in France by 15 percentage points. As for manufactured goods, the same three periods can be seen, with a loss of 1 point on average per year at the start of the 21st century, followed by a loss of 2.5 points between 2002 and 2008 and a slight gain since then (*see figure 4*).

annual average (in percentage points)	1999-2002	2002-2008	2008-2014	1999-2014
Industrial goods	**-1,0**	**-2,5**	**0,5**	**-1,0**
Contribution by products				
Energy, coking and refining	**-1,2**	**-1,5**	**0,0**	**-0,8**
Mining, energy, water and waste management	-1,1	-1,4	0,4	-0,6
Coking and refining	-0,2	0,0	-0,4	-0,2
Manufactured goods	**-0,1**	**-1,1**	**0,3**	**-0,4**
Agri-food products	0,0	0,0	0,1	0,0
Equipment goods	-0,3	-0,5	-0,2	-0,3
Transport equipment	0,8	-0,3	0,4	0,2
Other industrial goods	-0,6	-0,4	0,0	-0,3
First order approximation (transformation from Δlog to growth rate)	0,4	0,1	0,1	0,2

Source: Insee, national accounts, base 2010.

Figure 4. Sectorial contributions to the variation of foreign trade coverage ratio in France

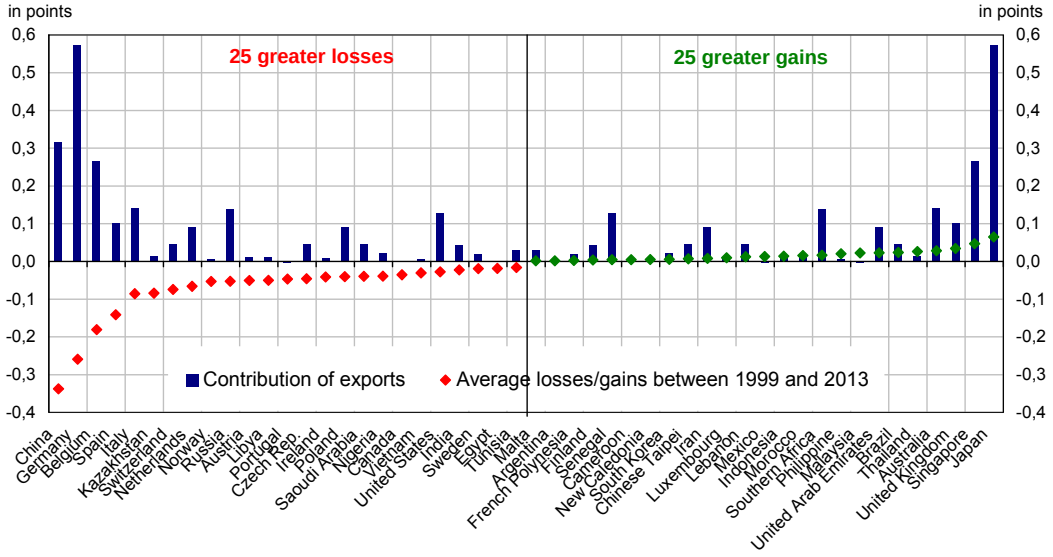
As has already been pointed out, losses are due mainly to energy goods, especially during the first two periods, because of the rise in oil prices. The acceleration of this loss in the mid-2000s was primarily due to transport equipment, while the change in the last few years has been more or less general. Notice that the agriculture and food industry had a null or slightly positive contribution to the trade coverage.

A breakdown by country can also help to build up knowledge of those trading partners from which France has respectively won and lost market share (*see figure 5*). It is no surprise, given the overall performance across the period, that the distribution is asymmetrical; losses are both more numerous and more sweeping than gains. Using bilateral data, the decline in

the coverage ratio is due to two countries in particular. First of all China, which alone accounts for a loss of a little over 0.3 percentage point on average per year out of the 1.0 total, and this is especially concentrated between 2002 and 2008, the first years following China's accession to the World Trade Organisation (WTO). France has also experienced a deterioration in its coverage ratio *vis-à-vis* Germany (contribution of almost -0.3 point) and this is despite a substantial increase in French exports to this country.

On the other hand, there are two more surprising phenomena relating to the losses. The first concerns the presence of many other countries in the Eurozone, such as Belgium, Spain, Italy, the Netherlands, Austria, Portugal and Ireland, which slightly temper the part played by the euro external exchange rate in the deterioration of the French trade balance. The second concerns exporters of commodities (Norway, Russia, Libya, Saudi Arabia) where the loss was ultimately fairly small compared to that recorded for energy products, and there are even gains in some cases (United Arab Emirates, Iran). This can be explained by a concurrent increase in exports to these countries (Russia, UAE and Saudi Arabia), and also by imports of these energy products *via* other countries such as Belgium, for example.[3]

Gains, on the other hand, are not so strong and can be found in trade with Japan (+0.06 pp), some countries of South-East Asia and Oceania, and the United Kingdom.



Sources: ITCS-OECD, Insee calculation.[4]

Figure 5. Main geographical contributions to the variation of foreign trade coverage ratio in France

At this point, the two limitations of these illustrations must be pointed out. The first relates to the possible differential in demand that economies have to deal with. If domestic demand is significantly lower than foreign demand, then imports will be less dynamic than exports. An adjustment for differential in demand is required. The second limitation relates to competition from other economies in third markets: a drop in the coverage ratio in some markets may be due to a loss of competitiveness *vis-à-vis* producers in these countries, and also *vis-à-vis*

[3] Trade flows are not adjusted for re-exports. In this specific instance, energy commodities transit through the main Belgian ports.

[4] In addition a specific database from the OECD's annual International Trade by Commodity Statistics (ITCS) database was also used. It provides a homogeneous and comparable international trade dataset and provides a detailed sectoral disaggregation of trade flows, according to SITC Rev 3 (Standard International Trade Classification, Rev 3). After processing, including converting products to the French classification of activities Rev.2 for level A17, these flows were available by value for every combination of product × reporting country (30 members in 2009 + China, Hong-Kong) × partner countries (260 in the world). The study is limited to industrial products for which French data were fairly similar to those produced by the national accounts, apart from data for the coking and refining sector, and others, because refuelling is not taken into account.

other exporters. This is especially the case with China and Germany, whose contribution to the deterioration of France's coverage ratio may be even greater than that measured by bilateral trade data alone.

I.5 Yet, the geographical and sectoral specialisation does not seem to be the main explanation of market losses since the mid-2000s

Bas et al. (2015) use a new dataset by World Bank, Banque de France and ITC (Gaulier et al. 2013) to examine the contribution of the geographical and sectoral specialisation of the French exporting sector to the market share losses since the mid-2000s. As already documented for previous periods (Fontagné and Gaulier, 2009) this contribution was, at least in comparison with European competitors (that all suffered recently from low demand in the region), neutral or positive. Aircraft, pharmaceutical products and beverage were among the strongholds of France that benefited from a relatively dynamic global demand in recent decades.

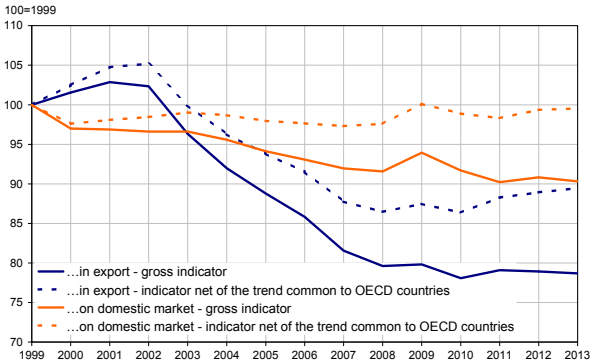
I.6 The performance of the French economy has deteriorated markedly in exports, although only moderately on the domestic market

To examine this question further, it is useful to look at the performances of the French economy not only in France but also in third markets. Two indicators have been constructed to demonstrate these performances. The export market indicator reports sales abroad in response to demand for French products. The domestic market indicator corresponds to the share of gross domestic product provided by domestic production. To see the growth in international trade, the two indicators can be constructed net of the common trend in the OECD countries (*see Box1*). A rise in these indicators would mean sales were greater than demand, or that there were gains in both export and domestic market share. A fall, on the other hand, would indicate losses of market share. These market share gains/losses may be due to factors such as price competitiveness, non-price competitiveness or specialisation in domestic production.

A wealth of information can be obtained by constructing these two indicators and examining changes since 1999 (*see figure 6*). First, the French economy's performance in third markets has fallen back over the last fifteen years, especially over the period 2002-2008. If adjusted for the common trend in the advanced countries, this decline would be more or less halved. Next, performances on the domestic market have also declined, although to a lesser degree. The indicator shows a moderate fall, or even near stability when corrected for growth in international trade over the period in question, showing moderate performances or counter-performances limited to just a few years.

The greatest decline in export performance could come from an intensified degree of competition from these third markets, or because new competitors may be more present (emerging companies in all markets). It could also be the result of company strategy which concentrate efforts on the French market where margins are stronger (because of reduced costs of transport, logistics, etc.). It may finally come from a competition which has moved more abroad to countries which do not share the same currency. The latters represented 46.3% in 1999 vs 50.9% in 2013. On the domestic market, their share only rose from 40.0% to 40.6% (see appendix 1).

These indicators reveal only a weak link between domestic and foreign performances. Therefore in the very short term, the two indicators are also weakly linked (the correlation coefficient between variations is less than 0.1 for both gross and net indicators of the common trend). In the medium term, the link between the two indicators is also weak, as performance on the domestic market stagnated or fell only slightly over the period, whereas export performance saw a more pronounced deterioration.



Sources: National accounts - Base 2010, OECD Economic Outlook n°96 database, Insee calculation.
Field: all goods and services.

Figure 6. Performance of the French economy

The macroeconomic results presented above suggest a disconnection between export and domestic market performances over the period. Is the diagnosis the same for the majority of French exporting companies? There are many reasons why aggregated changes could be different from individual changes. First, international trade leads to a certain degree of specialisation, and French companies do not cover the entire spectrum of demand, whether domestic or foreign. At aggregated level, demand can reflect changes in markets where companies have little or no presence. In addition, aggregated changes cover all trade, including that associated with new companies or companies exporting only infrequently. What is the situation for companies that are relatively stable in both markets, domestic and foreign? To this end, individual company data are explored to discover the nature of the link between performances in export and on the domestic market.

Box 1: Indicators illustrating France's trade performance

a) coverage ratio of industrial products

The coverage ratio (*CR*) is an indicator measuring the equilibrium of a country's trade (*see* Borey and Quille, 2013). It is the ratio of the trade balance (TB) to imports in value (M_{val}) and is expressed in this formula: CR = [Ln(1+TB/M_{val})]

It is negative (resp. zero / positive) if there is a trade deficit (resp. equilibrium / surplus). Expressed differently, ΔCR is also equal to ΔLn(X_{val}) - ΔLn(M_{val}). Written thus, it can be broken down in different ways:

- volume / price: $\Delta CR = \Delta[Ln(p_X / p_M)] + \Delta[Ln(X_{vol} / M_{vol})]$

The first term denotes the contribution of the terms of trade, i.e. of the export (p_X) and import (p_M) price differential, and the second term denotes the export (X_{vol}) and import (M_{vol}) volume differential. This breakdown can be calculated overall or for a specific good.

- by product, by destination: $\Delta CR_t \approx (X_{val,\ t}/X_{val,\ t-1}) - (M_{val,\ t}/M_{val,\ t-1}) = \sum_p gr\_X_{Fr\to p} \times (X_{Fr\to p}/X_{val})_{t-1} - gr\_M_{Fr\leftarrow p} \times (M_{Fr\leftarrow p}/M_{val})_{t-1}$.

This equation is similar (1st order) to the difference in export growth rate compared to that for imports, and which can be used to calculate contributions by product or by geographical destination p where:

(gr_)$X_{Fr\to p}$ represents (the growth rate for) French exports of product p / destined for p;

(gr_)$M_{Fr\leftarrow p}$ represents (the growth rate for) French imports of product p / from p.

b) export trade performance P^X

Export performance is defined as the ratio of exports to world demand for French products. This ratio is calculated by volume for all goods and services using the OECD Economic Outlook no. 96 database: $P^X_{Fra} = X_{Fra} / WD_{Fra}$

However, this raw indicator is driven downwards by the increase in international trade: the arrival of the emerging economies for inclusion in international trade most often restricts the performances of the advanced economies by cutting back their market shares. In order to have a "pure" measurement of performance on third markets this trend has to be removed, but is difficult to evaluate precisely. We therefore propose an alternative indicator which roughly corrects for the increase in international trade:

$P^X_{Fra} = \frac{X_{Fra}}{WD_{Fra}} \times \exp(-\beta t)$ where β corresponds to the trend approximated by the mean of $\Delta \ln\left(P^X_{OECD}\right)_t$ for the 34 OECD member countries aggregated over the period 1999-2013. It is a net indicator of the common trend in the OECD countries. This correction automatically reduces the drop in the performance indicator whenever international trade continues to develop to the detriment of the advanced countries, which is the case here (β is negative, at -0.9%).

c) trade performance in the domestic market P^{DM}

Trade performance in the domestic market corresponds to the share of gross domestic product provided by domestic production. It can be calculated simply as 1 - M / GDP where M represents imports and GDP the gross domestic product. Once again, this raw indicator is driven downwards by the increase in international trade: geographic specialisations and the general boom in trade (removal of tariff and legal barriers, decrease in transport costs, etc.) lead to a trend growth in the import content of domestic demand for all countries.

As before, in order to have a "pure" measurement in the domestic market, this trend has to be removed, and it is also difficult to evaluate exactly. Across all OECD member countries, the trend in international trade (approximated by the ratio M / GDP) is estimated and an alternative indicator is proposed, as follows:

$P^{MD}_{Fra} = 1 - \frac{M_{Fra}}{GDP_{Fra}} \times \exp(-\beta t)$ where β corresponds to the trend approximated by the mean of $\Delta \ln\left(\frac{M_{OECD}}{PIB_{OECD}}\right)_t$ for the 34 OECD member countries aggregated over the period 1999-2013.

This net indicator of the common trend across the OECD countries automatically improves the diagnosis whenever international trade continues to develop, which is also the case here (β is positive, at 2.1%).

For these two performance indicators, the reason for privileged trade perimeter around the OECD countries is the proximity of the constituent economies and also the availability of data concerning P^X.

II - Academic studies stress that production and liquidity constraints may provide a link between export and domestic performances

The emergence of numerous microeconomic databases has revealed how very different companies are regarding their participation in international trade. In particular, it can be seen that exporting companies often demonstrate a stronger productivity than their counterparts operating exclusively on the domestic market. This is the result either of self-selection as companies decide to join the world market, or a phenomenon of learning by exporting (*see* Clerides *et al*., 1998).

Melitz (2003) proposes an initial reference model describing this self-selection effect. This model starts from the premise that companies are different and have different technologies (i.e. productivities). When faced with fixed costs but also additional costs associated with exporting and transport to foreign markets, only productive companies persist and continue to participate actively in international trade. An empirical application of this type of model relates to the study of the link between company performances on the domestic and foreign markets. Several opposing forces come into play, some moving towards substitution while others favour complementarity between performances on each of the markets.

If a company's strategy is to gain presence in a particular market or to strengthen its position, it can decide on the best allocation of resources. For example, in order to maintain or conquer new markets, spending on advertising and participation at international fairs may be increased, which will automatically have a bearing on resources allocated to the national market. Improved performance in the target market will then be partly detrimental to performance in the other market. Similarly, when marginal production costs are increasing, this will result in substitutability between foreign markets and the national market (*see* Artus, 1970): since an increase in sales abroad leads *ex ante* to an increase in production costs (use of overtime, temporary jobs or less productive factors, etc.), the company could reduce this increase in costs *ex post* by reducing production aimed at the domestic market, particularly by raising sales prices.

Conversely, if the company is faced with liquidity constraints, which limit its expansion, a positive demand shock on a market could enable it to ease these constraints, which would result in a positive correlation between export and domestic market performances. There are other factors which favour complementarity between performances, such as cost shocks or technology shocks where the impact affects both exports and domestic sales. For example, in the case of a positive shock linked with application of a more efficient production process or with a fall in the cost of labour/capital following a reduction in contributions/taxes, this would be advantageous for sales in both markets.

Overall, depending on the strength of each of these mechanisms, we can see substitutability or complementarity between sales on the two markets. The empirical literature does indeed describe these two types of relationship, depending on the economies and the periods studied.

Blum *et al*. (2013) highlight two types of exporting companies (in Argentina, Chile and Colombia between 2004 and 2008): "occasional" exporters that export irregularly but often to the same markets, and "perennial" exporters, that export continuously but tend to enter and exit certain foreign markets frequently. They observe that the status of the company depends on its capital investment and hence on its production capacity. "Occasional" exporters are small companies with a small production capacity which cannot serve all markets. They therefore give priority to domestic demand which is less costly to access, and they enter (exit) the foreign markets when domestic demand falls (increases). The "perennials" on the other hand are companies with a strong production capacity, serving all markets continually, and making adjustments by reallocating sales between the different export markets. All in all, the authors demonstrate that domestic sales are negatively dependent on exports. Vannoorenberghe (2012) found similar results for French companies between 1998 and 2007.

It is also worth mentioning the work of Salomon and Shaver (2005) and Berman *et al.* (2015). Working with Spanish data, Salomon and Shaver show that there are links between exporting and domestic sales with companies' new determinants being investment in R&D and corporate expenditure on advertising. They observe a difference between companies that belong to foreign groups, where sales are substitutable, and other Spanish companies which demonstrate complementarity in their sales. In the first case, foreign-owned firms' export strategies appear subsumed under strategies of managing multinational networks in which the focus is sales outside Spain, and in the case of Spanish-owned firms, the focus seems to be on the domestic market and with solid domestic sales, exports can be invigorated. Using French data from 1995 to 2001, Berman *et al.* conclude that sales on the two markets are complementary. They emphasize that this result can be explained by a relaxing of liquidity constraints that companies may be facing.

The importance of financial factors is confirmed with Italian data, as underlined by Bugamelli et al. (2015). In this study, it is shown that the link between the dynamics of foreign and domestic sales varies over the business cycle, depending on changes in the relative severity of liquidity, credit and capacity constraints. More precisely, liquidity problems seem to be binding only when cyclical conditions worsen. As regards credit constraints, unconstrained firms manage to substitute domestic with foreign sales when domestic sales drop, while constrained ones cut their exports. Yet, from an econometric point of view, potential endogeneity problems between exports and domestic sales are not fully addressed in Bugamelli et al. (2015), in the absence of methods such as instrumental variables, as performed in the present article.

Following on from these studies, we look at the example of France over the recent period. Before that, we present our database.

III - Construction of the database of exporting industrial enterprises

The enterprise is defined here as a legal unit. The new definition of an enterprise, introduced by Decree n°2008-1354 of 18 December 2008, is not used here as it would be difficult to match up a large number of original sources (*see below*).

Microeconomic data on firms are taken from: *(i)* annual survey on firms (Enquêtes Annuelles d'Entreprises - EAE) and (ii) annual production of firms statistics (Élaboration des Statistiques Annuelles d'Entreprises - Esane) databases provided by the the French National Institute of Statistics and Economic Studies (Insee). Those surveys compile structural firms' statistics and decompose firms' revenues according to their different activity branches. Esane replaced the EAEs in 2008 and corresponds to a strengthened merge between survey, fiscal and social administrative data.

This paper focuses on the period 2002-2012 due to a change in the nomenclature of economic activities (NAF rev1) that leads to a undercoverage of branches in 2001. Similarly, the change in both the same nomenclature that occurred in 2007, and in the survey process in 2008 leads to an increased number of small firms included in the panel. Therefore, time series for the period 2002-2012 show a break in 2007. To circumvent this issue, our sample is split into two sub-samples, namely 2002-2006 and 2007-2012. Note that above mentioned changes induce a quality loss of our database in 2007. However, we purposely choose to keep this year in our sample to allow the computation of growth rates in 2008.

Trade data, and in particular French firms export data, stem from the French customs database. This dataset describes trade flows exiting the French territory and details the exporting firm's SIREN identification number, the value of the trade, its type in the Harmonized System (HS) classification, as well as the destination country. Trade data are exhaustive towards non-EU member countries, and exhaustive towards EU-member countries when a firm exports more than 460 000 euros annually.[5]

The use of customs' trade data is justified by the non-reporting of export revenues by branches in the Esane database, starting from 2008. Nonetheless, this breakdown of export revenues is available before 2008 and therefore allows controlling the quality of imputed export revenues.

Merging both the firms' databases and the customs' database is a difficult task, and in particular, the harmonization of nomenclatures across time (with different vintages of each nomenclature) and space (national, regional or international nomenclatures). This process is described below.

In addition to the two previous main data sources, we include information from the Insee's Financial linkages database (Liaisons Financières - LiFi) in order to identify firms' ownership, as well as from the CEPII's BACI database and from the National Accounts in order to construct foreign and domestic demands addressed to firms (see appendix 2).

III.1 Harmonization of nomenclatures

As mentioned, matching firms' data with customs' data is a difficult task as different nomenclatures and vintages coexist, and in particular activity-based nomenclatures with product-based ones.

Actually, the EAE and Esane databases sort firms by their main activity or their branches of industry using the NAF nomenclature stemming from the European Nomenclature of Economic Activities (NACE) produced by Eurostat. First introduced in 1993, the NAF nomenclature was updated twice in 2003 (NAF rev .1) and 2008 (NAF rev. 2). Trade data

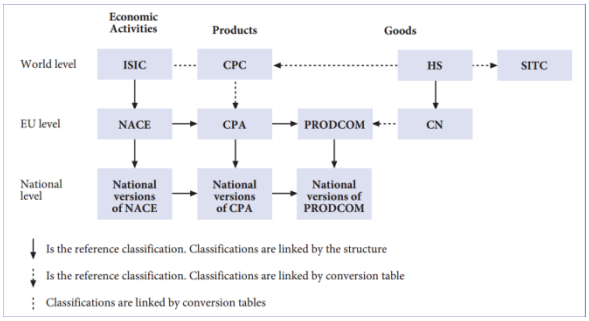
[5] This threshold has evolved across time.

uses the Harmonized System (HS) product nomenclature published by the World Customs Organization (WCO). This classification was updated in 2002, 2007 and 2012.

To interconnect these classifications (*see figure 7*), we introduce the Statistical Classification of Products by Activity in the European Economic Community (CPA, or CPF at the French level) that allows by construction a direct connection to NAF. In addition, to this uneasy swing from products to activities, we also need to account for revisions in the classifications. To reconcile the HS and NAF both through CPA and across vintages, we split our sample in two sub-samples ranging from 2002 to 2006 and 2007 to 2012. Over the first (resp. second) period, we construct a first (resp. second) interconnection table harmonizing the NAF rev. 1 and the HS2002 nomenclatures (resp. NAF rev. 2, CPA rev. 2, HS2007 and HS2012).

<table>
<tr><th></th><th>NAF (activity)</th><th>CPA (activity and product)</th><th>HS (product)</th></tr>
<tr><td>2002
2003
2004
2005
2006</td><td rowspan="2">rev. 1</td><td rowspan="2">rev. 1</td><td rowspan="2">2002</td></tr>
<tr><td>2007</td><td rowspan="3">2007

2012</td></tr>
<tr><td>2008
2009
2010
2011
2012</td><td>rev. 2</td><td>rev. 2</td></tr>
</table>



Source: Eurostat - NACE Rev. 2 Statistical classification of economic activities in the European Community Handbook
Note: in the French case, the national version of NACE (resp. CPA and PRODCOM) is NAF (resp. CPF and PRODFRA).

Figure 7. Sequence of updates and dependences between classifications

We use correspondence tables available on the WCO's, European Commission's and Insee's websites. The availability of a HS2002 to NAF rev 1 table allows to avoid the use of CPA over the 2002-2006 period. Marginally, we add minor hand-corrections to the initial tables to ensure their comprehensiveness.

A last difficulty remains as correspondence tables do not provide unique associations between codes. A single NAF classification code can correspond to two or more HS codes, and two different NAF codes can match a same HS code. Therefore and in order to take these links between unique codes, we construct a single harmonized table per sample period that matches each codes in each classification and vintage to a single harmonized code. The construction of such harmonized tables is conducted along the lines of Pierce and Schott (2009) and Van Beveren et al. (2012).

The process is presented below for a simplified example, as presented on Figure 8. When corresponding classifications, four cases might arise, namely:

- Line 1 - full bijectivity: code A in nomenclature N1 corresponds to one and only one code α in nomenclature N2, and *vice-versa*. This unique correspondence both ways is preserved in the harmonized table with a harmonized identifier R1.
- Line 2-3 - split: Code B in nomenclature N1 corresponds to two different codes in N2. Code B, β1 and β2 are therefore linked, and are associated to a same harmonized identifier R2 in the final correspondence table.

	Initial correspondence table		**Harmonized identifier**
	N1	**N2**	
1	A	α	R1
2 3	B B	$\beta 1$ $\beta 2$	R2
4 5	C1 C2	γ γ	R3
6 7 8	D1 D2 D1	$\delta 1$ $\delta 2$ $\delta 2$	R4
Unique identifiers	6	6	4

Figure 8:
Simplified harmonized correspondence table

- Line 4-5 - merge: Symmetrically, code C1 and C2 are associated to the same code γ in N2, and correspond to the harmonized identifier R3.
- Line 6-8 - combination: for codes D1, D2, $\delta 1$ and $\delta 2$, taking into account all links both ways between these codes indicates that they belong to a same category and therefore should correspond to a single harmonized identifier R4.

In this simplified and theoretical example, our harmonization process leads to a loss of information of two unique identifiers, starting from six unique codes in each classification. All in all, the use of these harmonized tables allows the merge between firms' activities and customs' trade information.

III.2 Data processing

Merging branches according to the harmonized nomenclature leads to a 14% loss of our observations, without a significant loss in turnover (*see figure 9*). One should note that even though the harmonization process is differentiated across the two sub-periods 2002-2006 and 2007-2012, branch merging losses are quasi identical on these two sub-samples.

	N	Turnover	N	Turnover
EAE-ESANE	572 171	9 913	100%	100%
Product/activity harmonization	494 303	9 909	86%	100%
Merge with trade data	494 303	9 909	86%	100%
Transformation in growth rate	300 601	7 248	53%	73%
Other trims…	80 449	4 051	14%	41%
…without outliers	66 026	3 652	12%	37%

Note: N corresponds to the number of statistical units. For line 1 only, this refers to activity branches, whereas for lines 2 to 6, it corresponds to harmonized branches. Turnover is in billion €. Both columns refer to the sum over all sample years.

Figure 9: Data treatments and harmonization losses

Furthermore, merging our firms' data with trade data is lossless. Indeed, the merge is conducted under the hypothesis that a branch with no observed exports in the customs' data is a non-exporting branch. Indeed, this might not be true due to the construction of customs' data itself (e.g. the declaration threshold), and some branches might actually export in the EAE-Esane data. A comparison of the customs' imputed export sales with the export turnover declared by firms themselves is presented in the Appendix 3. This analysis shows that mismatches are relatively costless for our sample.

A third major step is the transformation of our sample in level into a growth rate sample. This operation indeed leads to an important loss of information of about 33% of observations and 27 % of turnover. This loss corresponds to the first two years of each sub-sample (2002 and 2007) as well as to firms absent from the sample one year to the other. This operation does not bias our sample.

Lastly, we restrict our sample to firms whose main activity is manufacturing industry and delete aberrant observations (undeclared sales growth rates and observations for which total turnover is lower than export sales).

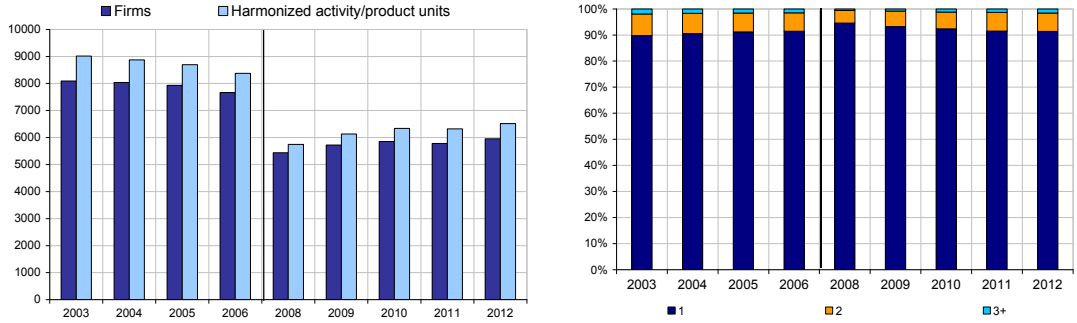
In order to trim outliers of our econometric analysis, we choose to delete the bottom and top 5% of observations in terms of both total and export turnover growth rates. The quantiles are computed per year $\times$ 2-digit-NACE main activity code to account for sector- and time-specificities in the dynamics of sales. As an alternative, we also consider trimming observations outside of the range:
[Q1-5$\times$StandardError ; Q3+5$\times$ StandardError], where Q1 and Q3 respectively stand for the first and third quartiles. This alternative trim leads to a negligible change in deleted observations.

III.3 Working sample structure

All in all, the final database used for the subsequent panel analysis contains around 66 000 harmonized year×firms×branches. Over 90% of firms operate in one branch (*see figure 10a and 10b*).

III.3.1 Structure by size

Firms are mostly of medium size (*see figure 11a*), with small firms (PME, between 10 and 249 employees) representing slightly less than 80% of our sample, and medium firms (ETI, between 250 and 4 999 employees) around 20%. However, in terms of total sales (*see figure 11b*), medium and large firms (GE, over 5 000 employees) dominate with respectively 60% and 20% shares. The remaining 20% come from small firms.



a. Number of statistical units *b. Harmonized branches per firm*

Sources: Insee, EAE-Esane, LiFi, national accounts; Customs; CEPII, BACI; authors' calculation.

Figure 10: Structure of the working sample

As a point of comparison, in 2013, there were 221 102 manufacturing firms in France, 84% of which were very small firms (TPEs, less than 10 employees)[6]. In our sample, these TPEs represent less than 4% of all firms.[7] The over-representation of medium and large firms is a direct consequence of the surveying scheme, favouring a better coverage in terms of turnover. In particular, large firms are exhaustively surveyed, excepted for a few profiled firms. These firms are treated separately in order to compute consolidated group-level statistics.

However, this over-representation of medium and large firms, as well as of groups is beneficial for our study as it corresponds to firms more likely to export. Actually, it is structurally more difficult and costly for small firms to access foreign markets (administrative costs, language, transportation or financial issues, etc.).

III.3.2 Structure by ownership and by sector

As shown on Figure 11c, our sample contains more than 80% of group-dependent firms, of which ⅓ are foreign groups. Even though independent firms account for close to 20% of branches, once weighted by total sales (*see figure 11d*), these firms are negligible.

As for the size of firms, this bias towards group-dependent firms is interesting as groups are more likely to export, and in particular foreign groups that export towards the parent company.

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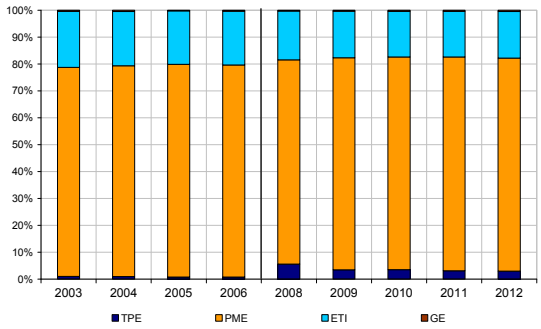
[6] See http://www.insee.fr/fr/themes/tableau.asp?ref_id=NATTEF09203.

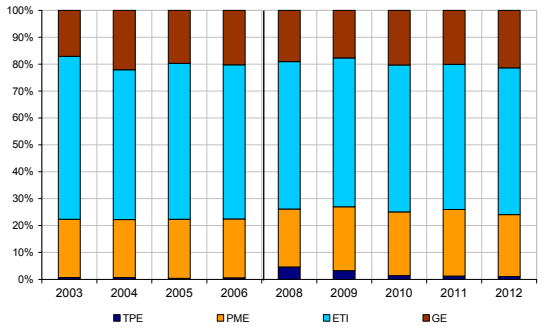
[7] TPEs are actually only observed over the sub-period 2008-2012. This corresponds to the switch to the Esane surveying scheme in 2008. Before 2008, TPEs are quasi inexistent in the sample.

Lastly, Figure 11e highlight that most branches (around 60%) are operating in the *Other manufactured goods* sector. In second position comes the *Machinery and equipment* industry (more than 20%) followed by the *Food products* industry (around 15%). Remaining firms operate in the *Transport equipment*'s sector (less than 5%) and the *Mining, coke, petroleum products and energy* sector (less than 1%).

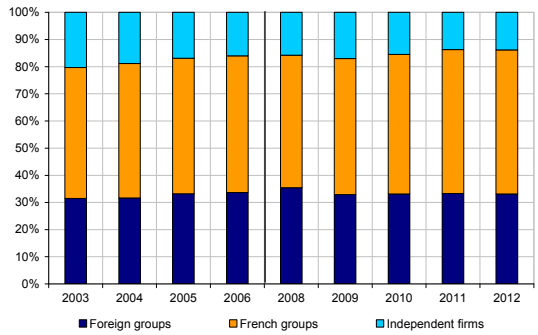
In terms of turnover, the *Mining, coke, petroleum products and energy* industry weights more with a 10% share, as for the *Transport equipment*. On the contrary, both the *Machinery and equipment* and *other manufactured goods* industries see their shares decline.



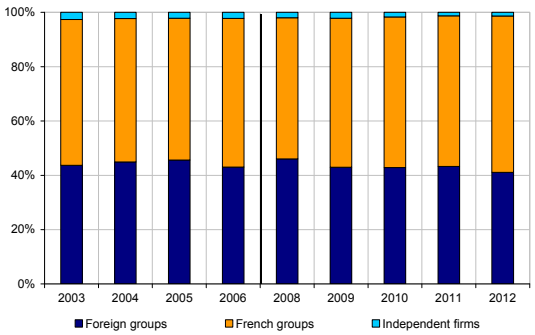
a. Decomposition by size



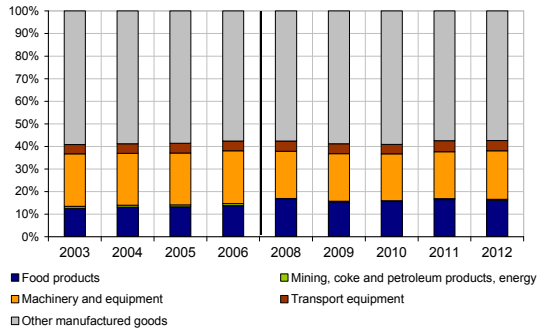
b. Decomposition by size (weighted by turnover)



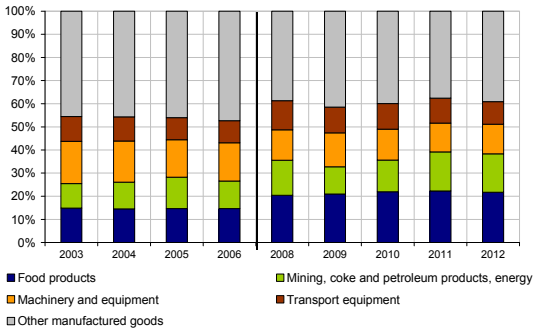
c. Decomposition by ownership



d. Decomposition by ownership (weighted by turnover)



e. Decomposition by industry sector



f. Decomposition by industry sector (weighted by turnover)

Note: TPE corresponds to Very Small Firms of less than 10 employees, PME to Small and Medium Firms between 10 and 249 employees, ETI to Intermediate Firms with 250 to 4 999 employees, and GE to Large Enterprises with more than 5 000 employees.

Sources: Insee, EAE-Esane, LiFi, national accounts; Customs; CEPII, BACI; authors' calculation.

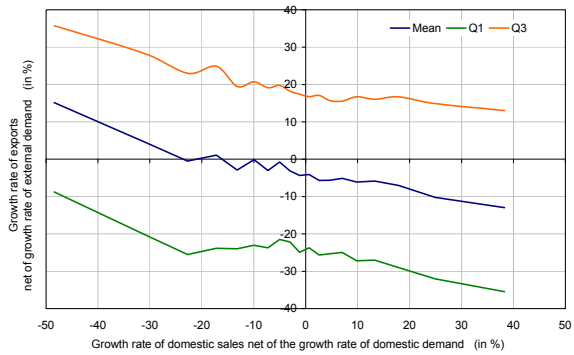
Figure 11: Structure of the working sample

IV - At the firm-level, the link between export performance and performance on the domestic market is weak

IV.1 For French companies, performances on the domestic and foreign markets may be negatively but only weakly linked in the short term

Depending on variations in demand for their goods on different markets, companies that are already in place will adjust their volumes and their selling prices ("intensive margin" adjustments). There may also be a change in the population of exporting companies (entering or exiting different markets, extensive margin adjustments). This phenomenon is not extensively studied here because of the low representation of such companies (mainly small and medium enterprises) in our database (*see Appendix 4*). The database is made up of the main industrial companies in France which have exported continually for at least two years in a row; and as seen, these data are not exhaustive.

Is there a relationship between the performances of companies in the domestic and export markets? At company level an increase in performance in the domestic market (resp. export market) is defined as growth in domestic sales (resp. in exports) that is greater than domestic demand (resp. external demand) in markets where the companies are present.[8] For the period 2003-2012, a moderate substitutability between the domestic market and export markets emerges for the "average" exporting industrial company (*see figure 12*): a 10-point improvement in performance on the domestic market would tend to be accompanied by a lesser performance of 3 points for export. This result persists if the exercise is repeated on sub-samples of companies differentiated by size and sector.



Sources: Insee, EAE-Esane, LiFi, national accounts; Customs; CEPII, BACI; authors' calculation.

Figure 12. Export and domestic market performances between 2003 and 2012

The strong heterogeneity in situations is also striking. An additional examination of the most and least successful companies in one market reveals performances that are in fact very scattered in the other market: although, in accordance with the preceding analysis, among those companies that have gained national market share there are a majority that have lost exports (Southeast quadrant), there are also a considerable proportion of them that have gained exports (Northeast quadrant). In the same way, although among the companies that have lost national market share, there are a majority that have gained in exports (Northwest quadrant), there are also a considerable proportion of them that have lost exports (Southwest quadrant).

The relationship highlighted here therefore shows that factors contributing to the substitutability of performances prevail over those favouring complementarity in France for the period 2003-2012. This result is different from the diagnosis obtained at aggregated level: in the short term, companies have a tendency to favour one market over the other,

[8] This domestic demand corresponds to the sum of final consumption, gross fixed capital formation and intermediate consumption at product level.

despite very varied situations and a fairly weak substitution. Nevertheless, these are short-term changes in performances established across a panel of companies, independently of their size and their importance in third markets and domestic markets. The analysis that follows differentiates in particular the average behaviour of all companies from that of the largest ones, which are the companies that participate most in international trade.

IV.2 The econometric analysis masks a diversity of behaviours between small and large companies

The above analysis was based on performance, defined as the ability of companies to increase their sales more quickly (or slowly) than demand. However, the sensitivity of sales to demand is usually less than one: a positive shock of 10% of foreign demand would usually be accompanied by an increase of barely 3% in foreign sales in the first year (*see figure 13a panel a and Box 2* for the methodology used). Similarly, a positive shock of 10% of domestic demand would usually be accompanied by an increase of 5% in domestic sales (*see figure 13b panel a*). These results therefore show the presence of production or liquidity constraints: companies would not have the capacity to immediately meet all additional demand for their products. In addition, for a given foreign demand, there is a negative link between domestic sales and exports, which only goes to confirm the result of a slight substitutability of sales: a 10% increase in domestic sales (resp. in foreign sales) would be accompanied, on average, by a 2% (resp. 1%) drop in exports (resp. domestic sales).

However, the link between exports and domestic sales is endogenous: many factors can influence both variables simultaneously, for example changes in transport costs or investment prices, which may result in the company having to choose, in the short term, between the two markets. To estimate only the impact of domestic demand shocks on exports, we apply instruments to growth in domestic sales: the explanatory variable we use for exports is the result of the regression model relating growth in domestic sales to domestic demand.[9] In this way, we eliminate the impact on the company's domestic sales of any factors other than domestic demand. In this instance, sales in these two markets prove to be complementary: a 10% increase in domestic sales is accompanied by a 4% increase in exports (*see figure 13a - panel b*). Similarly, the same phenomenon is observed in the other direction at a lesser extent. When exports are instrumented by foreign demand, the relationship is reversed: a 10% increase in exports is accompanied by a 1% increase in domestic sales (*see figure 13b - panel b*).

How is the inversion of the relationship to be explained? Here, only the impact of the growth in domestic sales due to the overall growth of the domestic market served by the company is considered. This preliminary adjustment means that the substitution effect resulting from the company's location strategy is neutralised, insofar as the instrument used is independent of the company's choice to serve one of the markets. These orders of magnitude are already found in the literature (*see* Berman *et al.,* 2015).[10] The positive link that emerges can then be interpreted as follows: increased sales in a market (domestic or foreign) provide liquidity that can ease the supply constraint from which the company is suffering. Success in a market can be a positive signal which facilitates external funding for companies suffering liquidity constraints, and hence increases sales in the other market.

The leverage effect, calculated as the proportion of debt and assimilated in total liabilities, has been used as a proxy of credit constraints, controlling for the sector effects (with the idea that, inside sectors, firms which have the smallest leverage ratios are more credit constrained since they had less recourse to indebtedness). The results of the regressions, using firms fixed effects in both stages of instrumental variables and excluding 2007 and

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[9] In other words, to avoid endogeneity problems linked to reverse causality (and also the bias induced by omitted variables and mis-measurement), the explanatory variable that may be influenced by the variable to explain is projected over a variable (the instrument). This instrument must have a link with this explanatory variable, but it is chosen in such a way that it is not correlated with the error term and is not influenced by the variable to explain (no reverse causality).

[10] Using French data for 1995-2001, the authors found a very similar effect to this and also showed substitutability when the adjustment for instrumental variables was not made.

2008, show that complementarity is globally higher for firms with smallest leverage ratios (defined as firms having a leverage ratio in the first quartile of each sector), compared with firms with highest leverage ratios (defined as firms having a leverage ratio in the upper quartile of each sector). This result stands both for the sample of all companies (coefficient of 1.0 for domestic sales of the least leveraged firms, compared with a non-significant coefficient at the 10% level for the most leveraged ones) and for SMEs (coefficient of 1.6 for domestic sales of the least leveraged firms, compared with a non-significant coefficient at the 10% level for the most leveraged ones), for domestic sales explaining exportations. Results are magnified for exportations explaining domestic sales both for the sample of all companies (coefficient of 0.31 for export sales of least leveraged firms, compared with a coefficient of 0.16 for the most leveraged ones) and SMEs (coefficient of 0.35 for export sales of least leveraged firms, compared with a non-significant coefficient at the 10% level for the most leveraged ones). This magnified effect for domestic sales explaining exportations is consistent with the above finding, as displayed in figure 13.

Among the largest exporting industrial companies (*see figure 13a and 13b - panel c*), there are two additional results that are particularly striking. First, the elasticities of exports to foreign demand and of domestic sales to domestic demand are much stronger, which may suggest fewer production constraints. Second, because they are probably less subject to financing constraints than small companies, extra sales in one market do not result in an increase on the other market (the coefficients of the instrumented variables are no longer significant). The domestic and foreign markets appear to be compartmentalised and the influence between the two is weak.

When only the smallest companies are considered (*see figure 13a and 13b - panel d*), liquidity constraints appear to be more significant[11]. These companies can only satisfy a small proportion of any additional demand made on them. Furthermore, an increase in domestic market sales can help increase exports. Mirroring this, an increase in exports can help increase domestic sales. Once again, this could be related to the existence of liquidity constraints: an increase in domestic (resp. foreign) sales could reduce these constraints and facilitate the financing of sales on the other markets.

On the whole, it would appear that the complementarity of domestic and export sales mainly concerns small and medium-sized industrial enterprises. The lack of complementarity for the largest companies would seem to be due to fewer production and liquidity constraints for these businesses.

[11] To give an idea of the magnitude of credit constraints faced by SMEs, using the SAFE survey performed by the Eurosystem with a sample of enterprises, it appears that, at the end of the period under review (2012), around 25% of SMEs asking for a bank loan did not get everything they applied for. This proportion is greater than 50% in countries such as Ireland, Greece, Spain, Italy, Netherlands and Portugal. On this subject, Cf. the SAFE survey for the April-September 2012 period on the following link:
https://www.ecb.europa.eu/pub/pdf/other/accesstofinancesmallmediumsizedenterprises201211en.pdf?b60ae06c3782e9478927d6c4851c83eb

	Without IV	With Instrumental Variable (IV)		
	Panel a	Panel b Whole	Panel c - Large firms	Panel d - SMEs
Δ Ln (DS)	-0,19***	-	-	-
	(0,01)			
Δ Ln $(DS)^{IV}$	-	0,39***	0,28	0,38**
		(0,10)	(0,20)	(0,18)
Δ Ln (FD_{vol})	0,28***	0,17***	0,49***	0,10**
	(0,02)	(0,03)	(0,08)	(0,04)
Δ Ln $(ExchangeRate_{export})$	0,42***	0,32***	0,63***	0,23**
	(0,05)	(0,05)	(0,12)	(0,10)
Fixed effects				
Firms	Yes	Yes	Yes	Yes
Grouping industries	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	65 208	65 208	7 232	30 456
R^2	0,32	0,32	0,36	0,38
RMSE	0,49	0,49	0,38	0,56
Mean value of ΔLnX	0,004	0,004	0,015	-0,007

a- …Foreign sales (X)

	Without IV	With Instrumental Variable (IV)		
	Panel a	Panel b Whole	Panel c - Large firms	Panel d - SMEs
Δ Ln (X)	-0,11***	-	-	-
	(0,00)			
Δ Ln $(X)^{IV}$	-	0,13***	0,06	0,19**
		(0,05)	(0,11)	(0,08)
Δ Ln (DD^{vol})	0,47***	0,25***	0,86***	0,09
	(0,04)	(0,06)	(0,17)	(0,10)
Δ Ln (DD^{price})	0,48***	0,24***	0,85***	0,10
	(0,06)	(0,07)	(0,19)	(0,12)
Δ Ln $(ExchangeRate_{import})$	0,03	-0,01	-0,75	0,39
	(0,18)	(0,18)	(0,59)	(0,27)
Fixed effects				
Firms	Yes	Yes	Yes	Yes
Grouping industries	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	65 325	65 208	7 232	30 456
R^2	0,22	0,22	0,26	0,34
RMSE	0,38	0,38	0,40	0,37
Mean value of ΔLnDS	-0,010	-0,010	0,014	-0,023

b- …Domestic sales (DS)

*Notes: FD/DD means foreign/domestic demand addressed to the firm. Panel b: domestic sales/export are instrumented by domestic/foreign demand (in volume) and the import/export exchange rate. ΔlnDS / ΔlnX is the growth rate of domestic sales / export. The estimation period is from 2003 to 2012. The regressions c- "Large firms " and d- "SMEs " correspond to the regression on the last decile and the first half of the firms in terms of turnover. The large firms (resp. Small and medium-sized enterprises - SMEs) represent about 70% (5%) of both the total turnover and export. The standard deviations are given in brackets. *, **, *** correspond to a significance at 10%, 5% and 1% levels respectively.*
Sources: Insee, EAE-Esane, LiFi, national accounts; Customs; CEPII, BACI; authors' calculation.

Figure 13: explanatory factors of…

Box 2: Model and estimation

Our aim was to estimate the relationship between growth in domestic and export sales. To do this, two equations were estimated for company × group of activities × year, the first covering domestic sales and the second export sales. In both cases, the process is the same, i.e. to relate sales in one market to sales in the other market and also to demand and effective exchange rate determinants (for price-competitiveness effects). Fixed effects for enterprises, groups of activities/products and years were also added.

In order to control for shocks specific to the enterprises at each date (location strategy, supply shocks that affect competitiveness in all markets), the instrumental variables method was used. The instruments were demand (foreign demand for exports and domestic demand for domestic sales) and exchange rates (resp. for export and import). These were good instruments as much as they were not affected by shocks that were specific to the enterprise (they were external) but were important determinants of sales. The presence of yearly fixed effects meant that effects linked to the synchronism of national and international economic cycles could be controlled for.

More specifically, for export and domestic sales (results for the latter are not shown here), the estimated model is:

$$\Delta\log(DS_{ijt}) = \alpha\Delta\log(X_{ijt}) + \beta\Delta\log(DD_{jt}^{vol}) + \chi\Delta\log(DD_{jt}^{price}) + \delta\Delta\log(ExchangeRate_{jt}^{import}) + u_i + v_j + w_t + \varepsilon_{ijt}$$

$$\Delta\log(X_{ijt}) = \alpha\Delta\log(DS_{ijt}) + \beta\Delta\log(FD_{ijt}^{vol}) + \chi\Delta\log(ExchangeRate_{ijt}^{export}) + u_i + v_j + w_t + \varepsilon_{ijt}$$

where:

- *i* represents the enterprise, *j* the group of activities/products and *t* the year;
- *DS/X* represents sales in the domestic/foreign market;
- DD^{vol} and DD^{price} represent domestic demand in volume and price related to group j;
- $ExchangeRate^{import}$ represents the import exchange rate specific to group j;
- $ExchangeRate^{export}$ represents the export exchange rate specific to enterprise i and group j;
- u_i, v_j and w_t are the fixed effects of *enterprise / group of activities / year*;
- ε represents the residual of the equation.

Note that the logarithm variation specification (very similar to a growth rate specification) eliminates differences between enterprises (and groups of activities/products) which do not vary over time. The enterprise fixed effects therefore control for differences in mean trend between enterprises over the period. In the main regressions that are displayed, firms fixed effects have been introduced only in the second step of instrumental regressions, but the main results are robust and even magnified for the main coefficients of interest when firms fixed effects are introduced in both steps.

Results are interpreted directly by studying the symbols and size of the coefficient α, i.e. the elasticity of the growth rate of sales in a market to growth rate of sales in the other market. The symbol for this elasticity gives information on the link between domestic and export sales: a positive coefficient indicates complementarity between sales in the two markets whereas a negative one indicates substitutability.

V - Robustness checks

Our results are based on the assumption that firms have the faculty to design their own production and sale strategy. This is not obvious for two kinds of firms present in our sample: *(i)* subsidiaries, notably when they belong to a group where sales are concentrated through a wholesale trade branch and *(ii)* firms producing intermediate goods and possibly linked to an outsourcing company and hence constrained in their activity. The following robustness checks show that our main results are robust to these aspects.

V.1 Main conclusions appear robust when studying independent companies and companies belonging to groups where exports are not concentrated through a wholesale trade subsidiary.

Here, we distinguish independent enterprises, subsidiaries of French groups and subsidiaries of foreign groups. Different strategies for each type of firms could come from their capabilities to design their own production and sales strategy. In the case of groups, both domestic sales and exports could be managed by commercial subsidiaries whereas the production remains the sole goal of industrial subsidiaries. The demand addressed to a group could pass through the commercial subsidiary and erase the link between demand for goods and sales of the industrial subsidiary.

From 2003 to 2012, our data covers around one half of the French manufacturing exports. The loss comes from exporting firms which are absent of our sample (for 44% of the total loss), mismatching between the two databases used in our study (24% because of imperfect merge of product and activity classifications) and exporting goods by non-industrial firms (for one third, mainly by commercial subsidiaries).

If we only work on firms establishing their own strategies and managing both production and sales, the main results presented above are robust. First, the sensitivity of sales to demand is less than one, so all firms face production constraints (*see coefficients on the third line of figure 14*). Second, there is a negative link between sales in different markets (*see coefficients on the first line*). Moreover, the magnitude of this negative link is pretty close between domestic sales and exports. Third, when we only take into account shocks coming from (domestic or foreign) demand, the substitutability between markets disappears and even shows an inversion in the case of independent enterprises (only for exports) and subsidiaries of foreign groups (*see coefficients on the second line*).

V.2 Substitutability is confirmed when focusing on non-multinational firms exporting final goods.

In addition to previous robustness test, we want to control the ability of each firm to set its own sales decisions and strategies. As such, we focus here on two categories of firms: (*i*) non-multinational firms and (*ii*) non-multinational firms principally exporting final goods. Indeed, multinational firms[12] are part of a more global and international sales network that does not allow to distinguish between individual and group sale strategies. Similarly, for firms selling a large share of intermediate goods, we cannot eliminate the possibility that these goods are only targeted to specific firms, hiding outsourced production. Therefore, controlling for these two aspects allows selecting a sub-sample of firms which are likely to be in control of their sale strategy.

To do so, we use the Broad Economic Classification (BEC rev. 4) published by the United Nations. Actually, this classification distinguishes Harmonized System (HS) products into 7 broad categories: 1. Food and beverages, 2. Industrial supplies, 3. Fuels and lubricants,

[12] Defined here as either foreign group-dependent firms, or French group-dependent firms for which only one subsidiary is identified as a French resident (that is if only one subsidiary is identified in the Financial Linkages (LiFi) database). Indeed, if a group is identified with no more than one subsidiary in France, it implies the existence of foreign subsidiaries. It therefore also defines the group as a multinational group.

4. Capital goods (except transport equipment), and parts and accessories, 5. Transport equipment and parts and accessories, 6. Consumer goods and 7. Goods not elsewhere specified. A thinner 3-digit classification then allows to associate each code to a main use of the product, namely capital goods, intermediate consumption or consumption goods. This follows the guidelines of the United Nations.[13] The correspondence between the HS and BEC nomenclatures shows that over 5,091 HS2007 codes, 37% are final goods (including capital goods), 62% are intermediate goods, and only 1% are considered as both.

	Independent enterprises		Subsidiaries of French groups		Subsidiaries of foreign groups	
	Panel a	Panel b	Panel a	Panel b	Panel a	Panel b
Δ Ln (DS)	-0,27***		-0,19***		-0,11***	
	(0,02)		(0,01)		(0,01)	
Δ Ln $(DS)^{IV}$		0,80**		0,22		0,26*
		(0,35)		(0,22)		(0,16)
Δ Ln (FD_{vol})	0,17***	0,03	0,30***	0,23***	0,41***	0,32***
	(0,06)	(0,08)	(0,03)	(0,05)	(0,04)	(0,06)
Δ Ln $(ExchangeRate_{export})$	0,67***	0,72***	0,45***	0,39***	0,66***	0,56***
	(0,22)	(0,22)	(0,09)	(0,10)	(0,09)	(0,09)
Fixed effects						
Firms	Yes	Yes	Yes	Yes	Yes	Yes
Grouping industries	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10 850	10 850	18 378	18 378	10 223	10 223
R^2	0,48	0,48	0,42	0,42	0,41	0,41
RMSE	0,55	0,55	0,42	0,42	0,35	0,35
Mean value of ΔLnX	-0,019	-0,019	0,034	0,034	0,024	0,024

a- …Foreign sales (X)

	Independent enterprises		Subsidiaries of French groups		Subsidiaries of foreign groups	
	Panel a	Panel b	Panel a	Panel b	Panel a	Panel b
Δ Ln (X)	-0,10***		-0,14***		-0,26***	
	(0,01)		(0,01)		(0,02)	
Δ Ln $(X)^{IV}$		0,17		0,04		0,28*
		(0,11)		(0,08)		(0,16)
Δ Ln (DD^{vol})	0,42***	0,15	0,36***	0,22**	0,66***	0,15
	(0,12)	(0,16)	(0,08)	(0,10)	(0,17)	(0,22)
Δ Ln (DD^{price})	0,27*	0,07	0,46***	0,30**	0,79***	0,19
	(0,15)	(0,18)	(0,10)	(0,12)	(0,17)	(0,24)
Δ Ln $(ExchangeRate_{import})$	0,28	0,23	0,44	0,42	-0,69	-0,58
	(0,46)	(0,46)	(0,35)	(0,35)	(0,75)	(0,75)
Fixed effects						
Firms	Yes	Yes	Yes	Yes	Yes	Yes
Grouping industries	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10 879	10 850	18 406	18 378	10 224	10 223
R^2	0,45	0,45	0,30	0,30	0,27	0,27
RMSE	0,33	0,33	0,36	0,36	0,53	0,53
Mean value of ΔLnDS	-0,010	-0,010	-0,010	-0,010	-0,032	-0,032

b- …Domestic sales (DS)

*Notes: we only work on a sample where the representativeness of the industrial production is sufficient. Here, the sales of each firm represent at least 75% of the total industrial production of the group. The sample size is reduced by 40%. The standard deviations are given in brackets. *, **, *** correspond to a significance at 10%, 5% and 1% levels respectively.*
Sources: Insee, EAE-Esane, LiFi, national accounts; Customs; CEPII, BACI; authors' calculation.

Figure 14: Robustness check of…

With this information, we construct a measure of the share of intermediate goods in sales. On average, the share of intermediate goods is 52%, rising to 60% when weighted by export sales levels. However, the indicator is quasi binary with slightly less than 40% (resp. more than 45%) of all branches (resp. for non-multinational firms only) with less than 5% of intermediate goods in exports, and with around 45% (resp. 40%) of our sample with more than 95% (*see figure 15*).

In terms of sector-specific differences, the indicator shows large disparities (*see figure 16*). The food industry produces less than 15% of intermediate goods, whereas the mining and energy industry is fully intermediate. In between, the machinery sector is associated with a 50% share, the transport equipment industry with a 70% share, and other manufactured goods are 60% intermediate goods.

[13] See http://ec.europa.eu/eurostat/ramon/other_documents/bec/BEC_Rev_4.pdf

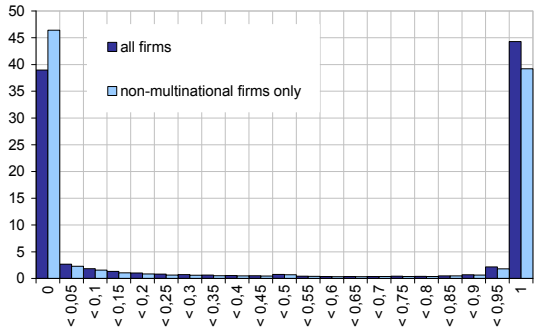

Figure 15: Distribution of the share of intermediate goods in export sales

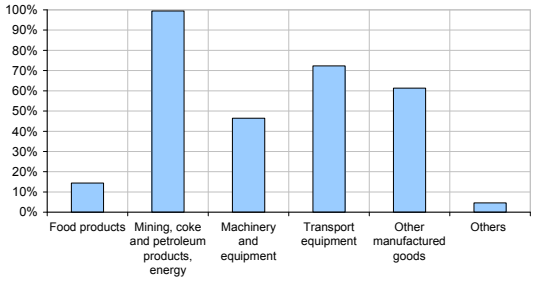

Figure 16: Share of intermediate goods in export sales by industry sector

All in all, we define firms exporting more than 50% of intermediate goods as intermediate goods exporting firms. As in the previous test, the sensitivity of sales to demand is less than one, so all firms face production constraints (*see figure 17*). There is also a negative link between sales in different markets. Again, taking only into account shocks coming from (domestic or foreign) demand, substitutability between markets disappears, however with no clear evidence of a sign inversion as observed before.

	Non-multinational firms		Non-multinational firms mainly exporting final goods	
	Panel a	Panel b	Panel a	Panel b
Δ Ln (DS)	-0,28***		-0,29***	
	(0,01)		(0,02)	
Δ Ln $(DS)^{IV}$		0,25		0,23
		(0,19)		(0,31)
Δ Ln (FD_{vol})	0,24***	0,17***	0,21***	0,15**
	(0,03)	(0,04)	(0,05)	(0,06)
Δ Ln $(ExchangeRate_{export})$	0,43***	0,41***	0,54***	0,55***
	(0,10)	(0,10)	(0,17)	(0,17)
Fixed effects				
Firms	Yes	Yes	Yes	Yes
Grouping industries	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	28 276	28 276	15 480	15 480
R^2	0,381	0,382	0,404	0,404
RMSE	0,545	0,545	0,54	0,54
Mean value of ΔLnX	-0,003	-0,003	-0,002	-0,002

*Notes: Non-multinational firms are firms independent of foreign groups, or independent of French groups for which only one subsidiary is identified as a French resident. Firms mainly exporting final goods are firms exporting less than 50% of intermediate goods according to the BEC indicator. Note that we cannot implement the same regression for domestic sales as we do not have their product classification in HS. The standard deviations are given in brackets. *, **, *** correspond to a significance at 10%, 5% and 1% levels respectively.*
Sources: Insee, EAE-Esane, LiFi, national accounts; Customs; CEPII, BACI; authors' calculation.

Figure 17: Robustness check for foreign sales

Conclusion

All in all, good performance on their domestic market partly offset export market share losses of French firms. But relatively strong domestic demand in France in the mid-2000s does not seem to be an explanatory factor of losses of export market share

The decline in export performance by the French economy was considerably greater than the decline in the domestic market during the last decade, and is the main factor to account for the deterioration in the trade balance for manufactured products.

During this period, any improvement in company performance in one of the markets tends to be to the detriment of the other. Export sales are indeed negatively linked to domestic sales. Although this link is weak, it does suggest that factors specific to substitution (company strategy, production costs) prevail over factors that encourage complementarity (liquidity constraint, technology or cost shock).

However, the deterioration in the trade balance is apparently not attributable to the dynamism of domestic demand. Indeed, for the most part, in the case of companies faced with a domestic demand shock, at worst, their response is not to adjust sales on foreign markets for the largest ones, and at best, they even take advantage of this situation to increase their exports. Given that a large proportion of French exports involve only a small number of companies, the largest companies, there could therefore not be any substitutability at aggregated level between domestic and foreign sales because domestic demand is so strong.

So how can we explain France's relatively greater losses of market share in third markets? Apart from margin behaviour, factors concerning price and non-price competitiveness basically act in the same way in each of the markets. The reasons are to be found more in the difference in demand structure in the domestic market and third markets, and in French companies' internationalisation strategies. Our study also suggests that in the short term, many exporting companies redirect their activity from one market to the other one for reasons other than a change in demand in these markets: as fixed costs are higher when exporting, the rise in production costs may have prompted some companies to withdraw from those markets where their profitability was becoming insufficient and hence to favour the domestic market.

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Appendix 1: competition between trade partners for export and import

Competition between trade partners, for import as well as for export, is very tight. In order to measure this competition, we reproduce in the case of France the work of Schmitz et al. (2012), which is itself inspired by the work of the Bank of International Settlements (BIS, *cf.* Turner and Van't Dack - 1993).

Competitiveness' indicators between a country i and one of its trade partner j usually take three kinds of competition into account:

the import competition between economies i and j on market i;

the export competition between economies i and j on market j;

and the competition between economies i and j on all other third markets k.

Let us consider the case of France. The share of imports of a trading partner country i is calculated as the simple portion of imports from i (m_{FRA}^{i}) on total imports (m_{FRA}):

(i) $w_i^m = m_{FRA}^{i} / m_{FRA} = m_{FRA}^{i} / \sum_j m_{FRA}^{j}$.

For exports, the calculation is more complex because it involves double weighting, which allow considering the competition faced by a country i on its own market but also the competition faced by this country on all other export markets k:

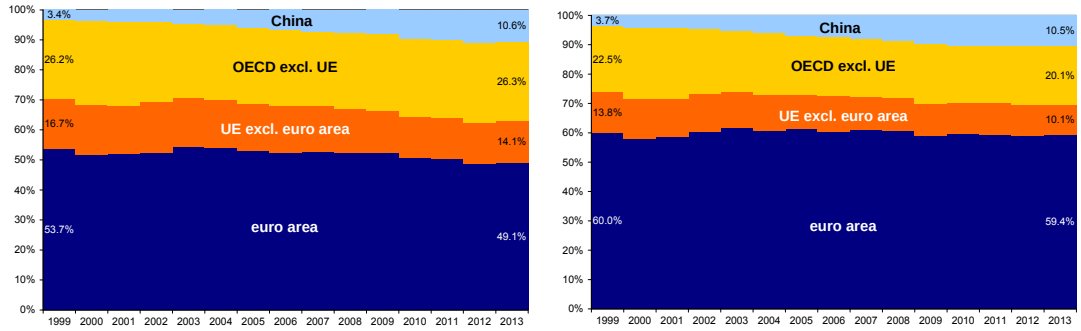
(ii) $w_i^x = (x_{FRA}^{i} / \sum_j x_{FRA}^{j}) \times (y_i / (y_i + \sum_{j \neq i} x_j^{i})) + \sum_{k \neq i} (x_{FRA}^{k} / \sum_j x_{FRA}^{j}) \times (x_i^{k} / (y_k + \sum_{i \neq k} x_i^{k}))$

in which x_i^j represents the exports of the country i towards market j; y_i represents the manufacturing output of i sold on market i.

The first term refers to the direct competition between both countries while the second one indicates the competition across all third markets.

The data used come from the Flubil database. For the sake of harmonisation, the calculation is done on an area restricted to 30 countries. Finally, due to lack of available data, the industrial production sold on the domestic market is proxied by the value added of industrial branches[14] to which we add imports and subtract exports of industrial goods.

In terms of competition, there are some differences between the one felt by France on its domestic market and on third markets. Throughout the period, Eurozone countries are more present on the French domestic market than on the French export markets. It should also be noted that for imports the share of the Eurozone is relatively constant (59.4 % in 2013 vs 60.0 % in 1999, *see figure A1*) whereas for exports it decreases to 49.1 % in 2013 (vs 53.7 % in 1999). The strongest deterioration in export performance could come from a relatively increased competition from non-Eurozone countries in a context of appreciation of the single currency over this period.



Sources: FluBil, Insee, authors' calculations

Figure A1: Competition on the export (left) and on the import (right) markets

[14] These data are available from the national accounts database of the United Nations.

Appendix 2: Foreign and domestic demands and exchange rate variables

In order to assess the performance of firms at the microeconomic level, we introduce foreign and domestic demands addressed to each firm. In addition, we also use branch- or firm-specific exchange rates.

Foreign demand

Foreign demand addressed to each firm × activities/products pool × year is computed as the weighted sum of growth rates (delta log) of total imports (obtained in the BACI database and excluding imports originating from France) from markets (country × pool) where the firm intervenes. Weights are firm-specific using customs' data to identify the distribution of each firms' exports across foreign markets for each year × pool. We construct a Tornqvist index as variations in total log-imports are weighted with the half sum of destination market shares at the current and previous dates. Other indexes, in particular Laspeyres indexes using t-1 weights (and standard growth rates rather than delta logs) are also computed. Results are globally unchanged but demand elasticities are usually stronger and with lower standard errors when using a Tornqvist index. In addition, we work with rolling weights rather than fixed ones, as is standard in the literature.

Domestic demand

Pool-specific domestic demand excluding inventories is defined as the sum of intermediate consumptions, final consumption and gross fixed capital formation of domestic agents in the considered activities/products pool. We use National Accounting data disaggregated in 138 levels (A138) provided by the Insee.

As for the correspondence between activity and product classifications, we need to construct a correspondence between this A138 nomenclature and our harmonized classification. In particular, we use an available HS2012-A138 correspondence table.

Identically to the construction of harmonized tables, it is possible to apply the Pierce and Schott algorithm, and obtain a new enlarged harmonized table. However, this step leads to large activities/products pools and therefore to important losses of information.

As such, we adopt an alternative construction method. Actually, using the HS2012-A138 correspondence table and our harmonized correspondence table to link the HS2012 nomenclature to our harmonized one allows us to identify for each A138 code to which harmonized code it corresponds. As a result, for each harmonized pool, we define the corresponding domestic demand as the weighted sum of domestic demands for each A138 product appearing in this harmonized pool. To avoid double counts of a A138 product appearing in different harmonized pools, it is necessary to impose a distribution of each A138 code

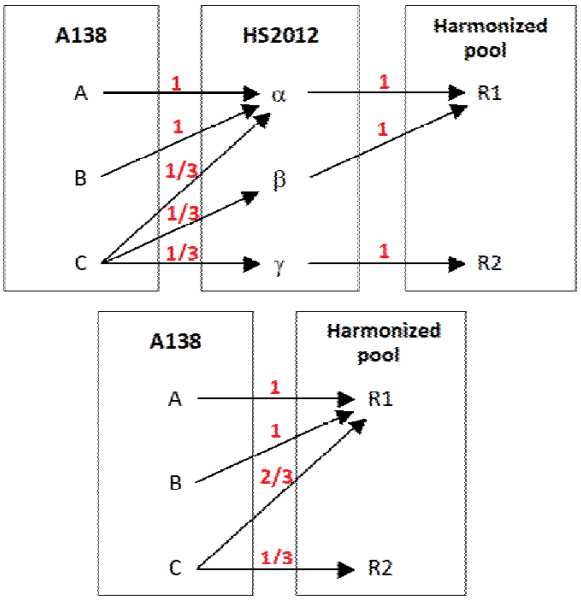


Figure A2: simplified representation of weights used in the distribution of domestic demand across harmonized pools

into the different pools where it appears. In the absence of additional information on possible weights that could be used in this distribution, we choose to share A138 demands equally across corresponding harmonized pools. This hypothesis indeed distorts the true (but unobserved) distribution but allows to preserve the total domestic demand level: the sum of all domestic demands over all A138 products is equal to the sum of all domestic demands over all harmonized pools.

To exemplify this hypothesis, the figure A2 gives a simplified representation. On the upper part, we represent the correspondence tables from A138 to HS2012 and from HS2012 to the harmonized classification. Here, there exists a complex link between code C in A138 simultaneously corresponding to three different HS2012 products, and ultimately to two different harmonized codes. In the absence of information on how to split the demand for C across α, β and γ, we assume an equal share across HS2012 products, that is ⅓ each.

In this example, no other complex links exist and the remaining weights are equal to one. Taking into account all these weights allows to compute the system of weights used for the final distribution, as presented on the lower part of the figure: domestic demands for product A and B fully count in the R1 pool, whereas domestic demand in product C counts for 2/3 in R1 (*via* α and β) and 1/3 in R2 (*via* γ). Note that this domestic demand does not carry a firm specific dimension as opposed to foreign demand.

Import and export real effective exchange rates

An export real effective exchange rate is computed for each firm × harmonized pool × year using a Tornqvist aggregation. We compute weighted averages of real (ie. deflated by the consumer price index) bilateral exchange rates. Weights (half-sum of total exports in t and t-1) are identical to the one used for foreign demand.

The import real effective exchange rate is computed in an identical manner using harmonized pool-specific weights (instead of firm-specific weights). We choose to do so to take into account the fact that customs' trade data only informs us on direct imports. Indeed, if a firm buys foreign goods to a French-based import company (for instance, fuel), these (indirect) imports will not be tracked down in the individual customs' data for this firm.

Appendix 3: Consistency between customs' trade data and firms' individual data with respect to export sales.

The absence of export sales data by branches of industry in the firms' individual database Esane forbids us to study the post-2007 period. To circumvent this issue, we reconstruct export sales using customs' data. However, and by construction, export sales as declared in the firms' database before 2007 and as constructed from trade data differ (in particular due to the non-reporting of European transactions below a certain value threshold).

To assess the quality of this imputed variable, we compare it over the period 2002-2006 with export sales declared by firms themselves in the EAE database. Table A below gives the share of firms (or harmonized pools) identified as exporters in each of the two available databases. Table B details the effective consistency between the two sources (for instance, if a firm is properly identified as an exporter by both sources). Lastly, Table C explicates correlation levels across databases between export sales levels on the one hand, and export statuses on the other hand.

We observe that a smaller number of statistical units (firms or harmonized pools) are identified as exporting in the Customs' data (*see figure A3a*). This corroborates our previous statement on the potential undervaluing of exports for small firms below the reporting threshold (this indeed also concerns larger firms). In total, the two sources differ for 30% of firms and 33% of harmonized activities/products pools, mostly due to units declared as exporters in the EAE and not in customs' data.

Distribution of export statuses depending on the source		Harmonized pool		Firm	
		Total 190,668		Total 121,670	
		Source: EAE			
		Non-exporters	Exporters	Non-exporters	Exporters
Source: Customs	Non-exporters	68,769	54,848	31,590	33,513
	Exporters	8,332	58,719	2,968	53,599
	Non-exporters	36%	29%	26%	28%
	Exporters	4%	31%	2%	44%

Note: In the full 2002-2006 sample at the firm level, including 121 670 observations, 33 513 firms declare themselves as exporters (in the EAE), but are not identified as such by customs' data (that is 28 % of our sample).

Figure A3a: Export status consistency between EAE and customs' databases (2002-2006)

Figure A3b indicates correlation levels between declared and imputed export sales from 29% to 68% at the firm level. Over the whole sample, this correlation level is 46% for exports sales in level and 48% for export statuses. Therefore, and as expected, matching is inaccurate. However, working only with exporting firms, one should note that firms identified as exporters by customs' data but not in the EAE is relatively small (around 2% to 4%). On the sub-sample of exporting firms (according to customs' data), the correlation level of exports sales in levels exceeds 90%.

		Total (2002-2006)	**2002**	**2003**	**2004**	**2005**	**2006**
Firms	export sales in level	0.46	0.68	0.29	0.30	0.33	0.58
	… on exporters (customs) only	*0.94*	*0.96*	*0.85*	*0.92*	*0.92*	*0.96*
	export status	0.48	0.48	0.48	0.48	0.48	0.48
Harmonized pools	export sales in level	0.47	0.67	0.27	0.28	0.34	0.62
	… on exporters (customs) only	*0.92*	*0.94*	*0.82*	*0.85*	*0.92*	*0.96*
	export status	0.42	0.43	0.42	0.42	0.42	0.42

Figure A3b: Correlation between export statuses or export sales across databases

Appendix 4: Adjustments through extensive margin - a rare phenomenon of entry/exit of international markets inherent to the sample used

Studying extensive margin phenomena is a difficult task due to the survey nature of our sample. Indeed, if a firm disappears from our sample, we cannot directly deduce that it exited the market (domestic or foreign) as it may simply mean an exit from the polling scheme. As such, we focus in this section on firms that are available for two consecutive years in our sample and for which we observe an entry or exit of foreign markets (as export sales reach (exit) or depart from zero (entry) from one year to the other).

Restricting to this sub-sample of firms, our sample does not contain a large number of firms entering and exiting international trade (*see figure A4*). Actually, within the group of exporting firms, most of them are *permanent* exporters, that are doing so over all periods of our sample. Only 18% of exporting firms actually adjust sales by an entry or an exit from foreign markets.

	Total	2003	2004	2005	2006	2008	2009	2010	2011	2012
Entering export	2.2%	2.8%	2.9%	3.0%	2.9%	1.4%	1.3%	1.9%	1.5%	1.7%
Exiting export	2.1%	3.1%	2.8%	2.9%	2.7%	1.4%	1.5%	1.4%	1.5%	1.4%

Figure A4: Entry and exit of firms from international trade

Regarding the reasons leading firms to adjust sales at the extensive margin, we can intuitively expect these entries and exits to be correlated with favorable or unfavorable shocks on all sales markets (foreign but also domestic) of large enough size so that they cannot be accommodated at the intensive margin.

For instance, following a large increase in foreign demand for a specific product, related non-exporting firms might now find it profitable to start exporting to benefit from this positive dynamics. Symmetrically, large negative demand shocks might push a firm to exit markets if its profitability is affected.

However, data seems not to exhibit such a behavior. Each year, less than 2-3% of firms enter or exit international trade markets.

One should also note that the measure of extensive margin is conventional as it depends on the chosen periodicity. For example, firms that export every two years, though being "permanent" exporters, will fuel extensive margins.

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