# Firms and the global crisis: French exports in the turmoil [#]

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**Abstract**

The unprecedented drop in international trade during the last quarter of 2008 and the first quarter of 2009 has mostly been analysed at the macroeconomic or sectoral level. However, heterogeneous exporters in terms of productivity, size or external finance dependence should be hit differently by the crisis. This issue is examined here using data on monthly exports at the product and destination level for some 100,000 individual French exporters, up to 2009M4. We show that the drop in French exports is mainly due to the intensive margin of large exporters. Small and large firms are evenly affected when sectoral and geographical specialisation are controlled for. Lastly, firms (small and large) in sectors more dependent on external finance are the most affected by the crisis.

[#] This paper represents the views of the authors and should not be interpreted as reflecting those of Banque de France or the European Central Bank.

## 1- Introduction

Much attention has been paid to the unprecedented drop in international trade during the last quarter of 2008 and the first quarter of 2009: according to Eichengreen and O'Rourke (2009) this drop in world exports is even sharper than during 1929-1930. Beyond a limited resurgence of protectionism (Gamberoni and Newfarmer, 2009; Baldwin and Evenett, 2009, Bussiere et al., 2009), two broad explanations of this collapse of world trade have been suggested.

First, the slump in trade has been associated with a sharp deterioration of demand and activity worldwide, deterioration which has been particularly severe in the rich club of OECD countries (Araujo and Oliveira-Martins, 2009) and for investment goods and the automobile industry (Francois and Woerz, 2009). The increasing dominance of manufacturing models relying on internationally fragmented supply chains (Tanaka, 2009, Yi, 2009) may have magnified this impact of depressed activity on international trade. However, simulations which aim at identifying the contribution of the demand channel and that take into account international input-output relationships have hardly reproduced the magnitude of the drop in world exports, suggesting that additional factors may have played a role (Benassy-Quéré et. al., 2009; Willenbockel and Robinson, 2009).

Secondly, the intensification of the financial crisis may have led to liquidity shortages and to higher risk aversion and negative confidence effects, both on the side of financial institutions as well as of producers. As a result, a more limited availability of trade credit and financing – instruments especially designed to finance import and export activities – may have represented a key determinant of the global downturn (Auboin, 2009).

But more specifically, the *micro-economic* dimension of the current episode of trade collapse has not been addressed so far using consistent and exhaustive information on individual firms' exports, to the best of our knowledge.[1] Beyond the severe burden of adjustment that the crisis has imposed on many

[1] The exception is Bernard et al. (2009) investigating the impact of the 1997 financial crisis on individual US exporters. They find that the intensive margin had the main contribution to the decline

individual firms, such episode can be envisaged as a natural experiment that allows to better understand how financial constraints interact with the different types of trade costs, namely sunk, fixed but recoverable and variable costs.[2] It remains to be uncovered how the extensive margin of trade – i.e. the participation to the trading activity of a firm on specific destinations and/or products – and the intensive margin of trade – i.e. the volume of traded merchandise – react to a sharp and unanticipated credit shortage.

But why should a credit crisis affect *exporters*, in particular? And should we expect exporters which are heterogeneous in their performance and key characteristics to be also heterogeneously affected by such a crisis?

The so-called *New* New Trade Theory with firm heterogeneity *à la* Melitz points to the importance of set-up (or beachhead) fixed costs which are often non-recoverable on top of exporting variable costs. Exporters are accordingly exposed to credit constraints when it comes to facing these additional costs to set-up export activity in a given foreign market. The interaction between credit constraints and firm heterogeneity sharpens the firm selection effect: the churning reallocating market shares from the least productive to the most productive exporters is higher than in normal circumstances (Manova, 2008). Interestingly Iacovone and Zavacka (2009) disentangle the demand-side (import contraction affecting in particular durable goods) and supply-side (such as the lack of external finance) determinants of the drop in sectoral exports during a banking crisis. Still, both Manova (2008) and Iacovone and Zavacka (2009) address the trade margins at a rather aggregated level: respectively 27 sectors (comprising 4-digit SITC products) and 4-digit ISIC sectors.

Against the background of exporters highly heterogeneous *within* sectors (See Mayer and Ottaviano (2007) and Eaton et al. (2008), providing evidence for the French case) the impact of the credit crunch and more generally the impact of the crisis should also differ accordingly across firms. One question

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in US exports. Still, they rely on annual data, while the development of the crisis would be better captured using infra-annual data.

[2] Sunk costs implied by export participation correspond to advertising, product adaptation to standards, gathering of information on regulations, R&D, etc. Fixed costs correspond to the maintenance of a

with important policy relevance is whether small and less productive firms are more adversely hit by the economic crisis than large and more productive firms. One could expect that small exporters may not be productive enough to overcome a sharp drop in foreign demand. They may also be more affected by credit restrictions as a result of their small size or lack of sufficient collateral or credit guarantees. In contrast, larger, more productive and more globalised firms may overcome more easily the contraction of foreign demand, and rely more extensively on intra-group financing or securities issues to cope with credit constraints.

In conclusion, how financial constraints affect *individual firms* is key to our understanding of the reaction of trade to shocks in presence of highly heterogeneous firms. Intuitively, more productive and financially less constrained firms participate more in the export activity: Greenaway et al. (2007) confirm this result on a panel of UK manufacturing firms observed over a span of ten years, with the result holding in the presence of sunk costs for export participation. In Muûls (2008), the variables costs of exporting can be financed internally by the firms. On the contrary, the fixed costs of exporting may require external financing when profits are too low or when the firm is short in liquidity. More productive and profitable firms or firms having better access to external finance are less constrained, all things being equal. Liquidity constraints will be an obstacle to export participation for firms productive enough otherwise. Using individual Belgian firm-level balance sheets and trade data at an annual frequency and combined with COFACE individual firm scoring, Muûls finds a robust relationship between exporting and financial constraints, even when controlling for productivity. Also a pecking order of trade is identified, with smaller or more remote markets being added subsequently, and less financially-constrained firms going further down the pecking order.

Against this background, this paper aims at disentangling the contribution of various sectoral, geographical and micro-economic determinants, including external finance dependence to the drop of French exports during the crisis. It relies on monthly data for individual French exporters at the

distribution network, the translation of the instructions for use, etc. Variable costs correspond e.g. to transport costs.

product and destination level.[3] Since sectors have been differently affected by the crisis, and differ in terms of external financial dependence, we ultimately aim at identifying the contribution of firms' characteristics to the drop in individual exports. We find that that the main discriminating factor is not firm size. Large and small exporters have been similarly hit by the crisis, if one controls properly for their exports' orientation in terms of sectoral specialisation and destination markets served. Indeed overall, large exporters absorbed a higher share of the trade contraction due to their size. The main discriminating factor lies elsewhere. We find that sectors where dependency on external finance is highest have been the most severely affected by the trade slump, and the financial dependence has affected all firms in these sectors, whatever their size. These results based on monthly firm level data accordingly reinforce the argument of a trade collapse fuelled by the credit crisis.

The rest of the paper is organised as follows. Section 1 presents the data. Section 2 provides detailed evidence on the evolution of firms' exports during the crisis. Section 3 decomposes trade margins and section 4 addresses the impact of financial dependence on individual export performance. Section 5 checks the robustness of the results to an alternative method of clustering firms across groups. The last section concludes.

**1- Data**

We rely on individual firms exports recorded on a monthly basis by the French customs. The period covered is 2000M1 to 2009M4. Two different thresholds apply for individual firms when it comes to the declaration of their exports. When exporting to a non-EU country, the threshold is 1,000 euros. When exporting to a Member state, the declaration is compulsory if the yearly cumulated value of exports to the other 26 EU Member states is larger than 150,000 euros. Using monthly data, it is unclear how this issue of threshold could be effectively tackled. Moreover we are interested in changes over time, and not in absolute figures. Hence we consider this issue of second order importance. We

[3] More precisely we consider exporters located in France, whatever the nationality of their ownership is.

drop Chapters 99 (Commodities not elsewhere specified) and 98 (Commodities specified at chapter level only) as well as monetary gold, from the data.

Each exporter is identified by its identification number (SIREN). This code allows to merge the data with the Amadeus database and thereby to match exports with financial information.

In order to control for developments in global demand, we use monthly HS2 digit level sectoral data for 52 countries, as provided by the ITC (UNCTAD-WTO, Geneva).

A first glance at the monthly French customs data (Figure 1) points to a steep decline in the value of total exports from September 2008 onwards. The number of French exporters, which is on a decreasing trend since the year 2000, also appears to have further contracted in the peak period of the crisis: from 50,458 units in October 2008, to 46,616 units in April 2009. While seasonality and the number of working days may bias the results somewhat, all in all about 3,800 firms stopped exporting, corresponding to 7 percent of the average number of monthly exporters over the whole ten year period considered. In conclusion, the comparison of data series relative to total exports values with the series on the number of exporters leads to the preliminary conclusion that the bulk of the adjustment has been on the intensive rather than on the extensive margin. This is what our analysis will try to sort out.

-- Figure 1 about here --

Each exporter ships its products in one or more product categories defined at the Combined Nomenclature 8 digits level (CN8) comprising some 10,000 different categories. Each category of product exported by a given firm can be shipped to more than one market. Accordingly, the most granular piece of information available in the French customs database is the value exported each month by a French resident firm in a CN8 category to each destination country. From a simple statistical point of view, the resulting four-dimensional data point should be defined as an *elementary flow*. On average, 629,000 elementary flows were recorded monthly over the period from 2005M1 to 2009M4.

Changes in trade flows over time may originate from changes in any of the following: number of exporters, number of products, destination markets served and value shipped per each elementary flow. In our analysis, however, we will aggregate the product dimension of the data in sectors. Thus, our dependent variable will comprise export flows, where each data point corresponds to the value of exports of all exported products categorised under CN8 categories belonging to the same HS2 sector by each French exporter to each destination country. We accordingly cumulate all products exported within a sector at the firm level, by destination. Incidentally, a firm may appear several times in the database, if it exports CN8 products belonging to more than one HS2 sector. This choice helps evaluating results on account that the current crisis appears to have had a distinctive sectoral dimension, as stylised facts from aggregate data suggest (effect strongest on durable goods, financial dependence of firms clearly following a sectoral dimension, etc.).

**2- Firm exports' developments during the crisis by size class**

The first issue we address is whether large and small exporters have been affected differently by the crisis. Since the French (annual) business survey (EAE) is only available up to 2007, we have no direct means of ranking firms by size. We will use the following two alternative methods to circumvent this problem.

Firstly, we will rank firms, within their sectors, according to the *total value of their exports relative to the exports of all other firms exporting in the same sector*, in a given month.[4] Hence the monthly composition of the quantiles in a given sector actually varies. Note that an individual firm can export in more than one HS2 Chapter, and thus can belong to different quantiles in different sectors. Since one may however challenge the use of such ranking for calculating quantiles' contributions to the observed changes in exports – the contribution of a given quantile is bounded by its overall weight – we also use a second method whereby the ranking is not determined by the size of exports.

[4] This approach does *not* consist in ranking all firms having exported at least once during the preceding 12 months in a given sector, as opposed to the status of operator on a yearly basis used by the French customs.

The second method of ranking is based on a criterion of diversification of exports at the individual firm level. We count the number of elementary flows by each firm (number of CN8 positions x destination markets in which exports are recorded at the firm level) and rank firms within quantiles accordingly. It is worth stressing here the underlying rationale of this alternative method of clustering firms in quantiles. Some very large French exporters in value are "champions", exporting a single CN8 to a very limited number of markets each month, but realising huge export values per elementary flow. Moreover, assuming a low frequency of trade relationships, the destination market of such exports may change from month to month. In such a scenario, these "champion-exporters" are categorised in the top percentile in terms of exported value, but would be classified in the bottom of the distribution in terms of diversification, inflating the extensive margin of the respective groups. We can safely assume that such scenario well applies to sectors such as aeronautics, ship building, etc. At the other end of the range of possible scenarios, we can imagine that some over-productive firms are able to export to many destinations while still remaining relatively small in terms of total value of exports, for instance because they are (French) leaders but of a very small and specialised market. This alternative method, whose aim is to control for these extreme cases, will be used as a test of robustness of our results in Section 5.

It is worth stressing that the extreme concentration of the losses among the top exporters made it worth categorising firms in four quantiles, using both criteria – value and diversification: the 1 percent largest exporters in each HS2 Chapter constitutes a single cluster, which we call Group 4. When using the value criterion, this group accounts for 63 percent of all French exports. Group 3 comprises exporters in the 95-99 percentiles, accounting for a further 24 percent of exports. Group 2 comprises exporters in the 80-95 percentiles and covers 11 percent of the total. The remaining bottom 80% of exporters, which belongs to Group 1, only explains a residual 3 percent exports. The observed concentration is more limited when the criterion of diversification is used: the share of Groups 1, 2, 3, and 4 in the total value of French exports are respectively 11 percent, 23 percent, 27 percent and 39 percent.

Also, the number of firms exporting by sector during the year is larger than the same number exporting during a specific month. This warning helps interpreting Figure 2 that plots the monthly total value of exports by quantile, cumulated over the 96 sectors. Quantiles are here defined in terms of values of exports (i.e. value criterion defined above). Export losses appear to be concentrated among the 1 percent largest exporters (Group 4), rather than on small firms, as one would expect owing to their presumed larger sensitivity to contractions in external demand and to credit shortages. This outcome however should not be taken at face value, as it primarily reflects the large concentration of the value of exports on a tiny proportion of large exporters. These latter, unlike small exporters, do export every month and throughout the entire period of observation, thereby registering the highest losses.

-- Figure 2 about here --

The stronger impact of the crisis on exports by the largest exporters is confirmed by plotting year-on-year changes, calculated as the 12-month rate of change. Continuing to define quantiles according to the value criterion, in Figure 3 we report evidence showing again that the 1 percent *largest* exporters of each export sector have been the most affected by the crisis. We observe a 31 percent drop in the exports of Group 4 in January 2009, against 9 and 11 percent for exporters in Groups 1 and 2 respectively. Interestingly, however, from February 2009 onwards, these differences shrink: in April, the losses for firms in Group 4 are only twice the size of those borne by firms in Group 1.[5]

-- Figure 3 about here --

Given this background, an analysis of the margins of trade becomes necessary to further explore the mechanisms at play during the crisis. The purpose of such analysis is to assess what part of the recent evolution of trade arose from changes in the volumes of shipments (intensive margin) and what part from the contribution of firms-destination specific dynamics of entry and exit (extensive margin).

**3- Decomposition of trade margins and contribution of the sectoral dimension**

[5] It is worth noting that losses in the other groups are mechanically cushioned with this method: a firm in the top 1 percent facing a drop in its exports may well be downgraded to Group 2 accordingly, and thus boost exports for this group.

Different strategies have been adopted in the literature to disentangle the margins of trade, but these have been usually computed on annual flows. Calculating the margins of trade on monthly firm-level data is more elaborate. Not only biases might arise due to problems of seasonality and different patterns of working days, but in addition monthly data imply a large turnover of firms and flows: as already stressed, not all exporters are exporting each month, and this is even truer for the individual products exported to each destination markets. Hence, when using monthly data, it is not possible to rely on a decomposition akin to the one based on yearly data. More specifically, it is not possible to define and compute the intensive margin as the change in the value of the flows present *continuously* throughout the considered period. Indeed this method would lead to a sharp underestimation of the reality.

Given these constraints we adopt a different method, proposed by Buono et al. (2008). This method provides an alternative – and incidentally more precise – assessment of the extensive margin: when summing up the margins, it allows to well approximate the observed aggregate growth rates of exports.[6] It relies on the so-called *mid-point growth rate* whose main advantage over more traditional methods is that it makes possible computing growth rates for newly created or destroyed flows. Namely, with this method we decompose the year-on-year changes to the overall value of French exports into four components: entries, exits, continuing flows with positive growth and continuing flows with negative growth. The extensive margin is provided by the difference between entry and exit rates and the intensive margin by the difference between positive and negative growth rates. The mid-point growth rate is computed on elementary flows defined as in Section 1: the monthly export flows by a French firm to a given destination of all CN8 products in a same HS2 sector.

For a firm *i* exporting a value *x* to country *c* and in sector *k* at month *t*, the midpoint growth rate is defined as:

$$g_{ickt} = \frac{x_{ickt} - x_{ick(t-12)}}{\frac{1}{2}\left(x_{ickt} + x_{ick(t-12)}\right)}$$

[6] In Buono et al. (2008) the method here described is applied to yearly data.

Similarly, the weight attributed to each flow is given by the relative share of the flow in total exports to country c by the overall population of French firms:

$$s_{ickt} = \frac{x_{ickt} + x_{ick(t-12)}}{\left( \sum_c \sum_i x_{ickt} + \sum_c \sum_i x_{ick(t-12)} \right)}$$

Finally, the year-on-year growth rate of the total value of French exports is:

$$G_t = \sum_k \sum_c \sum_i s_{ickt} g_{ickt}$$

Provided that the elementary trade flows in a sector can each month be classified into four subsets (created – disappeared – increased – decreased) $G_t$ can simply be decomposed into the above mentioned four *contributions*: extensive positive (entry), extensive negative (exit), intensive positive (increase in existing flows), intensive negative (reduction in existing flows).

To further illustrate this method, let us consider the 2003-2007 period and compute the corresponding decomposition using *yearly* data. Table 1 shows the simple averages of contributions. It is worth noting that according to our definition a new flow can be a new exporting firm (to a given destination in a given sector), or a new destination served by an incumbent exporter.

-- Table 1 about here --

According to the results in Table 1, over the period 2003-2007, the overall increase in the value of French exports, estimated at 3.9%, is driven by changes in the intensive margin: increased sales in existing flows (firm x destination) alone appears to have recorded a 21.1% yearly increase. Reduced sales in existing flows however absorb a large share of these gains, leading to an overall net positive contribution of the intensive margin to French export dynamics of 3.2%, i.e. about four fifths (82%) of the observed 3.9% yearly increase in exports. The remaining one fifth is contributed by the extensive margin, where a slight positive difference between entries and exits emerges.

Turning to monthly changes we expect more entries and exits than with annual data, as a result of the large turnover of elementary flows over months: one particular exporter might export in a given sector

to a given destination only in February in year t and only March in year t+1. In this case, it will be counted as an exit in February t+1 and an entry in March t+1.

To illustrate this point, we take the example of February 2009, which corresponds to the sharpest year-on-year drop in French exports in our sample (-27.5%). Overall 80% of the drop accrues owing to the intensive margin, with volumes of individual flows having fallen by 22.7% compared to their level in February 2009 (see Table 2). In other words, one fifth at most of the observed drop in exports is due to missing flows (firm x destination, in a sector). Not surprisingly, firms in all quantile groups record negative figures in both the intensive and extensive margins.[7] Nevertheless, the main contributor to the negative intensive margin is the group of the 1% largest exporters: for existing flows and on average, 67.4% of the value of the February 2009 losses is concentrated in the top 1% firms. Interestingly this figure is not so different from the share of exports by this group in total French exports.

-- Table 2 about here --

Having described the method we can now use it to characterise the micro-dynamics of French exports during the crisis. We focus on the sub-period running from January 2008 to April 2009. We will consider separately the four components of the variations recorded year-on-year. Indeed the different components may signal financing problems relative to specific aspects of the exporting activity: changes in entry rates may signal problems in financing the fixed sunk costs necessary to enter new markets; changes in exit rates instead may signal the impossibility to continue operating due to difficulties in bridging cash flow gaps with external financing. Finally, changes in the intensive margin can signal changes in demand conditions or a redistribution of market shares. In order to correct for seasonal and working-day variations, we apply to the raw data the "cvs-cjo" corrections calculated by the French Customs for large aggregates.[8]

The contribution of entry (new firms x destination in a sector) is shown in Figure 4. According to the literature on finance and trade shortly referred in the introduction of the paper, small and less productive firms, or firms highly dependent on external finance, are expected to suffer the most from

[7] Quantiles are defined here on the basis of value of exports.

the drying-up of credit. In contrast, firms benefiting from large collaterals, e.g. firms that being part of large groups could either borrow more easily or rely on internal sources of financing, are expected to be able to better cushion episodes of credit shortage in the market.[9] This hypothesis however is not confirmed by the data on entries: with the exception of a limited decrease in early 2009, we can hardly discern any sizeable reduction of entry in Figure 4, suggesting that no major difficulty for financing the corresponding fixed costs of market entry has been faced by firms, irrelevant of their size.[10] It is worth stressing however that sunk costs are usually paid by a firm well *before* its entry into a new market. Hence the effects of a credit shortage in 2008Q4–2009Q1 are likely to affect only marginally firms' entry strategies over the period of data availability (up to April 2009). Moreover, the mid-point growth rates method does not control for the sectoral composition of exports. As the trade crisis appears to have affected sectors unevenly, the cross-sectoral evidence reported in Figure 4 may hide more severe impacts on specific sectors. We will examine this issue below.

--Figure 4 about here --

Developments in firms' exits on the other hand may be symptomatic of difficulties in covering the export activity, due to costs of *fixed* or *variable* nature that cannot be financed with own capital of external finance. Problems in financing such costs should lead to exit: either exporters stop exporting in a sector, or they reduce the number of destinations they export to and concentrate on their core markets as the result of the pecking order of trade referred to above. We examine developments in exits since the outbreak of the crisis in Figure 5. It appears that indeed, over the recent period, firms have increasingly exited particular export markets, irrelevant of their size. The increase in exits from the exporting activity is ascertained for firms in the four quantile-groups. It appears that the acceleration started in September 2008 for the top 1% firms, but earlier for the 80-95 percentile group, possibly reflecting the increases in energy costs and deterioration of global demand that had started in

[8] Cf. for instance the French Customs Website (http://www.douane.gouv.fr/)
[9] However being part of a multinational group is not necessarily a good shield when the crisis is global and synchronised.
[10] The huge drop of the indicator for the 1% largest exporters in January should not necessarily be taken as proof of firms market entry responses to the crisis.

the previous months. The contribution of the top 1% exporters is dominant but falls short of the share of this group in total French exports.

--Figure 5 about here --

Abstracting from firms' sector and destination market specialisations, we conclude from the previous analysis that the contribution of the extensive margin to the decline in French exports is limited (one fifth at most). Moreover, it appears to be mostly explained by an increase in exit rates rather than by a reduction in entries from exporting markets. All in all, the great bulk of the deterioration in exports originated from the intensive margin.

Hence, in Figure 6, we illustrate the reduction in the intensive positive margins. It appears that although declining, even during a contraction of the market, a subset of firms increases their exports, mirroring the heterogeneity of sectoral developments and the underlying market shares redistributions across competitors. Hence, to the extent that the crisis is associated with a sharpening of the competitive environment, it represents an opportunity of expansion for top performers at the expenses of weaker firms. This is broadly in line with predictions from the literature on firm heterogeneity (e.g. Melitz and Ottaviano, 2008). More interestingly, the negative intensive margin (drop in sales in markets where firms are already present) very much contributes to the observed drop in French exports (Figure 7). The largest exporters contribute massively to this reduction in sales that, although accelerated from the summer 2008 onwards, had already started as early as January 2008.

--Figure 6 about here --

--Figure 7 about here --

In order to illustrate the sectoral composition of such drop in the sales of the largest firms on their existing markets, we aggregate the HS2 Chapters into broad sectors of activity, namely intermediate goods, consumption goods, automobile, other transport, other equipment, plus a residual grouping (see detail in Appendix 1). The breakdown by broad sector of the contribution by the top 1% French exporters' through the negative intensive margin is shown in Figure 8. More than one third of the deterioration is attributable to intermediate goods (-9.6% out of the overall -26.7% in April 2009).

Other equipment goods and the car industry contribute with –7.2% (i.e about one fourth) and –5.2% (i.e. about one fifth) respectively. In contrast, consumption goods and other transport material[11] play a minor role.

-- Figure 8 about here –

On account of these findings, the next step in our analysis is to systematically disentangle the contributions of sector and destination market from the observed "pure" changes in exports. In order to do so, we adapt the shift-share method of analysis to the present framework. This method of analysis is an adaptation of the weighted variance analysis (ANOVA) which was initially developed by studies in regional economics to give a statistical base to the geographical structural analysis (Jayet, 1993) and that has been more recently applied to international trade (Cheptea et al., 2005). Instead of decomposing a variable's growth by algebraic means (such as the constant market share analysis in the trade field), this method allows to perform econometric estimations at the most granular level of the data and to capture thereby estimated parameters associated with e.g. sectoral or geographical fixed effects. Results are independent from the order of decomposition, unlike in decompositions based on algebraic methods.

Elementary growth rates (mid-point growth rates in our case) – weighted by means of the variable $s_{ikt}$ defined above, i.e. export at time t plus export at time t-12 divided by total exports (all firms, sectors and destinations) at times t and t-12 – are accordingly regressed (at each period t) on a set of three dummies variable: countries, sectors and size-groups. Marginal averages (i.e. marginal impact of a given sector or destination or size) are computed from the estimated fixed effects. This is done for the same period as above, i.e. January 2008 to April 2009.

For instance, the mid-point growth rate for the top 1% exporters in April 2009 was equal to –30.2% (Table 3). However, large exporters are largely represented in the car industry or may be exporting to markets heavily hit by the crisis. The contribution of their geographical composition of exports was –0.2% in April and the contribution of the sectoral composition of their exports accounted for another –1.1%. Thus, we must correct the apparent mid-point growth rate and subtract these two effects to

[11] This broad sector basically exports aircraft. From year-on-year Airbus does not ship airliners to the

obtain –29.0%. To wrap up, the year-on-year drop recorded for the largest exporters in April 2009 would have been equal to –29.0%, had their export structure been similar to the cross-destination and cross-sector average French exporter at that date.

-- Table 3 about here –

The evidence emerging from the shift-share decomposition and the consecutive correction of the mid-point growth rates lead to qualify our initial conclusion according to which large and small French exporters have been hit unevenly by the crisis. At first glance, the *uncorrected* growth rates in the left hand side panel of Table 3 point to a large difference (almost 9 percentage points) between Group 1 (smallest exporters) and Group 4 (largest exporters): on average in April 2009 the smallest exporters have recorded only a -21.3% drop in their exports, and the largest exporters a –30.2% drop. The correction for the sectoral and, to a lesser extent, the geographical composition of exports magnifies the negative impact of the crisis on the smallest exporters (to -27.1%) suggesting that these latter mostly belong to sectors least hit, such as consumption goods, including food, and this cushioned their losses. On the contrary, correcting for the geographical and sectoral orientation of exports slightly smoothens the mid-point growth rate computed for the largest firms (from -30.2% to -29.0%).

All in all, controlling for the sectoral specialisation and geographical orientation, in growth rate terms there is limited evidence of a differential impact of the crisis on large and small exporters, with one notable exception: the month of February 2009, where the largest firms have been the most severely hit.

In conclusion, the sharp concentration of French exports on a limited number of firms explains why the largest exporters emerged as the main contributors to the observed drop in exports. However, firms of different size have not been affected by the crisis in significantly different ways. If a difference must be found between large and small exporters, this concerns the timing of the events: the corrected data suggest that the smallest exporters have been hit much earlier (already starting in August 2008) than larger firms, whose exports started collapsing only in 2008Q4.

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same countries and the bulk of the changes in exports is captured by the extensive margin.

With all these explanatory elements in hand, we can now perform econometric estimates aiming at explaining the individual mid-point growth rates by quantifying the importance of sectoral, geographical and microeconomic determinants, including the external finance dependence we are ultimately interested in, and of their interactions. Our conjecture is that if size does not matter, the financial dependence may be an important determinant, other things been equal.

**4- Determinants of individual export performance**

Our aim is ultimately to disentangle the contribution of various sectoral, geographical and micro-economic determinants of the drop in individual French firm exports during the crisis, including external finance dependence.

Our dependent variable, the mid-point growth rate of firms' exports, is measured at the level of the individual firm and is three-dimensional (time, HS2 sector, destination).

A first determinant of the change in exports is the demand for imports in the sector and destination market each firms exports to. We compute this demand as sectoral "net' imports in each destination market, where French exports are subtracted from the total imports of the destination. This procedure allows to avoid endogeneity problems. Data provided by the International Trade Centre (ITC) record monthly imports up to 2009M4 for a subset of only 52 countries, which however represent about 84% of the value of French exports. Given these figures, this variable will control appropriately for the well-documented drop in global demand and the extremely skewed sectoral dimension of the crisis.

A second determinant to be addressed is the overall impact of the crisis, notwithstanding the demand and sectoral issues referred to above. Indeed, the general climate of uncertainty and its impact on business confidence, shortage of liquidity and a more restrictive access to the financing of business activities in some regions of the world may have exacerbated contraction of both activity and trade, beyond demand developments. To control for this we create a variable *crisis* that is a step-dummy taking value 1 from 2008M10 onward. We test the sensitivity of our results by considering 2008M5 alternatively.

Thirdly, we must necessarily control for firms' heterogeneity. A firms' size is measured by the size of its exports relative to the average French exports in the HS2 sector of belonging and it is proxied by a set of dummies $q_{ikt}$ which indicate the quantile the firm belongs to (as defined above, in exports' value terms[12]).

Fourth, we need to introduce country-and-time and HS2-and-time fixed effects, in order to control for any country determinant varying over time, including the exchange rate and any sector specific shock, also over time. The difference in $\log import_{ckt}$ controls for variations in the demand addressed to French firms and specific to sector *k* in country *c*.

Beyond the classical determinants of export performances by individual exporters in a setting characterised by firm heterogeneity, this paper aims at addressing the impact of financial constraints. Hence, a fifth element of our estimation strategy is the financial constraints' dimension. In designing an estimation strategy suitable assessing the role of financial constraints, we must be cautious and ensure that we disentangle appropriately the several dimensions of the problem. Firstly, not all sectors are affected in the same way by financial constraints. By and large, the production function determines the type of financial needs dominant in a sector (See Rajan and Zingales, 1998). On this account, it is likely that in good times a well developed financial sector can be the source of a comparative advantage in financially constrained sectors. Secondly, during the turmoil, this advantage can be expected to reverse due to credit shortage. To capture this second effect, the financial variables must be interacted with a variable which well represents the sequencing of the crisis. Thirdly, heterogeneous firms may have uneven access to external finance and thus may be affected differently both by the financial dependence of the sector and the cross-effect of the crisis and financial dependence.

Following Rajan and Zingales (1998), our investigation of the effect of financial constraints on the dynamics of French firms' exports uses differences across sectors in their dependence on external finance. Rajan and Zingales (1998) use the capital expenditures minus cash flow over capital expenditures as their main indicator of financial dependence. Our source of financial data, Amadeus,

[12] $s_{ikt}$ (share in total exports of sums at time t and t-12 of firm-sector exports' value) are used to define

does not report capital expenditure, so we rely on two ratios. Cash flow over value added proxies for the self-financing capacity of the firm. The ratio of financial charges over turnover measures the extent to which firms rely on external financing to finance their activity (*depfi2*). Alternatively, we test the robustness of our results by including a third indicator of financial dependence, the ratio of capital employed over fixed assets (*depfi3*). An innovation of our paper with respect to the previous literature using indices of financial dependence is that we calculate our indices of financial dependence based on a dataset of firms included in our data-sample (i.e. French firms) and to the data-period under estimation, rather than relying on the indices computed by Rajan and Zingales for the 1980s-1990s. The table with the resulting index is available in Appendix to the paper.

As we do not have firm-specific financial information relative to each firm for which we have trade data, our financial variables are sectoral averages, at the HS2 level (the HS2 classification categorises goods in some 100 different sectors). Hence, we allocate each firm to its main HS2 sector and compute the weighted median of all firms in an HS2 sector. In order to limit the impact of outliers, we furthermore class the indicators in quintiles and add their value in order to obtain an indicator of financial dependence ranging from 2 to 10 for *depfi2* and from 3 to 15 for *depfi3*, respectively. Our indicator of financial dependence is time invariant since it is based on the assumption – standard in the literature spearheaded by Rajan and Zingales (1998) – that technological differences across sectors determine the need of external finance. As the technological needs of sectors are slow to evolve, we can assume their time-invariance over the period of estimation. In the regressions we use the log of those indicators.

Given this background, we estimatehe following equations on the period from 2007M1 to 2009M4 and by means of weighted OLS, with $s_{ikt}$ weights, computed as above (i.e. export at time t plus export at time t-12 divided by total exports (all firms, sectors and destinations) at times t and t-12):

$$g_{ickt} = \alpha\, d\log import_{ckt} + \beta\, q_{ikt} + \gamma q_{ikt} \times crisis + \varepsilon \qquad (1)$$

---

quantiles.

$$g_{ickt} = \alpha\, d\log import_{ckt} + \beta\, q_{ikt} + \phi\, q_{ikt} \times crisis + \gamma q_{ikt} \times \log(depfi_k) + \lambda\, q_{ikt} \times \log(depfi_k) \times crisis + \varepsilon \quad (2)$$

Finally, in equation (2) we identify the impact of the financial dependence on the mid-point growth rate of firms' exports by interacting our indicator of financial dependence, whose construction has been discussed in the previous paragraphs, with the size of firms. For robustness checking purposes we will furthermore replicate these estimations in Section 5 using the alternative method of grouping firms within quantiles discussed in section 2 which is based on firms' diversification of exports rather than exports' value.

Two previously mentioned constraints restrict the sample of firms on which estimations are performed. First, information on the sectoral demand is not available for all destinations but only for a subset of 52 countries. Second, not all HS2 sectors contain a sufficiently large number of firms present in Amadeus to be representative enough. We keep the 78 HS2 sectors for which Amadeus reports more than 30 firms in 2007.

We now proceed to illustrate the estimation results of equation (1). The coefficients reported in column (1) of Table 4 point to the fact that small firms record an export growth slightly lower than the group of largest firms, when controlling for the demand addressed in the relevant sector and destination market (*dlimport*). This result is robust to the introduction of other controls as shown by the results reported in columns (2) and (3) of Table 4.

In column (2), we report the coefficients for the estimation where the occurrence of the crisis is interacted with the size of the exporter relative to the sectoral average. Column (3) reports results where the dummy *crisis* uses October 2008, unlike results in columns (2), where the starting date for the crisis was assumed to be May 2008. All in all, results for all the above specification indicate that size ultimately did not matter: the differences in estimated parameters are not significant. This result confirms what we already found through the shift-share approach that we used to carry out the correction of the mid-point growth rates.

Summing up, a first conclusion is that differences in the size of exporters do not provide the key explanation for the differential impact of the crisis on individual exporters.

We now turn to a complementary explanation, which is the role of external financial dependence of individual exporters. We consider the October 2008 starting date for the crisis. Two alternative measures of financial dependence are considered.

Firstly, in column (4) of Table 4, we regress the mid-point growth rates on external financial dependence, measured by cash flow over value added and financial charges over turnover (*ldepfi2*) of the HS2 sector of main activity of the firm. This term is interacted with the size of the firm. Additional explanatory variables used in this specification include the interaction of these two terms with the *crisis* dummy.

The resulting coefficients clearly indicate firstly that there is no significant difference in the impact of the crisis by size quantile, confirming our previous result. Secondly, one hardly finds any difference between the impacts of *sectoral* financial constraints on firms of different size in "normal" times. The positive parameters obtained on the four variables interacting of *ldepfi2* with *q1,..q4* indicate that, notwithstanding differences in size, French exporters belonging to sectors extensively relying on external finance have a competitive advantage and export more. Thirdly, this advantage reverses during the crisis: the estimated parameter on the interaction of *crisis1* with *ldepfi2* and *q1,..q4* is negative and not significantly different across the different quantiles of size. Similar conclusions, though with less statistical significance can be drawn from column (5) relying on a different indicator of financial dependence, including additionally the ratio of capital employed over fixed assets (*depfi3*). The estimations are also robust to a change in the starting date assumed for the crisis (May instead of October 2008). Results are presented in Appendix to the paper.

-- Table 4 about here --

To sum up our results thus far:

- The crisis has impacted firms of different size evenly, when controlling for the sectoral dimension of the turmoil.

- Firms exporting in sectors highly dependent on external finance are structurally advantaged in a financially developed country such as France. Other things being equal, their export growth is above the average, whatever their individual size.

- The crisis has severely hit firms in sectors relying on external finance, irrelevant of firms' size.

Interestingly, we can compute the effect of the crisis, when the indicator of financial dependence is held at its mean, the $10^{th}$ and the $90^{th}$ percentile. This is done in Table (5), for both *depfi2* and *depfi3*.

Let us firstly concentrate on the left-hand side of the Table, corresponding to *depfi2*. Before commenting these results, it is worth reminding that two different distributions are considered here. On the one hand we are interested in the distribution of exporter size within each sector (HS2). We have four quantiles of exporters, defined as above using the criterion of total value of exports. On the other hand, we have deciles of financial dependence of the sectors themselves. The two financial dependence indicators are constructed using individual firm-level data, but they apply in the same manner for every exporter within a sector. We do not introduce in the estimations individual characteristics of exporters in terms of financial dependence.

Concerning the dynamics of exports for firms belonging to different quantiles, the estimation results suggest that the group of smallest exporters faces a slightly lower exports' growth over the period of estimation, but the impact of the crisis is similar across the four quantiles. On the contrary, belonging to an HS2 sector ranked in the top decile in terms of financial dependence has a strong negative bias on the export performance of the firms, whatever their size. This result contrasts with a negligible mean effect on the exporters belonging to the least financially dependent sectors.

-- Table 5 about here –

Another potentially important determinant of exporters' performance is their degree of globalisation. An essential dimension of the crisis is the synchronicity of the drop in activity world-wide. It suggests that globalised firms might well be the most adversely affected by the crisis: they rely on imports of semi-processed products that have to be financed and part of their exports is dedicated to their own affiliates abroad. The right metric to test the globalisation dimension of recent trade developments would therefore be the share of the each firm's intermediate imports in its total intermediate consumption. Unfortunately, such variable which would allow to properly controlling for the international breakdown of the value chain is not computable at the micro level, owing to the fact that the underlying information is only available at the sectoral level through input-output tables. Consequently, we tentatively construct an indicator of vertical specialisation at the sectoral level, defined as the share of total imported inputs used (directly and indirectly) in the production of goods by broad NACE sector (see Hummels et al. (2001) for a complete description of the methodology). We use French input-output tables for 2006 provided by Eurostat and allocate each individual exporter to its main NACE sector over the period. We add this variable of vertical specialisation and its interaction with the crisis dummy to specification (2) in column (6) and (7) of Table 4. Let us stress again, before turning to the result that we capture here a sectoral characteristic observed at the level of the NACE classification and that we take into account the "loose" approach to vertical specialisation by taking into account all imported intermediates, including energy or services. The sectors most dependent from intermediate imports are `coke, refined petroleum products and nuclear fuels', `motor vehicles, trailers and semi-trailers', `other transport equipment' and `basic metals'.

The negative coefficient on the interaction of our indicator of vertical specialisation and the crisis dummy indicates that firms belonging to sectors largely relying on intermediate imports have underperformed during the crisis.

Interestingly, this control variable is significant despite the presence of both the sectoral demand on the destination market and the time-varying sectoral fixed effect in the regression. This is due to the use of two different classifications: individual firm exports are classified according to HS2 headings, while each firm is associated with its NACE sector when it comes to measuring the dependence on

intermediate imports. The two classifications are not defined at the same degree of detail, and they do not match. The underlying rationale of the HS is to classify traded products, while the NACE is a classification in terms of activity. For instance, a caveat of the HS is that `Machinery & mech appliance. parts, nuclear reactors, boilers', at the 2 digit level, comprises goods emanating from very different industries. This leads to imperfectly controlling for characteristics of the sectors in terms of demand or specific shocks, when the HS is used. All in all, our additional variable may be able to better capture the sectoral composition effect associated with the crisis as compared to the ones relying on the HS classification. Some sectors, such as the car industry or the one of professional goods, have been severely hit by the crisis and the drying of credit. These same sectors also rely heavily on imported inputs.

Beyond this debate, what is key to our analysis here is that the inclusion of this additional control variable does not change our conclusion regarding firms' size and financial dependence.

**5- Robustness check defining the quantiles in terms of diversification**

We have so far relied on quantiles defined on the basis of the relative value of individual firms exports within a HS2 sector. Accordingly, contributions to the mid-point growth rates calculated are dependent from this assumption. Also, even if in section 4 we address the growth (and not the level) of individual exports, our results might be sensitive to the allocation of our exporters across quantiles. In order to control for the sensitivity of results to the allocation of firms to given quantiles, we rerun the estimations of section 4 using the alternative criterion of definition for the quantiles previously discussed, i.e the diversification of individual exports, calculated as the number of elementary markets (CN8 positions x destination countries) per French firm within a HS2 sector. The 1 percent most diversified exporters in each HS2 Chapter constitutes a single cluster, which we call Group 4. Group 3 comprises exporters in the 95-99 percentiles. Group 2 comprises exporters in the 80-95 percentiles. The remaining bottom 80% exporters belongs to Group 1.

We firstly replicate our decomposition of export growth over the period 2008M1 to 2009M4 in a positive extensive margin (entry), a negative extensive margin (exit), a positive intensive margin and a negative intensive margin. Results are shown in Figure 9 (to be compared with Figure 4) for entry, in Figure 10 (resp. 5) for exit, in Figure 11 (resp. 6) for the positive intensive margin and in Figure 12 (resp. 7) for the negative intensive margin.

Two main results can be drawn from the comparison of these figures. Firstly, as expected, there is much change for entry and exit. Using the criterion of value to rank the firms, the largest firms had the largest positive contribution to entry. This result is now reversed: the one percent most diversified firms contribute only marginally: we do face champions in their own export niche, hardly changing their strategy during the turmoil. On the contrary, the least diversified firms, exhibiting limited duration of their exports on their elementary markets, contribute largely.. The same explanation pertains to the contribution of exits. The less diversified firms contribute the most to exits, while the most diversified contribute only marginally. The latter keep their portfolio of markets rather constant and ultimately contribute at most to their weight in the total value of exports.

The second key observation is that the positive and negative intensive margins are much less affected by our change of metric. The largest firms in value, as well as the most diversified are the main contributors. The only difference is that the contribution of the first percentile is reduced, while the contribution of the last percentile is increased. What we see now is that diversified large firms, exporting many products to many markets face a plummeting of their sales on all markets similar to the one faced by firms exporting large values. Their negative contribution is still 17% at the end of the period considered, to be compared with 25% with the criterion of value.

All in all, given the overwhelming contribution of the intensive margin to the total change in French exports, our conclusions are fairly robust: the large and diversified exporters account for most of the drop in French exports during the turmoil.

-- Figure 9 about here --

-- Figure 10 about here --

-- Figure 11 about here --

-- Figure 12 about here --

The next robustness check is to perform the shift share correction using this new criterion of diversification. Results are given in Table 6, to be compared with Table 3. As in the estimations with quantiles defined in terms of export value, the uncorrected growth rates in the left hand side panel of Table 6 point to a large difference between the Group 1 (here the least diversified exporters) and Group 4 (the most diversified exporters): on average in April 2009 the least diversified exporters have recorded a –26.2% drop in their exports, and the most diversified exporters a –32.4% drop. Also as with the definition of quantiles in terms of export value, the correction for the sectoral and geographical composition of exports magnifies the negative impact of the crisis on the least diversified exporters (-28.4%). On the contrary, correcting for the geographical and sectoral orientation of exports smoothes the mid-point growth rate computed for the most diversified exporters (-29.9%). Overall, our conclusions are robust to this change of criterion of classification of firms and there is limited evidence of a differential impact of the crisis on well diversified and poorly diversified exporters when one controls for the orientation of their exports.

-- Table 6 about here –

The last step of our robustness check consists in replicating our econometric estimates using the definition of quantiles of exporters in terms of export diversification. Results are shown in Table 7. In column (2) we observe that the lower performance in terms of export growth no longer affects the quantile of the smallest firms, but now the two quantiles of the least diversified ones. More importantly, here again, there is hardly a significant difference in terms of impact of the crisis on the four quantiles of exporters. If a difference is to be captured, it is beneficial to the least diversified exporters. The latter result is in line with the explanation referred to above: some large and resilient

exporters may be little diversified. These results are confirmed in column (3) when the starting point of the crisis is supposed to be October 2008. In column (4), we introduce *ldepfi2*. Results are qualitatively similar to the ones presented in Table 4. Exporting in a financially constrained sector provides in general a competitive advantage in normal times, whatever the diversification of the exporters. As regards the magnitude of such effect, a difference must be made with the previous estimations based on the criterion of export value. We observe here that the impact is increasing in the diversification of exports. On the contrary, during a credit crisis, this becomes an obstacle for exporters, and this evenly hits their exports whatever their diversification. All in all, our results are robust to a change in the criterion for ranking: export value versus export diversification.

However, we identify a problem of multicolinearity when l*depfi3* is used instead of l*depfi2*, as reported in column (5). The model is neither able to identify the parameter associated with the l*depfi3* variable of financial dependence, nor able to identify the parameter on the interaction between the occurrence of the crisis and the quantile of exporters. This outcome is due to the peculiar nature of our exercise: we have time×sector fixed effects and a very limited variance between quantiles given their greater homogeneity, compared to the previous exercise whereby they were defined in export value terms. This result suggests that we should use information on the financial dependence of the individual firms, rather than of the sectors they belong to. To do so, we need detailed information on the financial dependence of each exporter, which is far beyond the exercise conducted here on the basis of the financial data provided by Amadeus. This will be the objective of a future research, relying on more detailed information available for French firms only.

## 6- Conclusion

Beyond a limited resurgence of protectionism, two broad explanations of this collapse of world trade have been suggested. Firstly the fall in activity is global, and has particularly hit investment goods and automobile industries. The international fragmentation of supply chains may have further magnified changes in industrial production. Secondly, dried trade finance may have hit exporters. Beyond trade finance, credit attrition may have affected particularly strongly sectors relying heavily on external

finance, in line with the seminal argument of Rajan and Zingales (1998). Such dependence of the *sectoral* export performance on external finance has been addressed in this paper using firm-level data for French exporters throughout the crisis.

Our results point to limited differences in the growth of exports among large and small exporters when the sectoral and geographical composition of exports is controlled. The econometric analysis nevertheless points to a differential impact of financial dependence: the highest the dependence on external finance of a sector, the worst French exporters operating in that sector have been affected by the crisis.

These results are robust to a change of the definition of the quantiles of exporters, whereby the value of exports is replaced by their diversification.

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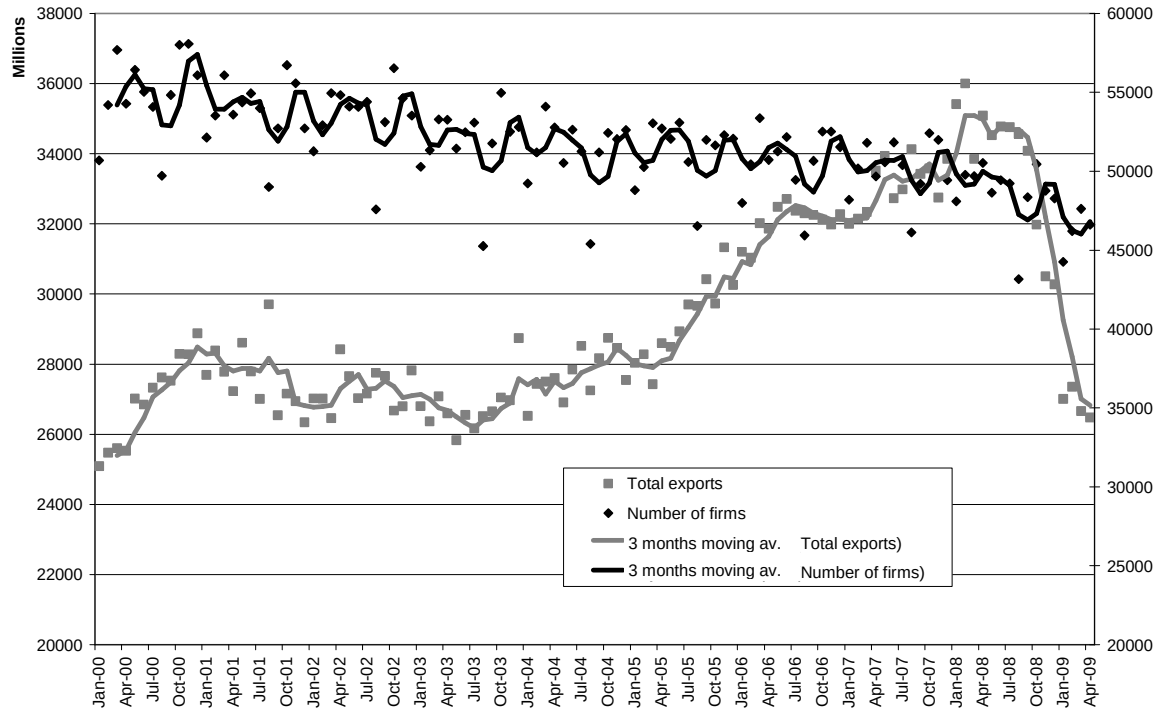
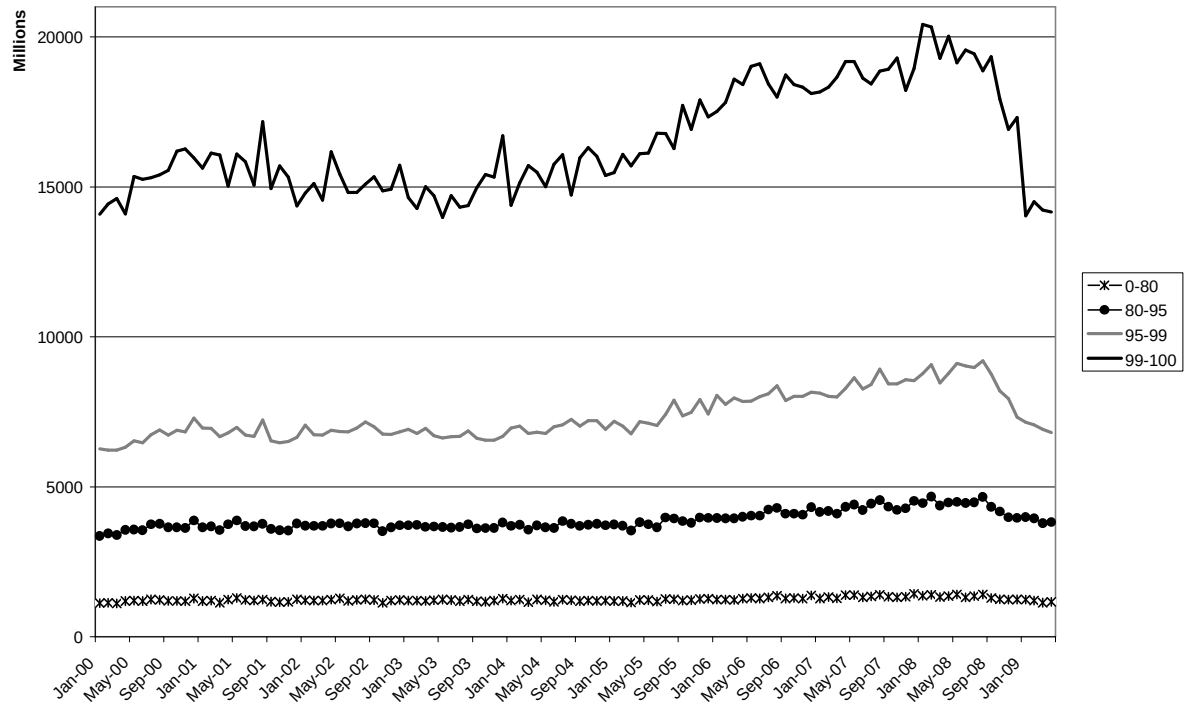
**Tables and Figures**

**Figure 1: Total value of French exports and total number of French exporters, 2000-M1 to 2009-M4**



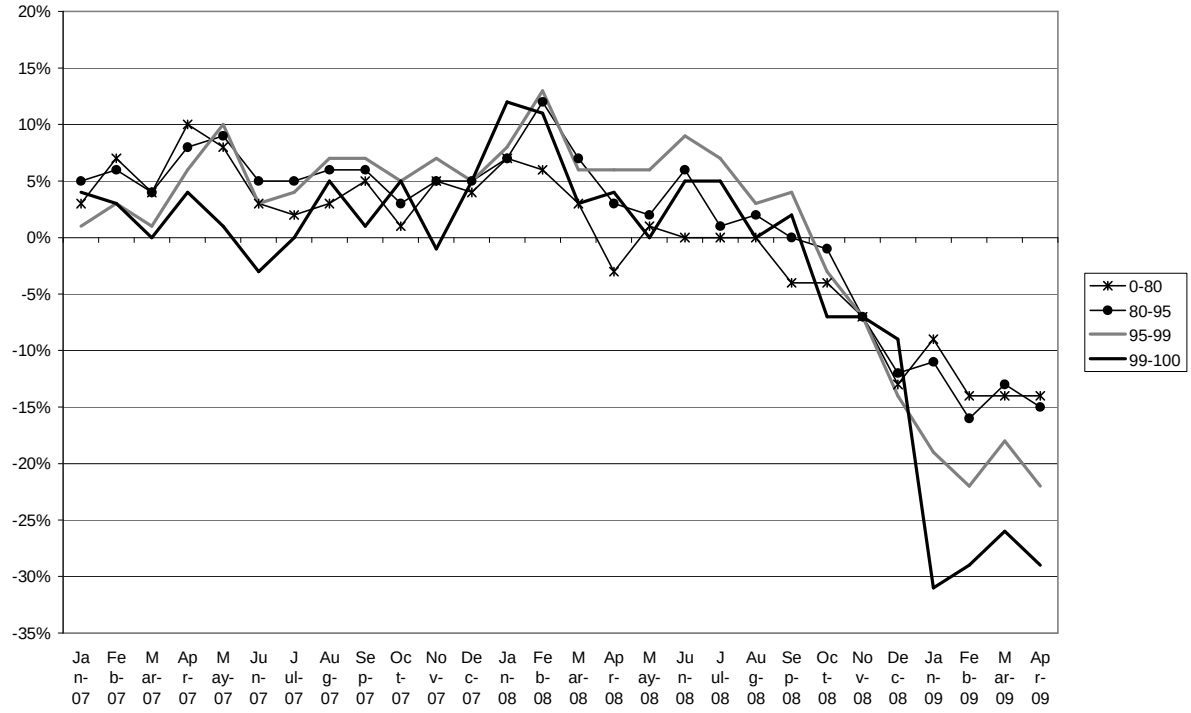

Note: Chapters 98 and 99 of the HS2 are dropped. 3-months moving averages. Left scale: euros.
Source: French customs data, own calculations

**Figure 2: Total value of French exports by quantile of exporters, 2000-M0 to 2009-M4**



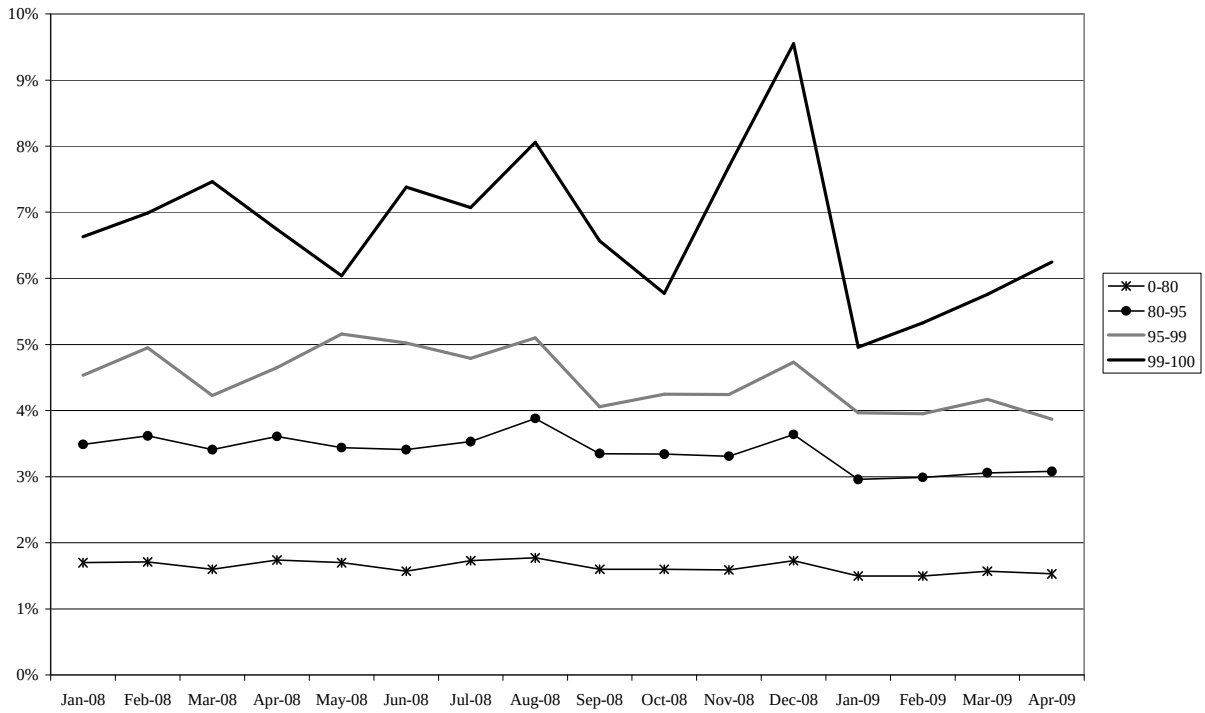

Note: Chapters 98 and 99 of the HS2 are dropped. 3-months moving averages. Exporters are ranked according to the value of their exports within a sector. Group 1 comprises exporters in the 0-79 percentiles, group 2 exporters in the 80-94 percentiles, group 3 in the 95-99 percentiles. Group 4 comprises the 1 percent largest exporters.
Source: French customs data, own calculations

**Figure 3: Percent change in the total value of French exports, by quantile of exporters, 2007-M1 to 2009-M4**



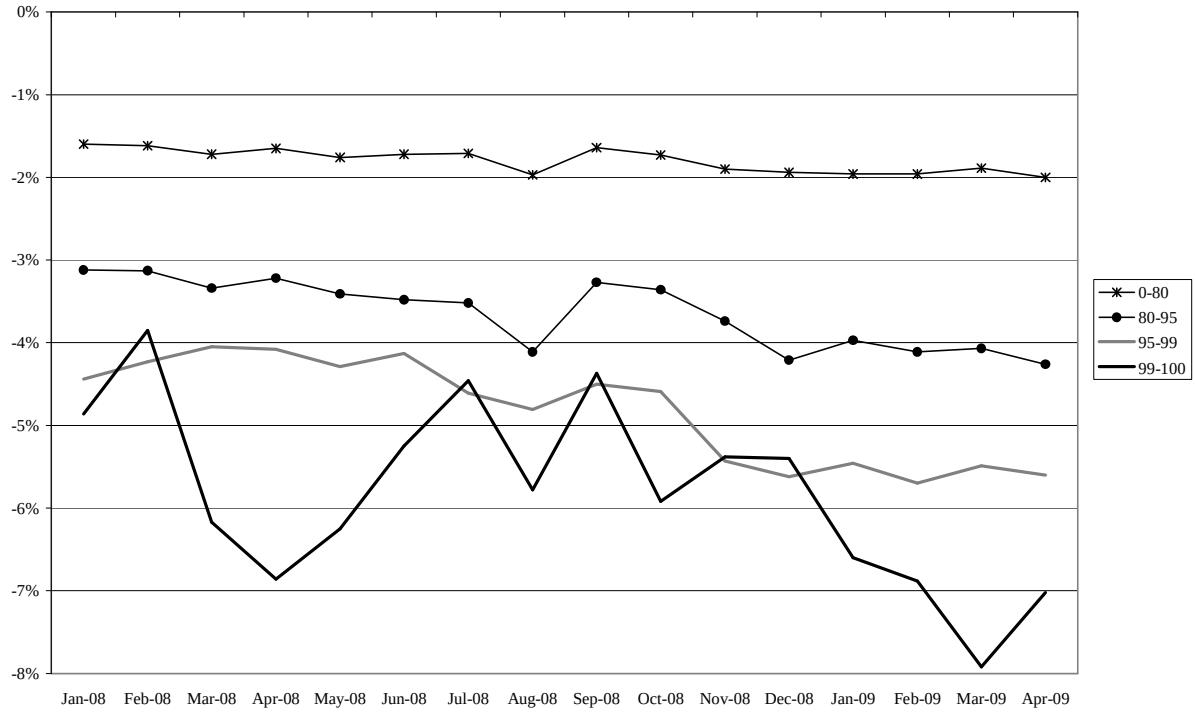

Note: Chapters 98 and 99 of the HS2 are dropped. Exporters are ranked according to the value of their exports within a sector. Group 1 comprises exporters in the 0-79 percentiles, group 2 exporters in the 80-94 percentiles, group 3 in the 95-99 percentiles. Group 4 comprises the 1 percent largest exporters.
Source: French customs data, own calculations

**Figure 4: Contribution of *entry* to mid-point growth rates 2008-M1 to 2009-M4**



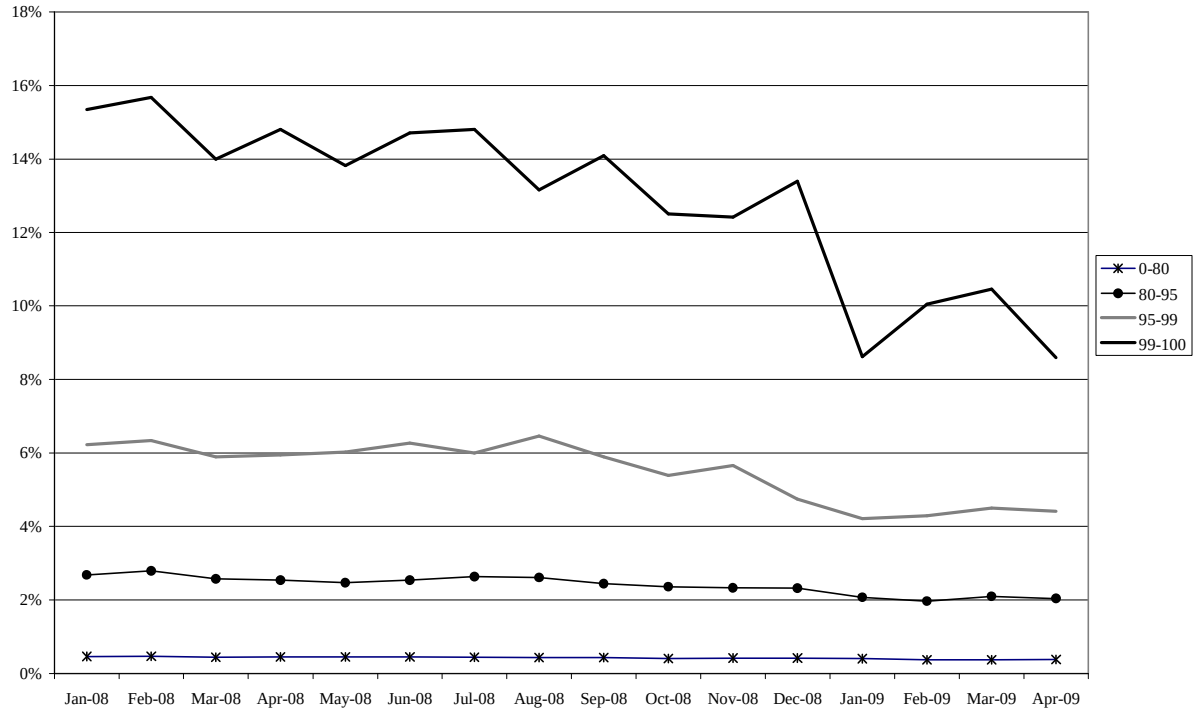

Note: Chapters 98 and 99 of the HS2 are dropped. Exporters are ranked according to the value of their exports within a sector.
Source: French customs data, own calculations

**Figure 5: Contribution of *exit* to mid-point growth rates 2008-M1 to 2009-M4**



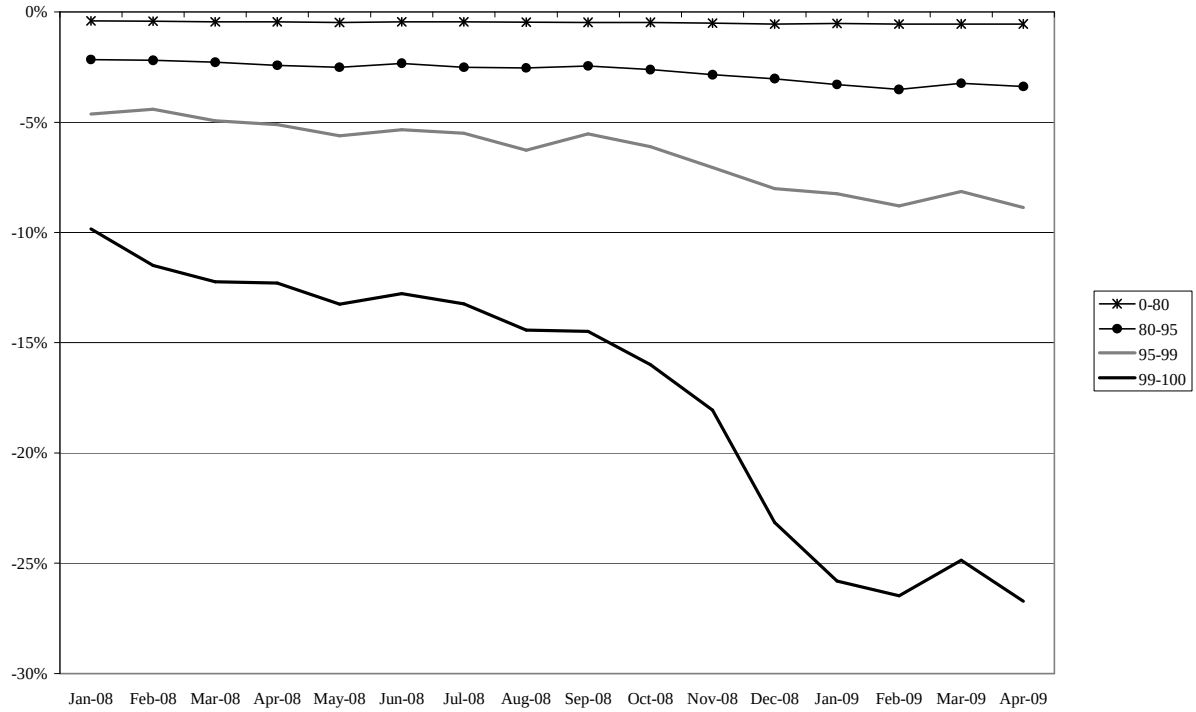

Note: Chapters 98 and 99 of the HS2 are dropped. Exporters are ranked according to the value of their exports within a sector.
Source: French customs data, own calculations

**Figure 6: Contribution of *positive growth* to mid-point growth rates 2008-M1 to 2009-M4**



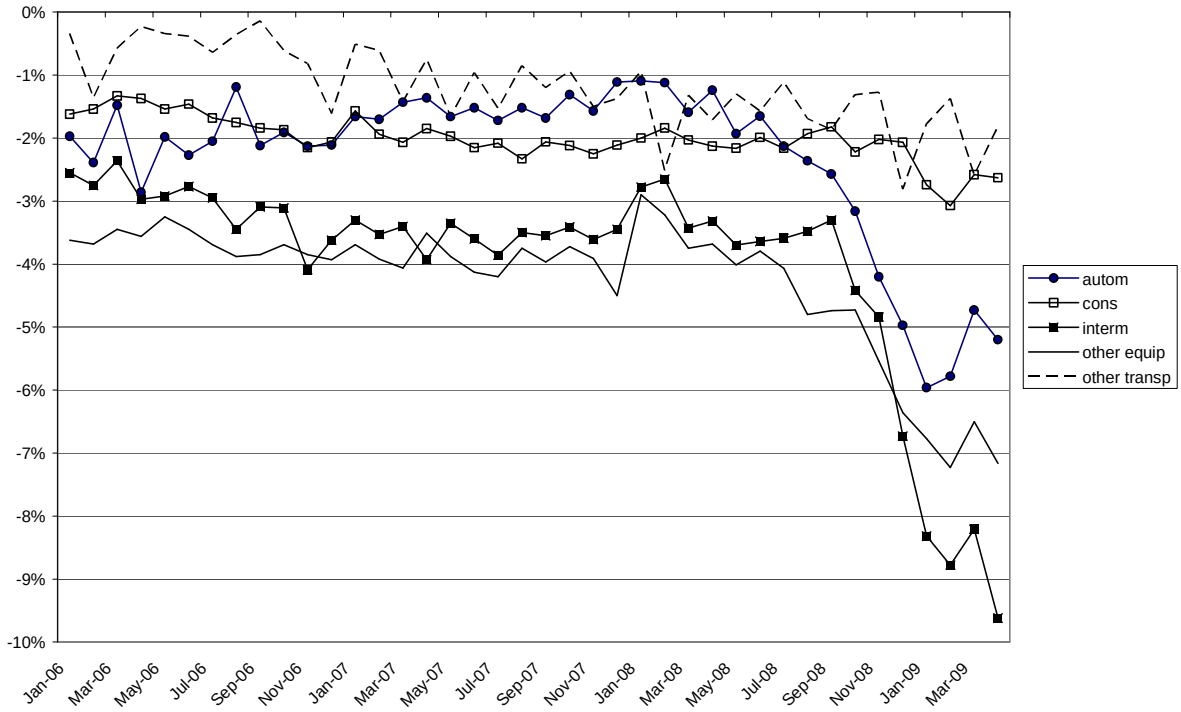

Note: Chapters 98 and 99 of the HS2 are dropped. Exporters are ranked according to the value of their exports within a sector.
Source: French customs data, own calculations

**Figure 7: Contribution of *negative growth* to mid-point growth rates 2008-M1 to 2009-M4 –**



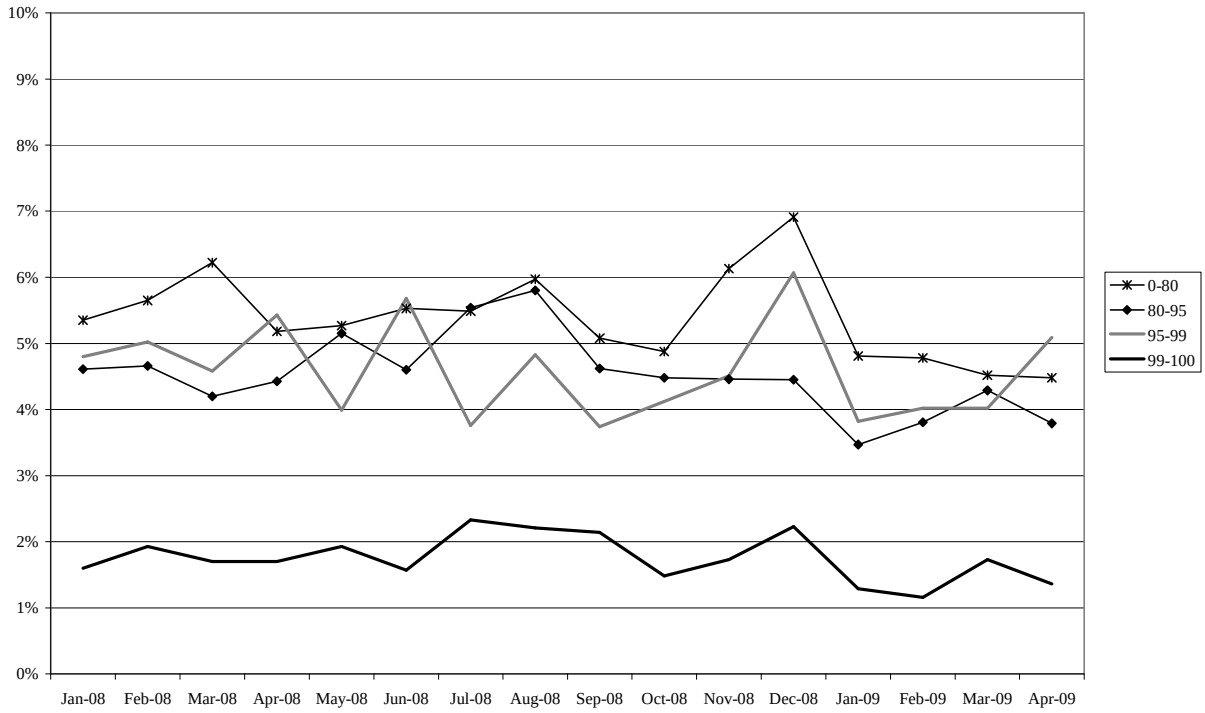

Note: Chapters 98 and 99 of the HS2 are dropped. Exporters are ranked according to the value of their exports within a sector.
Source: French customs data, own calculations

**Figure 8: Contribution of *negative growth* to the top 1% exporters sales' mid-point growth rates 2008-M1 to 2009-M4, by broad sector**



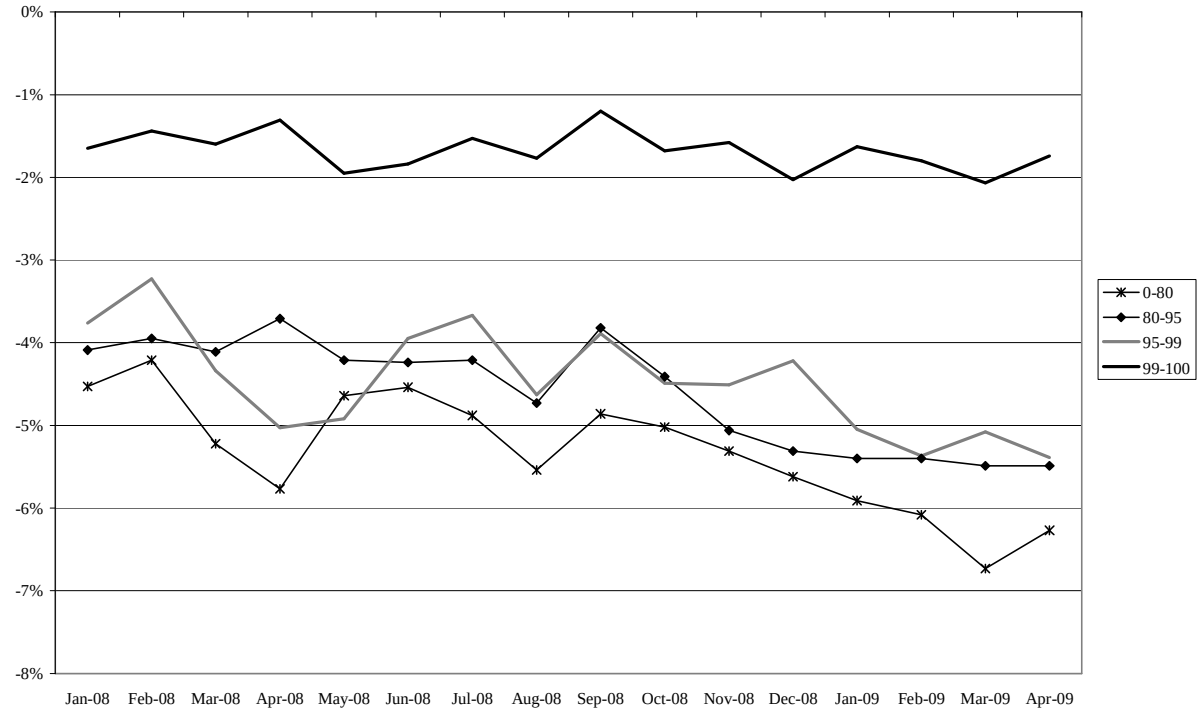

Note: Chapters 98 and 99 of the HS2 are dropped. Exporters are ranked according to the value of their exports within a sector.
Source: French customs data, own calculations

**Figure 9: Contribution of *entry* to mid-point growth rates 2008-M1 to 2009-M4**



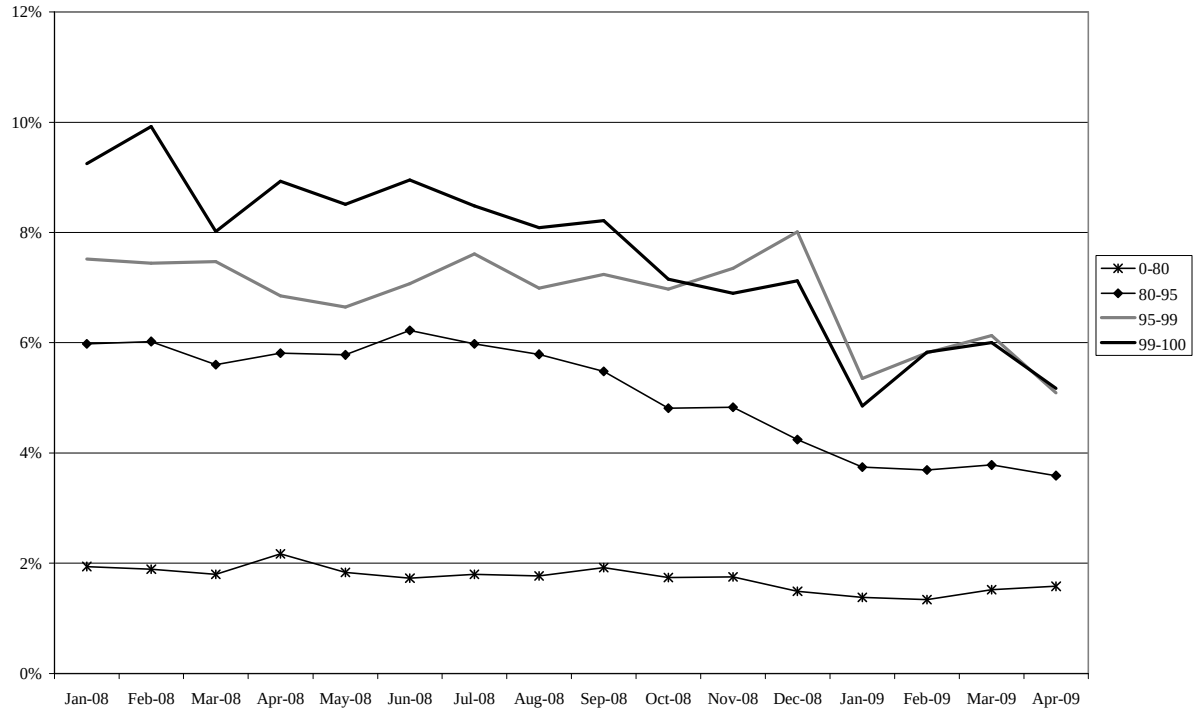

Note: Chapters 98 and 99 of the HS2 are dropped. Exporters are ranked according to the diversification of their exports within a sector.
Source: French customs data, own calculations

**Figure 10: Contribution of *exit* to mid-point growth rates 2008-M1 to 2009-M4**



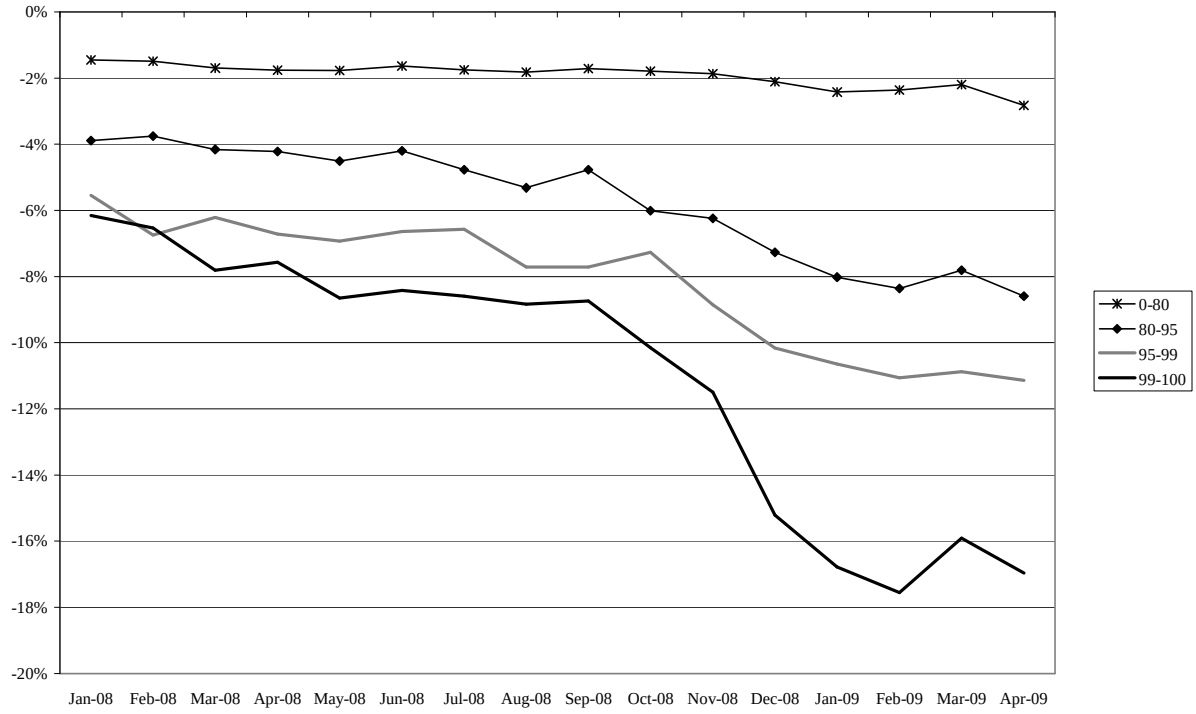

Note: Chapters 98 and 99 of the HS2 are dropped. Exporters are ranked according to the diversification of their exports within a sector.
Source: French customs data, own calculations

**Figure 11: Contribution of *positive growth* to mid-point growth rates 2008-M1 to 2009-M4**




Note: Chapters 98 and 99 of the HS2 are dropped. Exporters are ranked according to the diversification of their exports within a sector.
Source: French customs data, own calculations

**Figure 12: Contribution of *negative growth* to mid-point growth rates 2008-M1 to 2009-M4 –**




Note: Chapters 98 and 99 of the HS2 are dropped. Exporters are ranked according to the diversification of their exports within a sector.
Source: French customs data, own calculations

**Table 1: Contributions to mid-point growth rates, 2003-2007, French exports (percent)**

| | (1) Entry | (2) Exit | (1+2) Extensive | (3) Growth > 0 | (4) Growth < 0 | (3+4) Intensive | Total |
|---|---|---|---|---|---|---|---|
| Bottom 80% exporters | 0.6 | -0.5 | 0.0 | 0.2 | -0.2 | 0.0 | 0.0 |
| 80-95% | 1.2 | -1.1 | 0.1 | 1.4 | -1.4 | 0.0 | 0.1 |
| 95-99% | 1.7 | -1.5 | 0.2 | 4.0 | -3.6 | 0.4 | 0.6 |
| Top 1% exporters | 3.0 | -2.7 | 0.3 | 15.5 | -12.7 | 2.8 | 3.1 |
| All | 6.5 | -5.9 | 0.6 | 21.1 | -17.9 | 3.2 | 3.9 |

Note: Chapters 98 and 99 of the HS2 are dropped. Simple averages of contributions calculated for each year. Exporters are ranked according to the value of their exports within a sector.
Source: French customs data, own calculations

**Table 2: Contributions to mid-point growth rates, February 2009, French exports (percent)**

| | (1) Entry | (2) Exit | (1+2) Extensive | (3) Growth > 0 | (4) Growth < 0 | (3+4) Intensive | Total |
|---|---|---|---|---|---|---|---|
| Bottom 80% exporters | 1.5 | -2.0 | -0.5 | 0.4 | -0.6 | -0.2 | -0.6 |
| 80-95% | 3.0 | -4.1 | -1.1 | 2.0 | -3.5 | -1.6 | -2.7 |
| 95-99% | 4.0 | -5.7 | -1.8 | 4.3 | -8.8 | -4.5 | -6.3 |
| Top 1% exporters | 5.3 | -6.9 | -1.6 | 10.1 | -26.5 | -16.4 | -18.0 |
| All | 13.8 | -18.7 | -4.9 | 16.7 | -39.3 | -22.7 | -27.5 |

Note: Chapters 98 and 99 of the HS2 are dropped. Exporters are ranked according to the value of their exports within a sector.
Source: French customs data, own calculations

**Table 3: Mid-point growth rate of exports (year-on-year) by group of exporter before and after correction for export composition (sectoral and geographical)**

| | *Before correction* | | | | *After correction* | | | |
|---|---|---|---|---|---|---|---|---|
| **Group** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** |
| 2008-01 | 5.1 | 8.5 | 7.2 | 11.5 | 7.8 | 10.2 | 7.9 | 10.8 |
| 2008-02 | 4.7 | 10.2 | 11.4 | 11.6 | 2.4 | 9.3 | 10.5 | 12.2 |
| 2008-03 | -4.1 | 3.4 | 5.0 | 4.8 | -1.8 | 4.9 | 5.6 | 4.2 |
| 2008-04 | 2.9 | 4.8 | 6.2 | 3.8 | 2.3 | 3.7 | 4.5 | 4.6 |
| 2008-05 | -2.9 | -0.1 | 5.3 | 0.6 | -3.2 | -0.2 | 4.5 | 0.9 |
| 2008-06 | -4.9 | 1.4 | 7.6 | 6.5 | -3.3 | 1.7 | 7.2 | 6.5 |
| 2008-07 | 0.6 | 1.3 | 2.9 | 6.7 | 2.6 | 3.0 | 3.0 | 6.3 |
| 2008-08 | -7.4 | -1.4 | 2.0 | 1.6 | -7.2 | -1.3 | 1.1 | 1.9 |
| 2008-09 | -2.6 | 0.7 | -0.4 | 2.9 | -3.1 | -0.3 | -1.4 | 3.4 |
| 2008-10 | -7.0 | -2.6 | -4.5 | -5.8 | -9.5 | -5.0 | -6.0 | -4.8 |
| 2008-11 | -13.5 | -8.8 | -10.7 | -5.4 | -14.1 | -9.3 | -10.9 | -5.2 |
| 2008-12 | -11.1 | -11.5 | -17.9 | -9.0 | -9.9 | -10.4 | -14.8 | -10.4 |
| 2009-01 | -20.1 | -20.5 | -23.2 | -30.2 | -26.2 | -25.9 | -25.4 | -28.1 |
| 2009-02 | -21.6 | -24.3 | -26.1 | -28.9 | -22.6 | -26.1 | -26.8 | -28.3 |
| 2009-03 | -16.6 | -19.8 | -21.1 | -26.5 | -23.8 | -25.7 | -23.6 | -24.2 |
| 2009-04 | -21.3 | -23.1 | -26.2 | -30.2 | -27.1 | -27.4 | -26.9 | -29.0 |

Note: Group 1 comprises exporters in the 0-80 percentiles, group 2 exporters in the 80-95 percentiles, group 3 in the 95-99 percentiles. Group 4 comprises the 1 percent largest exporters. Exporters are ranked according to the value of their exports within a sector.
Source: French customs data, own calculations

**Table 4: Dependent variable year-on-year mid-point growth rate of monthly exports for individual firms (2007M1-2009M4)**

| Parameter | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| Intercept | -0.226*** | 0.001 | 0.002 | -0.195*** | -0.247*** | -0.496*** | -0.571*** |
| | (-41.29) | (0.19) | (0.30) | (-3.19) | (-3.25) | (-3.39) | (-3.47) |
| dlimport | 0.289*** | 0.289*** | 0.289*** | 0.289*** | 0.289*** | 0.287*** | 0.288*** |
| | (214.64) | (214.68) | (214.59) | (214.56) | (214.58) | (214.85) | (214.92) |
| q1 (smallest exporters) | -0.027*** | -0.017*** | -0.028*** | -0.041*** | -0.030*** | -0.030** | 0.085*** |
| | (-14.50) | (-6.86) | (-12.71) | (-5.96) | (-3.52) | (-2.55) | (4.4) |
| q2 | 0.005*** | 0.018*** | 0.009*** | -0.024*** | -0.027*** | -0.009 | 0.022** |
| | (5.28) | (13.32) | (7.60) | (-6.67) | (-5.63) | (-1.3) | (2.06) |
| q3 | 0.015*** | 0.028*** | 0.024*** | -0.010*** | 0.009*** | 0.023*** | 0.111*** |
| | (21.59) | (29.59) | (28.13) | (-3.91) | (2.71) | (4.81) | (14.3) |
| q4 (largest exporters) | | | | | | | |
| | . | . | . | . | | | |
| crisis*q1 | | -0.246*** | | | | | |
| | | (-29.16) | | | | | |
| crisis*q2 | | -0.250*** | | | | | |
| | | (-32.14) | | | | | |
| crisis*q3 | | -0.251*** | | | | | |
| | | (-32.72) | | | | | |
| crisis*q4 | | -0.221*** | | | | | |
| | | (-29.14) | | | | | |
| crisis1*q1 | | | -0.219*** | 0.560*** | 0.742*** | 1.609*** | 1.824*** |
| | | | (-24.98) | (6.43) | (6.84) | (7.75) | (7.77) |
| crisis1*q2 | | | -0.235*** | 0.533*** | 0.741*** | 1.625*** | 1.892*** |
| | | | (-29.33) | (6.17) | (6.89) | (7.87) | (8.13) |
| crisis1*q3 | | | -0.251*** | 0.533*** | 0.700*** | 1.618*** | 1.760*** |
| | | | (-31.96) | (6.18) | (6.52) | (7.84) | (7.57) |
| crisis1*q4 | | | -0.222*** | 0.512*** | 0.692*** | 1.591*** | 1.783*** |
| | | | (-28.48) | (5.94) | (6.45) | (7.72) | (7.69) |

Continued….

Note: Exporters are ranked according to the value of their exports within a sector.

| Parameter | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| l*depfi2**q 1 | | | | 0.151*** | | 0.312*** | |
| | | | | (3.40) | | (2.95) | |
| l*depfi2**q 2 | | | | 0.162*** | | 0.348*** | |
| | | | | (3.65) | | (3.28) | |
| l*depfi2**q 3 | | | | 0.162*** | | 0.335*** | |
| | | | | (3.66) | | (3.16) | |
| l*depfi2**q 4 | | | | 0.144*** | | 0.337*** | |
| | | | | (3.25) | | (3.18) | |
| crisis1*l*depfi2**q 1 | | | | -0.556*** | | -1.141*** | |
| | | | | (-8.85) | | (-7.61) | |
| crisis1*l*depfi2**q 2 | | | | -0.551*** | | -1.148*** | |
| | | | | (-8.80) | | (-7.68) | |
| crisis1*l*depfi2**q 3 | | | | -0.560*** | | -1.148*** | |
| | | | | (-8.95) | | (-7.69) | |
| crisis1*l*depfi2**q 4 | | | | -0.532*** | | -1.113*** | |
| | | | | (-8.51) | | (-7.45) | |
| l*depfi3**q 1 | | | | | 0.084*** | | 0.205*** |
| | | | | | (3.26) | | (2.7) |
| l*depfi3**q 2 | | | | | 0.095*** | | 0.241*** |
| | | | | | (3.71) | | (3.2) |
| l*depfi3**q 3 | | | | | 0.088*** | | 0.205*** |
| | | | | | (3.43) | | (2.73) |
| l*depfi3**q 4 | | | | | 0.083*** | | 0.247*** |
| | | | | | (3.25) | | (3.28) |
| crisis1*l*depfi3**q 1 | | | | | -0.321*** | | -0.820*** |
| | | | | | (-8.82) | | (-7.65) |
| crisis1*l*depfi3**q 2 | | | | | -0.326*** | | -0.849*** |
| | | | | | (-9.03) | | (-7.99) |
| crisis1*l*depfi3**q 3 | | | | | -0.317*** | | -0.792*** |
| | | | | | (-8.81) | | (-7.47) |
| crisis1*l*depfi3**q 4 | | | | | -0.305*** | | -0.788*** |
| | | | | | (-8.48) | | (-7.44) |
| Vertical spécialisation (VS) | | | | | | 0.102*** | 0.101*** |
| | | | | | | (19.52) | (19.36) |
| crisis1*VS | | | | | | -0.837*** | -0.838*** |
| | | | | | | (-86.1) | (-86.2) |
| n | 10 771 590 | 10 771 590 | 10 771 590 | 10 771 590 | 10 771 590 | 10691692 | 10691692 |

**Table 5: Mean effects by quantile of firm size and by quantile of financial dependence of HS2 sectors**

| | *depfi2* | | | *depfi3* | | |
|---|---|---|---|---|---|---|
| | Mean effect | Effect 10$^{th}$ perc. of sectors | Effect 90$^{th}$ perc. of sectors | Mean effect | Effect 10$^{th}$ perc. of sectors | Effect 90$^{th}$ perc. of sectors. |
| q 1 | -0.027 | -0.033 | -0.021 | -0.028 | -0.029 | -0.027 |
| q 2 | 0.011 | -0.004 | 0.026 | 0.010 | -0.002 | 0.022 |
| q 3 | 0.026 | 0.010 | 0.041 | 0.024 | 0.019 | 0.029 |
| q 4 | | | | | | |
| crisis1*q 1 | -0.559 | -0.085 | -1.004 | -0.269 | 0.046 | -0.598 |
| crisis1*q 2 | -0.537 | -0.077 | -0.969 | -0.248 | 0.062 | -0.571 |
| crisis1*q 3 | -0.539 | -0.072 | -0.979 | -0.249 | 0.059 | -0.571 |
| crisis1*q 4 | -0.532 | -0.073 | -0.963 | -0.243 | 0.058 | -0.557 |

Note: Exporters are ranked according to the value of their exports within a sector. Computed from specification (4) and (5) in Table 4.

**Table 6: Mid-point growth rate of exports (year-on-year) by group of exporter before and after correction for export composition (sectoral and geographical)**

| | *Before correction* | | | | *After correction* | | | |
|---|---|---|---|---|---|---|---|---|
| **Group** | **1#** | **2#** | **3#** | **4#** | **1#** | **2#** | **3#** | **4#** |
| 2008-01 | 12.1 | 12.2 | 10.3 | 7.9 | 11.5 | 11.1 | 10.5 | 8.6 |
| 2008-02 | 17.7 | 13.5 | 8.7 | 10.0 | 13.3 | 11.9 | 10.8 | 10.5 |
| 2008-03 | 9.6 | 7.2 | 5.1 | 0.8 | 0.4 | 6.5 | 6.2 | 3.2 |
| 2008-04 | -1.6 | 11.0 | 1.8 | 4.6 | 5.8 | 8.7 | 1.3 | 4.1 |
| 2008-05 | 6.5 | 9.7 | -4.3 | -0.4 | 5.5 | 7.1 | -1.6 | -0.6 |
| 2008-06 | 10.0 | 10.9 | 7.5 | 0.7 | 9.7 | 8.7 | 6.3 | 2.9 |
| 2008-07 | 6.3 | 11.2 | 4.0 | 1.8 | 5.8 | 9.9 | 2.3 | 3.9 |
| 2008-08 | 3.4 | 6.7 | -1.8 | -0.9 | 1.5 | 4.8 | -1.8 | 0.9 |
| 2008-09 | 4.1 | 6.8 | -2.1 | 1.1 | 2.7 | 2.8 | 0.5 | 1.8 |
| 2008-10 | -1.8 | -5.0 | -2.3 | -8.3 | -4.9 | -7.7 | -1.6 | -6.4 |
| 2008-11 | 6.0 | -8.9 | -5.1 | -12.3 | 1.5 | -10.5 | -8.6 | -7.0 |
| 2008-12 | 5.6 | -17.1 | -1.0 | -21.7 | -8.2 | -13.3 | -6.3 | -15.4 |
| 2009-01 | -19.4 | -27.3 | -22.6 | -33.0 | -26.2 | -28.1 | -22.9 | -30.2 |
| 2009-02 | -20.6 | -27.8 | -22.7 | -33.2 | -27.8 | -27.4 | -25.6 | -29.0 |
| 2009-03 | -25.8 | -23.2 | -20.1 | -27.5 | -21.8 | -25.2 | -21.7 | -26.2 |
| 2009-04 | -26.2 | -30.6 | -21.9 | -32.4 | -28.4 | -30.8 | -24.1 | -29.9 |

Note: Group 1 comprises exporters in the 0-80 percentiles, group 2 exporters in the 80-95 percentiles, group 3 in the 95-99 percentiles. Group 4 comprises the 1 percent largest exporters. Exporters are ranked according to the diversification of their exports within a sector.
Source: French customs data, own calculations

**Table 7: Dependent variable year-on-year mid-point growth rate of monthly exports for individual firms (2007M1-2009M4)**

| Parameter | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Intercept | | 0.011** | 0.009* | -0.648*** | -0.740*** |
| | | (2.14) | (1.70) | (-4.38) | (-4.45) |
| dlimport | | 0.289*** | 0.290*** | 0.289*** | 0.289*** |
| | | (214.85) | (215.42) | (214.76) | (215.00) |
| q1 # (least diversified) | | -0.090*** | -0.067*** | 0.301*** | 0.537*** |
| | | (-65.6) | (-54.47) | (41.57) | (46.86) |
| q2# | | -0.013*** | 0.002** | 0.285*** | 0.219*** |
| | | (-12.1) | (2.33) | (52.19) | (24.3) |
| q3# | | 0.020*** | 0.015*** | 0.191*** | 0.242*** |
| | | (20.21) | (16.62) | (37.78) | (29.52) |
| q4 # (most diversified) | | 0.000 | 0.000 | 0.000 | 0.000 |
| | | . | . | . | . |
| crisis*q1# | | -0.118*** | | | |
| | | (-15.12) | | | |
| crisis*q2# | | -0.212*** | | | |
| | | (-27.68) | | | |
| crisis*q3# | | -0.242*** | | | |
| | | (-31.62) | | | |
| crisis*q4# | | -0.250*** | | | |
| | | (-32.86) | | | |
| crisis1*q1# | | | -0.134*** | 1.679*** | ns |
| | | | (-16.64) | (8.06) | |
| crisis1*q2# | | | -0.245*** | 1.694*** | ns |
| | | | (-31.16) | (8.14) | |
| crisis1*q3# | | | -0.218*** | 1.516*** | ns |
| | | | (-27.75) | (7.28) | |
| crisis1*q4# | | | -0.250*** | 1.563*** | ns |
| | | | (-31.93) | (7.51) | |

Continued….

Note: Exporters are ranked according to the diversification of their exports within a sector.

| Parameter | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| l*depfi2**q 1 | | | | 0.234*** | |
| | | | | (2.19) | |
| l*depfi2**q 2 | | | | 0.284** | |
| | | | | (2.65) | |
| l*depfi2**q 3 | | | | 0.349** | |
| | | | | (3.26) | |
| l*depfi2**q 4 | | | | 0.454*** | |
| | | | | (4.25) | |
| crisis1*l*depfi2**q 1# | | | | -1.306*** | |
| | | | | (-8.66) | |
| crisis1*l*depfi2**q 2# | | | | -1.384*** | |
| | | | | (-9.19) | |
| crisis1*l*depfi2**q 3# | | | | -1.260*** | |
| | | | | (-8.37) | |
| crisis1*l*depfi2**q 4# | | | | -1.306*** | |
| | | | | (-8.67) | |
| l*depfi3**q 1# | | | | | 0.065 |
| | | | | | 0.85 |
| l*depfi3**q 2# | | | | | 0.242** |
| | | | | | 3.19 |
| l*depfi3**q 3# | | | | | 0.237 |
| | | | | | 3.12** |
| l*depfi3**q 4# | | | | | 0.341 |
| | | | | | 4.49*** |
| crisis1*l*depfi3**q 1# | | | | | ns |
| crisis1*l*depfi3**q 2# | | | | | ns |
| crisis1*l*depfi3**q 3# | | | | | ns |
| crisis1*l*depfi3**q 4# | | | | | ns |
| n | 10 771 590 | 10 771 590 | 10 771 590 | 10 771 590 | 10 771 590 |

## Appendix 1: Classification of HS2 groups in broad sectors

| Broad sector | HS2 | Content |
|---|---|---|
| interm | 1 | Live animals |
| interm | 5 | Products of animal origin, nes |
| interm | 10 | Cereals |
| interm | 11 | Milling products, malt, starches, inulin, wheat gluten |
| interm | 13 | Lac, gums, resins, vegetable saps and extracts nes |
| interm | 14 | Vegetable plaiting materials, vegetable products nes |
| interm | 15 | Animal,vegetable fats and oils, cleavage products, etc |
| interm | 23 | Residues, wastes of food industry, animal fodder |
| interm | 25 | Salt, sulphur, earth, stone, plaster, lime and cement |
| interm | 26 | Ores, slag and ash |
| interm | 27 | Mineral fuels, oils, distillation products, etc |
| interm | 28 | Inorganic chemicals, precious metal compound, isotopes |
| interm | 29 | Organic chemicals |
| interm | 31 | Fertilizers |
| interm | 32 | Tanning, dyeing extracts, tannins, derivs,pigments etc |
| interm | 34 | Soaps, lubricants, waxes, candles, modelling pastes |
| interm | 35 | Albuminoids, modified starches, glues, enzymes |
| interm | 36 | Explosives, pyrotechnics, matches, pyrophorics, etc |
| interm | 38 | Miscellaneous chemical products |
| interm | 39 | Plastics and articles thereof |
| interm | 40 | Rubber and articles thereof |
| interm | 41 | Raw hides and skins (other than furskins) and leather |
| interm | 44 | Wood and articles of wood, wood charcoal |
| interm | 45 | Cork and articles of cork |
| interm | 47 | Pulp of wood, fibrous cellulosic material, waste etc |
| interm | 48 | Paper & paperboard, articles of pulp, paper and board |
| interm | 50 | Silk |
| interm | 51 | Wool, animal hair, horsehair yarn and fabric thereof |
| interm | 52 | Cotton |
| interm | 53 | Vegetable textile fibres nes, paper yarn, woven fabric |
| interm | 54 | Manmade filaments |
| interm | 55 | Manmade staple fibres |
| interm | 56 | Wadding, felt, nonwovens, yarns, twine, cordage, etc |
| interm | 68 | Stone, plaster, cement, asbestos, mica, etc articles |
| interm | 70 | Glass and glassware |
| interm | 72 | Iron and steel |
| interm | 73 | Articles of iron or steel |
| interm | 74 | Copper and articles thereof |
| interm | 75 | Nickel and articles thereof |
| interm | 76 | Aluminium and articles thereof |
| interm | 78 | Lead and articles thereof |
| interm | 79 | Zinc and articles thereof |
| interm | 80 | Tin and articles thereof |
| interm | 81 | Other base metals, cermets, articles thereof |
| autom | 87 | Vehicles other than railway, tramway |
| other transp | 86 | Railway, tramway locomotives, rolling stock, equipment |
| other transp | 88 | Aircraft, spacecraft, and parts thereof |
| other transp | 89 | Ships, boats and other floating structures |
| other eqt | 82 | Tools, implements, cutlery, etc of base metal |
| other eqt | 84 | Nuclear reactors, boilers, machinery, etc |
| other eqt | 85 | Electrical, electronic equipment |
| other eqt | 90 | Optical, photo, technical, medical, etc apparatus |
| other eqt | 93 | Arms and ammunition, parts and accessories thereof |
| other eqt | 94 | Furniture, lighting, signs, prefabricated buildings |
| cons | 2 | Meat and edible meat offal |
| cons | 3 | Fish, crustaceans, molluscs, aquatic invertebrates nes |
| cons | 4 | Dairy products, eggs, honey, edible animal product nes |
| cons | 6 | Live trees, plants, bulbs, roots, cut flowers etc |
| cons | 7 | Edible vegetables and certain roots and tubers |
| cons | 8 | Edible fruit, nuts, peel of citrus fruit, melons |
| cons | 9 | Coffee, tea, mate and spices |
| cons | 12 | Oil seed, oleagic fruits, grain, seed, fruit, etc, nes |
| cons | 16 | Meat, fish and seafood food preparations nes |
| cons | 17 | Sugars and sugar confectionery |
| cons | 18 | Cocoa and cocoa preparations |
| cons | 19 | Cereal, flour, starch, milk preparations and products |
| cons | 20 | Vegetable, fruit, nut, etc food preparations |
| cons | 21 | Miscellaneous edible preparations |
| cons | 22 | Beverages, spirits and vinegar |
| cons | 24 | Tobacco and manufactured tobacco substitutes |
| cons | 30 | Pharmaceutical products |
| cons | 33 | Essential oils, perfumes, cosmetics, toileteries |
| cons | 37 | Photographic or cinematographic goods |
| cons | 42 | Articles of leather, animal gut, harness, travel goods |
| cons | 43 | Furskins and artificial fur, manufactures thereof |
| cons | 46 | Manufactures of plaiting material, basketwork, etc. |
| cons | 49 | Printed books, newspapers, pictures etc |
| cons | 57 | Carpets and other textile floor coverings |
| cons | 58 | Special woven or tufted fabric, lace, tapestry etc |
| cons | 59 | Impregnated, coated or laminated textile fabric |
| cons | 60 | Knitted or crocheted fabric |
| cons | 61 | Articles of apparel, accessories, knit or crochet |
| cons | 62 | Articles of apparel, accessories, not knit or crochet |
| cons | 63 | Other made textile articles, sets, worn clothing etc |
| cons | 64 | Footwear, gaiters and the like, parts thereof |
| cons | 65 | Headgear and parts thereof |
| cons | 69 | Ceramic products |
| cons | 91 | Clocks and watches and parts thereof |
| cons | 92 | Musical instruments, parts and accessories |
| cons | 95 | Toys, games, sports requisites |
| misc | 66 | Umbrellas, walking-sticks, seat-sticks, whips, etc |
| misc | 67 | Bird skin, feathers, artificial flowers, human hair |
| misc | 71 | Pearls, precious stones, metals, coins, etc |
| misc | 83 | Miscellaneous articles of base metal |
| misc | 96 | Miscellaneous manufactured articles |
| misc | 97 | Works of art, collectors pieces and antiques |

## Appendix 2: Classification of sector by financial dependence

| | hs2 | rz2 | rz3 |
|---|---|---|---|
| Works of art, collectors` pieces and antiques. | **97** | 2 | 3 |
| Coffee, tea, mat– and spices. | **9** | 2 | 3 |
| Animal/veg fats & oils & their cleavage products. etc | **15** | 3 | 5 |
| Oil seed, oleagi fruits. miscell grain, seed, fruit etc | **12** | 3 | 4 |
| Miscellaneous edible preparations. | **21** | 3 | 4 |
| Prep of meat, fish or crustaceans, molluscs etc | **16** | 3 | 6 |
| Cocoa and cocoa preparations. | **18** | 3 | 4 |
| Miscellaneous manufactured articles. | **96** | 3 | 6 |
| Essential oils & resinoids. perf, cosmetic/toilet prep | **33** | 3 | 7 |
| Edible fruit and nuts. peel of citrus fruit or melons. | **8** | 3 | 8 |
| Headgear and parts thereof. | **65** | 3 | 7 |
| Miscellaneous chemical products. | **38** | 4 | 8 |
| Dairy prod. birds` eggs. natural honey. edible prod nes | **4** | 4 | 7 |
| **Articles of leather. saddlery/harness. travel goods etc** | **42** | 4 | 5 |
| Mineral fuels, oils & product of their distillation.etc | **27** | 4 | 9 |
| Fish & crustacean, mollusc & other aquatic invertebrate | **3** | 4 | 6 |
| Miscellaneous articles of base metal. | **83** | 4 | 7 |
| Prep of cereal, flour, starch/milk. pastrycooks` prod | **19** | 4 | 5 |
| Salt. sulphur. earth & ston. plastering mat. lime & cem | **25** | 4 | 7 |
| Machinery & mech appliance. parts, nuclear reactors, boilers | **84** | 4 | 9 |
| **Pharmaceutical products.** | **30** | 4 | 9 |
| Prep of vegetable, fruit, nuts or other parts of plants | **20** | 4 | 5 |
| **Railw/tramw locom, rolling-stock & parts thereof. etc** | **86** | 4 | 9 |
| Live animals. | **1** | 5 | 6 |
| Meat and edible meat offal. | **2** | 5 | 7 |
| Sugars and sugar confectionery. | **17** | 5 | 9 |
| **Vehicles o/t railw/tramw roll-stock, pts & accessories** | **87** | 5 | 7 |
| Soap, organic surface-active agents, washing prep, etc | **34** | 5 | 7 |
| Printed books, newspapers, pictures & other product etc | **49** | 5 | 8 |
| Lac. gums, resins & other vegetable saps & extracts. | **13** | 5 | 6 |
| Art of stone, plaster, cement, asbestos, mica/sim mat | **68** | 5 | 7 |
| **Plastics and articles thereof.** | **39** | 5 | 7 |
| **Ships, boats and floating structures.** | **89** | 5 | 9 |
| Other vegetable textile fibres. paper yarn & woven fab | **53** | 5 | 9 |
| Fertilisers. | **31** | 5 | 10 |
| Wood and articles of wood. wood charcoal. | **44** | 5 | 8 |
| Wadding, felt & nonwoven. yarns. twine, cordage, etc | **56** | 6 | 8 |
| Musical instruments. parts and access of such articles | **92** | 6 | 11 |
| Articles of iron or steel. | **73** | 6 | 9 |
| Organic chemicals. | **29** | 6 | 9 |
| Copper and articles thereof. | **74** | 6 | 11 |
| Inorgn chem. compds of prec met, radioact elements etc | **28** | 6 | 11 |
| Natural/cultured pearls, prec stones & metals, coin etc | **71** | 6 | 11 |
| Tool, implement, cutlery, spoon & fork, of base met etc | **82** | 6 | 9 |
| Iron and steel. | **72** | 6 | 10 |
| Beverages, spirits and vinegar. | **22** | 6 | 9 |
| **Raw hides and skins (other than furskins) and leather.** | **41** | 7 | 11 |
| Albuminoidal subs. modified starches. glues. enzymes. | **35** | 7 | 8 |
| **Electrical mchy equip parts thereof. sound recorder etc** | **85** | 7 | 12 |
| Prod mill indust. malt. starches. inulin. wheat gluten | **11** | 7 | 9 |
| **Optical, photo, cine, meas, checking, precision, etc** | **90** | 7 | 11 |
| Paper & paperboard. art of paper pulp, paper/paperboard | **48** | 7 | 9 |
| Furniture. bedding, mattress, matt support, cushion etc | **94** | 7 | 11 |
| Edible vegetables and certain roots and tubers. | **7** | 7 | 9 |
| Knitted or crocheted fabrics. | **60** | 7 | 9 |
| Art of apparel & clothing access, not knitted/crocheted | **62** | 8 | 11 |
| Cereals. | **10** | 8 | 12 |
| Aluminium and articles thereof. | **76** | 8 | 9 |
| **Toys, games & sports requisites. parts & access thereof** | **95** | 8 | 12 |
| Other made up textile articles. sets. worn clothing etc | **63** | 8 | 12 |
| **Art of apparel & clothing access, knitted or crocheted.** | **61** | 8 | 11 |
| Special woven fab. tufted tex fab. lace. tapestries etc | **58** | 8 | 12 |
| Residues & waste from the food indust. prepr ani fodder | **23** | 8 | 9 |
| Tanning/dyeing extract. tannins & derivs. pigm etc | **32** | 8 | 11 |
| Man-made filaments. | **54** | 8 | 10 |
| Rubber and articles thereof. | **40** | 8 | 11 |
| Impregnated, coated, cover/laminated textile fabric etc | **59** | 8 | 11 |
| Ceramic products. | **69** | 8 | 12 |
| Cotton. | **52** | 8 | 10 |
| Live tree & other plant. bulb, root. cut flowers etc | **6** | 8 | 10 |
| Carpets and other textile floor coverings. | **57** | 9 | 10 |
| **Glass and glassware.** | **70** | 9 | 14 |
| **Clocks and watches and parts thereof.** | **91** | 9 | 12 |
| Footwear, gaiters and the like. parts of such articles. | **64** | 9 | 14 |
| Products of animal origin, nes or included. | **5** | 10 | 14 |
| Wool, fine/coarse animal hair, horsehair yarn & fabric | **51** | 10 | 12 |
| Man-made staple fibres. | **55** | 10 | 12 |
| **Aircraft, spacecraft, and parts thereof.** | **88** | 10 | 15 |

**Appendix 3 Estimation results controlling for financial dependence (breakpoint: May 2008)**

| | (1) | (2) |
|---|---|---|
| Intercept | -0.091 | -0.119 |
| | (-1.54) | (-1.61) |
| dlimport | 0.289*** | 0.289*** |
| | (214.63) | (214.66) |
| q 1 | -0.026*** | -0.017 |
| | (-3.37) | (-1.78) |
| q 2 | -0.006 | -0.009* |
| | (-1.59) | (-1.74) |
| q 3 | -0.005* | 0.015*** |
| | (-1.85) | (4.01) |
| q 4 | 0.000 | 0.000 |
| | . | . |
| crisis*q 1 | 0.409*** | 0.571*** |
| | (4.78) | (5.37) |
| crisis*q 2 | 0.386*** | 0.561*** |
| | (4.54) | (5.30) |
| crisis*q 3 | 0.416*** | 0.560*** |
| | (4.90) | (5.29) |
| crisis*q 4 | 0.413*** | 0.569*** |
| | (4.87) | (5.39) |
| Continued… | | |

**Appendix 3 (cont.)**

| | (1) | (2) |
|---|---|---|
| l*depfi2**q 1 | 0.073* | |
| | (1.70) | |
| l*depfi2**q 2 | 0.081* | |
| | (1.89) | |
| l*depfi2**q 3 | 0.086*** | |
| | (2.01) | |
| l*depfi2**q 4 | 0.068 | |
| | (1.59) | |
| crisis*l*depfi2**q 1 | -0.470*** | |
| | (-7.60) | |
| crisis*l*depfi2**q 2 | -0.460*** | |
| | (-7.47) | |
| crisis*l*depfi2**q 3 | -0.477*** | |
| | (-7.75) | |
| crisis*l*depfi2**q 4 | -0.459*** | |
| | (-7.46) | |
| l*depfi3**q 1 | | 0.040 |
| | | (1.60) |
| l*depfi3**q 2 | | 0.049** |
| | | (1.97) |
| l*depfi3**q 3 | | 0.044* |
| | | (1.78) |
| l*depfi3**q 4 | | 0.040 |
| | | (1.62) |
| crisis*l*depfi3**q 1 | | -0.273*** |
| | | (-7.64) |
| crisis*l*depfi3**q 2 | | -0.271*** |
| | | (-7.63) |
| crisis*l*depfi3**q 3 | | -0.270*** |
| | | (-7.63) |
| crisis*l*depfi3**q 4 | | -0.264*** |
| | | (-7.45) |
| n | 10 771 590 | 10 771 590 |