

DOMESTIC AND FOREIGN SALES IN ITALY DURING THE GLOBAL CRISIS AND BEFORE: COMPLEMENTS OR SUBSTITUTES?*

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(very preliminary: April 1st, 2014)

Abstract

Are a firm's foreign and domestic sales complements, substitutes or uncorrelated? The question is relevant both to assess the international transmission of shocks and in the context of the European sovereign debt crisis: it has been argued that the 2012-2013 recession was prompted by domestic demand but had in turn relevant adverse effect for the exporting capacity of Italian firms. Standard international trade theory predicts no interdependency between foreign and domestic sales; recent literature shows that different channels may justify either a negative (through capacity constraints) or a positive (through economies of scale or liquidity constraints) correlation, both at the aggregate and at the micro level; the evidence, however, is rather mixed. Using microdata on a sample of Italian manufacturing firms from 2001 to 2012, we show that: *i*) the sign of the correlation changes over the business cycle, being negative in the first part of the past decade and positive after the 2008 crisis burst; *ii*) all the channels suggested by the literature are at play and they may explain the time-varying correlation; *iii*) the drop of domestic sales by Italian firms in 2012 contributed negatively to the firms' ability to export, due to its interaction with liquidity constraints, curtailing, in our sample, exports growth by 0.6 percentage points out of 4.7 per cent and in particular affecting those exporters that also had a substantial presence on the domestic market.

JEL: F10, F12, F14, L11

Keywords: domestic sales, export, credit, liquidity and capacity constraints.

* We thank Andrea Brandolini and Paolo Sestito for helpful comments and Giuseppina Papadia for the valuable contribution in the construction of the INVIND-CADS dataset. The views expressed in this paper are those of the authors and do not necessarily reflect those of the Bank of Italy. The other usual disclaimers apply.

1. Introduction

Do the levels of firm's sales in foreign and domestic markets affect each other? If firms face constant marginal cost, profit maximization implies no link between the two markets. If instead supply factors such as physical and financial constraints or economies of scale constraints, matter, as shown by recent theory and empirical evidence, the correlation between domestic and foreign sales may turn either negative or positive, at least in the short run. This has obvious bearings for the international transmission of shocks. The GDP response to a shock is amplified when foreign and domestic sales are complements, but it is attenuated when they are substitutes. A non-zero correlation implies that any policy measure affecting domestic sales has an impact on foreign sales, and vice versa. The existence of such a link could also help partly explain the well-known difficulty of price competitiveness indicators to track export performance.

The question is even more relevant in the context of the European sovereign debt crisis. The standard view separates the roles of competitiveness and domestic demand in inducing the 2012-2013 recession; more importantly, it often suggests that gains in competitiveness may compensate the contraction of domestic sales. However, it has also been argued (e.g., De Nardis, 2014) that, since few firms are "pure exporters" while most exporting firms sell a significant part of their products in the domestic market too¹, the fall in domestic demand in the 2012-13 Italian recession may have hurt the exporting capacity of Italian firms.

When demand changes in one of a firm's destination markets, the size and sign of the correlation between sales in such a market and sales in other markets depends on the interplay of various factors that are related to the slope of a firm's marginal cost curve around the initial equilibrium output, to the demand elasticities in the domestic and foreign markets, to the presence of financial constraints that may limit a firm's capacity to adjust the production scale or to pay for fixed exporting costs. For all these reasons, the study of this correlation is largely an empirical matter.

Several papers estimate a *negative* relationship and explain it in terms of capacity constraints or of a convex cost function. As pointed out by Soares Esteves and Rua (2013), who find a negative correlation on Portuguese time-series data, when domestic demand is high, firms working at full capacity are not able to allocate resources to satisfy increasing foreign demand in the short run; when, instead, demand is weak, firms put more effort into export activity to compensate for the decline in domestic sales. Using data on Thai firms, Soderbery (2011) shows that the negative correlation mainly depends on firms being constrained in terms of both physical capacity and financial means; when domestic demand increases, these firms do not have the liquidity to expand their production capacity and therefore are forced to cut their exports. Ahn and McQuoid (2012) and Blum, Claro and Horstmann (2011) confirm this result for Chilean and Indonesian firms. Vannoorenberghe (2012) builds and successfully tests (on French firms) a model where a convex cost function explains both the negative relationship and the volatility of domestic and foreign sales.

A *positive* correlation between domestic and foreign sales can descend from the presence of "economies of scale" in production: a positive (negative) demand shock in one market increases (decreases) the production scale and decreases (increases) average cost, promoting (hindering) sales

¹ De Nardis (2014) recalls that in Italy manufacturing exporters, which are 20 per cent of all manufacturing firms, make on average 63 per cent of their total sales on the domestic market.

in the other market. In the case of Italy it is often argued that the abrupt shrinking of domestic markets in 2011-2013 has forced firms to reduce their production potential, making it more difficult also to compete on international markets.

Liquidity or credit constraints may also generate a *positive* correlation. When, for example, domestic sales collapse, firms with a liquidity shortage or credit constrained may not be able to bear the costs for selling abroad; lower domestic sales can make such a shortage even more severe. On a sample of French firms analyzed over the period 1995-2001, Berman et al. (2011) find that a 10 per cent exogenous increase in exports generates a 1.5 to 3 per cent increase in domestic sales in the short-term². Their evidence favors the liquidity channel. In particular, they find that firms belonging to sectors in which the need for short-term liquidity is higher – due to higher working capital requirement - have a higher correlation between domestic and foreign sales.

The liquidity/credit constraints story suggests that a non-zero correlation between foreign and domestic sales can also have relevant effects at the structural/micro level by affecting the composition of the pool of exporters. If for instance small firms – which are typically more dependent on domestic sales – are also more frequently credit/liquidity constrained, a fall in domestic sales will affect them more than larger exporters. An analogous composition effect may occur to the disadvantage of firms or sectors which have higher working capital requirements for technological or life-cycle reasons (newly born firms).

In this paper we estimate the correlation between domestic and foreign sales using a sample of Italian manufacturing firms covering the period 2001-2012. The focus on Italian firms is particularly interesting for a number of reasons.

It is the first time, to our knowledge, that this exercise is carried out for Italy and it benefits from a particularly rich database. Indeed, the Bank of Italy yearly survey on industrial and non-financial service firms (INVIND, hereinafter) that we use in the empirical analysis provides us with measures of both (a) credit constraints (as measured by firms' intentions to ask for credit to banks) and (b) capacity utilization (as a percentage of maximum physical output a firm can produce). These two measures allow us to test with some precision and at the firm-level the capacity constraints and the credit constraints hypotheses. Merging INVIND with balance sheet data we can also derive firm-level indicators of liquidity.

The focus on the recent Italian experience is interesting in many respects. First, the period under analysis (2001-12) comprises a “business-as-usual” period (2001-2007) along with two phases where foreign and domestic sales recorded very large (negative) fluctuations: the 2008-09 “sudden stop” in world trade after the Lehman collapse and the significant contraction of domestic demand that followed the sovereign debt crisis exploded in the summer of 2011. The latter recession saw also a credit crunch and widespread liquidity shortages (Bonaccorsi di Patti and Sette, 2009; Cingano, Manaresi and Sette, 2013), which means that we have all the ingredients – *inter alia* on a magnified scale – needed to estimate the importance of the liquidity and credit hypothesis. Second, the recent developments of the Italian economy have been characterized by a high and growing firm heterogeneity. Analyses conducted at the Bank of Italy have shown how different firms were hit and reacted very differently to similar shocks: this happened both before and during the Great

² They use a variety of instruments for French foreign sales: from product-destination specific imports to tariffs, from financial crises to civil wars. Their results are valid in cases where the foreign demand for firms' products is either increasing or decreasing, even if the effect is slightly larger in the latter case.

Recession and has ended with a lot of variance in terms of sales growth (both domestic and foreign), capacity utilization, liquidity and credit constraints that can be used in the empirical analysis to search for explanations to highly heterogeneous performances. We can therefore exploit significant cross-sectional and time series heterogeneity at the same time.

In the first part of our sample period (2001-07), the “business-as-usual period”, neither foreign nor domestic sales has been subject, at least at a macro level, to exceptional fluctuations; in theory, this period could help us to identify the role of capacity constraints using the cross-sectional variance of the data. The Lehman default of September 2008 endows us with an abrupt global trade collapse that has triggered some first liquidity and financial pain to industrial firms. After that, the collapse of domestic demand caused by the sovereign debt crisis burst in the summer of 2011 and, later, by the necessary fiscal adjustment and a visible credit crunch have worsened firms’ liquidity and credit difficulties; very likely, the relevance of capacity constraints decreased significantly for most firms since 2011, while that of credit and liquidity constraints grew. As a result, and differently from the previous literature, we can show that the sign of the correlation between foreign and domestic sales can change over time: all the channels described above can be at play at different intensity in different periods for different firms.

Our empirical analysis has so far unveiled only simple correlations with no causal interpretation. The main findings are the following.

- During the whole period 2001-2012, the correlation between foreign and domestic sales is not significantly different from zero: however, a negative correlation until 2007 is offset by a large and positive correlation in both 2008-2010 (Great Recession) and 2011-12 (sovereign debt crisis).
- At the macro level, in 2012 the drop in domestic sales may have reduced the growth of foreign sales (4.7 per cent) by 0.6 percentage points. Such a contribution is not exceedingly large, but still economically significant. The contribution is even more relevant if one consider the subset of firms that do export, but still largely rely on domestic demand: for these firms, the negative contribution has been 1.5 pp out of 4.2 per cent growth in exports.
- All channels suggested by the literature are at play. This may explain the time-varying correlation between domestic and foreign sales: while capacity constraints give rise to a negative correlation, credit and liquidity constraints lead to a positive one.
- The positive correlation in 2011-12 has been due to the aggravation and diffusion of liquidity problems and has been partially compensated by increased slack among Italian firms.

Our results suggest that the contraction of domestic demand recorded in 2012-13 may not only have constrained the export capacity of the Italian productive system as a whole, but has done so in particular to firms that also rely on the domestic market. Speculatively, we may conclude that the negative effect of the drop of domestic demand has acted more along the extensive rather than the intensive margin of exports, amplifying the performance gap between big and consolidated exporters on one side and the rest of the productive system on the other.

There are some evident caveats to our preliminary results. First of all, there is a reverse causality critique: it is surely important during the 2008-09 period when it is well known that the

“exogenous” shock was that to world trade, but it cannot be excluded also for other periods. We will deal with exogeneity issues more carefully in a second draft of the paper.

The finding of a positive correlation between domestic and foreign sales may arguably be spurious, due to firm-level characteristics as an overall decline in the ability to compete (analyses conducted at the Bank of Italy have given support to the argument that the long-going losses in competitiveness of the Italian economy caused the retreat from export market shares prior to the crisis). In our empirical analysis, we try to control for firm-level unobservable factors by sector and year dummies; in addition, firm fixed effects help us to exclude that a positive correlation between domestic and foreign sales is trivially due to the fact more productive firms are better sellers in any market.

The paper is organized as follows. In the next section we summarize the main features of the dataset. Section 3 provides some preliminary, descriptive evidence. Our more systematic empirical analysis aiming at testing the potential explanations of a non-zero correlation is described in section 4. Section 5 concludes.

2. Data

Our firm-level data come from two sources. The first is INVIND, the Bank of Italy yearly survey on industrial and non-financial service firms, which collects data on the most relevant variables on company activities, like domestic and foreign sales, investments, price changes, employment. Importantly for our purposes, INVIND collects a measure of capacity utilization measured, as in other business surveys, as a percentage of maximum physical output a firm can produce and a measure of credit constraints based on firms’ intentions to ask for credit to banks. More precisely, we classify firms as credit rationed if they answered positively to the following questions: (1) the firm would like to receive more credit at current conditions; and (2) the firm approached to an intermediary but the credit was denied (see also Gaiotti, 2013 for a similar use of this variable).

INVIND is stratified according to firms’ branch of activity, size class and geographical areas. The survey is conducted since 1984 but it has been subject to various changes in the sample design; the most relevant one occurred in 2001, when the reference population, originally composed of firms with at least 50 employees, was enlarged to include also 20+ firms. INVIND has a large panel component: from 1984 to 2012 at least 50 percent of firms participated to the survey for 10 years. Moreover, it collects not only information for the reference year but also for the year before, allowing us to calculate the yearly percentage change in domestic and foreign sales. INVIND is then merged with the Company Accounts Data Service (CADS) that collects balance sheet information on a large sample of Italian firms, with a very good coverage of large firms. We use CADS data to get balance-sheet cash flow and a proxy for liquidity, equal to the ratio between total short term assets and total short term debts (the so-called current ratio).

Since we focus on firms’ exports we restrict INVIND-CADS to manufacturing firms only and then only to the period from 2001 onwards to work with a sample including firms with less than 50 employees, those that are more likely to be credit or liquidity constrained and more reliant on domestic demand.

3. Preliminary evidence

In this section we show some preliminary evidence on the behavior of domestic and foreign sales. In Figure 1, based on INVIND, we plot the distribution of yearly changes of foreign sales (panel a) and domestic sales (panel b) during the period 2001-12. The Figure shows that both measures declined considerably in 2009, but their trends diverged after 2011, when the sovereign debt crisis, somehow specific to Italy, affected only domestic sales. The figure also allows to appreciate the rich cross-sectional variance in our data: in 2011-12 the distribution of firm-level growth rates of domestic sales ranged from -50 to 50 per cent.

A first look at the time-varying correlation between foreign and domestic sales is provided in Figure 2. The figure plots for each year the value of the time-varying coefficient β estimated in the regression:

$$\Delta f_{i,t} = \beta_t \Delta d_{i,t} + \gamma_t + \gamma_s + \gamma_{t,s} + u_{i,t} \quad [1]$$

where Δf_{it} is the percentage change in exports, Δd_{it} is the percentage change in domestic sales, γ_t are time fixed-effects, γ_s are sector fixed-effects, $\gamma_{t,s}$ are joint time-sector fixed-effects. The coefficient β_t is time-varying, and it is therefore a measure of the year-by-year correlation between foreign and domestic sales once common and sector time trends are accounted for. The dashed green lines delimit the 90 per cent confidence intervals.

Panel (a) of Figure 2 suggests that correlation is not statistically different from zero at the beginning of the period and it becomes positive during the Global Recession. In panel (b), where we also control for firms' fixed effects, the increase in correlation after the Lehman default is even larger, suggesting that the positive correlation found in panel (a) is not due to omitted firm-specific characteristics.

The changes in the correlation over the cycle can be better appreciated by estimating β over three separate periods (2001-07, period 1; 2008-10, period 2; 2011-2012, period 3) and adding some further controls. Table 1 reports the estimated coefficients of a different version of equation [1], namely:

$$\Delta f_{it} = \theta f_{i,t-1} + \beta_p \Delta d_{it} + \delta_p \Delta d_{it} * Y_i + \gamma_i + \gamma_t + \gamma_{t,s} + u_{it} \quad [2]$$

where, in addition to variables already defined in equation 1, f_{it-1} denotes the level of foreign sales f at time $t - 1$, the coefficient β is now allowed to change over the three periods ($p=1,2,3$), Y_i is a set of firm-specific characteristics interacted with Δd_{it} (whose effect is also allowed to change over the three periods).

The results are shown in Table 1. In the first column, where the coefficient β is constrained not to vary across periods, we find no statistically significant correlation between domestic and foreign sales. When we allow for different β_s , the estimated correlation is significantly negative in the period 2001-07, significantly positive both in 2008-10 and 2011-12 (column 2). To control for spurious comovements driven by sector or product-specific business cycles, we include sectoral time dummies in column 3 and we include the interaction of time dummies with a dummy identifying type of good (investment, intermediate or consumption good) in column 4; the sign and the magnitude of the β_s is unchanged.

In the last two columns we take care of the possibility that the positive correlation of sales across markets is spuriously due to omitted firm-specific variables. E.g., good firms may perform

well in both markets, while less efficient ones record a negative performance everywhere. In column 5, we interact the change of domestic sales with firm-level average labor productivity (proxied by sales per worker) over the period 2001-2007 (the effect is allowed to differ across the three sub-periods): the interaction term has a positive and significant coefficient, but the main results are unchanged.

Finally, one may argue that our results come from international business cycle correlation: in this case the estimated β s should be (spuriously) larger for firms exporting in the EU countries, whose business cycle is more likely synchronized with the Italian one. This is not the case. In column 6 the share of export towards EU (measured as of 2006) is interacted with the yearly change in domestic sales. The estimated coefficient on this variable is not statistically significant from zero and the other results do not change.

3.1. Assessing the relevance of the estimated effect

Based on the estimates presented in the first column of Table 1, for each year we calculate:

$$\widehat{\Delta f}_t = \widehat{\theta} \bar{f}_{t-1} + \widehat{\beta}_p \overline{\Delta d}_t + \gamma$$

where the symbol “ $\widehat{}$ ” denotes the estimated parameters and the bar denotes the sample average of the variable in year t ; γ captures the average of the estimated firms fixed effects and year effects. The term $\widehat{\beta}_p \overline{\Delta d}_t$ measures the change in total foreign sales growth Δf_t associated to the observed change in domestic sales (we cannot claim causation at this stage).

Figure 3 reports $\widehat{\Delta f}_t$ and $\widehat{\beta}_p \overline{\Delta d}_t$ from 2001 to 2012. Before 2008 the contribution of $\widehat{\beta}_p \overline{\Delta d}_t$ to the dynamics of exports is negative and negligible. Afterwards, when the correlation between sales across markets becomes positive, we find a significant contribution of $\widehat{\beta}_p \overline{\Delta d}_t$ to export growth. In 2009 the drop of domestic sales occurred immediately after the Lehman default was associated to a 2 percentage points in foreign sales (out of a total 14 percent drop). In 2012 the collapse of domestic sales, amounting on average to 5 per cent, acted as a drag, for 0.6 percentage points, on export growth (that was overall positive and equal to 4.7 per cent).

As a further check, we modify equation [2] to let the β s differ between firms that are almost “pure exporters” and firms that export but also sell a substantial portion of their production on the domestic market. According to De Nardis (2014), it is for the latter that we should expect a larger positive correlation between the behavior of domestic demand and the ability to export. To this aim, we split the sample into two groups, between the firms having a share of exports respectively above or below average³. The results, reported in Table 2, show that in period 3 the positive correlation between domestic and foreign sales is indeed much higher among firms that are more dependent on domestic demand.

Based on Table 2, Figure 4 is the equivalent of Figure 3 for the two different sets of firms, limited to the 2008-2012 interval. For firms that also rely on domestic demand, in 2012 the contribution of $\widehat{\beta}_p \overline{\Delta d}_t$ to the dynamics of exports was equal to -1.5 percentage points (out of a positive export growth rate of 4.2 per cent).

³ For each firm the average share is computed over 2001-2007. In the 2012 sample about 60 (40) per cent of firms have a higher (lower) than average export share. Firms included in the sample after 2007 are excluded from these estimates.

4. Searching for mechanisms

In order to gather some first evidence on the plausibility of two of the different mechanisms that may account for the correlation between foreign and domestic sales (liquidity constraints and/or capacity constraints, as discussed in section 1) we calculate the correlation separately for different groups of firms. The groups are selected based on *i*) the tightness of liquidity constraints; *ii*) the degree of capacity utilization.

We consider the following extension of equation [2] :

$$\Delta f_{it} = \theta f_{i,t-1} + \delta_1 \Delta^+ d_{it} + \delta_2 \Delta^- d_{it} + \beta_1 \Delta^+ d_{it} * X_{t-1} + \beta_2 \Delta^- d_{it} * X_{t-1} + \theta X_{t-1} + \gamma_i + \gamma_t + u_{it} \quad [3]$$

where Δ^+ is a positive change in domestic sales, Δ^- is a negative change, X_{t-1} represents the interaction variables measuring the intensity of either liquidity or capacity constraints (as specified below), γ_i are firm fixed effects and the other variables are defined as in previous equations. The X_{t-1} are lagged to avoid reverse causation. Their additional effect on the correlation between foreign and domestic sales is measured by the estimated vector of coefficients β_2 .

Short run liquidity and credit constraints may prevent firms to buy intermediate goods and afford the additional per-period costs associated to export (see the broad literature following Melitz, 2003). Therefore, for highly constrained firms the correlation between domestic and foreign sales should be positive as the liquidity generated by domestic sales might be needed to finance the exporting activity.

Credit and liquidity constraints were particularly severe since 2008, and especially during the sovereign debt crisis. We consider two measures: the share of firms that declare to have been denied credit (a measure derived as in Gaiotti, 2013); the ratio between short term assets and short term debts (the current ratio). Italian firms were more likely to be credit constrained after 2008 than at the beginning of the past decade. In our sample, the share of credit constrained firms increased from 6 per cent on average in the period before 2008 to 11 per cent in 2012 (Figure 5). The current ratio on average increased, suggesting that firms may instead have accumulated liquidity especially after 2008 as a response to credit restrictions; however, it decreased considerably for the 25th percentile of the distribution (Figure 6).

Table 3 reports the estimates of equation [3] with X_{t-1} defined as the current ratio (the higher the value of the current ratio, the higher a firm's liquidity). When we do not allow for a different correlation for positive and negative changes in domestic sales (column 1), we find, as expected, that the positive correlation between changes in domestic and in foreign sales decreases with the amount of liquidity a firm is endowed with. This effect is fully driven by the situations where domestic sales contracts (column 2).

The estimation of equation [3] with credit constraints is shown in Table 4. Column 2 reports results that are in line with those on liquidity. In the face of a drop in the domestic market, on average firms substitute domestic with foreign sales (i.e., negative correlation), but those that are credit constrained are forced to cut their exports, too (positive β_2).

Capacity constraints could help explain a negative short run correlation between domestic sales and exports (e.g. Ahn and McQuoid, 2012, Blum et al. ,2013, Berman et al. 2011). When capacity utilization is high, firms should be less able to increase their sales in both domestic and foreign

market. We then expect that high capacity utilization is associated to a negative correlation between domestic and foreign sales.

To analyze this issue, we use the index of capacity utilization collected by INVIND from 2001 to 2012. From Figure 7, where we report its average evolution over the period 2001-12 (2001=100,) it is quite evident that the recent crisis has determined a large drop on average, stronger in 2009 and 2012. The drop is much larger at the 25th percentile of the distribution of capacity utilization, i.e. among firms with a larger productive slackness to start with.

Table 5 shows the results of estimating equation [3] with X_{t-1} representing capacity utilization (column 1). The estimated coefficient is expected to be negative. Again, this is what we find both when we do not (column 1) and when we do (column 2) distinguish between negative and positive changes of domestic sales. In the latter case, the indirect effect of capacity utilization on the correlation between sales across markets is always at work, independently of the sign of the changes in domestic sales.

In Tables 6 and 7 we jointly test the relevance of liquidity/credit constraints on one side and capacity constraints on the other by including at the same time among the Xs the capacity utilization and our proxies for liquidity and credit constraints.

From the results reported in column 2 of Table 6 we can conclude that a positive correlation between changes in domestic and foreign sales, that holds for both increases and decreases of domestic sales, is reduced when capacity constraints becomes binding while liquidity constraints get more relaxed. As seen before, the effect of capacity constraints holds for both positive and negative changes in domestic sales, while that of liquidity constraints only for negative ones. The coefficients presented in column 3, based on a model which includes also sector-time dummies, confirms that our results are not driven by sector specific shocks.

The results are confirmed, though statistically less neatly, when credit and capacity constraints are considered together (Table 7).

4.1. Quantitative assessment

As an illustration of the shifting pattern of complementarity/substitutability between foreign and domestic demand and of its economic relevance, based on the estimates presented in column 2 of Table 6, Figure 9 reports the change in foreign sales (Δf) associated to the change in domestic sales (Δd), focusing on the 2012 recession.⁴ We distinguish four cases, according to whether firms face liquidity constraints and whether they have large margins of spare productive capacity :

1. Firms with low liquidity, low capacity utilisation (the current ratio equal to the 25th percentile of its distribution in 2012, and capacity utilization equal to the 25th percentile);
2. Firms with low liquidity, binding capacity constraints (the current ratio equal to the 25th percentile, capacity utilization equal to the 75th percentile);
3. Firms with high liquidity and low capacity utilization (the current ratio equal to the 75th percentile, capacity utilization equal to the 25th percentile);
4. Firms with high liquidity, binding capacity constraints (the current ratio equal to the 75th percentile, capacity utilization equal to the 75th percentile).

⁴ We set f_{t-1} equal to the year 2011 average.

As shown by Figure 9, the slope of the relation between the change in domestic sales and the change in foreign sales changes dramatically for the four types of firms. A strongly positive slope applies (foreign and domestic demand are complements) for illiquid firms with large spare capacity; in this case a 10% fall in domestic sales, combined with a change from the 75th to the 25th percentile of the distribution of liquidity, is associated to a 2 pp fall in foreign sales. The slope decreases as capacity constraints become binding. It becomes negative when firms face no liquidity constraint, strongly so as capacity utilization increases: domestic and foreign sales become substitutes.

5. Concluding remarks

In the debate on the disappointing performance of the Italian economy, the role of a very weak and even contracting domestic demand is commonly seen only from one angle: it is a direct drag on growth, and therefore it calls for measures to gain international competitiveness and increase exports as a compensation.

In this paper we have presented evidence that may unveil a more complex link: depending on some supply side features, the dynamics of domestic demand can be directly correlated to that of exports.

Our results need to be further explored; so far we have not tested the direction of causality, although, at least for the period of the sovereign debt crisis, we have a strong prior that it runs from changes in domestic sales to exporting capacity. Still, we believe our results offer a new interesting perspective to interpret a period, like the one Italy entered after the sovereign debt crisis burst in the summer of 2011, where the growth of domestic demand was negative, the availability of credit was sharply reduced and firms' liquidity difficulties became serious and diffuse. In light of these results, economic policy should consider that export growth in the short run may be adversely affected by the developments on the domestic market, with an intensity that depends on the severity of the credit crunch and the liquidity shortage and on the existence of capacity constraints .

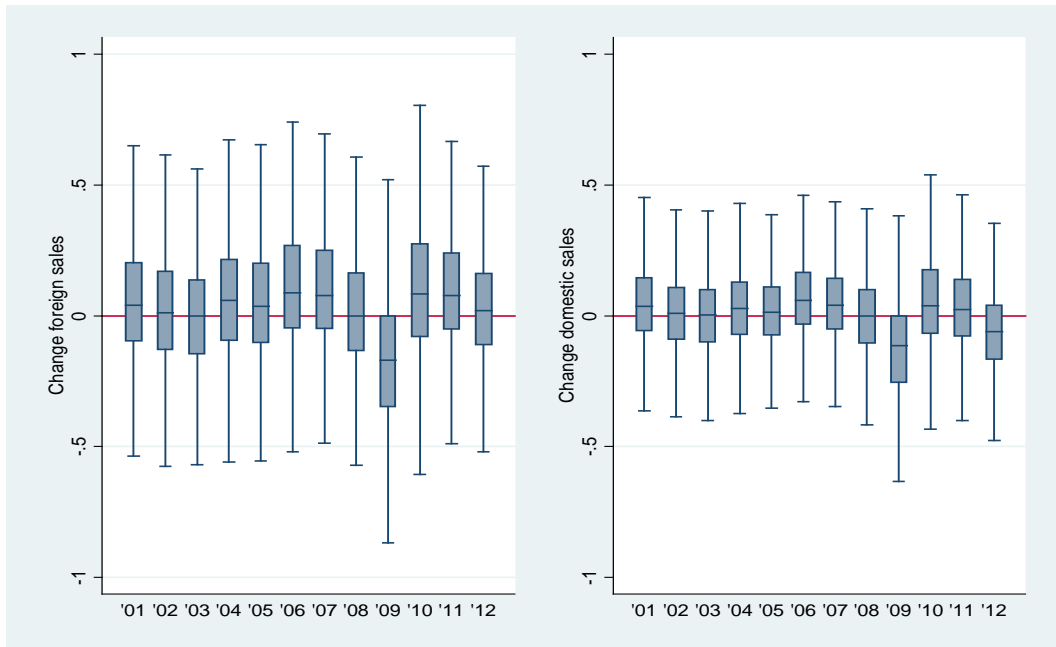
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Tables and figures

Fig.1

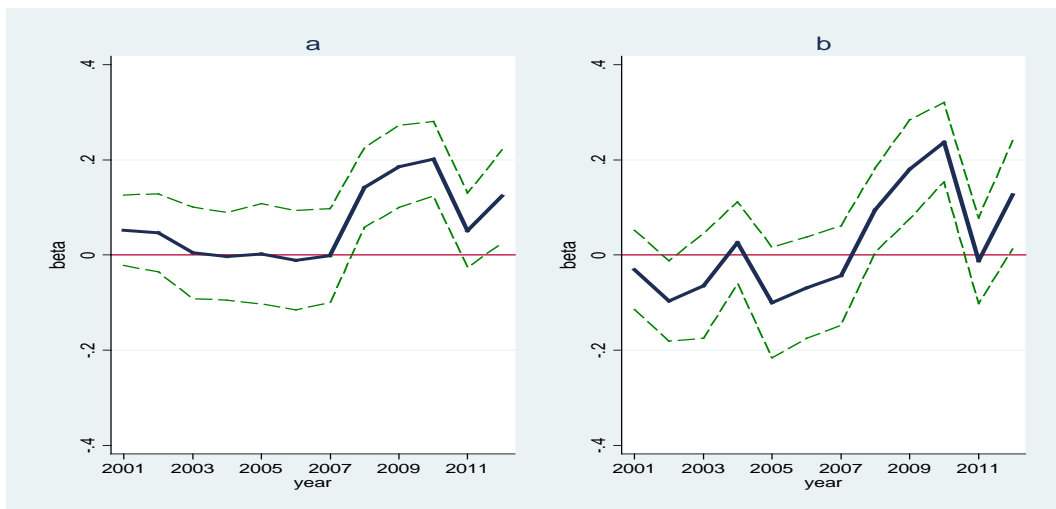
Distribution of yearly change in domestic and foreign sales, 2001-2012.



Source and notes. Invind 2001-2012; manufacturing sector.

Fig.2

Correlation between domestic and foreign sales, 2001-2012. OLS estimates
(Sector and time dummies in panel a; time dummies and firm fixed effects in panel b)



Source and notes. Invind 2001-2012; manufacturing sector. Percentage changes in domestic and foreign sales. Confidence intervals at 90%. Robust standard errors.

Tab. 1

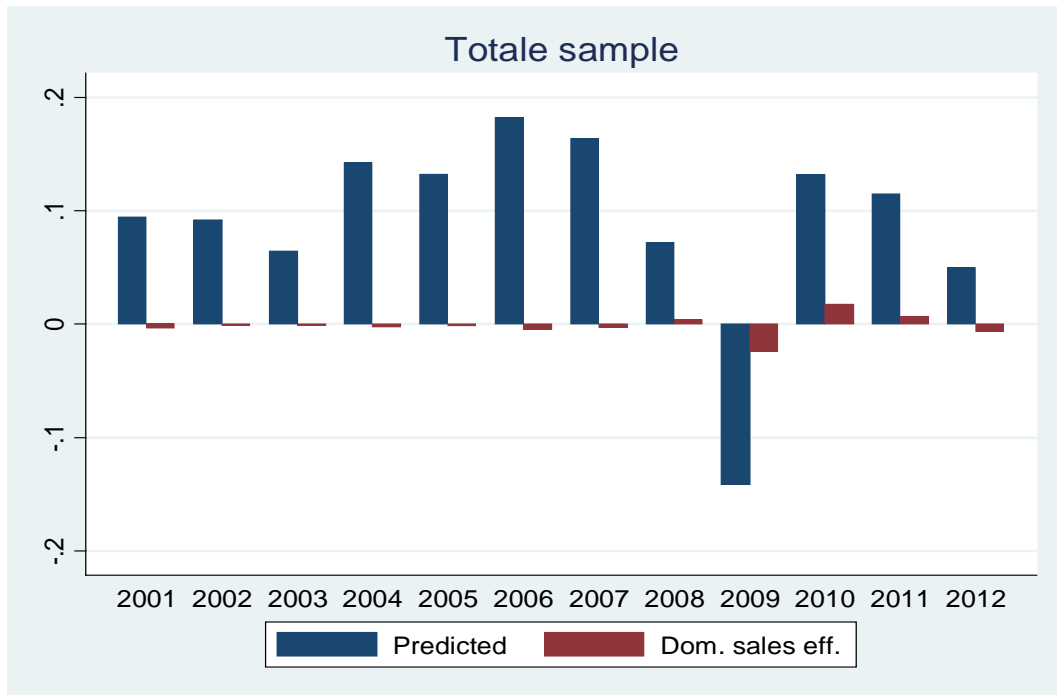
Correlation between domestic and foreign sales

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Log export (t-1)	-0.1573*** (0.0086)	-0.1572*** (0.0086)	-0.1579*** (0.0087)	-0.1707*** (0.0108)	-0.1563*** (0.0087)	-0.1766*** (0.0147)
Change dom. sales	0.0254 (0.0166)	-0.0562** (0.0230)	-0.0691*** (0.0232)	-0.0853*** (0.0270)	-0.0743*** (0.0241)	-0.1347** (0.0577)
Period 2* Change dom. Sales		0.2170*** (0.0377)	0.2012*** (0.0383)	0.2157*** (0.0432)	0.1951*** (0.0431)	0.1996** (0.0998)
Period 3* Change dom. Sales		0.1294*** (0.0481)	0.1411*** (0.0486)	0.1605*** (0.0543)	0.1594*** (0.0578)	0.2751** (0.1379)
Change dom. sales*Average prod. (1)					0.0001** (0.0000)	
Period 2* Change dom. s.* Av. prod. (1)					0.0001 (0.0001)	
Period 3* Change dom. s.* Av. prod. (1)					-0.0001 (0.0001)	
Share exported in EU (2)						0.0007 (0.0009)
Period 2* Change dom. s.* Share in EU (2)						0.0009 (0.0015)
Period 3* Change dom. s.* Share in EU (2)						-0.0022 (0.0020)
Time trends	yes	yes	yes	yes	yes	yes
Sector*time trends	no	no	yes	no	no	no
Type of good*time trends	no	no	no	yes	no	no
Observations	26328	26328	26328	20172	24603	10645
R-squared	0.31	0.31	0.32	0.33	0.30	0.23

Notes: OLS estimates. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (1) Average of sales per workers from 2001 to 2007, i.e. before the Global financial crisis. (2) Share of exports towards EU in total foreign sales.

Fig. 3

Change in foreign sales and component associated with the change in domestic sales



Tab. 2

Correlation between domestic and foreign sales: firms with low and high export share

VARIABLES	(1) Low export share	(2) High export share	(3) Total
Log export (t-1)	-0.1647*** (0.0114)	-0.1465*** (0.0127)	-0.1575*** (0.0086)
Change dom. Sales	-0.0211 (0.0694)	-0.0678*** (0.0184)	
Period 2* Change dom. Sales	0.2360** (0.0982)	0.1913*** (0.0372)	
Period 3* Change dom. Sales	0.2723** (0.1339)	0.0849* (0.0508)	
Change dom. Sales*Low share			-0.0340 (0.0686)
Period 2* Change dom. *Low share			0.2371** (0.0959)
Period 3* Change dom. *Low share			0.2617** (0.1301)
Change dom. Sales*High share			-0.0656*** (0.0187)
Period 2* Change dom. *High share			0.2095*** (0.0354)
Period 3* Change dom. *High share			0.0885** (0.0450)
Time dummies	yes	yes	yes
Observations	11995	12621	26,333
R-squared	0.30	0.31	0.31

Notes: OLS estimates. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. (1) Firms with share of foreign sales in total sales lower than the average in the period 2001-07; (2) Firms with share of foreign sales in total sales higher than the average in the period 2001-07.

Fig. 4

Change in foreign sales and component associated with the change in domestic sales:
 “pure” exporters and other firms

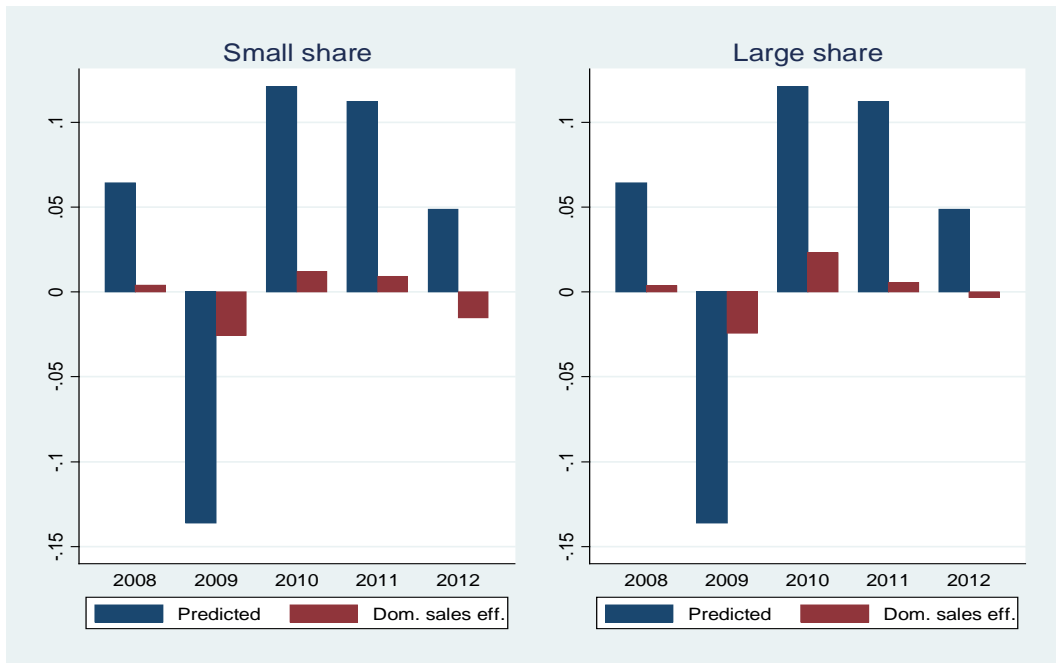
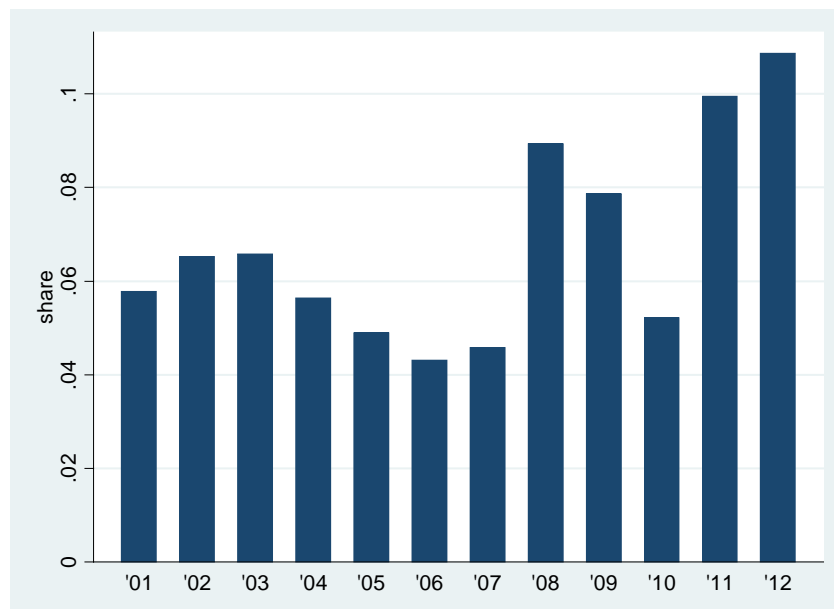


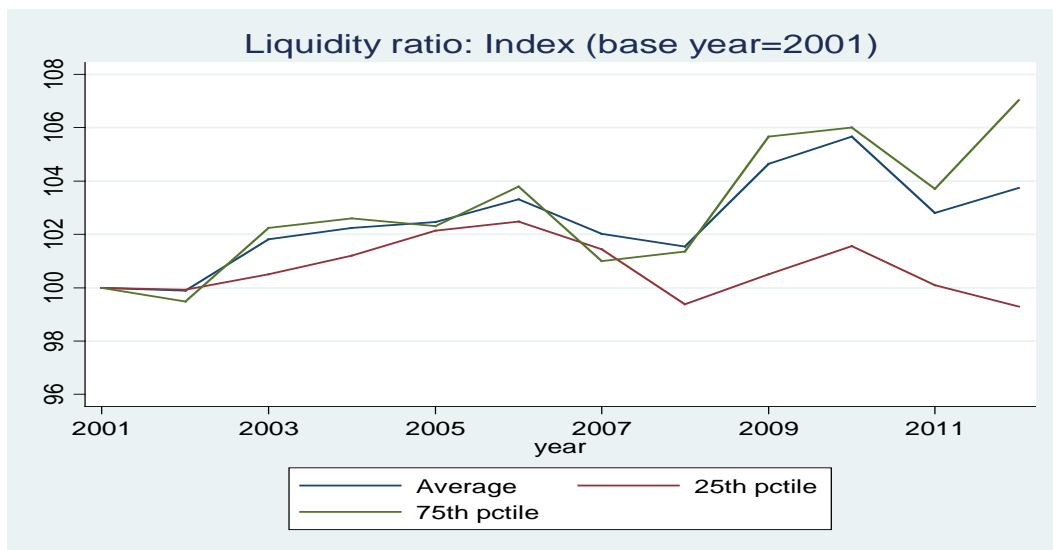
Fig. 5

Share of credit constrained firms, by year



Source and notes. Invind 2001-2012; manufacturing sector. Credit constrained firms are firms who state that they would like to receive more credit at current conditions and they approached to an intermediary and credit was denied. Shares calculated excluding missing values.

Fig. 6



Source: Invid-CADS data, 2001-2012. The current ratio is equal to the ratio between short-term assets and short-term debts.

Tab. 3

Correlation between domestic and foreign sales: the effect of liquidity constraints

VARIABLES	(1)	(2)
Export (t-1)	-0.1735*** (0.0121)	-0.1736*** (0.0121)
Change dom. sales	0.1111** (0.0553)	
Negative dom. change		0.1342 (0.1175)
Positive dom. change		0.0984 (0.0865)
Current ratio (t-1)	-0.0326** (0.0129)	-0.0413*** (0.0149)
Curr. ratio* change domestic	-0.0687* (0.0383)	
Negative dom. change*Curr. rat.		-0.1453* (0.0824)
Positive dom. change*Curr. rat.		-0.0298 (0.0605)
Time dummies	yes	yes
Observations	18584	18584
R-squared	0.31	0.31

Notes: OLS estimates Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

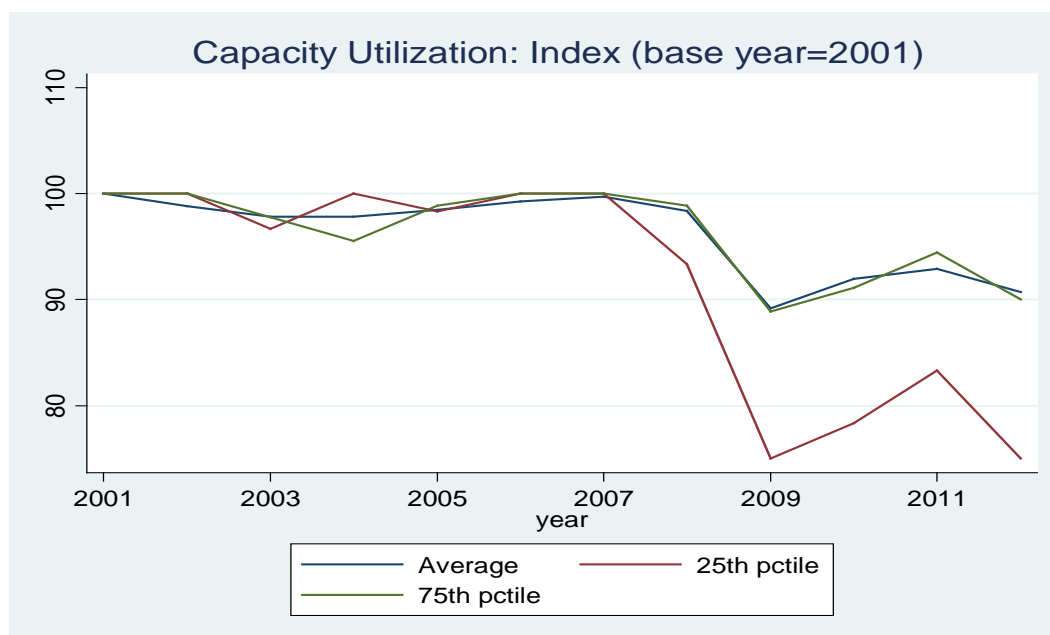
Tab. 4

Correlation between domestic and foreign sales: the effect of credit constraints

VARIABLES	(1)	(2)
Export (t-1)	-0.1765*** (0.0110)	-0.1768*** (0.0110)
Change dom. sales	-0.0028 (0.0188)	
Negative dom. change		-0.0836* (0.0429)
Positive dom. change		0.0366 (0.0283)
Cr. Rationed (t-1)	-0.0191 (0.0222)	0.0070 (0.0310)
Cr. Rationed* change domestic	0.0925 (0.0755)	
Negative dom. change*credit constr.		0.2608* (0.1396)
Positive dom. change*credit constr.		-0.0059 (0.1217)
Time dummies	yes	yes
Observations	21763	21763
R-squared	0.31	0.31

Notes: OLS estimates Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Fig. 7



Source and notes. Invind 2001-2012.

Tab. 5

Correlation between domestic and foreign sales: the effect of capacity constraints

VARIABLES	(1)	(2)
Export (t-1)	-0.1650*** (0.0126)	-0.1651*** (0.0126)
Change dom. sales	0.4187*** (0.1128)	
Negative dom. change		0.3870* (0.2165)
Positive dom. change		0.4327** (0.1714)
Capacity utiliz.	-0.0004 (0.0004)	-0.0004 (0.0005)
Change dom. sales *Capacity utiliz.	-0.0049*** (0.0014)	
Capacity utiliz.*Negative dom. change		-0.0053** (0.0027)
Capacity utiliz. *Positive dom. change		-0.0047** (0.0021)
Time dummies	yes	yes
Observations	15966	15966
R-squared	0.31	0.31

Notes: OLS estimates Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Tab. 6

Correlation between domestic and foreign sales: the joint effect of liquidity and capacity constraints

VARIABLES	(1)	(2)	(3)
Export (t-1)	-0.1802*** (0.0144)	-0.1802*** (0.0144)	-0.1808*** (0.0147)
Change dom. sales	0.5375*** (0.1422)		0.5400*** (0.1416)
Negative dom. change		0.6487** (0.2648)	
Positive dom. change		0.4737** (0.2176)	
Current ratio (t-1)	-0.0366*** (0.0137)	-0.0471*** (0.0160)	-0.0330** (0.0138)
Curr. ratio* change domestic	-0.0825* (0.0435)		-0.0866** (0.0435)
Negative dom. change*Curr. rat.		-0.1743* (0.0931)	
Positive dom. change*Curr. rat.		-0.0341 (0.0710)	
Capacity utiliz.	-0.0004 (0.0005)	-0.0005 (0.0006)	-0.0005 (0.0005)
Capacity utiliz.* change domestic	-0.0051*** (0.0015)		-0.0053*** (0.0015)
Negative dom. change* Capacity utiliz.		-0.0058** (0.0028)	
Positive dom. change* Capacity utiliz.		-0.0047** (0.0022)	
Time dummies	yes	yes	yes
Time*Sector dummies	no	no	yes
Observations	14086	14086	14086
R-squared	0.31	0.31	0.33

Notes: OLS estimates. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Tab. 7

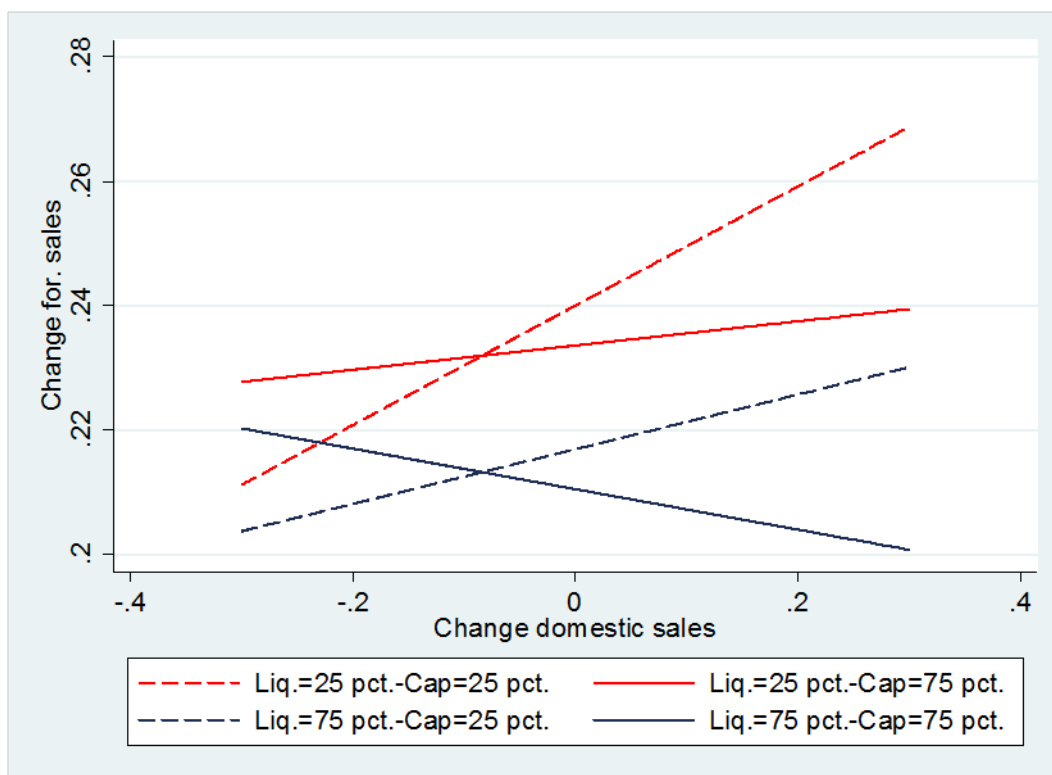
Correlation between domestic and foreign sales: the joint effect of credit and capacity constraints

VARIABLES	(1)	(2)	(3)
Export (t-1)	-0.1732*** (0.0136)	-0.1734*** (0.0136)	-0.1740*** (0.0139)
Change dom. sales	0.3718*** (0.1162)		0.3756*** (0.1160)
Negative dom. change		0.2567 (0.2239)	
Positive dom. change		0.4213** (0.1751)	
Cr. Rationed (t-1)	0.0027 (0.0238)	0.0496 (0.0314)	0.0017 (0.0239)
Cr. Rationed* change domestic	0.1130* (0.0665)		0.1090* (0.0663)
Negative dom. change*credit rat.		0.4121*** (0.1357)	
Positive dom. change*credit rat.		-0.0629 (0.1014)	
Capacity utiliz.	-0.0004 (0.0005)	-0.0003 (0.0005)	-0.0004 (0.0005)
Cap. Utiliz.* domestic change	-0.0045*** (0.0014)		-0.0048*** (0.0014)
Cap. Utiliz.* Negative dom. change		-0.0042 (0.0027)	
Cap. Utiliz.* Positive dom. change		-0.0046** (0.0022)	
Time dummies	yes	yes	yes
Time*Sector dummies	no	no	yes
Observations	15162	15162	15162
R-squared	0.32	0.32	0.33

Notes: OLS estimates. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Fig. 9

Substitutability between domestic and foreign sales for different types of firms



Notes: Based on values observed in 2012.