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evidence from matched bank-firm data

by Francesco Bripi, David Loschiavo and Davide Revelli

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SERVICES TRADE AND CREDIT FRICTIONS: EVIDENCE WITH MATCHED BANK-FIRM DATA

by Francesco Bripi¹, David Loschiavo² and Davide Revelli³

Abstract

This paper investigates the relationship between bank credit and exports of services by Italian firms. In order to identify the role of credit supply in services exports we use matched data on bank-firm relationships and the shocks affecting banks' funding during the sovereign debt crisis. The study suggests that credit supply shocks had a significant impact on services exports: a bank credit reduction of 1% led to a fall in exports of about 0.4%. These results hold even after controlling for alternative sources of firms' external finance, unobserved credit demand heterogeneity and a number of robustness checks.

JEL Classification: F10, F14, F36, G21, L80.

Keywords: trade in services, credit frictions, bank-firm relationships.

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1. Introduction¹

After the Great Recession, a large body of empirical literature has established that financial frictions have important effects on several firm outcomes, such as investments, employment and exports of goods (Amiti and Weinstein, 2016; Chodorow-Reich, 2014; Foley and Manova, 2015). However, we still have limited understanding of whether financial factors can also shape firms' ability to export services.

Thanks to technology improvements that have increased the international tradability of services, trade in services has been growing rapidly in the last twenty years. Since the nineties, it has grown by a factor of 5, while trade in goods have increased only by a factor of 3.5 (Lennon, 2009). Studying services trade, economists have focused mainly on the positive effects of the removal of policy barriers and the reallocation of jobs due to increasing international competition (Francois and Hoekman, 2010). Perhaps because of the dearth of data, the role of financial frictions on services trade has almost been neglected. This paper is aimed at shedding light on this issue, investigating empirically whether financial frictions hinder firms' exports of services.

We analyzed a subset of Italian exports of services, mainly business and personal services,² that were about 2% of GDP and 40% of all the services exported (average between 2010 and 2013); as a comparison, exports of goods were 23.9% of GDP in the same period (Bentivogli et al., 2016). We focus on a specific event, the sovereign debt crisis of 2011-12, in order to better isolate credit supply from demand factors. In 2012, exports of services increased by 5.8% in total (6.7% for business and personal services). Using firm level data we show that this growth was led by firms financed by banks with better funding conditions.

A clear prediction of the role of credit frictions for services exports is far from being obvious a priori. On the one hand, service provisions, different from manufactured goods, do not require capital intensive investments in machinery, thus lowering the demand of external funds in the form of long term debt. Moreover, services are non-storable, that is, the delivery is likely to be immediate (especially if they are traded over the internet); this implies the absence of shipment delays (as in the case of goods) that justify exporters' working capital needs during the transfer.³

¹ We thank participants to the CEPR-WTI Conference on Services Trade at EUI in Florence, the European Economic Association Annual Conference in Geneva, the LETC workshop on Empirical trade in Ljubana, the ETSG 2015 in Paris, the seminars at the Bank of Italy in Rome and in Milan and at the University of Verona (Italy). We are also very grateful to Veronica Rappoport, Daniel Paravisini, Andrea Ariu, Alberto Pozzolo, Sara Formai, Silvia Del Prete, Stefano Federico, Valeria Pellegrini and two anonymous referees for very useful comments. The views here expressed are those of the authors and do not necessarily reflect those of the Bank of Italy. All errors are our own. Contacting author: francesco.bripi@bancaditalia.it.

² In detail, these are: computer and information services; royalties and license fees; other business services; personal, cultural and recreational services; communication services.

³ For a discussion on shipment delays in services trade see Ariu (2016a).

On the other hand, similar to exports of manufactured goods, variable costs of exporting can be relevant: several business services tend to be less standardized to fit the specific needs of customers so that dedicated investments in product customization are required for each delivery (Jones et al., 2005; Markusen, 1989; Markusen et al., 2005; Eickelpasch and Vogel, 2011). Given the need to finance these costs, credit frictions might hinder a firm's capacity for exporting services. Fixed costs of entering a foreign market to sell services also implies that firms have to face initial upfront costs.⁴

Since both scenarios are possible, the link between financial frictions and firms' exports of services is essentially an empirical question. For this purpose, we focus our analysis on a specific event—the sovereign debt crisis between 2011 and 2012—in order to better disentangle credit supply from demand factors.⁵ Since during that period financial tensions derived from the sovereign debt market (and not by the imports of Italian services from the rest of the world), we consider this crisis as an exogenous event with respect to the services traded by Italian firms.⁶ The peak of the sovereign debt crisis was in November 2011, when the spread between the Italian 10 year T-bills and the corresponding German bills increased considerably, reaching values well above 500 basis points (see fig. 1). These strains were quickly transmitted to both the availability and the cost of funding—especially in the interbank market—for the Italian banks, leading to a tightening of their credit standards and to a reduction of the lending growth rate.⁷ Even though banks reduced aggregate lending in Italy (see fig. 2), credit supply by healthier banks increased during this period, whereas credit growth by less healthy banks began to shrink in the second half of 2012 (see fig. 2 and 3). We show that in 2011–12, the export services of firms that received more credit have grown faster; moreover, using an instrumental variable approach, we also show that supply shocks played a relevant role in the dynamic of credit granted to the firms.

We implemented our empirical exercise using very detailed datasets available at the Bank of Italy. We merge matched data on bank-firm relationships with survey data on export service flows (mainly business services) by Italian companies (see section 3 for details).

⁴ Considering services other than mode 3 in the GATS classification of trade in services (FDI), fixed costs include the expenses to learn the characteristics of destination country, those for advertising and networking in order to mitigate the high information asymmetries between producers and clients that are idiosyncratic to many services (Lennon, 2009; Zahler *et al.*, 2014).

⁵ We do not analyze the first part of the Financial Crisis because the detailed data on services trade are only available starting from 2009.

⁶ Note that in a robustness check we show that the results are substantially unchanged when we exclude the PIGS countries from the sample.

⁷ Del Giovane *et al.* (2013) show that the magnitude of the effects on both the cost and the availability of credit was stronger on average during the sovereign debt crisis than during the global financial crisis. Albertazzi *et al.* (2014) found that a 100 b.p. increase in the sovereign spread reduced annual lending growth to firms by around 0.7 percentage points.

In our empirical strategy, we ran cross section estimates of the growth rate of export services in 2012 on the change in the credit granted in the same period. We use instrumental variables of the growth rate of credit using the “retail” components of domestic bank funding (the ratio of deposits and bank bonds held by domestic households over bank assets). To understand the validity of our proposed instrument, consider that, during the phase when sovereign debt tensions emerged, Italian banks faced a relevant decline in fund-raising from non-residents and in wholesale funding as a result of the market perception of increased country risk. Faced with such a general reduction of wholesale funding, the ability for banks to access retail funding marked a difference for lending practices across banks: in 2012 the aggregate growth in lending to firms was positive, albeit decreasing, for banks relying more intensively on this source of funding, whilst it reduced for the other banks (see fig. 2 and 3). In addition to showing the aggregate data, we also test the validity of our instrument using matched bank-firm credit data, to show that this credit change was higher for firms financed more intensively by banks with a greater relevance of retail funding (for more details see Section 5).

Our analysis suggests that credit frictions had a significant impact on services exports of Italian firms during the period considered. A bank credit reduction of 1% induced a fall in exports flows by 0.40%.⁸ The results hold after the inclusion of various firm controls and a number of robustness checks. Note that the focus of the paper is on the intensive margin of services exports, because the analysis of the extensive margin (i.e. the number of firms starting to export or exiting from the foreign market), is not feasible: indeed, a relevant share of the firms in the export services dataset are surveyed. Nevertheless, as long as we limit our attention to credit supply shocks taking place in a limited period, it is plausible that in face of sudden shocks, firms will reduce the volume of exports, rather than exiting the exports markets altogether. Our results are in line with those of Paravisini et al. (2015) who, using Peruvian data, find that the credit shock during the financial crisis affected the intensive margin of exports of that country.

Overall, this is the first paper that provides evidence on the importance of credit and financing for export of services activities. We are aware that the evidence provided is limited to a crisis event and that the link between the two phenomena needs further investigation. Nevertheless, while many papers have focused on the role of financial frictions on exports of goods, our results have relevant implications for various economic effects of international trade linkages given the increasing role of trade services in the global value chains.

The paper is structured as follows. In section 2, we briefly review the literature related to trade services and to trade and finance. The datasets used and the sample definition are described in

⁸ This result is line with previous evidence on Italian exports of goods: for more details see Section 6.3.

section 3. In section 4, we shortly discuss the sovereign crisis, while the empirical methodology is outlined in section 5. The main results are presented in section 6 and the robustness checks are in section 7. Section 8 concludes the paper. An appendix gives a short description of the survey, discusses sample restrictions and reports some additional robustness checks.

2. Related literature

The literature on the international trade in services has been growing remarkably in the last few years. In the last decade, a small but rapidly growing number of papers have analyzed firm-level data on exporters and importers of services: Breinlich and Criscuolo (2011) in the UK, Kelle et al. (2013) in Germany, Ariu (2016a) and Ariu (2016b) in Belgium, Federico and Tosti in Italy (2012), just to name a few. Most of these works highlight the relevant heterogeneity among firms exporting services and confirm the view, consolidated in the international trade in goods literature, that exporting firms are more productive and bigger in size.

Despite the growing interest for firms' exports of services, the literature on trade services and finance is still very scant and, to our knowledge, only few papers have considered this topic so far. Biewen et al. (2012) show that the level of financial development of the exporting countries did not have a significant effect on services imports by German multinational firms during the years 2002–2008. Borchert and Mattoo (2012) suggest that the crisis resilience of trade services (relative to the collapse of trade in goods) in 2008–2009 was due to the lower dependence on external financing of services with respect to the production of goods. To support their idea, they provide anecdotal evidence of Indian firms. Using balance data sheets, Ariu (2016a) shows that service exports of Belgian firms have been quite resilient to the financial crisis and that services exports were not affected by external finance dependence, nor by long term financial debt. We obtained different results from Ariu (2016a) regarding the effect of credit export services, but note that we analyzed a different country, and the sovereign crisis which, differently from that of 2008-2009, did not affect world trade services.

Apart from these contributions, our work explores the topic using very detailed data on the financial exposure of firms, that is to say the outstanding credit by banks to Italian firms exporting services. We match these data with information from the banks' balance sheets, such as total assets, the various sources of banks funding, the level of capitalization, etc. In this way, we exploit the heterogeneity not only across firms, but also across banks in order to detect the different behavior of lenders depending on their idiosyncratic shocks.

With regard to the papers using Italian firm level data for service exports, Conti et al. (2010) focuses on exporters in some service sectors, where firms are selected as service producers according to their primary sector code;⁹ however, this is a restricted sample given that services are exported also by firms with a different prevailing business activity (manufacturing, utilities, etc.).¹⁰ More recently, Federico and Tosti (2012) used a dataset of actual trade service transactions carried out by Italian firms in 2009. They found that exports and imports of services are highly concentrated in a few firms and that many of them are manufacturing producers. They also show that the intensive margin is negatively correlated to the distance from the country of destination. Alternately, we focus on a later period (2011 and 2012) to investigate the possible effects of the credit supply shocks.

This work is also related to the recent literature on international trade in goods and finance. In this field, many papers have used sector-level measures of “external finance dependence” first introduced by Rajan and Zingales (1998); for example, Manova (2008), Chor and Manova (2012), Iacovone and Zavacka (2009). Other works have applied the approach using firm level data (see for example: Behrens et al., 2013; Alborno et al., 2012; Feenstra et al., 2014). Among this last group, our paper is closely related to Muûls (2015) who shows that manufacturing exports (and imports) are affected by firm credit scores, where this last variable is a proxy of credit constraints. Similarly to Muûls (2015), we consider the role of firm credit ratings, where the score is assigned by an independent body using the balance sheet data of the firm; however, different from her study, we also rely on a more direct measure of credit supply shocks (the overall outstanding credit given by banks).

Finally, as it will be explained in detail in section 4, our empirical methodology follows mainly the trade and finance literature using bank firm data, which has greatly expanded since the first work in the aftermath of the financial crisis (Ahn et al., 2011). We also took from the wide literature on bank-firm’s relationships during the sovereign debt crisis and on multiple lending (Bolton et. al., 2013). Our work is closer to Paravisini et al. (2015), who estimate the effect of the credit crunch on goods exports of Peruvian firms using a specific event shock. The estimates also use a “within firm” estimation methodology, following Khwaja and Mian (2008); this last approach has been also exploited, among others, by Del Prete and Federico (2014) to estimate the impact of trade finance on the overall (goods and services) exports of Italian firms. Our work is also very close to Buono and Formai (2016), who analyzed the link between credit supply changes following

⁹ They consider the NACE Rev. 1 sections G, I and K for the year 2003.

¹⁰ In fact, as it will be showed below, manufacturing firms are about 50% of the sample.

M&A episodes involving Italian banks and goods exports, for the correction of omitted variable bias through an ancillary regression method (Section 6).

3. Data

The paper uses four main sources of data. The Direct Reporting database (henceforth DR) of the Bank of Italy contains sample data on services exports per firm, year, type of service and country of destination. The DR data are from the TTN (Non-financial Quarterly Transactions, *Transazioni Trimestrali Non finanziarie* in Italian) survey on services trade – excluding travel and tourism – which is carried out every quarter on a representative sample of Italian firms. A short description of the survey is in the Appendix (section A.1).

The services analyzed in the TTN survey are business services (that is, services provided to firms) and personal services. In particular: Communications services, Computer and Information services, Royalties and Licenses fees, Other business services and personal, cultural and recreational services (see table A.1 for details).¹¹ Since services trade transactions are reported quarterly, we collapse data to one-year period to avoid estimation bias due to seasonality and serial correlation of exports.

Forasmuch as Italian firms – differently from US companies – are strongly reliant on bank credit (Langfield and Pagano, 2016), we focus on the shocks to the banking system capturing most of their external financing. Credit data on bank-firm relationships are from the Italian Credit Register (henceforth CR) of the Bank of Italy. The CR database collects data on borrowers with exposure above 30,000 euros towards a single intermediary.¹² In our main regressions we consider the overall exposure including three types of outstanding debt: loans backed by account receivables, term loans, revolving credit lines. Guarantees granted to firms are included in a robustness check.

Our third source is from the Supervisory Reports reported by banks to the Bank of Italy on a quarterly basis. These contain balance-sheet data of all banks operating in Italy, including banks that are not listed on the stock market. From these data we select various bank variables (yearly averages) to instrument credit supply, as it will be explained in detail below. It is worth noting that we use banks consolidated data, to exclude interbank transactions made by banks belonging to the same group.

¹¹ We exclude taxes and government, financial, insurance and construction services.

¹² The threshold is computed on the overall outstanding exposure (including debt and guarantees) of a firm with respect to a given intermediary operating in Italy (banks, other financial intermediaries providing credit, special purpose vehicles).

The fourth data source is the Company Accounts Data Service (henceforth CADS – *Centrale dei Bilanci*), managed by an independent agency (Cerved Group). CADS is one of the largest datasets with detailed balance-sheet data for a large sample of non-financial incorporated firms in Italy. For our analysis we consider, among others, an overall measure of the ex-ante risk of firms' default (Altman's *Z-score*). This variable is computed annually by Cerved Group on every incorporated firm of the database using balance sheet information (Altman *et al.*, 1994).

We apply various restrictions to our data (see Appendix A.2 for details). After various selections we have a dataset of about 9,000 observations. Among others, note that we have excluded exports towards tax haven countries. Moreover, since our identification strategy (see section 5) relies on the heterogeneous reaction of banks in their lending decisions as a response to financial shocks, as in Khwaja and Mian (2008) and Jiménez *et al.* (2010), we restrict the sample to firms that obtain loans from at least two banks. Multiple banking is quite common in Italy; for example, analyzing a long period before the Financial crisis, Buono and Formai (2016) find that each firm borrowed from 4 banks on average; multiple banking is common even among small firms and during the last years of crisis (Gobbi and Sette, 2015).

All variables definitions are described in table A.2 in the Appendix. Table A.3 reports the summary statistics of the main variables used in the empirical analyses.

4. The sovereign debt crisis

In the summer of 2011, after the announcement of the involvement of private-sector investors in the restructuring of the Greek public debt, the attention of the media and of the financial markets spread from Greek and Portuguese to Italian and Spanish government securities. These countries fell into a negative feedback loop between sovereign difficulties and bank funding. While in some countries, such as Ireland and Spain, the main fragility factors were in the domestic banking sector, the Italian case is interesting for our purposes, because initially the instability originated from the sovereign debt and only after it affected domestic banks, not vice-versa (Angelini *et al.*, 2014). The tensions of Italian sovereign debt increased sharply in the second part of 2011, and in November, the spread between the Italian 10 year T-bills and the corresponding German bills soared reaching values above 500 basis points (see fig. 1).

During 2011, Italian banks faced a relevant fall in deposits of foreign residents because of the market perception of increased country risk; also, the interbank funding channel from domestic banks was altered. Over that year, wholesale funding as a share of total funding of Italian banks declined by 4.8 percentage points (Bank of Italy, 2012). Facing this sharp reduction of funding,

combined with a weak business cycle, Italian banks reacted by reducing the overall lending, and from the start of 2012, the rate of growth of credit to the non-financial private sector turned negative (see fig. 1, but also Del Giovane et al., 2013 and Albertazzi et al., 2014). In contrast, the lending supply of banks with a greater access to retail funding was better insulated from the significant fluctuations in market conditions (see fig. 2).

The malfunctioning of the wholesale funds markets over several European area countries induced the European Central Bank (ECB) to implement non-conventional monetary policy measures and, in particular starting from December 2011, the Long Term Refinancing Operations (LTRO's) aimed at increasing banks liquidity.¹³ The ECB interventions were effective: sovereign spreads dropped and the wholesale markets revived; the overall decrease of banks' lending was milder than if the ECB's non-conventional measures had not been adopted (see fig. 3 from Casiraghi et al., 2013 and Albertazzi et al., 2014).

These offsetting effects induced by the non-conventional monetary policy measures do not allow us to consider wholesale funding as an appropriate instrument of credit supply. Conversely, the retail components, deposits and bank bonds held by resident households, have been quite stable sources of funding for banks operating in Italy during the period considered, and in 2012 the growth in lending to firms was positive for banks with lower funding gaps (Bank of Italy, 2012).

5. Empirical methodology

We aim to test whether the change of bank credit granted¹⁴ to services exporting firms affects the growth of services exported. Since credit is the outcome of demand and supply, we need to disentangle credit supply determinants resorting to shocks to banks funding from changes in the demand for credit by firms. Our identification strategy, which follows strictly the methodology of Paravisini *et al.* (2015), moves along two separate steps.

Before moving into that, we briefly outline our choice of the timing window. Note that the tensions in the sovereign markets started in the summer of 2011, but the pattern of credit growth changed remarkably only from the first quarter of 2012, when lending by banks with retail funding above the threshold increased, while the decline of the other banks continued (see figure 2). Then, we set the timing of our empirical exercise splitting the periods into *pre* and *post* crisis at the end of

¹³ Between December 2011 and February 2012 the Eurosystem conducted two three-year longer-term refinancing operations (LTROs) and widened the range of assets eligible as collateral. See Bank of Italy, Economic Bulletin, April 2012.

¹⁴ Rather than the amount of credit actually *used* by firms, we consider the credit *granted* to them which is commonly acknowledged as a better proxy of credit supply. See for instance Jiménez *et al.* (2012).

2011. Nevertheless, we also consider in robustness check the case in which banks' lending policies might have changed soon after the summer of 2011 (see section 6.6).

1. *within – firm estimation.* We first show the validity of the selected instrument using matched bank-firm data. Recall that our identification assumption is that banks with a lower fraction of retail funding in year $t-1$ (2011) have reduced the supply of credit in the following year t (2012) relatively more than other banks. Following Khwaja and Mian (2008), we test the identification assumption using the *within-firm* estimation procedure,¹⁵ which compares the change in the amount of lending by banks with different dependence on retail funding to the same firm, before and after the sovereign debt shock. In practice, this means estimating the following equation:

$$\Delta \log(CR_{i,b,2012}) = \delta_0 \text{retail_funding}_{b,2011} + \delta_i + u_{i,b,2012} \quad (1)$$

The dependent variable is the change in the log of the total amount of outstanding debt of firm i with bank b ($\log(CR_{i,b,2012})$) in 2012. Our explanatory variable (*retail_funding*) is the log of the ratio of bank's deposits and bonds (held by domestic households) and bank assets lagged one year (in 2011). We also include fixed effects (δ_i) to control for unobserved changes at firm level.¹⁶

Note that equation (1) states our identification assumption. That is, credit supply of banks with a greater access to retail funding was better insulated – during the Sovereign crisis – from the significant fluctuations in market conditions, and also from the changes in monetary policy¹⁷. To understand the validity of this assumption, note that banks with a large and stable pool of retail deposit funding are less vulnerable to changes in market rates (since most of their funding is non-market based; Berlin and Mester, 1999). Along this line of thought, the bank lending channel literature (Gambacorta and Marques-Ibanez, 2011; Albertazzi et al. 2016) has recently highlighted the role of bank funding composition in influencing lending supply during periods of financial stress; in particular, when short-term maturity sources of financing (such as wholesale) tend to dry up faster than the medium-longer term sources (such as retail deposits and equity).

Indeed, in 2011, with sovereign yields rapidly rising, wholesale funding (both domestic and foreign) decreased sharply. These funding shocks were transmitted to the supply of credit, even though only to some extent because the drain in funds was partially offset by central bank

¹⁵ This procedure has been used also by Iyer *et al.* (2014), Jiménez *et al.* (2010) and Jiménez *et al.* (2012).

¹⁶ We cluster the standard errors at the bank level in order to allow for correlations in error terms across observations related to the same bank.

¹⁷ In fact, banks that are less dependent on wholesale financing tend to adjust their interest rates and lending supply more slowly, as they are relatively less sensitive to changes in market rates; thereby leading to a relatively slower speed of the pass-through of monetary policy (Kok Sørensen, K. and T. Werner, 2006).

refinancing.¹⁸ For example, using banks responses to the euro-area Bank Lending Survey in Italy, Del Giovane *et al.* (2013) show that at the peak of the sovereign debt crisis (the last quarter of 2011) the supply of credit has been mostly dependent from the banks' funding difficulties. Differently, banks with the higher share of retail funding have provided more credit than the banks relying relatively more on other sources.¹⁹ We exploit the heterogeneity across banks with respect to this variable in order to identify credit supply. Indeed, the coefficient of variation (the standard deviation divided by the mean) of the ratio of retail funding over assets was 39.8% in 2011, reaching almost the levels of the Financial Crisis of 2009 (45.7%); this is confirmed by the visual analysis of fig. 4 where the dispersion, given by the span between the maximum and the minimum, of retail funding increased in 2011 reaching levels above those of 2009, whilst the dispersion of wholesale funding was much narrower.

Another way to ensure the validity of our instrument, is to address the orthogonality condition of the instrument across firms. In other terms, one may be worried that the funding shock affected banks' credit supply only for a particular subset of firms in the sample, so that our instrument might only identify the local average treatment effect (LATE). If the instrument is random regarding the potential outcomes, there should not be relevant differences in the firms' characteristics (at their mean values) across the subgroups of firms defined by quartile values of the instrument. Table 1 shows this, corroborating further the validity of our instrument.

2. *firm level estimation.* After estimating equation (1), in the second step we implement IV estimation. In practice, we aggregate the data at firm level and estimate the relationship between credit supply and exports using the following reduced form equation:

$$\Delta \log(X_{i,s,c,2012}) = \beta \Delta \log(CR_{i,2012}) + \gamma_s + \gamma_c + \varepsilon_{i,s,c,2012} \quad (2)$$

where $\Delta \log(X_{i,s,c})$ is the one year change (between 2011 and 2012) of the log of services exports by firm i of service s to destination country c . Note that we limit our attention to the intensive margin, because the survey data on services exports from DR do not allow us to analyze the extensive margin.

¹⁸ Carpinelli and Crosignani (2015) compute that wholesale funding went down by 5 percentage points, to 28% of overall funding, in just 6 months, from June to December 2011. At the end of 2011 funding from the Eurosystem represented 9% of total funds.

¹⁹ In a theoretical paper, Agur (2013) shows that wholesale funding raises the impact of capital requirements on credit rationing compared to retail funding. Ratnovski and Huang (2009) find that the high reliance on depository funding (vs. wholesale funding) was a source of resilience of Canadian banks during the financial crisis. Dagher and Kazimov (2015) show that during the financial crisis banks that were more reliant on wholesale funding curtailed their credit significantly more than retail-funded banks.

Equation (2) is composed of two parts. The first part is given by the one year change of *total credit* granted $\Delta \log(CR_i)$ by all banks' lending to firm i in the same period. Credit growth is instrumented to capture the dynamics of credit supply. Note that in estimating equation (2) with IV's, our instrumental variable (*retail_funding*) is now at firm level. This means that we have aggregated the variable, summing the variable across banks. As it is standard in this kind of exercises (see for example Amiti and Weinstein, 2016), the instrumental variable at firm level is a weighted measure sum of retail funding, where the weight is given by the following:

$$\omega_i = \frac{CR_{i,b,2011}}{\sum_{i=1}^n CR_{i,b,2011}} \quad (3)$$

Equation (3) shows that ω_i is the fraction of lending to firm i by bank b in 2011 ($CR_{i,b,2011}$) over the sum of credit granted by all banks (n) to the firm in the same year.

In the second part of equation (2) we include a set of service and country (γ_s and γ_c) dummies that account for any features of service s (technology differences that affect tradability, regulatory standards, etc.) or for local shocks in the importing country c (such as demand shocks, regulatory barriers, etc.). In this way, following Paravisini *et al.* (2015), we also address the issue of the potential bias on our estimated coefficients that may rise because of the non-random matching between banks and firms. In fact, the risk in using matched bank-firm data in this framework is that some banks might be specialized in lending to firms exporting a specific type of services s or to a particular country c .

6. Results

6.1 Preliminary analysis of data

In this part we document the heterogeneity of banks over the retail funding variable before the sovereign debt shock. Table 2 shows descriptive statistics for the 72 bank groups in our sample. The average amount of banks' assets in the sample is 4 billion of euros. Banks with a value of the ratio between retail funding over assets below median are usually bigger in size (the average value of assets is about 9 billion of euros) than banks above the median value (3.3 billion of assets). In 2012 credit growth to the firms in the dataset was 5.7%, and interestingly it derived only from banks with retail funding above the median (10.2%), while the change was null for banks in the other category.

6.2 *Within-firm estimation*

In this subsection we show the validity of our proposed instrument of credit supply through a *within-firm* estimation of matched bank-firm credit data as in equation (1). Following Khwaja and Mian (2008), this means estimating the growth rate of total credit growth on our proposed instrumental variable (*retail_funding*) and firm fixed effects. The results (column 1 of table 3) show that the estimated coefficient of the IV variable is, as expected, positive and significant.

Moreover, since the banking literature suggests the relevance of other determinants of credit supply, we test the effects of these variables as regressors additional to *retail_funding*. We first explore the role of an additional instrumental variable (*Gov_bonds*) on credit change, given by the ratio between bank holdings of Italian Government securities and bank assets. This variable has been used by Bottero *et al.* (2015) to show that credit supply tightening was more intense for Italian banks that were more exposed to government sovereign securities during the Sovereign debt crisis.²⁰ We find that credit growth is lower for firms financed by banks having higher exposure towards sovereign securities (column 2). We also test the validity of another plausible instrumental variable: *Lowcap* is a dummy variable equal to 1 for banks that were low capitalized, that is with a Total Capital Ratio (TCR) lower than 10%.²¹ We find a significant effect with the expected negative sign, that is credit supply growth is lower for firms financed by banks with a Total Capital Ratio lower than 10 (column 3).

A recent contribution by Bofondi *et al.* (2013) suggests that foreign banks benefited from lower exposure to the adverse effects of the Italian sovereign debt crisis: in column 4 we find that the estimated parameter of foreign banks dummy (*Foreign_Bank*) is positive as expected.

Finally, we also repeat the previous exercise using *Mainbank* (a dummy equal to 1 when the bank is the main bank lending to firm *i* and 0 otherwise), as in Del Prete and Federico (2014): the effect is negative suggesting that in that period on average main banks reduced credit supply to their borrowers (column 5).

²⁰ Specifically, Bottero *et al.* (2015) focus on the period before the bailout request by Greece (2009:Q2 to 2010:Q1) and on the four quarters after it (2010:Q2 to 2011:Q1), while we use a later period. This might raise concerns about the endogeneity of this additional instrument, where credit adjustments may have exerted a feedback effect on the composition of sovereign bonds in the banks portfolios. However, note that the spread between the Italian 10 years T-bills and the corresponding German bills in the first quarter of 2011 was only 80 basis points higher than the corresponding period in 2010, while it increased of additional 224 b.p.s. one year later. Nevertheless see our placebo estimates in section 7.

²¹ Following Albertazzi and Marchetti (2010), we choose the dummy specification (instead of a continuous variable) to capture possible non-linearities; in fact, capital requirements might affect credit supply especially when the bank ratio is closer to the threshold. Then, we set the threshold at a higher value than the official Basel II regulatory threshold (8%), because this is the value that was actually perceived by the market as the relevant benchmark (Albertazzi and Marchetti, 2010).

Note that in all the specifications analyzed so far the parameter of *retail_funding* remains positive and significant as in column 1.²²

6.3 Firm level estimation (baseline)

In this subsection we move to estimate the aggregate effect of credit supply at firm level as in Jiménez *et al.* (2010). This means that we estimate the effects of a shock in credit supply on firms' services exports using a weighted measure of retail funding as instrumental variable as described in section 5 by equation (2). In column 1 of table 4 (Panel A) we report the results of an OLS regression of services exports growth on credit changes without any firm control. The estimated effect is positive (0.2%) and significant at 1% confidence level. When the change of credit is instrumented, as in column 2, the effect is also significant at 1% and positive (0.43%). It follows that the IV estimate of the export elasticity to credit is 2.1 times larger than the OLS estimate. This attenuation bias helps us to get an idea of the relative importance of demand (in addition to supply determinants) of credit in shaping this result and it is consistent with the idea that firms with higher export growth have more internal funds at their disposal and, consequently, they demand less bank credit (on this point see also Buono and Formai, 2016).

To control for potentially confounding firms' characteristics, we add some firm-specific regressors suggested by the wide literature on international trade and firm heterogeneity.²³ A first set of controls consists of the log of employment (*Employees*) to take firm size into account and the log of firm's EBIT over assets to capture total profitability (*Profitability*). When we add both these variables (column 3), the instrumented measure of credit supply has still a significant impact on the dependent variable.

Another relevant control is the credit score variable (*Z-score*) which is a categorical variable that measures the probability of default and is used as a proxy of the firm's credit worthiness.²⁴ The sign of the *Z-score* parameter is negative (column 4), meaning that firms with a higher probability of default are less likely to export services, but it is not significant. Since the *Z-score* is known both to the borrower and to any lender, this variable might capture credit supply as well as demand effects. While we do not deny this ambivalence, for our purposes we note that its inclusion does not change the statistical significance and, to a lesser extent, the magnitude of the instrumented credit

²² Finally, in the following columns we repeat the previous tests by adding combinations of these determinants of bank lending, and the previous results are confirmed.

²³ All controls are lagged one period.

²⁴ The *Z-score* takes integer values from 1 to 9, with higher values representing higher probability of default of the firm.

supply change ($\Delta Credit$), thus confirming the role of bank funding on their lending practices and ultimately on services exports.

In the successive columns we insert controls that capture firm financial characteristics that can also challenge our candidate variable to explain services exports.²⁵ With any of these controls, the sign (positive, as expected) and the statistical significance of the coefficient of the effect of credit supply on services export does not change substantially, whilst its magnitude mildly varies, in a range between 0.43 and 0.32: this latest value is obtained once we include *Trade_Cred* in column 8. In the horse race estimates the coefficient of interest is 0.4 and it is significant at 1% (column 11). This last estimate of the baseline specification implies that a 1% reduction in the stock of credit resulted in a decline of 0.4% in export flows of services. This result is in line with previous evidence using total exports (including both goods and services) of Italian firms. Minetti and Zhu (2011) find that credit rationing reduced foreign sales of medium and big size manufactures by 38% in the year 2000. Using a dataset comprising manufacturing and services companies for a long period (1997-2011), Buono and Formai (2016) obtain, an elasticity of exports to credit supply shocks of 0.56.

To give a sense of the economic magnitudes, we calculate the change in export growth in response to a one standard deviation increase in the instrumented variable (as from column 11): increasing the growth of credit supply by one standard deviation would increase the exports growth by around 17% of a standard deviation. Furthermore, the signs of control variables' coefficients, although not always statistically significant, are in line with what one should expect on the basis of previous evidence on trade and finance.²⁶

In order to assess the validity of the IV, we report the first stage regression results in Panel B of the same table. The estimates show a significantly strong relation between our instrument and the change of credit. Firms more intensively financed by banks with a higher share of retail funding received more credit: for example 1% increase of the instrumental variable compared to the average value, would experience a growth in credit of about 1.8% (column 11). Finally, we check that the

²⁵ A dummy for highly leveraged firms (*Distressed*) in column 5. *Capital intensity* (given by the log of the ratio between fixed assets and employees) in column 6; the ratio of intangibles over the sum of tangible and intangible assets (*Intangibles*) in column 7; a general measure of firm external financial dependence (*Ext. Fin*) in column 9. Finally, to capture substitutes of bank financing we add a measure of trade credit over total firm debt (*Trade_cred*) in column 8 and a measure of the firm's reliance on external financial resources from foreign sources relatively to its overall debt (*For_Debt*) in column 10. See table A.2 for variables definition.

²⁶ Many of the coefficients of all these variables are not significant when included in the horse race estimate in column 11. For instance, firms exports are reduced if they have a higher share of intangibles (but not significantly), as these assets are less valuable as collateral that can be used in borrowing (Almeida and Campello, 2007). On the other hand, higher levels of trade credit contribute (statistically significantly) to exports growth. The coefficient on the variable for distressed firms is positive and significant, meaning that firms with a higher leverage increase exports in services.

instrumental variable does not suffer of the problem of weak instruments: in all specifications the F tests of excluded instruments in the first stage are well above the value of 10, the threshold recommended by Staiger and Stock (1997).

6.4 *Other endogeneity issues*

In this subsection we run four types of robustness checks of the identification strategy: *i*) the correction for non-random matching between banks and firms; *ii*) the definition of the instrumental variable; *iii*) the shocks to other sources of banking on credit supply; *iv*) omitted variable bias.

The first concern deals with the correction for possible non-random matching between banks and firms. Recall that our correction consisted of adding fixed effects to isolate demand effects of particular services *or* of particular countries. Paravisini *et al.* (2015) consider the more binding case where banks might be specialized in lending to firms that export particular services *and* to particular destinations. In practice, this means using joint service-country dummies, rather than separate service and destination dummies. The results in Table 5 (columns 1 and 2) show that the estimated coefficients have a slightly lower magnitude than those of the baseline specification and they are still significant. A similar concern deals with the possibility that banks might be specialized in lending to firms located in an area where there are many producers or exporters of some given services. To deal with this second possibility of non-random matching we add joint service-geographic area dummies to the baseline specification. The results in Table 5 (columns 3 and 4) show that the estimated coefficients are positive and significant at 1% and that their magnitude is slightly greater than in the baseline specification. Results are qualitatively unaffected even when we repeat the previous exercise adding both types of interacted dummies (see columns 5 and 6).

A second issue regards the definition of the instrument. Defining retail funding over assets implies assuming that bank assets have been quite stable over the period. However, the available evidence shows that these have been affected in a relevant measure by the Sovereign crisis (for example, by the decrease of government bonds prices). Therefore, in Table 5 (columns 7 and 8) the instrument is defined as share of domestic retail funding on *total* funding. This alternative definition also avoids any concern about potential endogeneity between bank total assets and credit granted. In this case the estimated coefficients of the elasticity of credit supply are statistically significant and positive, as expected.²⁷

²⁷ In the richest specification (column 9) the magnitude is smaller (about 0.30%) than the analogous of the baseline specification (in Table 4).

A third issue arises because the bank funding shock might not be the only cause that implied aggregate credit decline since the end of 2011 and during the following year. In fact, the available evidence suggests that, differently from the Financial crisis, the sovereign debt crisis exerted its effects on banks' balance sheet in various dimensions (Angelini *et al.*, 2014). While the instrument considered so far is related to liabilities, also banks assets were severely affected, as we just stated in the previous paragraph. To address this issue we repeat the previous baseline regressions with an additional instrumental variable, the ratio between bank holdings of Italian Government securities and bank assets (*Gov_bonds*). We perform a two-step efficient generalized method of moments (GMM) estimator, which is more efficient than the traditional IV/2SLS estimator for an over-identified system of equations. The estimates in Table 6 (columns 1 to 3) show that our results are robust to such a change. In detail, the magnitude of the estimated coefficient of credit supply varies from about 0.36 to 0.45 and it is positive and significant in all of the estimates. Moreover, also the first stage statistics are in line with our predictions: the estimated coefficients of *Retail_funding* and of *Gov_bonds* are both significant and have the expected signs.²⁸ The instruments adopted are robust to the tests of weak instruments: the first stage F-statistics of the richest specification is 141.3, much above the critical values given by the Stock-Yogo weak identification test for single endogenous regressor and two instruments (19.93 using the 10% maximal IV size tolerance). The test of over identifying restrictions provided by the Hansen J statistic fails to reject the null hypothesis, thus confirming the validity of the proposed instruments.

We also test other variables suggested by the banking literature that, as already explained in subsection 6.2, may explain the pattern of credit supply and therefore may be plausible additional instruments. First we consider bank capitalization, where low capitalized banks might reduce credit supply (columns 4 to 6) and the validity of our results is also confirmed in this case.²⁹ In columns 7 to 9 we add a dummy for foreign banks (*For_dum*) given the relevance in explaining credit supply during the sovereign debt crisis (Bofondi *et al.*, 2013): the coefficients of credit supply growth credit are positive as expected and significant at 1% and the magnitude is very similar to that of baseline model (0.40), but the coefficient of *Foreign Bank* in the richest specification of the first stage statistics is not significant. Finally, we have considered, in columns 10 to 12, a dummy for the main bank (*Mainbank*): the estimates confirm our results.³⁰

²⁸ The negative sign for the *Gov_bonds* variable means that credit is lower in firms financed prominently by banks that are more exposed to the sovereign securities. This finding is in line with the work of Bottero *et al.* (2015).

²⁹ With the exception of the most parsimonious specification in column 4 where the J test of overidentification rejects the null of no overidentification.

³⁰ In unreported estimates we test the validity of all the instrumental variables, but the results show that the J test in the most parsimonious specification (without additional controls) rejects the null.

Finally, endogeneity might plague our estimates because of omitted variables bias, when the determinants of credit demand might not be fully specified in the first stage. To address this concern, we follow an approach used by Buono and Formai (2016), where we run an ancillary *within-firm* regression of credit growth on the proposed instrument and on firm dummies as in equation (1). Hence, we collect the estimated firm fixed effects to build a proxy for the unobserved shocks of credit growth (*Firm dummy*). Then, we add this variable as a control of unobserved firm characteristics that may affect credit change in the IV regressions at the firm level. The main results of the baseline model are substantially confirmed (Table 7).

7. Robustness checks

In this section we report a series of further robustness checks, regarding mainly the definition of the credit variable, the main activity of the firm and the role of geography variables.

Definition of credit – As a first robustness check, we add guarantees to the definition of credit used insofar (that is, loans backed by account receivables, term loans, revolving credit lines, see Section 3). The estimates including guarantees are in columns 1 to 3 of Table 8. The estimated coefficients of the credit growth are positive and significant at 1% in all specifications and the magnitude in the richest specification (column 3) is similar to that of the baseline: indeed, increasing the growth of credit supply by one standard deviation would increase the export growth by around 18% of a standard deviation.

A second issue regards the inclusion of bad debts in the credit change variable. Bad debts are the loans that a bank declares impossible to recover from a debtor.³¹ According the rulings of the Credit Register, when a lender declares that a loan is bad, the total amount of credit granted by the lender to borrower i becomes null. Since the changes implied by this rule might impair the actual effect of credit supply, we repeat the baseline estimates by adding bad loans to the total amount of credit granted. The estimates in Table 8 (columns 4 to 6) show that the inclusion of bad loans does not significantly change the results.

Main activity of the firm – We also check whether our results may be driven by the relevant presence of non-services producing firms (manufacturers, construction companies, etc...), which are more than 50% of the sample, even though with low intensity of services exports (see Table A.4). This feature is common to other similar countries: for example, Kelle and Kleinert (2010) find

³¹ The CR definition of bad loans excludes late payments. In general, outstanding loans can be performing, past-due, restructured, substandard or bad (the worst category). While there is no threshold and no exact rule, a loan is considered “bad” if the bank considers the borrower irreversibly unable to repay its debt after having assessed his overall financial conditions, even if the loan is backed by guarantees. See Bonaccorsi di Patti *et al.* (2015).

for a sample of German companies that services exports and imports are not limited to firms classified as service producers, but also companies from other sectors (manufacturing, etc...). Since the production of goods might require higher levels of physical assets than the provision of services, manufacturing firms might need higher levels of external finance to produce their main product (e.g.: car), rather than the ancillary activity (e.g.: post sale assistance). To verify that we do not wrongly attribute the effect of credit supply frictions to services exports, rather than to production and exporting of goods, we repeat the previous regressions by adding sector fixed effects and the results are substantially unchanged (column 1, Table 9): the sign of the effect of credit supply growth on the change of exports of services is positive and different from zero.³²

Another way to look at this issue is to add a measure of services export intensity (the ratio of services exports over total sales lagged one year) to the previous specification: the results in column 2 reveals no relevant changes in the estimated parameters of interest, even though it is significant only at 5%. We also test the role of capital investment. Provided that credit is also financing investments (in unreported estimates we find that the estimated coefficient of Δcredit on the investment rate using the same specification of column 1 in table 9 is 0.018 and significant only at 10%), we test whether services exports are boosted by investments, by adding the investment rate (lagged one period) as a control to the usual specification: we do not find that this variable has any relevant effect (column 3). We also add both measures of services intensity and of the investment rate in column 4: the magnitude of the coefficient of interest is slightly lower, but still significant at 5%.

Since in our dataset two thirds of the firms export also goods, we consider whether credit was supplied to finance these exports rather than exports of services. We do it by interacting ΔCredit with a dummy equal to 1 if the firm reports goods exports. The results (column 5) reveal that credit change is significant at 5% and with a magnitude similar to that of the baseline, whilst ΔCredit interacted is positive but not significant. In column 6 we add the services intensity and the investment rate to the previous specification, and the coefficient of interest is about slightly smaller than that of column 5 and still significant at 5%. Note also that the credit growth of goods exporters is not significant.

³² Since exports of services are mainly concentrated among big or very profitable firms, for which credit constraints might have been less likely binding, we have also tested whether the effect is stronger among bigger or more profitable enterprises of some particular sectors (Manufacturing, Services, etc...). The results (Table A.5) do not show any particular effect and the coefficient of credit change is still significant and positive (columns 3 and 6). We repeat this exercise in Table A.5bis to check whether services exports are biased towards sectors and some particular financial characteristics and we obtain similar results.

Geography – A first check of this type is the relevance of PIGS. Recall that we considered the Sovereign crisis as an exogenous event for our empirical exercise. This statement is fully correct if we estimate the baseline model excluding exports towards the other countries involved in the sovereign debt crisis, namely the so called “PIGS” (Portugal, Ireland, Greece and Spain). The estimates reported in Table 10 (columns 1 and 2) show that the results are almost unchanged.

Moreover, we have tried to exploit the geographic information of the destination countries in order to detect the effects of usual variables defining gravity equations: distance and GDP. With regard to the latter measure, we consider GDP growth, instead of levels, because this should better capture changes in imports of services from the destination countries. Both these variables are not significant when they are jointly inserted in the regressions (columns 7 to 8). Moreover, in all these estimates the effect on the main variable of interest (ΔCredit) remains substantially unaffected.

Placebos – We have also analyzed whether the results of the baseline specification hold when moving the timing window forward or backward of some quarters. First, we consider the fact that the spread had started to increase after June 2011 and consequently we repeat the baseline estimates setting the timing two quarters backward (that is, the *ex-ante* period starts in 2010-Q2 and it ends in 2011-Q2, and the *ex-post* period runs from 2011Q3 to 2012Q2). The magnitude of the estimated parameter of credit supply growth in the specification with a limited number of controls (column 1 of table 11) is 0.21, about the half of the respective of baseline in table 4 (0.43); note that in the richest specification the coefficient of interest has an even smaller magnitude (0.17) and it is significant only at 10%. These results suggest that, despite the aggregate credit growth patterns reacted with a delay (end of 2011) with respect to the start of the tensions coming from sovereign debt (summer 2011), there are signs, even though of a weaker magnitude, of a significant impact on services already in the second half of 2011. Backed with these findings, we also check whether the results hold using the growth rates one year earlier (between 2010 and 2011) and one year later (between 2012 and 2013). Table 11 (columns 3 to 6) shows that, as expected, the coefficients of ΔCredit are not significant anymore. Finally, we shortly mention other robustness checks in the Appendix (A.3).

8. Conclusions

The empirical literature on trade in services has grown considerably in the last decade. While most works on this topic have highlighted the relevance of firms’ heterogeneity and of restrictive regulation, very few papers, if any, have analyzed in detail the role of financial frictions

on trade in services. We fill this gap in the literature using detailed data and we show that credit supply shocks have a sizeable and significant effect on the exports of services. We have used matched bank-firm data and firm level data on service transactions to examine the relationship between credit supply and service exports of Italian firms during the years when the sovereign debt crisis was most acute—that is between 2011 and 2012. Controlling for several dimensions of firms' heterogeneity and for local demand fixed effects, we find a significant and positive effect of credit supply variation on the growth rate of exports in services of Italian firms. Note that given that our data on export services are from a sample survey, we do not address the analysis of the extensive margin. We leave this interesting topic to future research.

This is the first paper that provides evidence on the role of credit supply on services exports. Despite the evidence found being limited to the period of the sovereign debt crisis, a period of strong capital outflows and growing difficulty of raising funds in international markets for Italian banks, this has relevant implications for services trade have become an important component of international trade and of global value chains.

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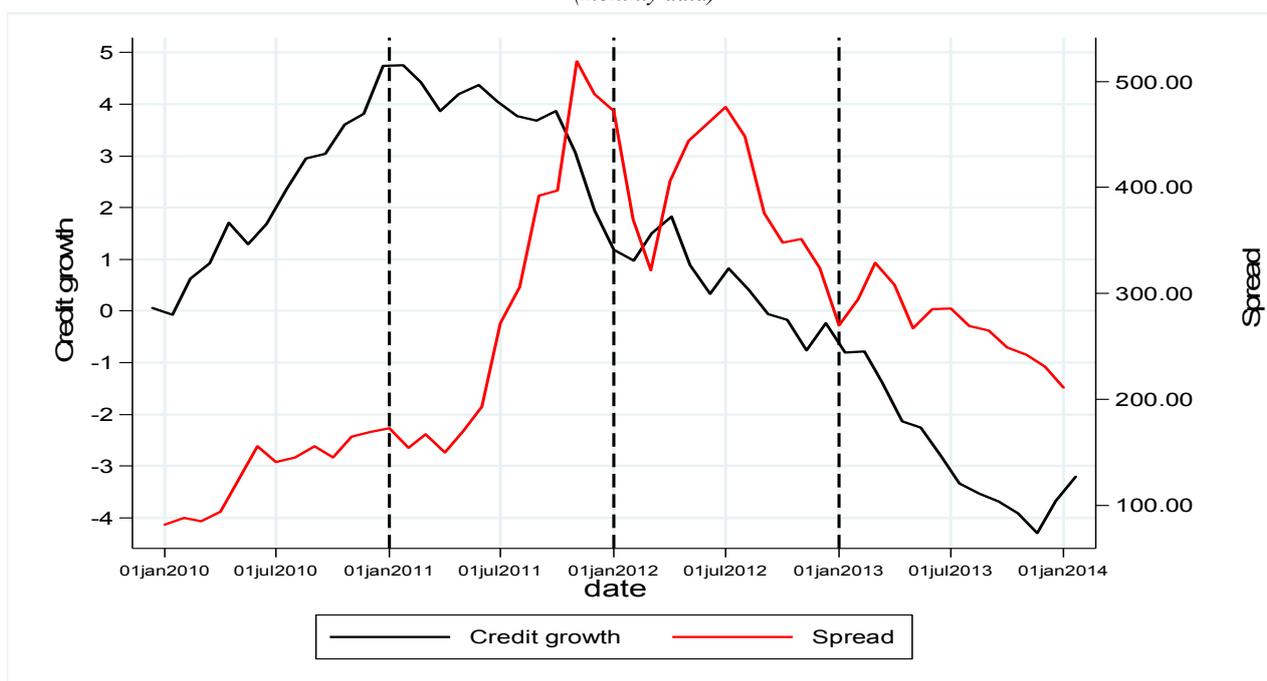
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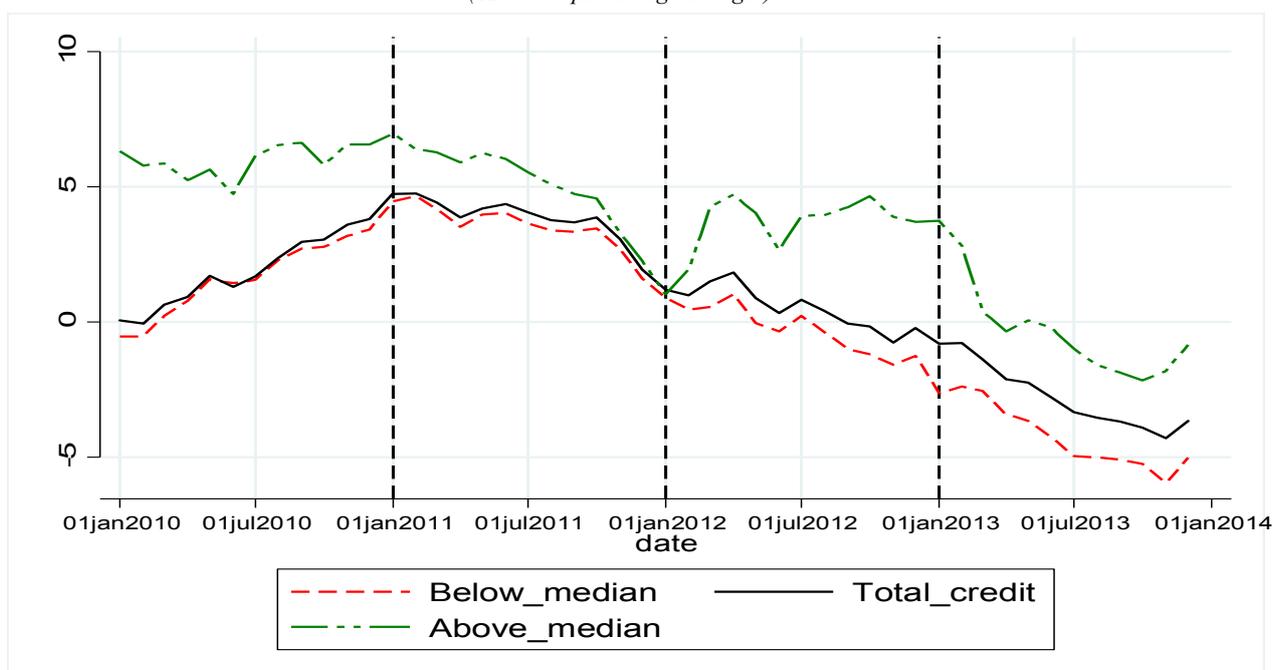
Tables and Figures

Figure 1. T-Bills spread and growth rate of loans.⁽¹⁾
(monthly data)



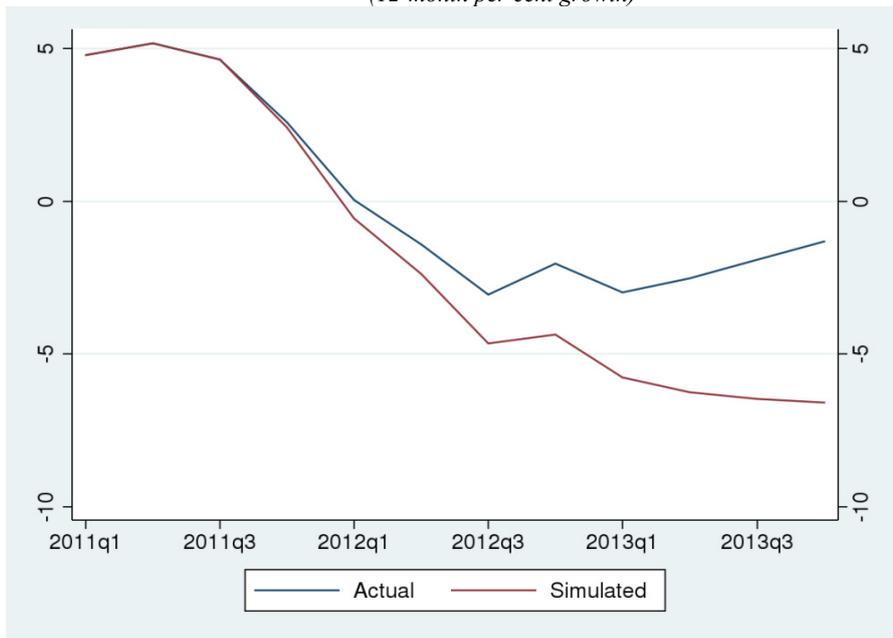
(1): The spread is the difference between the yield on the Italian T-bills with 10 years of maturity and the yield on the corresponding German T-bills (right axis). Growth of credit granted by banks belonging to the dataset adjusted for loan sales, securitizations and write-offs (left axis). Source: Bank of Italy and ECB.

Figure 2. Loans to firms by banks' position with respect to retail funding⁽¹⁾
(12 month percentage changes)⁽²⁾



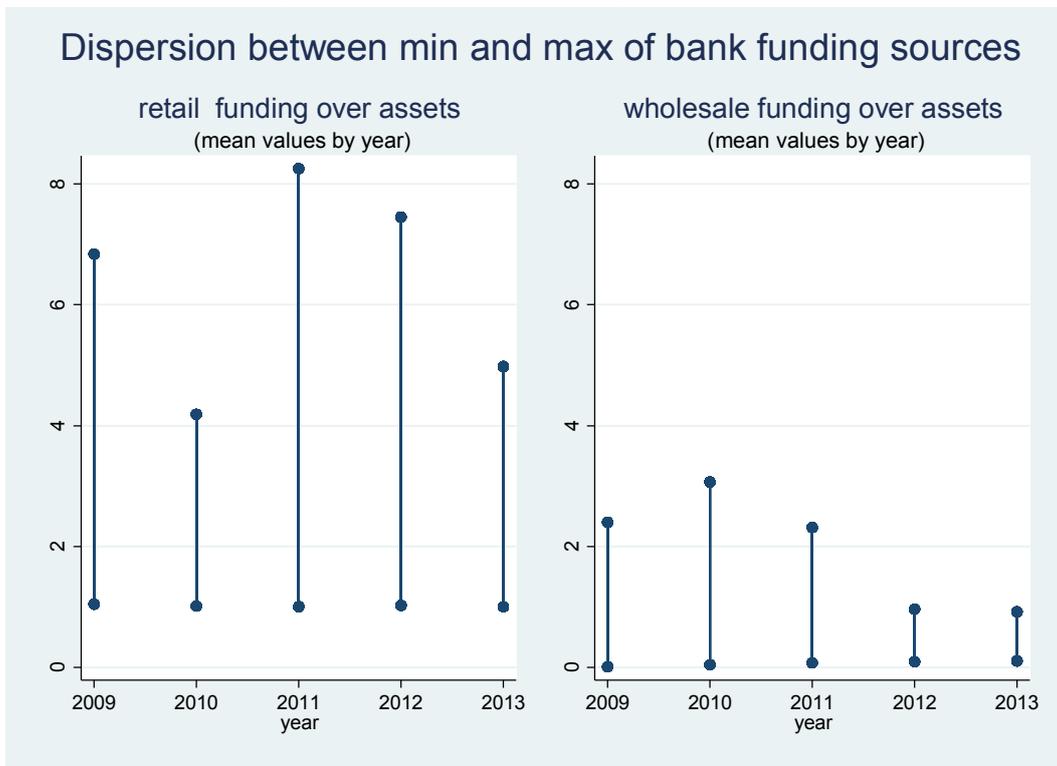
(1) The figure illustrates bank lending from banks with low levels of retail funding, the most exposed to the sovereign shock (*Below median*), and banks with higher levels (*Above median*). A bank is classified as below (above) the median if the ratio of average retail funding in 2011 was lower (higher) than the median value of the year. The vertical dotted lines mark the start of each year. (2) Twelve-month rates of change of loans by banks belonging to the dataset. Loans include bad loans, repos, and loans not reported in banks' balance sheets because they have been securitized. The rates of change are calculated from the differences in the stocks (delta stock), adjusted to take account of reclassifications, revaluations, changes in exchange rates and every other variation that does not originate from an economic transaction. Source: Bank of Italy.

Figure 3. Lending to firms: actual and simulated dynamics
(12-month per cent growth)



Notes: The simulated profile posits the absence of unconventional policy measures. Source: Casiraghi, Gaiotti, Rodano and Secchi (2013).

Figure 4. Bank funding dispersion by year



Source: authors' calculation on Supervisory Reports data".

Table 1. Firms' characteristics by quartile of the instrumental variable ⁽¹⁾

	quartiles			
	1 st	2 nd	3 rd	4 th
Services Exports ⁽¹⁾	1,061,101	1,206,260	1,855,673	1,485,999
Employees ⁽¹⁾	1,015.8	939.4	2,304.9	1,377.9
Profitability ⁽¹⁾	29.5	22.9	40.8	17.2
Z-Score ⁽¹⁾	4.7	4.1	4.1	4.6
Distressed ⁽¹⁾	0.51	0.67	0.63	0.64
Capital Intensity ⁽¹⁾	226.3	144.5	161.4	186.0
Intangibles ⁽¹⁾	0.22	0.24	0.26	0.29
Trade Credit ⁽¹⁾	109,595	147,389	125,784	147,963
Ext. Fin ⁽¹⁾	1.9	1.9	1.9	1.9
For_Debt ⁽¹⁾	175.9	146.2	113.3	99.5

Source: CADs, CR, SR. (1): Average values by quartile of the instrumental variable. (2): variable in logs; all variables definition see table A.2.

Table 2. Banks' characteristics by median of the instrumental variable ⁽¹⁾

variable	All sample		Below median		Above median	
	mean	st. dev.	mean	st. dev.	mean	st. dev.
Assets (1)	4,010,000	61,900,000	8,880,000	66,500,000	3,260,000	57,900,000
Δcredit (2)	5.7	466.7	0.0	730.7	10.2	82.1

(1): data in thousands of euros of 2011; (2): growth rate between 2011 and 2012.

Table 3. Within – firm estimates of Credit Growth

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Retail_fund.	0.0969*	0.582***	0.186***	0.0969*	0.0944*	0.527***	0.582***	0.574***	0.527***	0.517***
	(0.0513)	(0.158)	(0.0582)	(0.0513)	(0.0513)	(0.160)	(0.158)	(0.158)	(0.160)	(0.160)
Gov_bonds		-0.636***				-0.472**	-0.636***	-0.628***	-0.472**	-0.459**
		(0.199)				(0.211)	(0.199)	(0.199)	(0.211)	(0.210)
Low Cap.			-0.371***			-0.286**			-0.286**	-0.293**
			(0.115)			(0.119)			(0.119)	(0.119)
Foreign_Bank				2.125*			2.006*		2.014*	2.001*
				(1.141)			(1.120)		(1.120)	(1.120)
Mainbank					-0.158***			-0.149***		-0.152***
					(0.0499)			(0.0500)		(0.0500)
Observations	9096	8930	9096	9096	9096	8930	8930	8930	8930	8930
R ²	0.785	0.793	0.786	0.785	0.786	0.793	0.793	0.793	0.793	0.793

The estimates show OLS regressions. The dependent variable is the growth rate of credit (ΔCredit). Retail_funding is the log of the ratio between retail funding sources (domestic retail deposits and banks bonds held by households) over total bank asset assets. Gov_bonds is the log of the ratio between the bank holdings of government securities and risk weighted assets. Lowcap is a dummy=1 if the bank Total Capital Ratio is below 10 and 0 otherwise. Mainbank is a dummy=1 for the main lender of a firm. For_dum is dummy=1 if the bank is foreign. All variables definitions are in table A2 in the Appendix. All regressors are lagged 1 year (2011). All estimates include firm fixed effects. Standard errors (in parentheses) are robust and clustered at bank level: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 4. Firm level (baseline) estimates

Panel A											
	OLS	2SLS Second stage estimates									
	2 nd stage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Δ Credit	0.201***	0.427***	0.491***	0.405***	0.422***	0.368***	0.428***	0.319***	0.432***	0.386**	0.400***
	(0.0333)	(0.132)	(0.130)	(0.109)	(0.125)	(0.117)	(0.128)	(0.110)	(0.130)	(0.150)	(0.125)
Employees			0.0890***								0.0531
			(0.0229)								(0.0356)
Profitability			0.0534***								0.0516***
			(0.0200)								(0.0195)
Z-Score				-0.0482							0.0157
				(0.0572)							(0.0697)
Distressed					0.128						0.432***
					(0.0827)						(0.120)
Capital int.						0.0271					0.0376
						(0.0222)					(0.0376)
Intangibles							-0.320***				-0.182
							(0.123)				(0.156)
Trade Cred.								0.271			0.731**
								(0.220)			(0.314)
Ext. Fin									-5.694		0.951
									(5.299)		(5.930)
For_Debt										0.0328	-0.00173
										(0.0345)	(0.0289)
Services FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Countries FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.0386										

Panel B: First stage estimates											
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	
Retail_fund	1.191***	1.225***	1.444***	1.253***	1.350***	1.220***	1.695***	1.203***	1.412***	1.798***	
	(0.140)	(0.152)	(0.154)	(0.151)	(0.148)	(0.132)	(0.163)	(0.139)	(0.147)	(0.137)	
R^2	0.151	0.167	0.202	0.217	0.170	0.238	0.195	0.165	0.302	0.497	
F test	71.92	65.23	87.77	68.6	85.52	85.79	108.09	74.86	93.8	171.12	
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Observations	4088	4055	3696	3950	3950	3701	3947	3034	3949	2917	2670

The estimates show OLS (column 1) and 2SLS regressions (columns 2 to 11). The dependent variable is the growth rate of services exports. Δ Credit is the log difference of credit. The IV variable (Retail_funding) is the log of the ratio between retail funding sources (deposits and banks bonds held by domestic households) over total bank assets. All controls and IV's are lagged 1 year (2011). Variables definitions are in table A.2 in the Appendix. Standard errors (in parentheses) are clustered at service and country level: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5. Estimates with interacted dummies (services&country, services&area) and with share of retail funding

Panel A: 2SLS Second stage estimates								
	Service & Country dummies		Service & Area dummies		Service & Country dummies and Service & Area dummies		IV: Share of Retail Funding	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ΔCredit	0.291** (0.125)	0.355*** (0.128)	0.452*** (0.144)	0.457*** (0.150)	0.406*** (0.142)	0.483*** (0.152)	0.276*** (0.103)	0.298*** (0.0991)
Employees		0.0360 (0.0356)		0.0573 (0.0377)		0.0489 (0.0390)		0.0436 (0.0357)
Profitability		0.0524*** (0.0199)		0.0536** (0.0231)		0.0435* (0.0229)		0.0525*** (0.0194)
Z-Score		0.0162 (0.0731)		0.0355 (0.0729)		0.0391 (0.0754)		0.0363 (0.0683)
Distressed		0.359*** (0.116)		0.447*** (0.134)		0.491*** (0.143)		0.366*** (0.113)
Capital int.		0.0399 (0.0358)		0.0207 (0.0424)		0.0272 (0.0437)		0.0393 (0.0375)
Intangibles		-0.232 (0.165)		-0.236 (0.177)		-0.318* (0.183)		-0.0952 (0.146)
Trade Cred.		0.497 (0.323)		0.481 (0.333)		0.488 (0.355)		0.756** (0.311)
Ext. Fin		2.954 (6.770)		1.706 (6.740)		5.314 (7.584)		1.767 (6.222)
For_Debt		0.0304 (0.0302)		0.0167 (0.0346)		0.0347 (0.0361)		-0.0152 (0.0260)
Services FE	No	No	Yes	Yes	No	No	Yes	Yes
Country FE	No	No	Yes	Yes	No	No	Yes	Yes
Serv.&Coun. FE	Yes	Yes	No	No	Yes	Yes	No	No
Serv.&Area FE	No	No	Yes	Yes	Yes	Yes	No	No
Panel B: First stage estimates								
Retail_fund/Assets	1.205*** (0.147)	1.686*** (0.138)	1.079*** (0.131)	1.622*** (0.125)	1.106*** (0.144)	1.637*** (0.139)		
Retail_fund/Total Funding							1.674*** (0.137)	2.184*** (0.143)
R ²	0.165	0.509	0.232	0.572	0.265	0.600	0.294	0.622
F test (p-value)	67.20 (0.000)	149.35 (0.000)	67.35 (0.000)	167.17 (0.000)	58.76 (0.000)	137.99 (0.000)	183.42 (0.000)	303.33 (0.000)
Observations	4055	2670	4055	2670	4055	2670	4055	2670

The estimates show 2SLS regressions. The dependent variable is the growth rate of services exports. ΔCredit is the log difference of credit. The IV variable in columns 1 to 6 is the ratio between retail funding sources and total bank assets; in columns 7 and 8 it is the log of the share of retail funding over total funding. Retail funding is given by deposits and banks bonds held by domestic households. All controls and IV's are lagged 1 year (2011). Variables definitions are in table A.2 in the Appendix. Standard errors (in parentheses) are clustered at service and country level: * p < 0.1, ** p < 0.05, *** p < 0.01.

Table 6. Estimates with additional instrumental variables

	Panel A: GMM-IV Second stage estimates															
	Government bonds				Lowcap				Foreign banks				Mainbank			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)				
ΔCredit	0.433*** (0.131)	0.445*** (0.109)	0.353*** (0.114)	0.606*** (0.111)	0.532*** (0.0892)	0.297*** (0.106)	0.410*** (0.131)	0.444*** (0.108)	0.395*** (0.123)	0.482*** (0.109)	0.467*** (0.0997)	0.406*** (0.125)				
Employees		0.0808*** (0.0218)	0.0461 (0.0347)		0.0892*** (0.0218)	0.0547 (0.0354)		0.0849*** (0.0221)	0.0527 (0.0355)		0.0854*** (0.0221)	0.0486 (0.0351)				
Profitability		0.0565*** (0.0194)	0.0546*** (0.0192)		0.0461** (0.0196)	0.0549*** (0.0194)		0.0523*** (0.0198)	0.0515*** (0.0195)		0.0503*** (0.0199)	0.0509*** (0.0195)				
Z-Score		-0.0442 (0.0578)	0.0241 (0.0691)		-0.0660 (0.0565)	0.0326 (0.0690)		-0.0475 (0.0579)	0.0164 (0.0696)		-0.0528 (0.0567)	0.0225 (0.0691)				
Distressed			0.409*** (0.117)			0.381*** (0.115)			0.429*** (0.119)			0.441*** (0.120)				
Capital int.			0.0363 (0.0375)			0.0348 (0.0374)			0.0369 (0.0375)			0.0372 (0.0377)				
Intangibles			-0.143 (0.150)			-0.0990 (0.147)			-0.179 (0.155)			-0.199 (0.154)				
Trade_debt			0.756*** (0.312)			0.824*** (0.306)			0.733*** (0.314)			0.752*** (0.313)				
Ext. Fin			0.402 (6.062)			0.972 (6.381)			0.948 (5.931)			0.628 (5.857)				
For_Debt			-0.00996 (0.0273)			-0.0206 (0.0260)			-0.00283 (0.0284)			0.000436 (0.0288)				
Services FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				

	Panel B: First stage estimates											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Retail_funding	1.190*** (0.139)	1.489*** (0.168)	1.911*** (0.132)	1.322*** (0.128)	1.649*** (0.143)	1.994*** (0.140)	1.170*** (0.139)	1.442*** (0.165)	1.792*** (0.136)	1.532*** (0.173)	1.765*** (0.192)	1.941*** (0.153)
Gov_bonds		-0.0249*** (0.0113)	-0.220*** (0.0219)									
Lowcap				-1.272*** (0.0995)	-1.869*** (0.115)	-4.007*** (0.542)						
Foreign bank							-0.503*** (0.167)	-0.617*** (0.211)	-0.0947 (0.232)			
Mainbank										-0.641*** (0.0639)	-0.633*** (0.0648)	-0.293*** (0.0764)
F test (p-value)	46.00 (0.000)	42.62 (0.000)	141.34 (0.000)	102.47 (0.000)	134.48 (0.000)	106.51 (0.000)	39.20 (0.000)	40.69 (0.000)	86.82 (0.000)	50.84 (0.000)	51.19 (0.000)	86.03 (0.000)
J test (p-value)	5.106 (0.0238)	2.109 (0.1465)	0.843 (0.3587)	5.587 (0.0181)	1.154 (0.2827)	2.597 (0.1070)	1.950 (0.1626)	2.142 (0.1433)	0.041 (0.8388)	0.545 (0.4605)	0.007 (0.9314)	0.502 (0.4787)
R ²	0.151	0.215	0.511	0.170	0.249	0.523	0.174	0.232	0.499	0.151	0.215	0.477
Observations	4055	3696	2670	4055	3696	2670	4055	3696	2670	4055	3696	2670

Panel A shows the second stage of the IV (GMM) regressions. The dependent variable is the growth rate of services exports. ΔCredit is the log difference of credit. The first IV (*Retail_funding*) is the log of the ratio between retail funding sources (deposits and banks bonds held by domestic households) over total bank assets. The second IV is: Gov_bonds (the log of the ratio between the bank holdings of government bonds and bank risk weighted assets) from column 1 to 3; Lowcap (a dummy=1 if the bank Total Capital Ratio is below 10 and 0 otherwise) from column 4 to 6; For_dum (a dummy=1 if the bank is foreign) from column 7 to 9; Mainbank (a dummy=1 for the main lender of a firm) from column 10 to 12. All controls and IV's are lagged 1 year (2011). Variables definitions are in table A.2 in the Appendix. Standard errors (in parentheses) are clustered at service and country level. Panel B shows the first stage. The dependent variable is the growth rate of credit (ΔCredit), as defined above. All controls (not showed) and IV's are lagged 1 year (2011). Standard errors (in parentheses) are clustered at service and country level. * p < 0.1, ** p < 0.05, *** p < 0.01. (1).

Table 7. Estimates with firm dummy from ancillary regression

Panel A										
	OLS 2 nd stage	2SLS Second stage estimates								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ΔCredit	0.204*** (0.0256)	0.460*** (0.122)	0.484*** (0.112)	0.451*** (0.126)	0.408*** (0.128)	0.444*** (0.108)	0.397*** (0.151)	0.443*** (0.157)	0.481*** (0.122)	0.460*** (0.150)
Employees			0.0755*** (0.0217)	0.0406 (0.0396)		0.0767*** (0.0212)	0.0347 (0.0388)		0.0747*** (0.0225)	0.0383 (0.0335)
Profitability			0.0428* (0.0220)	0.0469* (0.0252)		0.0383 (0.0463)	0.0419** (0.0206)		0.0356* (0.0191)	0.0339 (0.0278)
Z-Score			-0.0746 (0.0550)	-0.0199 (0.0826)		-0.0952* (0.0561)	-0.0355 (0.0831)		-0.0710 (0.0679)	0.0264 (0.0830)
Distressed				0.490*** (0.129)			0.377*** (0.118)			0.515*** (0.129)
Capital int.				0.0538 (0.0397)			0.0367 (0.0352)			0.0188 (0.0409)
Intangibles				-0.183 (0.153)			-0.191 (0.188)			-0.255 (0.180)
Trade Cred.				0.881** (0.387)			0.433 (0.390)			0.585 (0.392)
Ext. Fin				-0.764 (6.200)			0.772 (7.635)			1.400 (9.751)
For_Debt				0.00918 (0.0306)			0.0275 (0.0328)			0.0236 (0.0370)
Firm dummy	-0.0140 (0.00987)	-0.0314 (0.0191)	-0.0203 (0.0166)	0.00155 (0.0194)	-0.0304* (0.0172)	-0.0191 (0.0168)	0.000936 (0.0186)	-0.0279 (0.0195)	-0.0161 (0.0176)	0.00362 (0.0180)
Services FE	Yes	Yes	Yes	Yes	No	No	No	No	No	No
Country FE	Yes	Yes	Yes	Yes	No	No	No	No	No	No
Serv.&Coun. FE	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Serv.&Area FE	No	No	No	No	No	No	No	Yes	Yes	Yes
R ²	0.226									

Panel B: First stage estimates										
Retail funding		1.539*** (0.172)	1.539*** (0.156)	1.862*** (0.149)	1.168*** (0.136)	1.447*** (0.149)	1.659*** (0.115)	1.123*** (0.130)	1.407*** (0.153)	1.722*** (0.142)
Chi-sq. test		245.90	304.78	2120.02	37.50	43.13	31.31	68.02	104.58	587.52
(p-value)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0819)	(0.000)	(0.000)	(0.000)
R ²		0.226	0.226	0.501	0.103	0.171	0.447	0.144	0.218	0.506
Observations	3871	3871	3539	2547	3871	3539	2547	3871	3539	2547

The estimates show OLS (column 1) and 2SLS regressions (columns 2 to 11). The dependent variable is the growth rate of services exports. ΔCredit is the log difference of credit. The IV variable (*Retail_funding*) is the log of the ratio between retail funding sources (deposits and banks bonds held by domestic households) over total bank assets. All controls and IV's are lagged 1 year (2011). Variables definitions are in table A.2 in the Appendix. Standard errors are bootstrapped (in parentheses), clustered at service and country level. In columns 5 to 7 standard errors (in parentheses) are clustered at service & country level; in columns 8 to 10 standard errors are clustered at service and country level and at service&area level: * p < 0.1, ** p < 0.05, *** p < 0.01.

Table 8. Estimates with different definition of credit change

Panel A: 2SLS Second stage estimates						
	Credit includes guarantees			Credit includes bad loans		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ Credit	0.427*** (0.132)	0.465*** (0.110)	0.430*** (0.128)	0.427*** (0.132)	0.458*** (0.109)	0.310** (0.128)
Employees		0.0819*** (0.0221)	0.0456 (0.0329)		0.0822*** (0.0222)	0.0916** (0.0390)
Profitability		0.0233 (0.0294)	0.0214 (0.0295)		0.0284 (0.0298)	0.0375 (0.0279)
Z-Score		-0.0560 (0.0584)	-0.0679 (0.0636)		-0.0689 (0.0585)	-0.0552 (0.0694)
Distressed			0.369*** (0.110)			0.266** (0.121)
Capital int.			0.0510 (0.0349)			0.0337 (0.0367)
Intangibles			-0.208 (0.160)			-0.0943 (0.158)
Trade Cred.			0.624** (0.307)			0.0473 (0.0300)
Ext. Fin			7.246 (4.759)			7.247* (4.179)
For_Debt			0.0167 (0.0269)			0.0251 (0.0352)
Services FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: First stage estimates						
Retail_funding	1.191*** (0.140)	1.467*** (0.168)	1.677*** (0.145)	1.190*** (0.140)	1.467*** (0.166)	1.734*** (0.129)
R^2	0.151	0.214	0.485	0.150	0.214	0.496
F test	71.92	76.49	134.37	71.89	77.77	180.07
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	4055	3696	2826	4055	3696	2670

Panel A shows the second stage of the IV (2SLS) regressions. The dependent variable is the growth rate of services exports. Δ Credit is the log difference of credit. Credit contains guarantees in columns 1 to 3. It contains bad loans in columns 4 to 6. The IV variable (Retail_funding) is the log of the ratio between retail funding sources (deposits and banks bonds held by domestic households) over total bank assets. All controls and IV's are lagged 1 year (2011). Variables definitions are in table A.2 in the Appendix. Standard errors (in parentheses) are clustered at service and country level. Panel B shows the first stage. The dependent variable is the growth rate of credit (Δ Credit), as defined above. All controls (not showed) and IV's are lagged 1 year (2011). Standard errors (in parentheses) are clustered at service and country level: * p < 0.1, ** p < 0.05, *** p < 0.01. (1).

Table 9. Estimates with sector effects, services intensity and goods exports

Panel A: 2SLS and GMM-IV Second stage estimates						
	(1)	(2)	(3)	(4)	(5)	(6)
ΔCredit	0.364*** (0.127)	0.325** (0.136)	0.363*** (0.129)	0.322** (0.138)	0.453** (0.186)	0.381** (0.186)
ΔCredit x Goods_Exp ⁽¹⁾					1.883 (1.647)	1.432 (1.561)
Employees	0.0520 (0.0359)	0.0271 (0.0395)	0.0516 (0.0366)	0.0254 (0.0413)	0.00124 (0.0504)	-0.0197 (0.0537)
Profitability	0.0534*** (0.0195)	0.0514*** (0.0193)	0.0534*** (0.0195)	0.0514*** (0.0193)	0.0439** (0.0221)	0.0437** (0.0217)
Z-Score	0.0311 (0.0713)	0.0458 (0.0724)	0.0316 (0.0711)	0.0475 (0.0724)	-0.0181 (0.0907)	0.0139 (0.0883)
Distressed	0.400** (0.122)	0.315** (0.139)	0.401*** (0.121)	0.315** (0.140)	0.432*** (0.137)	0.317** (0.140)
Capital int.	0.0375 (0.0381)	0.0322 (0.0389)	0.0377 (0.0382)	0.0328 (0.0388)	0.0562 (0.0415)	0.0457 (0.0418)
Intangibles	-0.200 (0.156)	-0.130 (0.170)	-0.201 (0.155)	-0.131 (0.170)	-0.423 (0.297)	-0.283 (0.288)
Trade Cred.	0.733** (0.315)	0.684** (0.319)	0.736** (0.314)	0.692** (0.317)	0.608* (0.349)	0.584* (0.350)
Ext. Fin	2.714 (6.832)	3.502 (7.214)	2.735 (6.847)	3.586 (7.259)	-4.202 (8.626)	-1.467 (8.852)
For_Debt	-0.000578 (0.0295)	0.00179 (0.0293)	-0.000516 (0.0295)	0.00204 (0.0293)	0.0244 (0.0423)	0.0216 (0.0417)
Serv. Exports / Sales		-0.706 (0.504)		-0.723 (0.520)		-0.903* (0.523)
Investment rate			-0.0480 (0.440)	-0.150 (0.473)		-0.159 (0.483)
PRIM. FE ⁽²⁾	Yes	Yes	Yes	Yes	Yes	Yes
MAN FE ⁽²⁾	Yes	Yes	Yes	Yes	Yes	Yes
UTI FE ⁽²⁾	Yes	Yes	Yes	Yes	Yes	Yes
CON FE ⁽²⁾	Yes	Yes	Yes	Yes	Yes	Yes
SER FE ⁽²⁾	No	No	No	No	No	No
Services FE ⁽³⁾	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
F test	166.20	163.08	162.29	157.08	88.53	85.29
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	2670	2670	2670	2670	2670	2670

The estimates show 2SLS and GMM-IV regressions (only second stage). The dependent variable is the growth rate of services exports. ΔCredit is the log difference of credit. The IV (*Retail_funding*) is the log of the ratio between retail funding sources (deposits and banks bonds held by domestic households) over total bank assets. All controls and IV's are lagged 1 year (2011). Variables definitions are in table A.2 in the Appendix. Standard errors (in parentheses) are clustered at service and country level: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. (1): *Goods_Exp* is a dummy =1 if the firm exports goods in 2011 or in 2012. (2): Sectors are defined by NACE Rev. 2 classification: PRIM is the primary sector (Agriculture and Mining). MAN is Manufacturing. UTI is Utilities. CON is Construction. SER is services. (3): Fixed effects are defined by the classification of the services of the BP – IMF Manual V.

Table 10. Geography and gravity variables

2SLS Second stage estimates								
	Estimates without PIGS countries		Estimates with gravity variables (distance and GDP growth)					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ΔCredit	0.468*** (0.114)	0.398*** (0.130)	0.443*** (0.108)	0.345*** (0.129)	0.475*** (0.112)	0.387*** (0.128)	0.447*** (0.108)	0.350*** (0.130)
Employees	0.0928*** (0.0231)	0.0580 (0.0372)	0.0826*** (0.0223)	0.0398 (0.0368)	0.0752*** (0.0227)	0.0381 (0.0365)	0.0825*** (0.0223)	0.0398 (0.0368)
Profitability	0.0587*** (0.0203)	0.0572*** (0.0191)	0.0421** (0.0188)	0.0408** (0.0181)	0.0375** (0.0189)	0.0380** (0.0182)	0.0411** (0.0189)	0.0402** (0.0182)
Z-Score	-0.0278 (0.0621)	0.0187 (0.0737)	-0.0508 (0.0590)	0.0342 (0.0693)	-0.0636 (0.0598)	0.0281 (0.0699)	-0.0567 (0.0589)	0.0309 (0.0694)
Distressed		0.397*** (0.126)		0.371*** (0.122)		0.425*** (0.122)		0.375*** (0.122)
Capital int.		0.0480 (0.0403)		0.0354 (0.0387)		0.0230 (0.0380)		0.0345 (0.0387)
Intangibles		-0.227 (0.164)		-0.130 (0.166)		-0.179 (0.163)		-0.138 (0.165)
Trade Cred.		0.700** (0.339)		0.610* (0.324)		0.668** (0.320)		0.603* (0.324)
Ext. Fin		10.30 (7.013)		1.565 (6.520)		1.352 (6.454)		1.599 (6.546)
For_Debt		-0.000898 (0.0316)		-0.00169 (0.0291)		0.00404 (0.0290)		-0.000696 (0.0292)
Distance			-0.0290 (0.0292)	0.00313 (0.0347)			-0.0415 (0.0311)	-0.00496 (0.0359)
ΔGDP					0.00879 (0.00723)	0.00633 (0.00592)	0.00996 (0.00724)	0.00640 (0.00611)
Services FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Countries FE	Yes	Yes	No	No	No	No	No	No
F test	67.48	148.67	72.89	163.44	74.54	170.71	72.88	163.11
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	3325	2401	3561	2577	3669	2649	3561	2577

The estimates show 2SLS regressions (only second stage). The dependent variable is the growth rate of services exports. ΔCredit is the log difference of credit. The IV (Retail_funding) is the log of the ratio between retail funding sources (deposits and banks bonds held by domestic households) over total bank assets. Distances from capital cities are from CEPII and GDP growth in real terms is from the IMF. All controls and IV's (except ΔGDP) are lagged 1 year (2011). Variables definitions are in table A.2 in the Appendix. Standard errors (in parentheses) are clustered at service and country level: * p < 0.1, ** p < 0.05, *** p < 0.01.

Table 11. Estimates in different periods

2SLS Second stage estimates						
	Placebo: 2 quarters backward (2010Q2:2011Q2 - 2011Q3:2012Q2)		Placebo: 2010-11		Placebo: 2012-13	
	(1)	(2)	(3)	(4)	(5)	(6)
ΔCredit	0.206*** (0.0534)	0.167* (0.0879)	-0.536 (0.346)	0.0919 (0.747)	0.379 (0.721)	0.626 (0.658)
Employees	0.294*** (0.0599)	0.273*** (0.101)	0.121** (0.0561)	0.0140 (0.133)	0.0145 (0.0869)	0.0258 (0.117)
Profitability	-0.0296 (0.0881)	0.0317 (0.0444)	0.582 (0.417)	0.396 (0.943)	-0.325 (0.463)	-0.235 (0.250)
Z-Score	0.315*** (0.0705)	0.311** (0.153)	0.0184 (0.0879)	0.181 (0.144)	-0.207* (0.118)	-0.125 (0.0934)
Distressed		-0.692*** (0.182)		-0.371 (0.735)		-0.0549 (0.0973)
Capital int.		0.0318 (0.0636)		-0.120** (0.0501)		0.0389 (0.0403)
Intangibles		0.258 (0.167)		0.228 (0.147)		-0.287* (0.150)
Trade Cred.		0.454 (0.788)		-1.316 (1.243)		
Ext. Fin		16.48** (8.141)		-2.001 (3.772)		24.69 (26.42)
For_Debt		0.0235 (0.0430)		-0.0158 (0.0941)		0.0557** (0.0226)
F test	173.44	52.80	34.79	13.72	10.19	51.83
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	2717	2080	2788	2072	3085	2271

The estimates show SLS regressions. The dependent variable is the growth rate of services exports. ΔCredit is the log difference of credit. The IV variable (Retail_funding) is the log of the ratio between retail funding sources (deposits and banks bonds held by domestic households) over total bank assets. All controls and IV's are lagged four quarters. The growth rates are computed between the four quarters periods 2010Q2:2011Q2 and 2011Q3:2012Q2 in columns 1 and 2. The estimates are relative to the years 2010 and 2011 in columns 3 and 4 and to 2012 and 2013 in columns 5 and 6. Variables definitions are in table A.2 in the Appendix. Standard errors (in parentheses) are clustered at service and country level: * p < 0.1, ** p < 0.05, *** p < 0.01.

Appendix

A.1 *Short description of Direct Reporting*

The sample of the firms in the Direct Reporting (section TTN) is built by splitting the population of firms in two groups, depending on whether firms have made cross border transactions through financial intermediaries or not.

In both groups, all firms with a high level of turnover are selected: in 2012 the threshold was 100 million of euros in the first group and 250 million in the second group; these thresholds vary every year in order to make the sample more stable over time. Below these thresholds, about 400 firms with a turnover of at least 10 million (in both groups) are sampled with random extraction from the relevant subpopulation. Firms below 10 million are not sampled.

All selected firms have a legal obligation to answer to the TTN questionnaire. For more detail, see Federico and Tosti (2012) and Bentivogli *et al.* (2016).

A.2 *Sample restrictions*

We apply some restrictions to our datasets, explained in detail as follows.

- 1st We restrict our attention to non-financial firms, therefore dropping from the DR sample companies with NACE Rev. 2 code equal to 65, 66 and 67. Starting with a sample of 14,648 observations, with this restriction we lose about 1% of them.
- 2nd We winsorize the bottom and top 1% percentiles of the export values in order to avoid that our results are driven by outliers.³³ We lose another 2,5% of the observations.
- 3rd We restrict the sample to firms that obtain loans from at least two banks. Single-bank firms amount to just 8.6% of the total observations.
- 4th Finally, we drop destination countries that are tax havens,³⁴ international organizations (such as IMF, etc...) or rare destinations (countries with an overall frequency lower than 10). These represent 10% of the observations.

³³ In some robustness checks (not reported here for sake of brevity, but they are available under request to the authors) we use trimming at 1% and in others we do not apply any restriction of this type: in all cases most of the results showed in the paper hold.

³⁴ Tax havens are excluded from the analysis because the transactions with these countries might be more motivated by tax avoidance, than reflect actual demand of services provision from these countries. The list of the excluded countries is taken using the Financial Secrecy Index (FSI) by the Tax Justice Network. We have excluded all countries in the list that match with our data, with the exception of countries that are members of the EU, of the OECD and the BRICS countries. Note that Hebois and Johannesen (2015) show that the nature of the service trade with tax havens may also reflect “genuine” specialization of tax haven countries in highly specialized service industries that have emerged in response to the tax incentives offered by them. Remarkable examples of the latter categories of services are in the financial sector, ship management and reinsurance. Since our analysis is restricted to non-financial

After all these selections we are left with a database of about 9,000 observations, with 527 exporting services firms and 72 bank groups; on average each firm borrows from 6.2 banks, exports 2,6 services to 19.4 countries.

A.3 Other robustness checks

Following Bernard *et al.* (2009), we decompose the change in the total value of each firm's exports into the change of the number of countries, the number of services, the density and the average value exported per active country-product pair.

$$\Delta X_{i,2012} = \Delta(\ln c_{i,s,2012}) + \Delta(\ln s_{i,s,2012}) + \Delta(\ln d_{i,s,2012}) + \Delta(\ln u_{i,s,2012}) \quad (4)$$

where $\Delta(\ln c_{i,s,t})$ is the change in the number of countries, $\Delta(\ln s_{i,s,t})$ is the change in the number of services, $\Delta(\ln d_{i,s,t})$ the change in density and $\Delta(\ln u_{i,s,t})$ is the change in the average value per active country-service pair. We do not find any relevant effects of credit for the different margins.

We have also considered whether the effects depend on the type of credit (credit granted for export/import operations versus other purposes). As in Del Prete and Federico (2014), we find that trade credit for exports is used only by a small minority of firms (about 4%) and that it does not significantly affect the growth of services exports. We obtain similar results considering also the maturity of credit (short, medium and long term loans).

Finally, the baseline results are confirmed when we add tax havens, when we use total assets (as alternative to employees to proxy firm size) and when we re-estimate the baseline using non winsorized data.

firms, most of the reasons for including tax havens become thereby less relevant. In any case, in unreported estimates we find very similar results of the baseline model when tax haven countries are included in the sample.

Table A.1. Classification of service types

Service	Extended Balance of Payments Services classification 2002 (EBOPS 2002) code	Percentage of total ⁽¹⁾
Communications services	245	
Postal Services	246	2.8%
Courier Services	246	0.1%
Telecommunication services	247	8.2%
Computer and information services	262	
Computer Services	263	7.8%
News agency services	889	0.0%
Other information provision services	890	0.5%
Royalties and license fees	266	
Royalties and license fees	266	1.5%
Franchises and similar rights	891	3.9%
Other royalties and license fees	892	7.6%
Other business services	268	
Other trade-related services	271	3.1%
Operational leasing services	272	1.6%
Legal Services	275	0.1%
Accounting, auditing, book-keeping and tax consulting services	276	2.2%
Business and management consultancy, public relations services	277	5.4%
Advertising, market research and public opinion polling	278	10.2%
Research and development services	279	2.2%
Architectural, engineering and other technical consultancy	280	9.0%
Waste treatment and depollution	282	0.0%
Agricultural services	283	0.0%
Mining and on-site processing services	283	0.3%
Other miscellaneous business, professional and technical services	284	23.3%
Services between affiliated enterprises, n.i.e.	285	9.2%
Personal, cultural and recreational services	287	
Education Services	895	0.8%
Health services	896	0.0%
Other	897	0.1%

(1): percentages are computed on years 2011 and 2012.

Table A.2. Variables description

Variable name	Description	Source
Exports	Log of services exports	Direct Reporting
Credit	Log of credit granted to the firm	Credit Register
Retail funding ⁽¹⁾	Log of 1 + the ratio of retail domestic deposits and bonds held by the households over total assets ⁽²⁾	Supervisory Reports
Low_Capit. ⁽¹⁾	Dummy equal to 1 if bank's total capital ratio is above 10%	Supervisory Reports
Mainbank	Dummy equal to 1 if the bank is the main lender of a firm	Credit Register
Employees	Log of the number of employees	CADS ⁽³⁾
Profitability	Log of 1 + EBIT/Assets	CADS ⁽³⁾
Z-Score	Log of 1 + Credit Score variable ⁽⁴⁾	CADS ⁽³⁾
Distressed	Dummy equal to 1 if firm leverage is above the sample median	CADS ⁽³⁾
Capital intensity	Log of 1 + the ratio of the stock of capital over employees	CADS ⁽³⁾
Intangibles	Share of intangible assets over the sum of tangibles and intangibles	CADS ⁽³⁾
Trade_debt	Log of 1+ the share of trade debt over total debt	CADS ⁽³⁾
Ext. Fin	Log of 1+ the ratio between the external financial resources and the capital expenditure	CADS ⁽³⁾
For_Debt	Log of 1+ the ratio between total firm external financial resources from foreign sources (banks, trade debt and intra-group finance) and total debt	Direct Reporting
Services intensity	Log of 1+ the ratio between exports of services and total sales	CADS ⁽³⁾ and Direct Reporting
Investment rate	Log of 1+ the ratio between investment and total assets	CADS ⁽³⁾

(1): the variables are weighted with the share of banks' lending to the firms; (2) in the alternative definition the denominator is given by total funding by both domestic and foreign depositors (wholesale and retail) plus the total amount of bank bonds; (3): Company Accounts Data Service; (4): the original variables takes integer values from 1 to 9, where higher values mean a higher probability of default.

Table A.3. Summary statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
ΔExports ⁽¹⁾	527	-0.03	1.22	-8.6	4.9
ΔCredit ⁽¹⁾	527	5.70	0.21	-0.8	8.1
Retail funding ⁽²⁾	9,096	0.51	0.38	0.0	6.9
Gov_Bonds ⁽²⁾	9,096	0.10	0.25	0.0	5.2
Low capitalization ⁽²⁾	9,096	0.06	0.23	0	1
Mainbank ⁽²⁾	9,096	0.17	0.38	0	1
Foreign banks ⁽²⁾	9,096	0.01	0.08	0	1
Employees ⁽¹⁾	527	1,539.2	7,500.55	5.0	146,178
Profitability (EBIT)	527	2,444,273	3,851	17,494	86,588
Z-Score ⁽¹⁾	527	4.3	1.95	1	9
Distressed ⁽¹⁾	527	0.61	0.49	0	1
Capital Intensity ⁽¹⁾	527	202.31	686.12	0.6	12,444
Intangibles ⁽¹⁾	527	0.27	0.30	0	1
Trade Credit ⁽¹⁾	527	151,140.3	473,692.7	54.0	5,538,000
Ext. Fin ⁽¹⁾	527	0.88	0.02	0.6	0.9
For_Debt ⁽¹⁾	214	139.63	195.68	0.0	1131.1
Goods Exports ⁽¹⁾	484	15,7028.6	90.4907.4	0.0	14,100,000
Investment rate ⁽¹⁾	484	0.28	0.079	0.0	0.74

(1): Variables are defined at firm level. (2): variables are defined at bank-firm level.

Table A.4. Services intensity by sector in 2011

Sector code (Nace Rev.2 2 digit)	Sector description	Services export Intensity ⁽¹⁾
35	Electricity, gas, steam and air conditioning supply	87.88%
96	Other personal service activities	85.17%
92	Gambling and betting activities	65.26%
71	Architectural and engineering activities; technical testing and analysis	47.11%
26	Manufacture of computer, electronic and optical products	44.92%
49	Land transport and transport via pipelines	29.76%
72	Scientific research and development	18.06%
93	Sports activities and amusement and recreation activities	16.38%
61	Telecommunications	14.61%
43	Specialised construction activities	14.46%
77	Rental and leasing activities	14.44%
42	Civil engineering	13.35%
74	Other professional, scientific and technical activities	13.07%
81	Services to buildings and landscape activities	12.63%
22	Manufacture of rubber and plastic products	12.08%
52	Warehousing and support activities for transportation	11.11%
60	Programming and broadcasting activities	1.86%
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	1.24%
17	Manufacture of paper and paper products	1.22%
41	Construction of buildings	1.09%
47	Retail trade, except of motor vehicles and motorcycles	0.74%
78	Employment activities	0.69%
19	Manufacture of coke and refined petroleum products	0.52%
86	Human health activities	0.46%
1	Crop and animal production, hunting and related service activities	0.38%
84	Public administration and defence; compulsory social security	0.32%
33	Repair and installation of machinery and equipment	0.31%
56	Food and beverage service activities	0.23%
6	Extraction of crude petroleum and natural gas	0.17%
38	Waste collection, treatment and disposal activities; materials recovery	0.10%
36	Water collection, treatment and supply	0.09%

(1): Services Intensity is defined as the ratio between services exports and turnover. Source: Direct Reporting.

Table A.5. Estimates with sector effects

	2SLS Second stage estimates					
	Employees			Profitability		
	(1)	(2)	(3)	(4)	(5)	(6)
ΔCredit	0.576*** (0.145)	0.473*** (0.115)	0.365*** (0.126)	0.405*** (0.134)	0.474*** (0.114)	0.365*** (0.127)
Employees					0.0773*** (0.0215)	0.0517 (0.0360)
Profitability		0.0482** (0.0202)	0.0564*** (0.0197)			
Z-Score		-0.0491 (0.0580)	0.0346 (0.0712)		-0.0481 (0.0578)	0.0323 (0.0712)
Intangibles			-0.209 (0.159)			-0.198 (0.156)
Capital int.			0.0384 (0.0379)			0.0373 (0.0381)
Distressed			0.404*** (0.121)			0.404*** (0.122)
Trade Cred.			0.753** (0.316)			0.734** (0.315)
Ext. Fin			2.859 (6.874)			2.367 (6.687)
For_Debt			0.000464 (0.0297)			-0.000219 (0.0295)
PRIM FE ⁽¹⁾	Yes	Yes	Yes	Yes	Yes	Yes
MAN FE ⁽¹⁾	Yes	Yes	Yes	Yes	Yes	Yes
UTI FE ⁽¹⁾	Yes	Yes	Yes	Yes	Yes	Yes
CON FE ⁽¹⁾	Yes	Yes	Yes	Yes	Yes	Yes
SER FE ⁽¹⁾	No	No	No	No	No	No
Employees x PRIM FE ⁽¹⁾	0.134** (0.0542)	0.131** (0.0543)	0.117 (0.0716)			
Employees x MAN FE ⁽¹⁾	0.0869*** (0.0230)	0.0848*** (0.0225)	0.0486 (0.0366)			
Employees x UTI FE ⁽¹⁾	0.108* (0.0562)	0.111* (0.0577)	0.0402 (0.0586)			
Employees x CON FE ⁽¹⁾	0.0117 (0.0424)	0.0245 (0.0409)	-0.00857 (0.0516)			
Employees x SER FE ⁽¹⁾	0.0714*** (0.0213)	0.0750*** (0.0219)	0.0653* (0.0360)			
Profitability x AGR+MIN FE ⁽¹⁾				0.0496 (0.0404)	0.0893** (0.0404)	0.0951** (0.0435)
Profitability x MAN FE ⁽¹⁾				0.0228 (0.0209)	0.0568*** (0.0203)	0.0458** (0.0210)
Profitability x UTI FE ⁽¹⁾				0.0513 (0.0421)	0.0839** (0.0416)	0.0406 (0.0404)
Profitability x CON FE ⁽¹⁾				-0.0149 (0.0278)	0.0241 (0.0273)	0.0136 (0.0316)
Profitability x SER FE ⁽¹⁾				0.0109 (0.0210)	0.0476** (0.0200)	0.0538*** (0.0195)
Services FE (2)	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
F test	64.44	72.43	163.43	68.25	75.03	166.57
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	3947	3696	2670	3696	3696	2670

The estimates show 2SLS regressions (only second stage). The dependent variable is the growth rate of services exports. ΔCredit is the log difference of credit. The IV (*Retail_funding*) is the log of the ratio between retail funding sources (deposits and banks bonds held by domestic households) over total bank assets. All controls and IV's are lagged 1 year (2011). Variables definitions are in table A.2 in the Appendix. Standard errors (in parentheses) are clustered at service and country level: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. (1): Employees and Profitability are interacted using sector level dummies, where sectors are defined by NACE Rev. 2 classification: PRIM is the primary sector (Agriculture and Mining). MAN is Manufacturing. UTI is Utilities. CON is Construction. SER is services. (2): Fixed effects are calculated considering the classification of the services of the BP – IMF Manual V.

Table A.5bis. Estimates with sector effects

	2SLS Second stage estimates					
	(1)	(2)	(3)	(4)	(5)	(6)
	Intangibles	Capital int.	Distressed	Trade Cred.	Ext. Fin	For_Debt
ΔCredit	0.398*** (0.132)	0.371*** (0.126)	0.366*** (0.139)	0.327** (0.128)	0.363*** (0.127)	0.387*** (0.123)
Employees	0.0535 (0.0363)	0.0529 (0.0359)	0.0559 (0.0361)	0.0584* (0.0355)	0.0521 (0.0358)	0.0558 (0.0363)
Profitability	0.0506** (0.0198)	0.0547*** (0.0195)	0.0510*** (0.0195)	0.0549*** (0.0195)	0.0538*** (0.0195)	0.0538*** (0.0197)
Z-Score	0.0244 (0.0694)	0.0296 (0.0709)	0.0316 (0.0695)	0.0428 (0.0720)	0.0335 (0.0713)	0.0295 (0.0700)
Intangibles		-0.213 (0.155)	-0.127 (0.182)	-0.205 (0.155)	-0.196 (0.156)	-0.179 (0.166)
Capital int.	0.0330 (0.0380)		0.0333 (0.0378)	0.0488 (0.0385)	0.0371 (0.0381)	0.0356 (0.0376)
Distressed	0.430*** (0.123)	0.412*** (0.121)		0.363*** (0.122)	0.402*** (0.122)	0.426*** (0.117)
Trade Cred.	0.760** (0.313)	0.736** (0.315)	0.781** (0.317)		0.735** (0.315)	0.772** (0.316)
Ext. Fin	0.926 (6.870)	2.543 (6.801)	0.933 (6.278)	2.157 (6.278)		1.362 (6.699)
For_Debt	-0.00295 (0.0276)	0.00102 (0.0291)	-0.00753 (0.0312)	0.00318 (0.0294)	-0.000306 (0.0295)	
Intan x PRIM (1)	3.658					
Intan x MAN (1)	-0.133					
Intan x UTI (1)	-0.252					
Intan x CON (1)	-1.659*					
Intan x SER (1)	-0.182					
Capint x PRIM (1)		0.127				
Capint x MAN (1)		0.0191				
Capint x UTI (1)		0.0252				
Capint x CON (1)		-0.111				
Capint x SER (1)		0.0445				
Distr. x PRIM (1)			0.996*			
Distr. x MAN (1)			0.459***			
Distr. x UTI (1)			0.358			
Distr. x CON (1)			-0.628*			
Distr. x SER (1)			0.394**			
Trade Credit x PRIM (1)				2.897		
Trade Credit x MAN (1)				0.470		
Trade Credit x UTI (1)				-0.544		
Trade Credit x CON (1)				-0.0890		
Trade Credit x SER (1)				1.070***		
Ext_fin x PRIM (1)					3.286	
Ext_fin x MAN (1)					2.239	
Ext_fin x UTI (1)					2.186	
Ext_fin x CON (1)					1.611	
Ext_fin x SER (1)					2.394	
For_Deb x PRIM (1)						0.0864
For_Deb x MAN (1)						-0.00758
For_Deb x UTI (1)						-0.0250
For_Deb x CON (1)						-0.162*
For_Deb x SER (1)						0.00207
Services FE (2)	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
F test	182.87	171.04	160.32	159.77	166.55	166.37
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	2670	2670	2670	2670	2670	2670

The estimates show 2SLS regressions (only second stage). The dependent variable is the growth rate of services exports. ΔCredit is the log difference of credit. The IV (*Retail_funding*) is the log of the ratio between retail funding sources (deposits and banks bonds held by domestic households) over total bank assets. All controls and IV's are lagged 1 year (2011). Variables definitions are in table A.2 in the Appendix. Standard errors (in parentheses) are clustered at service and country level: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. (1): Variables are interacted using sector level dummies, where sectors are defined by NACE Rev. 2 classification: AGR+MIN is Agriculture and Mining. MAN is Manufacturing. UTI is Utilities. CON is Construction. SER is services. (2): Fixed effects are calculated considering the classification of the services of the BP – IMF Manual V.

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