Services trade and credit frictions: evidence with matched bank – firm data

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Abstract

The effects of credit supply shocks on the exports of services are not clear a priori. On the one hand, services need lower initial investment in physical capital than manufacturing. On the other hand, competitiveness for exporting services requires investments in intangible capital and in product customization that may be subject to credit frictions. Using Italian matched bank-firm data and focusing on the Sovereign Debt Crisis, we find a significant elasticity of services exports to credit supply. The effects are especially relevant when exporting services that are secondary products of the firm or towards countries with weaker institutions.

Keywords: Trade in services, credit frictions, bank-firm data.

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

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1. Introduction

Due to the technology improvements, trade in services has been growing considerably in the last decades.[2] In this context, competitiveness is a key factor for firms exporting services, but it requires dedicated investments, in intangible capital and in product customization, that may be subject to credit frictions, especially during a financial shock.

Indeed, 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 (e.g.: Amiti and Weinstein, 2017; Chodorow-Reich, 2014; Foley and Manova, 2015). However, we still have limited understanding of the influence of financial factors on firms' ability to export services.

A clear prediction of the role of credit frictions for services exports is not obvious a priori. On the one hand, services typically require lower investment in physical initial capital than manufacturing; hence, it is reasonable to expect lower credit needs for starting up a business, or the export activity.

On the other hand, exporting services requires intensive sunk costs as investment to acquire knowledge in the characteristics of the destination country, such as the legal framework, clients network, etc…, (Eickelpasch and Vogel, 2011; Silva and Carreira, 2016; Lejpras, 2009) and the prevailing intangible nature of these assets does not allow to use them as collateral in case of default (Haskel and Westlake**,** 2017), thus enhancing the risk of credit constraints (Almeida and Campello, 2007). Indeed, the greater reliance of firms on the traditional system of bank lending in many countries does not help to overcome tyranny of collateral that is inherent in financing intangible investment (Dell'Ariccia *et al.*, 2018).

Variable costs also matter for the international competitiveness of services. While there are no shipment days that can justify trade finance (the delivery is immediate[3]), several services tend to be less standardized to fit the specific needs of customers, so that dedicated costs in product customization are required (Vogel, 2011; Hoekman and Mattoo, 2008; Jones *et al.*, 2005; Markusen, 1989; Wong *et al.*, 2006).

[2] The share of services in world trade has increased from 15% at the beginning of the 80's to 20% in 2010 (Jensen, 2016).

[3] 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: for a discussion on shipment delays in services trade see Ariu (2016a).

In these situations credit constraints may emerge if a relevant part of the costs of providing services is financed externally. It turns out that this is a likely situation, as showed by various papers that calculate the external financial dependence for manufacturing and services.[4]

From all the observations above, it follows that the role of credit frictions on the exports of services is a likely result and it is to be tested empirically. To this aim, we use a largely representative subset of Italian firms (exporting mainly business and personal services[5]). We focus on a specific event — the Sovereign Debt Crisis between 2011 and 2012 — in order to better disentangle credit supply from demand factors.[6] We exploit the fact that during the crisis, banks more reliant on retail funding were less exposed to the shock and thus were able to continue to expand credit supply, while the more exposed banks reduced it (see section 4 for further details).

To this aim, we use very detailed datasets: we merge matched bank-firm relationships data, confidential supervisory data on banks' balance sheets, and survey data on services exports of Italian companies (mainly business services, see section 3 for details).

Our empirical exercise consists of cross section IV regressions of the growth rate of export services in 2012 on the change in the credit granted in the same period. The growth rate of credit is instrumented with the "retail" components of domestic bank funding (the ratio of deposits and bank bonds held by domestic households over bank assets) lagged one year. The validity of our instrument is preliminary tested by 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 findings suggest that credit supply had a significant impact on services exports of Italian firms during the period considered. A bank credit change of 1% induced a rise in exports flows between 0.3% and 0.4%. The results hold after the inclusion of various firm controls and a number of robustness checks.

Our contribution not only provides the first evidence on the importance of credit frictions for exporting services, but it extends along other dimensions closely related to services. First, the significant role of credit supply arises when services are exported to countries with a weaker

[4] In the Appendix (table A.1) we report as an example the measure computed by Catão *et al.* (2009) on manufacturing and services US firms, which clearly shows that external financial dependence is higher in various some services sectors than in other manufacturing ones. For example, "sale, maintenance and repair of motor vehicles and motorcycles, sector code 50," has a higher level of external financial dependence than "manufacture of other transport equipment, code 35": 1.12 Vs 0.69, respectively. Other works in this vein have similar findings (Duygan-Bump *et al.*, 2015; De Serres *et al.*, 2006; Balta and Nikolov, 2013).

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

[6] The crisis derived from increased uncertainty over sovereign risk and subsequently it affected banks with a different intensity. 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.

institutional background, where contractual risks are greater.[7] This result is consistent with the "complementarity of inputs" assumption: this is a typical feature of services provision such that the production process ends in the country where it is consumed (Lennon *et al.*, 2017).

Secondly, our estimates show that credit constraints affected the exports of services when these are exported as secondary products by a multi-product firm, typically a manufacturer: the case is known as *servitization* (Breinlich *et al.* 2014; Crozet and Millet, 2017). While there are various reasons for manufacturers to provide services, credit needs may arise if marginal costs increase as one moves away from the product of core competence (Eckel and Neary, 2010; Eckel *et al.*, 2015).

Finally, we further try to disentangle the channel through which credit frictions may arise and we show that credit supply shocks affect exports of services that require more complex tasks in production and these effects are only significant when exporting to countries with a weaker institutional background.

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 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 statistics and robustness checks.

2. Related literature

The literature on the international trade in services has been growing remarkably in the last decade. A 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 2016b) in Belgium, Federico and Tosti in Italy (2016), 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 services trade (relative

[7] For example, this is the case when the importer's decision to buy foreign services critically depends on local financing intermediaries (Niepmann and Schmidt-Eisenlohr, 2017).

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 on Indian firms. Using balance sheets data, Ariu (2016a) shows that services 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 obtain 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 in services.

Differently 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.

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) (see, for example, Manova, 2008; Chor and Manova, 2012; Iacovone and Zavacka, 2009). Other works have applied this approach using firm level data (see for example: Behrens *et al.*, 2013; Albornoz *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). Moreover, our work is also related to the papers on multi-product companies. Among others, Manova and Yu (2017) show how Chinese multi-product firms allocate exports across destinations depending on the quality of their products. Since our dataset of services exporters is composed of many manufacturers, we provide evidence that credit frictions significantly affected firms decision of exporting services, independently of whether they also export goods.

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., 2016). In this vein, 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 (2018), who analyzed the link between credit supply changes following 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 first is the Direct Reporting database (henceforth DR) of the Bank of Italy, which contains sample data on services exports per firm, quarter, year, type of service and country of destination. We use data contained in a part of DR, named TTN (Non-financial Quarterly Transactions, *Transazioni Trimestrali Non finanziarie* in Italian): this is a 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.2 for details).[8] 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.

The second source we use is the Italian Credit Register (henceforth CR) of the Bank of Italy, which collects data on borrowers with exposure above 30,000 euros towards a single intermediary[9]. 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. 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.

[8] We exclude taxes and government, financial, insurance and construction services.

[9] 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).

Our third source is from the Supervisory Reports (henceforth SR) 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.

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 (*Cred_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 which we keep 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 (2018) 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.3 in the Appendix. Table A.4 reports the summary statistics of the main variables used in the empirical analyses.

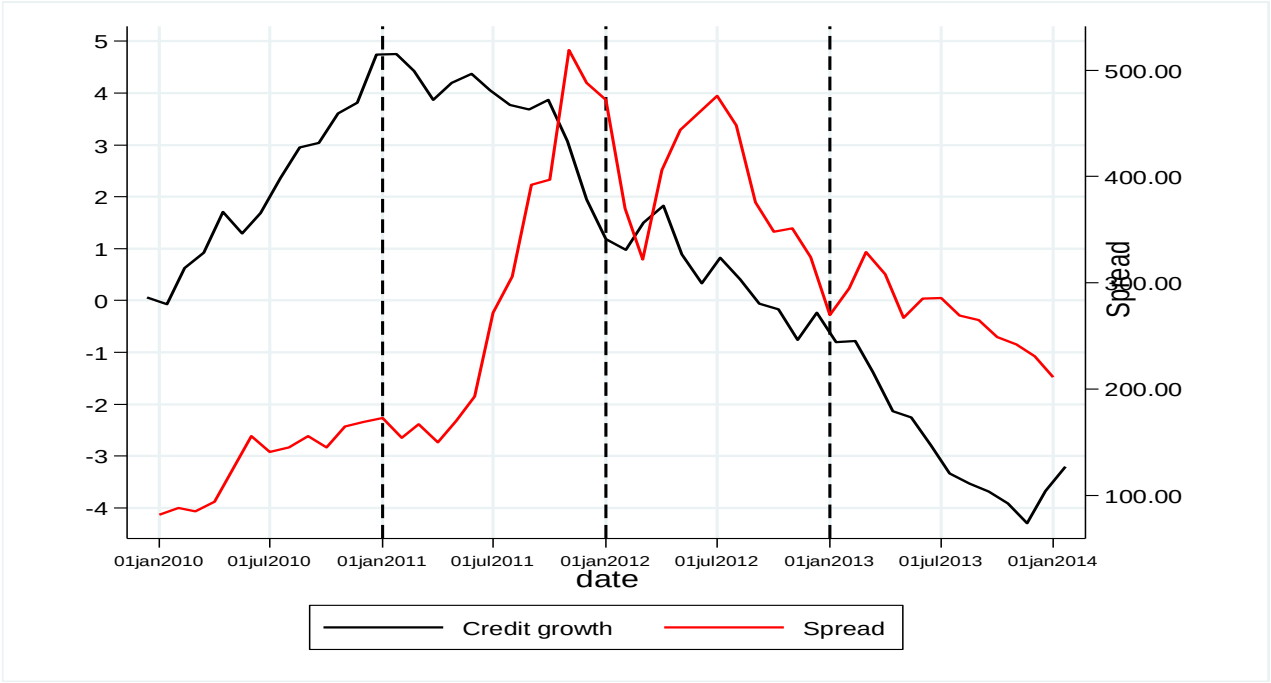
4. The sovereign debt crisis

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 on the 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).

Figure 1. T-Bills spread and growth rate of loans.[(1)]

(monthly data; left scale: 12 month percentage changes;[(2)] right scale: basis points)



Source: Bank of Italy and ECB. (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). (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 and every other variation that does not originate from an economic transaction.

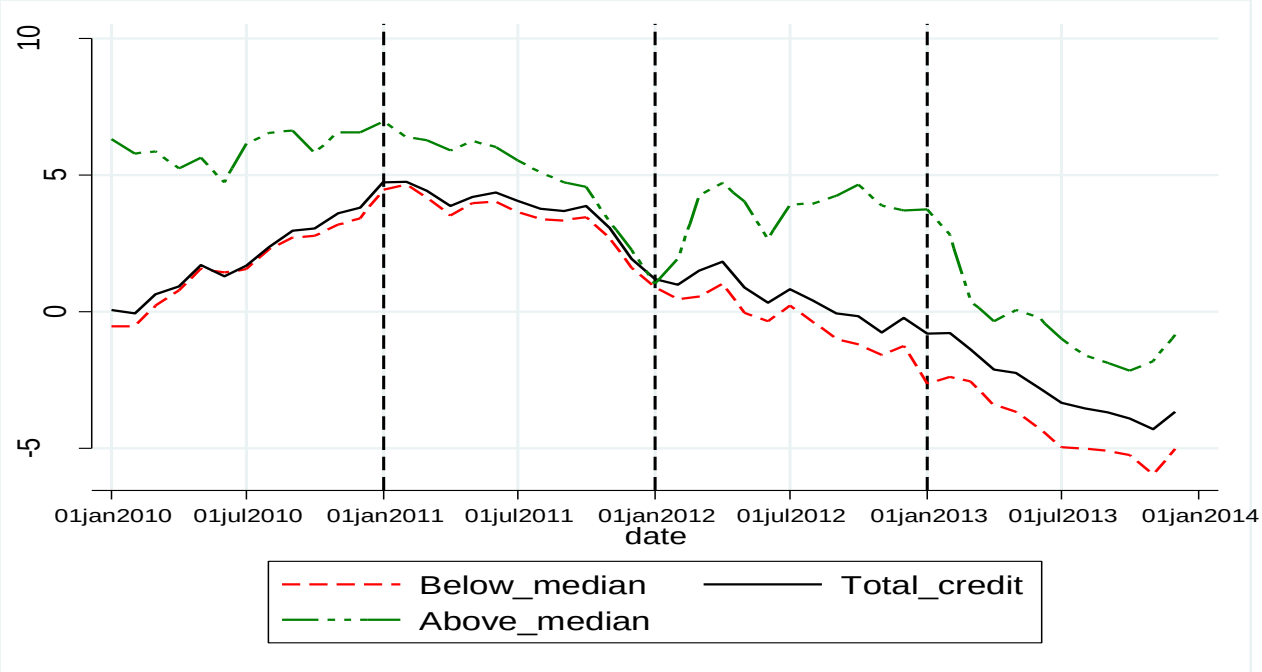
To understand the validity of our proposed instrument (retail funding) consider that, during the phase when sovereign debt tensions increased, Italian banks experienced a relevant decline in fund-raising from non-residents and in wholesale funding as a result of the market perception of increased country risk.[10] Faced with such a general reduction of funding, the rate of growth of credit to the non-financial private sector turned negative in the second half of 2012 (see fig. 1), but 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 for banks relying more intensively on this source of funding remained positive throughout the year, whilst it reduced for the other banks (see fig. 2).[11] In other terms, the lending supply of banks with a greater access to retail funding was better insulated from the significant fluctuations in funding market conditions.

[10] Over that year, wholesale funding as a share of total funding of Italian banks declined by 4.8 percentage points (Bank of Italy, 2012).

[11] Del Giovane et al., 2013 and Albertazzi et al., 2014.

Figure 2. Loans to firms by banks' position with respect to retail funding [1]

(12 month percentage changes) [2]



Source: Bank of Italy. (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 vale 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 and every other variation that does not originate from an economic transaction.

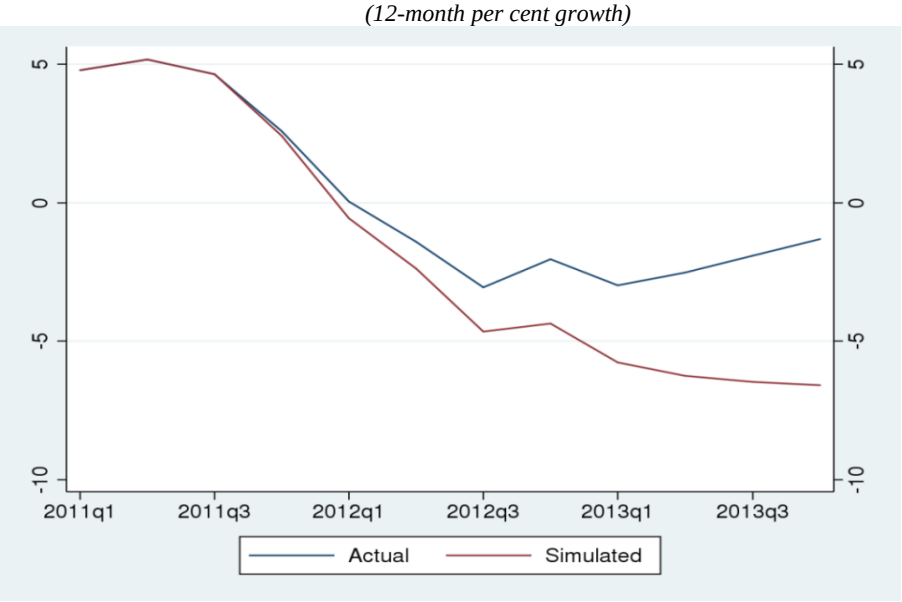
The malfunctioning of the wholesale funds markets over several European area countries induced the European Central Bank (ECB) to implement non-conventional monetary policy measures and, in particular starting from December 2011, the Long Term Refinancing Operations (LTRO's) aimed at increasing banks liquidity.[12] 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 (Albertazzi *et al.*, 2014, and see also fig. 3 from Casiraghi *et al.*, 2016).

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).

[12] 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 the ECB annual reports on 2011 and on 2012 (ECB, 2012 and 2013).

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 (2016).

5. Empirical methodology

We aim to test whether the change of bank credit granted[13] 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 2011. Nevertheless, we also consider in robustness checks the case in which banks' lending policies might have changed soon after the summer of 2011 (see Appendix section A.4).

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

[13] 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).

using the *within–firm* estimation procedure, 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.[14] In practice, this means estimating the following equation:

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

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 *b* deposits and bonds (held by domestic residents) over bank assets lagged one year (in 2011). We also include firm fixed effects (δ_i) to control for unobserved changes at firm level.[15]

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 policy[16]. 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. As already mentioned above, 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 refinancing (see fig. 3).[17] 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

[14] Accordingly, we use observations of firms with credit relationships only from multiple banks. This procedure has been used by a large literature on within-firm estimations with bank firm data. To mention a few of them, see Iyer *et al.* (2014), Jiménez *et al.* (2010) and Jiménez *et al.* (2012).

[15] 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.

[16] 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).

[17] Carpinelli and Crosignani (2017) 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.

than the banks relying relatively more on other sources.[18] 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%).

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.

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

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

Source: CADS, CR, SR. (1): Average values by quartile of the instrumental variable. (2): unit values; (2): ratio. See table A.3 for variables definition.

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:

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

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*.

[18] 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 amount of credit across banks. As it is standard in this kind of exercises (see for example Cingano *et al.*, 2016), the instrumental variable at firm level is a weighted measure sum of retail funding, where the weight is given by the following:

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

Equation (3) shows that ω_i is the fraction of lending by bank *b* in 2011 ($CR_{i,b,2011}$) over the sum of credit granted by all banks (*n*) to the firm *i* in the same year. Note that in order to reduce endogeneity we lag the weight of one 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 non-random matching between banks and firms when using bank-firm data: that is, when some banks might be specialized in lending to firms exporting a specific type of services *s* or to a particular country *c*.

Finally, note that the focus of the paper is on the intensive margin of services exports. The analysis of the extensive margin (i.e. the number of firms starting to export or exiting from the foreign market) is not feasible because a relevant share of the firms in the export services dataset are sampled (for the methodology see Appendix A.1). Nevertheless, two facts reveal that focusing on the intensive margin is a proper approach to our analysis. Indeed, various studies — also on countries similar to Italy — show that services exports are very concentrated in few medium size and large firms,[19] which are typically better able to bear the fixed costs of exporting and therefore to maintain the export status even during a time of crises. Secondly, 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 level of exports, rather than exiting the exports markets altogether. For example, Paravisini *et al.* (2015) find that credit shocks affected the intensive margin of goods

[19] Federico and Tosti (2016) show that exports and imports of services in Italy are highly concentrated in few firms. For similar results in other countries see for example Gaulier *et al.* (2011) on French firms and Breinlich and Criscuolo (2011) for firms in the UK.

exports by Peruvian firms-during the financial crisis, but they find no significant effect the evidence on the extensive margin.

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.

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

	All sample		Below median		Above median	
variable	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

Source: Bank of Italy (supervisory reports). (1): data in thousands of euros in 2011; (2): growth rate between 2011 and 2012.

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, which is given by the ratio between bank holdings of Italian Government securities and bank assets. This 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.

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. Low_Cap is a dummy=1 if the bank Total Capital Ratio is below 10 and 0 otherwise. Foreign_Bank is dummy=1 if the bank is foreign. Mainbank is a dummy=1 for the main lender of a firm. 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: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

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: *Low_Cap* is a dummy variable equal to 1 for banks that were low capitalized, that is with a Total Capital Ratio (TCR) lower than 10%.[20] 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.* (2017) 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). Note that in all the specifications analyzed so far the parameter of *retail_funding* remains positive and significant as in column 1.[21]

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-level control. The

[20] Following Albertazzi and Marchetti (2010), we choose the dummy specification (instead of a continuous variable) to capture possible non-linearity; 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.

[21] 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.

estimated effect – which still includes credit demand factors – 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, 2018).

Table 4. Firm level (baseline) estimates

Panel A

	OLS 2nd stage	2SLS Second stage estimates									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
ΔCredit	0.201***	0.427***	0.494***	0.405***	0.422***	0.368***	0.428***	0.319***	0.432***	0.386**	0.316**
	(0.0333)	(0.132)	(0.136)	(0.109)	(0.125)	(0.117)	(0.128)	(0.110)	(0.130)	(0.150)	(0.135)
Employees			0.131***								0.126***
			(0.0301)								(0.0411)
Profitability			0.0539**								0.0962***
			(0.0221)								(0.0304)
Cred_Score				-0.0482							0.0313
				(0.0572)							(0.0696)
Distressed					0.128						0.376***
					(0.0827)						(0.124)
Capital int.						0.0271					0.0802**
						(0.0222)					(0.0390)
Intangibles							-0.320***				-0.0659
							(0.123)				(0.165)
Trade Cred.								0.271			0.747**
								(0.220)			(0.311)
Ext. Fin									-5.694		1.120
									(5.299)		(5.947)
For_Debt										0.0328	-0.00614
										(0.0345)	(0.0289)
Service FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country 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***	1.158***	1.444***	1.253***	1.350***	1.220***	1.695***	1.203***	1.412***	1.676***
		(0.140)	(0.142)	(0.154)	(0.151)	(0.148)	(0.132)	(0.163)	(0.139)	(0.147)	(0.137)
R^2		0.151	0.156	0.202	0.217	0.170	0.238	0.195	0.165	0.302	0.502
F test		71.92	66.46	87.77	68.6	85.52	85.79	108.09	74.86	93.8	148.58
(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	3947	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. 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.3 in the Appendix. Standard errors (in parentheses) are clustered at service and country level: * p < 0.1, ** p < 0.05, *** p < 0.01.

To control for potentially confounding firms' characteristics, we add some firm-specific regressors suggested by the wide literature on international trade and firm heterogeneity.[22] 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

[22] All controls are lagged one period.

variables (column 3), the instrumented measure of credit supply has still a significant impact on the dependent variable.

Another relevant control is *Cred_score*, an inverse measure of the credit worthiness of a firm. This is a categorical variable that measures the probability of default.[23] The sign of the *Cred_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 *Cred_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 supply change (Δ*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.[24] With any of these controls, the sign (positive, as expected) and the statistical significance of the coefficient of credit supply 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* (that is, the credit granted by suppliers) in column 8. We expect this variable to influence the estimated parameter of interest because trade credit can act as a substitute of bank credit. This is both in column 8 and in the horse race (column 11), where estimated coefficient of interest drops to 0.32. The last estimate of the baseline specification implies that a 1% reduction in the stock of credit resulted in a decline of 0.32% 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 (2018) 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

[23] The *Cred_score* variable takes integer values from 1 to 9, with higher values representing higher probability of default of the firm.

[24] 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.3 for variables definition.

by around 13% 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.[25]

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 1.7% (column 11). Finally, we check that the 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 results

In this section we report results additional to the baseline and that enrich our analysis. They regard the main activity of the firm, the role of geography variables and the characteristics of the services exported.

Multi-product firms – In this subsection we check whether our results may be driven by the presence of firms whose core activity is not in producing services (manufacturers, construction companies, etc…): they are more than 50% of the sample and have a low intensity of services exports (see Table A.5). These features are found also in other countries: for example, Kelle and Kleinert (2010) find 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...). In addition to this, we also note that even services firms in our sample export services that are different from their main production code. Overall, in our sample 468 firms (about 89%) are multi-product, in the sense that they export at least one service that is not their core activity.

Since multi-product firms might use credit for various purposes, and it is likely that the use is concentrated on their core business, such as exporting goods or to differentiate quality of their exports across destinations (Manova and Yu, 2017), we check whether the significant parameter

[25] 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.

estimates we find on services exports are not driven by the core activities of the firms. In other terms, manufacturing firms might require higher levels of physical assets for the provision of services, so that they 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). Therefore, the risk is to wrongly attribute the effect of credit supply frictions to services exports, rather than to the production and exporting of goods.

To this end, we first check whether there are any unobserved sector effects: in Table 5 we repeat the baseline regressions by adding sector fixed effects and the results are substantially unchanged (columns 1 and 2): the sign of the effect of credit supply growth on the change of exports of services is positive and different from zero.[26] Moreover, since half of the firms in the sample are manufacturers, we repeat the previous exercise by interacting Δcredit with a dummy for manufacturers. The estimates (columns 3 and 4) show that the effect derives from non-manufacturing firms. Third, since in our dataset two thirds of the firms export also goods, we consider whether the effect of credit supply on services exports depends on whether firms are goods exporters. To this aim, we interact ΔCredit with a dummy equal to 1 if the firm reports goods exports and the complementary dummy for non-exporters of goods. The estimates (columns 5 and 6) show that credit change still has positive and statistically significant effect, but only for non-exporters of goods, thus revealing that being a goods exporter did not imply a differential reaction on services exports.

Moreover, in columns 7 and 8 we split firms by the level of services export intensity (given by the ratio of services exports and turnover); given the feature of multi-product firms, this ratio means the intensity of secondary production for most of the sample (see table A.5 in the Appendix). The estimates show that the effect of credit is relevant only when this secondary activity is more relevant across firms. Since about 88% of firms are multi-product (as defined above), we expect that the effect of credit derives mainly from these firms: columns 9 and 10 confirm this point.[27] Finally, we repeat the previous exercise by considering multi-product exports: that is, we label as multi product the exports of services that are not the core product of the firm. Again we find that the significant effect derives from the export of services that are secondary products (columns 11 and 12).

[26] Since exports of services are mainly concentrated among big or very profitable firms, for which credit constraints might be less 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.8) 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.8bis to check whether services exports are biased towards sectors and some particular financial characteristics and we obtain similar results.

[27] Note that in column 2 the coefficient of the credit change interacted with multi-product firm is statistically greater that of the other interacted variable.

Table 5. Estimates with sector effects, services intensity, goods exports and multi-product

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Sector FE		Manufacturing		Goods Exports		Services intensity		Multi-product firms		Multi-product exports	
ΔCredit	0.452***	0.266*										
	(0.139)	(0.151)										
ΔCredit x Manuf. sector			-1.175	-1.876								
			(1.865)	(2.217)								
ΔCredit x Other sectors			0.386***	0.222**								
			(0.0955)	(0.0974)								
ΔCredit x Goods Exporter[(1)]					-1.571	-4.749						
					(2.713)	(8.643)						
ΔCredit x no Goods Export[(2)]					0.389***	0.227*						
					(0.101)	(0.122)						
ΔCredit x High Ser. Int.[(2)]							0.316***	0.252*				
							(0.114)	(0.134)				
ΔCredit x Low Ser. Int.[(2)]							-3.449	-5.038				
							(2.848)	(17.20)				
ΔCredit x multi-product firm[(3)]									0.400***	0.495***		
									(0.136)	(0.135)		
ΔCredit x single-prod. firm[(3)]									-7.807	16.61*		
									(25.95)	(8.689)		
ΔCredit x multi-pr. exports[(3)]											0.489**	0.627***
											(0.229)	(0.192)
ΔCredit x single-pr. exports[(3)]											0.265*	-0.0213
											(0.145)	(0.141)
Manufacturing sector FE			Yes	Yes								
Goods Exporter FE					Yes	Yes						
High Services Intensity FE							Yes	Yes				
Multi-product firms FE									Yes	Yes		
Multi-product exports FE											Yes	Yes
Firm controls	No	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Services FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Countries FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE [(4)]	Yes	Yes	No	No	No	No	No	No	No	No	No	No
F-test	72.78	154.43										
(p-value)	(0.000)	(0.000)										
Weak identification Cragg-Donald Wald F Test			38.43	30.80	23.19	3.25	79.46	3.38	0.51	24.80	62.60	81.26
10% maximal IV size			7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03
Observations	4055	2670	4055	2670	4022	2646	4055	2670	4055	2670	4055	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. In the first stage this variable is interacted with any of the interacting variables that appear in the table, as explained in what follows. (1): "Goods Exporter" is a dummy =1 if the firm exports goods. (2) "High/Low Services intensity" is a dummy for firms with a ratio of services exports over sales above (below) the sample median. (3): Single/multi-product exports are trade flows of the same/different service of the firm core activity. (4): Sectors are defined by NACE Rev. 2 classification. Firm controls are Employees, Profitability, Cred_Score, Distressed, Capital int., Intangibles, Trade Cred., Ext. Fin and For_Debt. All controls and IV's are lagged 1 year (2011). Variables definitions are in table A.3 in the Appendix. Standard errors (in parentheses) are clustered at service and country level: * p < 0.1, ** p < 0.05, *** p < 0.01.

In general these estimates show that credit constraints affected the exports of services when these are not the main product of the firm. This phenomenon, known as *servitization*, is diffused among manufacturers of advanced countries (see among others Crozet and Milet, 2017). Our results are coherent with the assumption made by works on multi-product firms that marginal costs increase as one moves away from the product of core competence (Eckel and Neary, 2010; Eckel *et al.*, 2015). Then, the greater marginal costs circumstances could justify credit frictions in these circumstances.

Geography – We look at the geography of destinations exploiting how the country characteristics interact with ΔCredit. In this way we check whether the credit frictions are relevant for exporting services to some groups of countries. In table 6 we first interact ΔCredit with dummies for the level of GDP, GDP per capita and a financial development indicator (higher or lower than the sample median) and we find that the effect of credit growth is significant only for exports to less developed

countries or with a lower level of financial development (columns 1 to 3). Similar results emerge when the credit change is interacted with the various measures of the World Governance Indicators (Rule of Law, Regulatory Quality, Control of corruption, Government effectiveness, Voice and accountability) in columns 4 to 8.[28]

Table 6. Estimates on services exports with Δcredit interacted with country characteristics

GMM Second stage estimates								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	GDP	GDP per capita	Financial Development	Rule of Law	Regulatory Quality	Control of corruption	Government effectiveness	Voice and accountability
ΔCredit x high GDP countries	0.125							
	(0.164)							
ΔCredit x low GDP countries	0.450***							
	(0.171)							
ΔCredit x high GDP pc. countries		0.213						
		(0.179)						
ΔCredit x low GDP pc. countries		0.433***						
		(0.152)						
ΔCredit x high FinDev countries			0.299					
			(0.184)					
ΔCredit x low FinDev countries			0.337**					
			(0.139)					
ΔCredit x high Rule of Law				0.211				
				(0.179)				
ΔCredit x low Rule of Law				0.449***				
				(0.143)				
ΔCredit x high Regulatory Quality					0.228			
					(0.172)			
ΔCredit x low Regulatory Quality					0.438***			
					(0.151)			
ΔCredit x high Control of corruption						0.253		
						(0.182)		
ΔCredit x low Control of corruption						0.393***		
						(0.141)		
ΔCredit x high Government effectiv.							0.220	
							(0.182)	
ΔCredit x low Government effectiv.							0.433***	
							(0.140)	
ΔCredit x high Voice and account.								0.234
								(0.175)
ΔCredit x low Voice and account.								0.424***
								(0.146)
High GDP country	Yes							
High GDP pcap. country		Yes						
High FD country			Yes					
High Rule of Law				Yes				
High Regulatory Quality					Yes			
High Control of corruption						Yes		
High Government effectiveness							Yes	
High Voice and accountability								Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Services FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Weak identification Cragg-Donald Wald F Test	98.46	97.33	91.11	97.70	100.17	93.36	93.27	97.52
10% maximal IV size	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03
Observations	2670	2670	2670	2670	2670	2670	2670	2670

The estimates show 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. In the first stage this variable is interacted with any of the interacting variables that appear in the table, as explained in what follows. FinDev is the level of financial development measured as the ratio between private credit by commercial banks and other private institutions over GDP (source: IMF). Rule of Law, Regulatory Quality, Control of corruption, Government effectiveness, Voice and accountability are from the World Governance Indicators. Firm controls are Employees, Profitability, Cred_score, Distressed, Capital int., Intangibles, Trade Cred., Ext. Fin and For_Debt. All controls and IV's are lagged 1 year (2011). Variables definitions are in table A.3 in the Appendix. Standard errors (in parentheses) are clustered at service and country level: * p < 0.1, ** p < 0.05, *** p < 0.01.

[28] In unreported estimates we repeat this exercise splitting between Advanced and Emerging countries (using the IMF classification) and OECD and non-OECD: we obtain similar results.

Overall, this last set of results reveals that credit supply is especially relevant for exporting services to countries with weaker institutional setting. Then this finding highlights a typical feature of services provision, the "complementarity of inputs" (Lennon *et al.*, 2017), which means that the production process ends in the country where it is consumed, so that particular features affecting the importer (adequate infrastructure, financial means, etc…) may play a role.[29]

Services – We look at two characteristics of services that, as mentioned in the introduction, may explain the presence of credit frictions: production customization and intangibility.

Customization of services on specific clients' needs may require executing very complex tasks for each service provision. This implies that credit could spur exports of services that require a more complex production process. To test this hypothesis, we use a measure of production complexity developed by Naghavi *et al.* (2015). These authors build a measure of production complexity on almost all sectors of the US economy using data on the task of complexity of problem solving from the US occupation database (O*NET). Note that using US data allows to consider this measure more exogenous with respect to our data. We convert these indexes into our services categories and divide services into high vs low complex tasks intensity.[30] By interacting credit growth with high vs low services complexity dummies we provide a first evidence that credit growth affected exports only of more complex services (table 6bis, column 1). Moreover, starting from this finding, we investigate further the channels that drive credit frictions. Recall that in table 6 we have found that the effects are significant when exporting services to countries that are poorer or have weaker institutions. Indeed, services with higher customization on the needs of the client have little (or null) market value outside the buyer-seller relationship; this makes the counterparty contractual risk greater especially in countries where the institutional setting of the importer is weak. Accordingly, by interacting further this interacted measure of ΔCredit with binary measures of countries that have high or low Rule of Law or GDP per capita (columns 2 and 3), we find interestingly that credit supply shocks significantly affected exports of complex services to countries with lower institutional background and lower GDP per capita.

Secondly, we look at intangibility of services. In general, all services are predominantly intangible, so that borrowing constraints may be binding through limited collateral value of the assets. Nevertheless, to investigate this issue more deeply, we split services into high and low

[29] Our statement that the Sovereign crisis was an exogenous event for our empirical exercise is completely correct if we confirm the results excluding the GIPS countries (Greece, Ireland, Portugal, and Spain). The results (unreported for sake of brevity) are almost unchanged. Moreover, we have tried to detect the effects of usual variables in gravity equations (distance and GDP growth). Both these variables are not significant when they are jointly inserted in the regressions (unreported) and the effect on ΔCredit remains substantially unaffected.

[30] The procedure to build these variables are described in the Appendix (section A.3).

intangibility of their assets using firm level data of listed companies in the US, where intangibility is the ratio of intangible fixed assets over total fixed assets. By interacting credit growth with the services intangibility dummies we show that credit supply shocks affect significantly both the exports that have relatively higher or lower rates of intangible assets in the production (column 4), with the magnitude of the high services parameter slightly greater (0.44). Also in this case we further interact credit supply growth with dummies of low Rule of Law or low real GDP per capita.

Table 6bis. Estimates on services exported with ΔCredit interacted with tangibility, product complexity and country group measures

	GMM Second stage estimates					
	(1)	(2)	(3)	(4)	(5)	(6)
	Complexity	Complexity x Hi/Low RGDPpc	Complexity x Hi/Low Rule of Law	Intangibility	Intangibility X Hi/Low RGDPpc	Intangibility X Hi/Low Rule of Law
ΔCredit x Hi-Compl	0.326**					
	(0.145)					
ΔCredit x Low-Compl	0.287					
	(0.177)					
ΔCredit x Hi-Compx x Low RoL		0.520***				
		(0.171)				
ΔCredit x other		0.221				
		(0.157)				
ΔCredit x Hi-Compx x Low RGDPpc			0.448**			
			(0.187)			
ΔCredit x other			0.254			
			(0.157)			
ΔCredit x Hi-Int.				0.435**		
				(0.205)		
ΔCredit x Low-Int.				0.296**		
				(0.145)		
ΔCredit x Hi-Int x Low_RGDPpc					0.578**	
					(0.284)	
ΔCredit x other					0.308**	
					(0.141)	
ΔCredit x Hi-Int x Low_RoL						0.591**
						(0.260)
ΔCredit x other						0.310**
						(0.143)
High Complexity	Yes					
High Complexity x Low Rule of Law		Yes				
High Complexity x Low RGDPpc			Yes			
High intangibility				Yes		
High intangibility x Low RGDPpc					Yes	
High intangibility x Low Rule of Law						Yes
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Services FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Weak identification Cragg-Donald Wald F Test	115.8	110.6	108.8	115.8	110.6	108.8
10% maximal IV size	7.03	7.03	7.03	7.03	7.03	7.03
Observations	2670	2670	2670	2670	2670	2670

The estimates show 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. In the first stage this variable is interacted with any of the interacting variables that appear in the table, as explained in what follows. Hi-Int. and HI-Compl. are the dummies for services that have intangibility above the median of intangibility or of product complexity (see section Appendix A.3). Hi/Low-RGDPpc are dummies for countries above/below the median of the GDP per capita. Hi/Low-RoL are the analogous dummies with respect to the Rule of Law from the World Governance Indicators. Firm controls are Employees, Profitability, Cred_score, Distressed, Capital int., Intangibles, Trade Cred., Ext. Fin and For_Debt. All controls and IV's are lagged 1 year (2011). Variables definitions are in table A.3 in the Appendix. Standard errors (in parentheses) are clustered at service and country level: * p < 0.1, ** p < 0.05, *** p < 0.01.

The estimates (column 5 and 6) show that all the coefficients of credit shocks are significant.

Overall, from this last group of estimates we derive two main conclusions. First, credit supply shocks affect the exports of services when these are directed to importing countries with a weaker institutional setting, but only for the services that embed a higher complexity in production. Secondly, all services are subject to the tyranny of intangibles so that they are affected by credit frictions.

7. Robustness checks

In this section 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 other sources of banking shocks 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 7 (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 columns 3 and 4 show that the estimated coefficients are positive and significant at 1% and that their magnitude is about similar to the analogous estimates 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 7 (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.[31]

Table 7. 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**	0.261*	0.452***	0.351**	0.406***	0.392**	0.276***	0.226**
	(0.125)	(0.138)	(0.144)	(0.167)	(0.142)	(0.169)	(0.103)	(0.104)
Firm controls	No	Yes	No	Yes	No	Yes	No	Yes
Service 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***	1.546***	1.079***	1.459***	1.106***	1.468***		
	(0.147)	(0.138)	(0.131)	(0.122)	(0.144)	(0.134)		
Retail_fund/Total Funding							1.674***	2.027***
							(0.137)	(0.140)
R^2	0.165	0.516	0.232	0.580	0.265	0.608	0.294	0.629
F test	67.20	125.10	67.35	143.68	58.76	119.21	183.42	277.37
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(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. Assets are bank total assets. Total Funding includes also bank funding from the interbank market and from foreign retail depositors. Firm controls are Employees, Profitability, Cred_Score, Distressed, Capital int., Intangibles, Trade Cred., Ext. Fin and For_Debt. All controls and IV's are lagged 1 year (2011). Variables definitions are in table A.3 in the Appendix. Standard errors (in parentheses) are clustered at service and country level: * p < 0.1, ** p < 0.05, *** p < 0.01.

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 8 (columns 1 to 2) show that our results are robust to such a change. In detail, the magnitude of the estimated coefficient of credit supply varies between 0.43 and 0.25 and it is positive and significant in both 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 sign.[32] The instruments adopted are

[31] In the richest specification (column 8) the magnitude is smaller (about 0.23%) than the analogous of the baseline specification (in Table 4).

[32] 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).

strong: the first stage F-statistics of the richest specification is 121.4, 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 3 and 4) and the validity of our results is also confirmed in this case.[33]

Table 8. Estimates with additional instrumental variables

Panel A: GMM-IV Second stage estimates								
	Government bonds		Low capitalization		Foreign banks		Main bank	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ΔCredit	0.433***	0.254**	0.606***	0.219*	0.410***	0.306**	0.410***	0.327**
	-0.131	(0.122)	-0.111	(0.114)	(0.131)	(0.132)	-0.131	(0.134)
Firm controls	No	Yes	No	Yes	No	Yes	No	Yes
Service FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: First stage estimates								
Retail_funding	1.190***	1.814***	1.322***	1.880***	1.170***	1.675***	1.532***	1.822***
	-0.139	(0.133)	-0.128	(0.140)	-0.139	(0.136)	-0.173	(0.153)
Gov_bonds	-0.0249**	-0.199***						
	-0.0113	(0.0225)						
Low_Cap			-1.272***	-3.927***				
			-0.0995	(0.534)				
Foreign_bank					-0.503***	-0.00934		
					-0.167	(0.213)		
Mainbank							-0.641***	-0.306***
							-0.0639	(0.0768)
F test	46.00	121.37	102.47	94.47	39.20	75.34	50.84	75.01
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
J test	5.106	1.192	5.587	1.867	1.95	0.139	0.545	0.808
(p-value)	(0.0238)	(0.2748)	(0.0181)	(0.1718)	(0.1626	(0.7096)	(0.4605)	(0.3688)
R^2	0.151	0.514	0.17	0.528	0.174	0.502	0.151	0.505
Observations	4055	2670	4055	2670	4055	2670	4055	2670

Panel A shows the second stage of the GMM-IV 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) in columns 1 and 2; Low_Cap (a dummy=1 if the bank Total Capital Ratio is below 10 and 0 otherwise) in columns 3 and 4; Foreign_bank (a dummy=1 if the bank is foreign) in columns 5 and 6; Mainbank (a dummy=1 for the main lender of a firm) in columns 7 and 8. Firm controls are Employees, Profitability, Cred_Score, Distressed, Capital int., Intangibles, Trade Cred., Ext. Fin and For_Debt. All controls and IV's are lagged 1 year (2011). Variables definitions are in table A.3 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).

In columns 5 and 6 we add a dummy for foreign banks (*For_dum*) given the relevance in explaining credit supply during the sovereign debt crisis (Bofondi *et al.*, 2017): 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 (0.30), but the coefficient of *Foreign Bank* in the richest

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

specification of the first stage statistics is not significant. Finally, we have considered, in columns 7 and 8, a dummy for the main bank (*Mainbank*): the estimates confirm our results.[34]

Finally, endogeneity might still 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 (2018), 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 9).

Finally, note that we shortly mention other robustness checks in the Appendix (section A.4).

Table 9. Estimates with firm dummy from ancillary regression

	OLS 2nd stage	2SLS Second stage estimates					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ΔCredit	0.204***	0.460***	0.378**	0.408***	0.317**	0.443***	0.382**
	-0.0256	-0.122	(0.147)	-0.128	(0.152)	-0.157	(0.158)
Firm dummy	-0.014	-0.0314	0.000488	-0.0304*	-0.000371	-0.0279	0.00341
	-0.00987	-0.0191	(0.0181)	-0.0172	(0.0188)	-0.0195	(0.0209)
Firm controls	No	No	Yes	No	Yes	No	Yes
Service FE	Yes	Yes	Yes	No	No	No	No
Country FE	Yes	Yes	Yes	No	No	No	No
Serv.&Coun. FE	No	No	No	Yes	Yes	Yes	Yes
Serv.&Area FE	No	No	No	No	No	Yes	Yes
R^2	0.226						
		Panel B: First stage estimates					
Retail funding		1.539***	1.732***	1.168***	1.536***	1.123***	1.538***
		(0.172)	(0.143)	(0.136)	(0.120)	(0.130)	(0.128)
Chi-sq. test		245.90	213.245	242.48	185.740	199.993	162.555
(p-value)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R^2		0.215	0.506	0.103	0.453	0.144	0.515
Observations	3871	3871	2547	3871	2547	3871	2547

The estimates show OLS (column 1) and 2SLS regressions (columns 2 to 7). 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. Firm controls are Employees, Profitability, Cred_Score, Distressed, Capital int., Intangibles, Trade Cred., Ext. Fin and For_Debt. All controls and IV's are lagged 1 year (2011). Variables definitions are in table A.3 in the Appendix. Standard errors are bootstrapped (in parentheses), clustered at service and country level. In columns 4 and 5 standard errors (in parentheses) are clustered at service &country level; in columns 6 and 7 standard errors are clustered at service and country level and at service&area level: * p < 0.1, ** p < 0.05, *** p < 0.01.

8. Conclusions

While the empirical literature on trade in services has grown considerably in the last decade highlighting 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.

[34] 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 hypothsis, raising concerns of overidentification.

Despite services require less capital investment than goods, they may be highly dependent on external finance. Moreover, they are intensive on intangible capital and on dedicated investments on product customization. These features make services likely to be subject to credit frictions.

We fill this gap in the literature showing 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.

Overall, our contribution is threefold. First, we show empirically the role of credit frictions for exporting services. Secondly, the analysis highlights the different reaction of multi product firms to credit shocks, where this affects the exports of secondary products (servitization) rather than the core product of the firm. Third, we find that the effects of credit shocks are especially relevant for exporting services to countries with weaker institutions, where the counterparty contractual risk is greater. Finally, we further identify the source of credit frictions as these matter for exporting more complex services in countries with weaker institutions or lower GDP per capita.

Despite the evidence we provide is limited to the sovereign debt crisis, a period of strong capital outflows and growing difficulty of raising funds in international markets for Italian banks, our findings have relevant implications for the interaction between the role of credit frictions and various economic effects of international trade linkages, given the increasing role of services in international trade and the growing importance of multi-product firms in the global value chains.

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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 (2016) 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. 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.[35] 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,[36] international organizations (such as IMF, etc…) or rare destinations (countries with an overall frequency lower than 10). These represent 10% of the observations.

[35] 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.

[36] 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 Hebous 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.

A3. Indicators of services intangibility and of product complexity

Intangibility – Intangibility of assets has been computed on ORBIS Bureau van Djck data on US listed firms between 2008 and 2011. For each firm we compute intangibility as the sum of intangible fixed assets in the four years divided by the sum of total fixed assets in the same period. We take the average of the intangibility rate and the sum of total sales at sector level, using the NAICS 2002 classification at four digit. Then, we convert both intangibility and total sales from NAICS 2002 at 3 digit into the EBOPS 2002 services classification system, using the correspondence table provided by E. Van der Marel (https://sites.google.com/site/erikvandermarel/links). Finally, we take the weighted average of intangibility in each EBOPS 2002 service category using total sales.

Production complexity – Naghavi *et al.* (2015) build measures of production complexity using the intensity of problem solving tasks in each occupation, where occupations are classified with the System of Occupations Classification (SOC). Data on complex problem solving skills is taken from the U.S. Department of Labor's Occupational Information Network (O*NET) and they ae for the year 1999. From SOC they convert these measures into NACE Rev. 1.1 at two digit. We convert the services exported classified as EBOPS 2002 into NAICS 2002 using the correspondence table provided by E. Van der Marel and then into NACE Rev. 1.1 at two digit using the correspondence tables provided by the Census Bureau. Finally, the production complexity measures are converted again into EBOPS 2002, where for each service we take the simple average of the complexity index.

A4. Additional robustness checks

In this subsection we run two types of additional robustness checks not included in the main text.

Definition of credit – Given that our argument on the presence of credit frictions relies on the difficulty of using intangible assets as collateral, as a first robustness check, we add guarantees to the definition of credit used insofar (that is, loans backed by account receivables, term loans,

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.

revolving credit lines, see Section 3). We expect that credit frictions matter even in the presence of guarantees. The estimates including guarantees are in columns 1 and 2 of Table A6. The estimated coefficients of the credit growth are positive and significant at 1% in all specifications and the magnitude in the richest specification (column 2) is slightly greater than that of the baseline: indeed, increasing the growth of credit supply by one standard deviation would increase the export growth by around 16% of a standard deviation.

A second issue on the definition of credit regards the inclusion of bad loans in the credit change variable. Loans are "bad" when a bank declares impossible to recover the credit from a debtor.[37] 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 A6 (columns 3 and 4) show that the inclusion of bad loans does not substantially change the results.

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 (see fig. 1) and consequently we repeat the baseline estimates setting the timing two quarters backward (that is, the growth rate is between the four quarters period 2010Q3-2011Q2 and the following one (2011Q3-2012Q2). The magnitude of the estimated parameter of credit supply growth in the specification with no other control (column 1 of table A7) is 0.14, less than the half of the respective of baseline in table 4 (0.43); however, note that in the richest specification the coefficient of interest is not significant anymore. 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 an 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 backward (between 2010 and 2011) and one year forward (between 2012 and 2013). Columns 3 to 6 show that, as expected, the coefficients of ΔCredit are not significant anymore in the 2010-2011 period, while the effects might have persisted in the year 2013 (columns 5 and 6).

[37] 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).

Decomposition of exports – 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. In unreported estimates we do not find any relevant effects of credit for the different margins.

Type of credit – 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), in our data 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 (unreported estimates). We obtain similar results considering. also the maturity of credit (short, medium and long term loans).

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

Table A.1. Sectoral measure of External Financial Dependence (EFD)

macro-sector	Isic Rev. 3	description	EFD
Services	62	Air transport	1.27
Services	75	Public administration and defence; compulsory social security	1.26
Services	50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel	1.12
Utilities	40	Electricity, gas, steam and and hot water supply	1.07
Services	55	Hotels and restaurants	0.84
Manufacturing	35	Manufacture of other transport transport equipment	0.69
Services	60	Land transport; transport via via pipelines	0.53
Manufacturing	20	Manufacture of wood and and of products of wood and cork, except furniture;	0.51
Manufacturing	28	Manufacture of fabricated metal metal products, except machinery and equipment	0.51
Services	53	Wholesale trade, retail and and commission trade, except of motor vehicles and motorcycles	0.46
Manufacturing	33	Manufacture of medical, precision precision and optical instruments, watches and clocks	0.40
Manufacturing	27	Manufacture of basic metals metals	0.33
Primary	14	Other mining and quarrying quarrying	0.25
Manufacturing	19	Tanning and dressing of of leather; manufacture of luggage, handbags, saddlery, harness and footwear	0.25
Services	64	Post and telecommunications	0.16
Manufacturing	26	Manufacture of other non-metallic non-metallic mineral products	0.13
Services	85	Health and social work	0.13
Manufacturing	18	Manufacture of wearing apparel; apparel; dressing and dyeing of fur	0.09
Construction	45	Construction	0.08
Manufacturing	32	Manufacture of radio, television television and communication equipment and apparatus	0.07
Manufacturing	23	Manufacture of coke, refined refined petroleum products and nuclear fuel	0.05
Services	93	Other service activities	0.05
Manufacturing	15	Manufacture of food products products and beverages	-0.02
Manufacturing	21	Manufacture of paper and and paper products	-0.04
Services	90	Sewage and refuse disposal, disposal, sanitation and similar activities	-0.10
Services	80	Education	-0.14
Manufacturing	24	Manufacture of chemicals and and chemical products	-0.17
Manufacturing	29	Manufacture of machinery and and equipment n.e.c.	-0.20
Manufacturing	31	Manufacture of electrical machinery machinery and apparatus n.e.c.	-0.23
Manufacturing	17	Manufacture of textiles	-0.43
Manufacturing	34	Manufacture of motor vehicles, vehicles, trailers and semi-trailers	-0.45
Primary	13	Mining of metal ores ores	-0.54
Manufacturing	36	Manufacture of furniture; manufacturing manufacturing n.e.c.	-0.59
Services	63	Supporting and auxiliary transport transport activities; activities of travel agencies	-0.62
Services	74	Other business activities	-0.67
Services	92	Recreational, cultural and sporting sporting activities	-0.86
Manufacturing	25	Manufacture of rubber and and plastics products	-0.96
Services	72	Computer and related activities activities	-1.30
Services	70	Real estate activities	-1.55
Manufacturing	22	Publishing, printing and reproduction reproduction of recorded media	-1.68

Source: Catão et al. (2009).

Table A.2. Classification of service types

Service	(EBOPS[1] 2002) code	Percentage of total [(2)]
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 afiliated 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): Extended Balance of Payments Services classification 2002. (2): percentages are computed on years 2011 and 2012.

Table A.3. Variables description

Variable name	Description	Source
Exports of services	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)]
Cred_score	Log of 1 + Credit Score variable [(4)]	CADS [(3)]
Distressed	Dummy equal to 1if 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 Credit	Log of 1+ trade credit	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
Exports of goods	Dummy=1 if the firm reports goods exports	CADS [(3)]
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. 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
Cred_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

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

Table A.5. Services intensity by sector in 2011

	Sector code (Nace Rev.2 2 digit)	Sector description	Services export Intensity [1]
Top 25%	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%
Bottom 75%	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 A6. Estimates with different definition of credit change

Panel A: 2SLS Second stage estimates				
	Credit includes guarantees		Credit includes bad loans	
	(1)	(2)	(3)	(4)
ΔCredit	0.427***	0.377***	0.427***	0.242**
	-0.132	(0.139)	-0.132	(0.138)
Firm controls	No	Yes	No	Yes
Service FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Panel B: First stage estimates				
Retail_funding	1.191***	1.589***	1.190***	1.632***
	(0.140)	(0.138)	(0.140)	(0.129)
R^2	0.151	0.489	0.15	0.496
F test	71.92	132.22	71.89	159.48
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	4055	2826	4055	2670

Panel A shows the second stage of the IV (2SLS) regressions. The dependent variable is the growth rate of services exports. ΔCredit is the log difference of credit. Credit contains guarantees in columns 1 and 2. It contains bad loans in columns 3 and 4. 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.3 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. Firm controls are Employees, Profitability, Cred_Score, Distressed, Capital int., Intangibles, Trade Cred., Ext. Fin and For_Debt. 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 A7. Estimates in different periods

2SLS Second stage estimates						
	Placebo 2 quarters backward (2010Q3-2011Q2 – 2011Q3-2012Q2)		Placebo 1 year backward (2010Q1-2010Q4 – 2011Q1-2011Q4)		Placebo 1 year forward (2012_Q1:2012_Q4 - 2013_Q1:2013_Q4)	
	(1)	(2)	(3)	(4)	(5)	(6)
ΔCredit	0.142***	0.150	-0.184	0.0255	0.125	2.380**
	(0.0450)	(0.0981)	(0.229)	(0.929)	(0.211)	(1.184)
Firm controls		Yes		Yes		Yes
						(0.105)
Service FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
F test	117.13	35.69	60.80	8.81	149.00	16.86
(p-value)	(0.000)	(0.000)	(0.000)	(0.0031)	(0.000)	(0.000)
Observations	3664	2080	3369	2072	3273	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. Firm controls are Employees, Profitability, Cred_score, Distressed, Capital int., Intangibles, Trade Cred., Ext. Fin and For_Debt. 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.3 in the Appendix. Standard errors (in parentheses) are clustered at service and country level: * p < 0.1, ** p < 0.05, *** p < 0.01.

Table A.8. Estimates with sector effects

2SLS Second stage estimates						
	Employees			Profitability		
	(1)	(2)	(3)	(4)	(5)	(6)
ΔCredit	0.488***	0.409***	0.270**	0.405***	0.474***	0.365***
	(0.127)	(0.108)	(0.131)	(0.134)	(0.114)	(0.127)
Employees					0.0773***	0.0517
					(0.0215)	(0.0360)
Profitability		0.0568**	0.0982***			
		(0.0226)	(0.0298)			
Cred_score		-0.0229	0.0564		-0.0481	0.0323
		(0.0560)	(0.0697)		(0.0578)	(0.0712)
Intangibles			-0.0761			-0.198
			(0.160)			(0.156)
Capital int.			0.0782**			0.0373
			(0.0395)			(0.0381)
Distressed			0.337***			0.404***
			(0.122)			(0.122)
Trade Cred.			0.777**			0.734**
			(0.321)			(0.315)
Ext. Fin			1.043			2.367
			(6.534)			(6.687)
For_Debt			-0.00505			-0.000219
			(0.0293)			(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)	-0.119	-0.0621	-0.173			
	(0.238)	(0.239)	(0.252)			
Employees x MAN FE (1)	0.0285	0.0797**	0.120***			
	(0.0311)	(0.0356)	(0.0453)			
Employees x UTI FE (1)	-0.0655	-0.00880	-0.425			
	(0.122)	(0.124)	(0.474)			
Employees x CON FE (1)	0.0399	0.0939	-0.0387			
	(0.145)	(0.150)	(0.260)			
Employees x SER FE (1)	0.130***	0.174***	0.142**			
	(0.0303)	(0.0371)	(0.0705)			
Profitability x AGR+MIN FE (1)				0.0496	0.0893**	0.0951**
				(0.0404)	(0.0404)	(0.0435)
Profitability x MAN FE (1)				0.0228	0.0568***	0.0458**
				(0.0209)	(0.0203)	(0.0210)
Profitability x UTI FE (1)				0.0513	0.0839**	0.0406
				(0.0421)	(0.0416)	(0.0404)
Profitability x CON FE (1)				-0.0149	0.0241	0.0136
				(0.0278)	(0.0273)	(0.0316)
Profitability x SER FE (1)				0.0109	0.0476**	0.0538***
				(0.0210)	(0.0200)	(0.0195)
Service FE (2)	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
F test	71.79	82.63	162.02	68.25	75.03	166.57
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	3947	3947	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.3 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.8bis. 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***	0.371***	0.366***	0.327**	0.363***	0.387***
	(0.132)	(0.126)	(0.139)	(0.128)	(0.127)	(0.123)
Employees	0.0535	0.0529	0.0559	0.0584*	0.0521	0.0558
	(0.0363)	(0.0359)	(0.0361)	(0.0355)	(0.0358)	(0.0363)
Profitability	0.0506**	0.0547***	0.0510***	0.0549***	0.0538***	0.0538***
	(0.0198)	(0.0195)	(0.0195)	(0.0195)	(0.0195)	(0.0197)
Cred_score	0.0244	0.0296	0.0316	0.0428	0.0335	0.0295
	(0.0694)	(0.0709)	(0.0695)	(0.0720)	(0.0713)	(0.0700)
Intangibles		-0.213	-0.127	-0.205	-0.196	-0.179
		(0.155)	(0.182)	(0.155)	(0.156)	(0.166)
Capital int.	0.0330		0.0333	0.0488	0.0371	0.0356
	(0.0380)		(0.0378)	(0.0385)	(0.0381)	(0.0376)
Distressed	0.430***	0.412***		0.363***	0.402***	0.426***
	(0.123)	(0.121)		(0.122)	(0.122)	(0.117)
Trade Cred.	0.760**	0.736**	0.781**		0.735**	0.772**
	(0.313)	(0.315)	(0.317)		(0.315)	(0.316)
Ext. Fin	0.926	2.543	0.933	2.157		1.362
	(6.870)	(6.801)	(6.278)	(6.278)		(6.699)
For_Debt	-0.00295	0.00102	-0.00753	0.00318	-0.000306	
	(0.0276)	(0.0291)	(0.0312)	(0.0294)	(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
Service 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.3 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: 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.