BANCA D'ITALIA
EUROSISTEMA

Temi di discussione

(Working Papers)

Does trust among banks matter for bilateral trade? Evidence from shocks in the interbank market

by Silvia Del Prete and Stefano Federico

April 2019

Number 1217

BANCA D'ITALIA
EUROSISTEMA

Temi di discussione

(Working Papers)

Does trust among banks matter for bilateral trade? Evidence from shocks in the interbank market

by Silvia Del Prete and Stefano Federico

Number 1217 - April 2019

The papers published in the Temi di discussione *series describe preliminary results and are made available to the public to encourage discussion and elicit comments.*

The views expressed in the articles are those of the authors and do not involve the responsibility of the Bank.

ISSN 1594-7939 (print)
ISSN 2281-3950 (online)

Printed by the Printing and Publishing Division of the Bank of Italy

DOES TRUST AMONG BANKS MATTER FOR BILATERAL TRADE? EVIDENCE FROM SHOCKS IN THE INTERBANK MARKET

by Silvia Del Prete[*] and Stefano Federico[**]

Abstract

Do financial crises have an impact on trade flows via a shock to corporate risk or to bank risk? Focusing on Italy's exports during a period characterized by both the global financial crisis and by the sovereign debt crisis, we exploit the prediction of standard trade models according to which financial shocks should be magnified by the time needed to ship a good to the importer's country and by sector-level financial vulnerability. We also use bank-pair data on Italian banks' assets and liabilities vis-à-vis their foreign bank counterparts in a specific country to construct proxies for the availability of trade finance in a given market. We find evidence of a negative impact of financial shocks on exports, especially to more distant countries and in more financially vulnerable sectors. The main channels seem to be mainly related to an increase in corporate risk (reflecting shocks to bank finance and to buyer-supplier trade credit), while the 'contagion effect' of shocks stemming from bank risk seems to be much less significant.

JEL Classification: G21, F14, F30, G30, L20.
Keywords: bilateral trade, interbank markets, counterparty risk.

Contents

[*] Bank of Italy, Florence Branch, Regional Economic Research Division.

[**] Bank of Italy, Directorate General for Economics, Statistics and Research.

1 Introduction[1]

The role of financial shocks in international trade has been subject to greater scrutiny since the 'great trade collapse' during the 2008-09 global financial crisis. While the evidence reported in several studies shows that financial factors played a significant role in the contraction of trade flows (Chor and Manova 2012, Paravisini et al. 2014, Del Prete and Federico 2014), there is less consensus on the specific channels through which their effect played out.

Broadly speaking, financial factors may propagate to trade flows through multiple channels, which generate a shock to either 'corporate risk' or 'bank risk'. The first channel arises when the exporter, the importer or both are directly hit by a shock that negatively affects the trade transaction. This might reflect, for instance, a shock to the credit supply[2], which lowers the availability of working capital for export or import, or a shock to the supply of buyer-supplier trade credit, which can be used as an alternative to bank financing: an increase in counterparty risk between a firm and its foreign buyers or suppliers may diminish the willingness to carry out transactions without an advance or immediate transfer of payment funds.

The second channel relates instead to shocks to exposures between exporters' banks and importers' banks, which may indirectly affect trade flows. Trade transactions are sometimes financed with the intermediation of the banking system in both countries via letters of credit issued by the importer's bank and confirmed by the exporter's bank. These transactions might not take place if, following an increase in bank counterparty risk, trust among correspondent banks vanishes.

[1]The views expressed in this paper are those of the authors and do not necessarily reflect those of the Bank of Italy. The authors are grateful to Rym Ayadi, Guglielmo Barone, Silvia Fabiani, Alberto Felettigh, Sara Formai, Roberto Tedeschi, two anonymous referees, and participants at the Banking Research Network Workshop at the Bank of Italy (September 2016), at the World Finance Conference at Cagliari University (July 2017), at the Seminar held at the Department of Economics and Business at the Florence University (November 2017), at the Workshop on territorial economies held at the Bank of Italy (December 2017), at a Seminar held at the University of Turin (April 2018) and at the NETEF2018 Workshop held at IMT Lucca (September 2018) for their useful comments.

[2]For example, a sudden freeze in the interbank market may reduce the availability of funding for banks that are therefore forced to reduce their lending to its borrowers.

The distinction between corporate risk and bank risk is well established in the trade finance world (see for instance ICC (2010) for a quantification of trade finance exposures, disaggregated by corporate and bank risk, in a sample of global banks). However, there is very little evidence on the relative importance of each of these two transmission channels during financial crises. Did the global financial crisis, or subsequent episodes of financial turmoil, have an impact on trade flows via a shock to corporate risk or to bank risk? What happened to bilateral trade when foreign banks stopped lending to domestic banks on the interbank market? Was the usual counterparty risk in international transactions mitigated by the intermediation role played by banks or was it instead exacerbated by contemporaneous shocks to bank risk?

To answer these questions, we exploit two, very different, shocks that hit international interbank markets as a source of identification. The first shock is the global financial crisis, which intensified right after Lehman Brothers' default and was followed by a large contraction of world trade between late 2008 and early 2009. The second shock is the sovereign debt crisis in the euro area, which led to a steep rise in risk premium in Italy, Spain and other countries.

Specifically, this paper focuses on Italy, which experienced a large fall in trade flows in 2008-09 and was then severely hit by the sovereign debt crisis, especially between the second half of 2011 and the first half of 2012. Using data on Italy's exports by destination country, sector and time over the 2007-2015 period, we investigate the transmission channels of these two different financial crises to trade flows.

Our strategy is two-pronged. In a first step of the analysis, we exploit the prediction from standard trade models according to which a financial crisis should have a relatively larger impact on trade with a longer time-to-ship, especially in more financially vulnerable sectors. The intuition is that the longer the time needed to ship a good to a given country, the higher the opportunity cost of funds faced by the exporter and/or the higher the probability that the importer may default on the payment to the exporter. In our framework, time-to-ship is an amplifier of the impact on aggregate trade flows

stemming from an exogenous increase in the risk premium faced by the exporter or in the counterpart's default risk.

We regress therefore the level of exports on a triple interaction between a financial crisis dummy, geographical distance (which approximates for the time needed to ship goods to or from a given country[3]) and various sector-level indicators of financial vulnerability. In other words, we analyze whether during financial crises Italy's exports with more distant countries fell more (relative to less distant countries) in sectors that were more financially vulnerable (relative to less financially vulnerable sectors). We use several indicators of financial vulnerability, which capture the potential transmission channels, such as the extent to which firms usually rely on trade finance products, on external finance, on buyer-supplier trade credit, etc.

In a second step, we introduce the role of bank intermediation in trade flows. Although we do not directly observe the cost of trade finance faced by Italian exporters vis-à-vis a specific country, we use bank-pair data on Italian banks' assets and liabilities on their foreign bank counterparts in a specific country to construct proxies of the trust among banks. The cross-border market for bank liquidity is indeed the most reactive to change in trust among banks. Bilateral interbank exposures (excluding collateralized forms of interbank lending) can be considered a good proxy of the level of 'confidence' a given bank has with respect to its international bank counterpart. As an alternative proxy of trade finance availability, we also consider a subset of off-balance sheet interbank positions that mainly include trade-finance-related exposures. This second step allows us to assess the direct impact of shocks in the interbank market and whether they contributed to dampen or exacerbate the effect of financial crisis shocks on trade flows.

Overall, our approach based on country-sector data can be seen as complementary to the literature based on firm-level data. While those studies often consider a quasi-natural

[3]There are significant differences in the time-to-ship between Italy and its trading partners: as an example, it takes about two days to ship a good by sea from Genoa to Barcelona and about a month to ship a good from Genoa to Shanghai. Additional time may be needed after reaching the foreign country's port for customs clearance, inspection procedures, handling at the port and domestic transport until delivery to the importer.

experiment and typically focus on a single shock and a specific transmission channel (Del Prete and Federico 2014), our main contribution is to provide a more flexible framework in which the impact of the various financial shocks (the global financial crisis and the sovereign debt crisis), through different transmission channels (corporate risk or bank risk), can be assessed. To this end, we follow a widely-used empirical approach (Chor and Manova 2012) and employ a very demanding specification, with an extensive set of fixed effects controlling for many potential confounding factors. To the best of our knowledge, this is the first paper which tries to disentangle the relative importance of shocks to corporate risk versus those to bank risk, and to assess their impact on trade flows. While of course the two shocks might influence each other and are to some extent intertwined, they are clearly distinct shocks (as suggested by the trade finance literature) and it is worthwhile to explore their economic importance.

The rest of the paper is organized as follows. Section 2 briefly discusses the relevant literature. Section 3 presents the theoretical motivation on which our empirical framework is based. Sections 4 and 5 describe our data sources and our econometric strategy, respectively. The main results are reported in Section 6. Section 7 concludes.

2 Related literature

Our paper is related to several existing studies that have analyzed the impact of financial shocks on international trade. Focusing on the role of general financial conditions, Chor and Manova (2012) exploit variations in the cost of external capital across countries (approximated by the interest rate in the domestic interbank market) and in the financial vulnerability across sectors. They find that the impact of higher financing costs in the exporting country on U.S. imports during the 2008-09 trade collapse was more severe for sectors that require more external finance, have limited access to trade credit or few collateralizable assets. Crinò and Ogliari (2017) study how financial imperfections affect product quality across countries and industries, and analyze the implications for

trade flows and prices. They state that the interplay between cross-country differences in financial frictions and cross-industry differences in financial vulnerability is an important determinant of the geographical and sectoral variation in average product quality. Therefore, they provide evidence that quality adjustments are a substantial mechanism through which financial development shapes the variation in trade flows and export prices across countries and industries.

Other studies have instead considered 'trade finance', i.e. a more specific form of bank financing, which is explicitly tied to trade transactions (letters of credit, export and import loans, etc.). Niepmann and Schmidt-Eisenlohr (2014a) show that the use of letters of credit varies with the riskiness of the destination market in a non-linear way: it is higher for exporters that sell to high-risk and low-risk countries than for those selling to medium-risk countries. In a separate contribution, Niepmann and Schmidt-Eisenlohr (2014b), using variation in the importance of banks as providers of letters of credit across countries, argue that the larger a bank's share of the trade finance market in a given country, the larger the effect on exports to that country following a reduction in the supply of letters of credit.

Various studies test the hypothesis that time-to-ship (or distance) magnifies the effect of financial shocks on trade flows. Schmidt-Eisenlohr (2013) provides evidence from gravity regressions using a broad measure of financing costs in trading partners; he also finds that importer finance is as important for trade as exporter finance. Berman et al. (2013) show that a financial crisis in the importer country is associated with a larger decrease in imports when the time-to-ship to the destination country is higher.

Our work contributes to the more general debate on the role of bank intermediation for trade flows (CGFS 2014) and whether it has been affected by the structural contraction of international interbank activity since the global financial crisis. The decline of interbank activity, in particular in the unsecured segment, was driven by an increase in bank counterparty risk and by regulatory changes and poses questions on its potential implications for real activities, including trade flows, some of which typically benefit

from the intermediation of the banking sector. This branch of literature explores the direct impact of new regulatory requirements (Basel III) on trade finance activities. In particular, the application of the leverage ratio to trade finance instruments standing off the balance sheet of banks had raised concerns in terms of their impact on trade flows, especially vis-à-vis low-income countries; a softer treatment of trade finance instruments in the final draft of the regulatory rules partially attenuated these concerns (Auboin and Blengini 2014). Demir et al. (2017), using Turkey's July 2012 adoption of Basel II as a quasi-natural experiment, find that the share of letters-of-credit-based exports decreases (increases) when the associated risk weights for counterparty exposure increase (decrease) after the adoption of Basel II; however, the growth of firm-product-country-level exports remains unaffected.

Finally, our paper is related to the literature on interbank market shocks, which are one of the transmission channels of liquidity shocks to the real economy. Focusing on the negative effects of the crises on bank risk perception in the interbank markets, among others, Cappelletti et al. (2011) find that during the financial crisis there was no drastic fall of the overall lending and borrowing activity in the Italian interbank market; however, while activity between banks belonging to the same group rose significantly, extra-group positions declined, probably due to the loss of trust between the foreign partners. In the same vein, Angelini et al. (2011) analyze the micro and macroeconomic determinants of the sharp increase of worldwide interbank interest rates and argue that before August 2007 interbank rates were insensitive to borrowers' characteristics, whereas afterward they became reactive to borrowers' creditworthiness, signaling how the 'level of confidence' among partners on the interbank market is instantaneously measured by the reaction of cost and quantity exchanged on that market. Moreover, De Socio (2011) suggests that credit risk perception increased before the key events of the crisis, while liquidity risk was mainly responsible for the subsequent increases in the Euribor spread. Recently, Cappelletti and Mistrulli (2017) state that, given a certain shock on the international interbank market, the multiple lending of the same customers can amplify the contagion

effects on real economy *via* credit markets.

3 Theoretical motivation

Our empirical work is motivated by standard models that describe the impact of financial shocks on trade flows. We start with the theoretical framework developed by Berman et al. (2013). It is a partial equilibrium model of trade with monopolistic competition, which assumes that international transactions are settled on an open account basis, i.e. the exporter receives the payment from the importer only after the delivery of the good (typically in 30, 60 or 90 days after delivery). Although available only for a few countries, the evidence on payment methods in international trade seems to validate this assumption. Open account terms are the most widely method of payment for exporters and importers in Central and Eastern Europe (UNECE 2003). Demir and Javorcik (2018) report that around 60 percent of Turkey's exports of textiles and clothing were sold on open account terms; the rest was accounted for by bank-intermediated financing (letters of credit and documentary collections), while cash in advance was extremely marginal.

An additional assumption of the model is that, if the importer defaults on its payment, the exporter loses the value of the shipment. Exporters sell to many countries, which differ in terms of the length of shipping (i.e. the time needed for the exporter to ship the good to the importer). An exogenous financial shock in the exporting country is assumed to raise the interest rate faced by the exporter.

In this context, Berman et al. (2013) show that exporters react to an increase in the cost of borrowing by increasing export prices and decreasing export volumes; in addition, exporters with lower productivity stop exporting to the destination country hit by the financial shock. At the aggregate level, an increase in the interest rate faced by the exporter is shown to reduce aggregate exports to a given country, through both the intensive and extensive margins. Crucially, this effect is magnified by the length of shipping: the longer the time needed to ship the good to a given country, the larger the

fall in exports due to the financial shock. Berman et al. (2013) also show that a similar mechanism applies to an increase in the probability of default of the importer, which may derive from a financial shock in the importing country: the fall in exports is once again amplified by the length of shipping. In both cases, the role played by time-to-ship as described by this model is that of an amplification of the effect of financial shocks on exports.

Suppose now that there are many sectors, which differ, because of largely technological reasons, in terms of their reliance on credit (either working capital or trade finance) and, more generally, in terms of vulnerability to financial shocks. For instance, industries with more tangible assets such as plant, property and equipment, which firms can easily pledge as collateral, are likely to enjoy easier access to outside capital and be less exposed to financial shocks. In contrast, industries with bigger capital expenditures, which cannot be serviced internally, are more dependent on external finance. Specific sectors, where trade transactions are less frequent or with riskier counterparts, may be especially dependent on trade finance, and therefore more exposed to financial shocks. In this framework, financial shocks to the exporter's country (or to the importer's country) would have a negative impact on trade flows, which is amplified for countries with a longer time-to-ship and for more financially vulnerable sectors.

In a second step of the analysis, the model can be enriched by introducing the role of bank intermediation in trade flows. The importer's bank may issue a letter of credit, assuring the exporter that she will be paid. The letter of credit may be confirmed by the exporter's bank: in this case, the exporter receives the payment from the bank after providing the relevant documentation (commercial invoices, transport and insurance documents, etc.). Letters of credit are however expensive and require trust among the exporter and importer's banks. The crucial point therefore is to what extent an exogenous financial shock raises the cost of letters of credit.[4] Anyway, other things being equal, it

[4]Schmidt-Eisenlohr (2013) studies the optimal choice between letters of credit and the alternative forms of payment (open account, cash in advance). The equilibrium contract is determined by financial market characteristics and contracting environments in both the source and the destination countries.

is more likely that during a crisis, the use of bank intermediated trade finance (e.g. LCs) arises as consequences of an increase in the importer's probability of default, resulting in a sort of substitution between 'corporate' and 'bank' risk.

If the cost of trade finance was to increase with the financial crisis, then higher cost of trade finance during financial crises would rise exponentially with time-to-ship and would translate in lower aggregate trade flows in the same manner as in the baseline model. On the contrary, if the cost of trade finance is not affected by the financial crisis, reflecting the resilience of interbank relationships even during a financial crisis, a larger availability of trade finance would attenuate the negative effect of the financial shock on trade flows. To account for this factor, we use direct measures of Italian banks' exposure on the interbank market, in terms of assets and liabilities towards foreign intermediaries, as a proxy of the cost of trade finance. This allows us to capture shocks to increased counterparty risk and lower trust among trading partners' banks and how they affect trade flows.

4 Data

Our dataset is derived from the following sources. Data on trade flows between Italy and the rest of the world comes from Eurostat's publicly available external trade in goods statistics (COMEXT). We collect monthly export (and import) flows of goods by partner country and sector (according to the NACE 3-digit classification). We aggregate exports (and imports) at the quarterly frequency, in order to smooth monthly fluctuations as well as take into account short-run lags in the reaction of exports to financial shocks. The main econometric analysis focuses on Italy's exports; however, we also look at imports in unreported estimations, in order to provide a more comprehensive picture and to take into account also financial shocks in Italy's trading partners.

We restrict the sample to the top 100 partner countries. This set of countries accounts for more than 98% of Italy's trade in goods. Our final dataset covers a quarterly panel of 100 countries and 88 3-digit sectors from 2007Q1 to 2015Q4. As shown by Bugamelli

et al. (2018), Italy's exports sharply fell in 2008-09, in the context of the global trade collapse. The subsequent rebound was more gradual compared to that of the other main euro area competitors' exports. Since 2010 Italy's exports have significantly expanded, growing at a pace largely in line with that of the other main European countries and of world trade.

To measure sector-level indicators of financial vulnerability, we use Cerved, a commercial database which collects the balance sheets of non-financial Italian firms. As our dependent variable refers to exports of goods, we restrict the Cerved sample to manufacturing firms (about 100,000 companies per year). An additional indicator, which refers to the use of trade finance by exporters and importers, is derived from the match between Centrale dei bilanci, a commercial database which collects more detailed balance sheet data for a subset of Italian companies (including data on exports), and the Bank of Italy's credit register (Centrale dei rischi), which provides confidential information on lending relationships (including data on trade finance loans and guarantees. Two further indicators, which are indirect proxies of financial vulnerability, such as the share of micro and small exporters and that of domestic (non-multinational) firms, are derived from Eurostat' s publicly available Trade by Entreprise Characteristics dataset.

Data on interbank positions between Italian and foreign banks, which are used to approximate for the availability of bank-intermediated trade finance, is taken from the Bank of Italy's confidential Supervisory Reports. We observe end-of-month stocks of interbank loans and deposits since December 2008. Interbank loans and deposits are further disaggregated by instrument (sight, overnight, term, repos, other deposits or loans), by currency and by original maturity. We exclude repos and other collateralized interbank loans or deposits, in order to consider only those types of interbank exposure with a counterparty risk. As with our trade data, we compute quarterly averages of end-of-month stocks in order to smooth excessive fluctuations.[5] We also consider off-balance sheet guarantees provided by Italian banks: this instrument is mainly related

[5]Data for 2008Q4 are proxied by December 2008 data, given that no data are available for the earlier months.

to import and export activities; unfortunately, such data are only available since mid-2010 and we can test their impact on trade only in the sovereign debt crisis.[6]

Finally, we collect data on geographical distance between Italy and its trading partners from CEPII and data on countries' GDP and GDP per capita from the IMF World Economic Outlook database.[7]

5 Econometric strategy

In line with the theoretical motivation described in Section 3, our econometric strategy is structured in two steps.

5.1 Direct counterparty risk

In a first step, we consider a setting in which Italian exporters belonging to many sectors, which differ in terms of financial vulnerability, export to many destination countries, which differ in terms of the time-to-ship (approximated by the geographical distance). An exogenous financial crisis in Italy, which raises the interest rate faced by the Italian exporter, is expected to lower aggregate exports: this effect should be magnified in countries with a longer time-to-ship and in more financially vulnerable sectors.[8]

We account for this relationship by using a triple interaction strategy, as in the following equation:

[6]Our measures of bank trust, based on assets, liabilities and guarantees among correspondent banks in the interbank markets, are the unique we can adequately built. Alternative measures, based on the duration of interbank relationships (Affinito and Piazza, 2018), are not available for our purpose, due to data limitations (specifically, the lack of detailed information before 2008, which would be needed to compute duration measures over a sufficiently long time span). Furthermore, these measures are less feasible in the context of the interbank market, where by definition interbank positions have very short durations (e.g. overnight) and a higher turnover (even within the same banking group).

[7]One could question that distance is not only a proxy of the risk of default, but it could be also a proxy of the maturity of the cash cycle. In both cases, distance can act as an amplifier of financial shocks, in line with the scope of our empirical analysis.

[8]An alternative case refers to the specular case of Italian importers. An exogenous financial crisis in Italy, which raises the probability of default of the Italian importer, is expected to lower aggregate imports, in particular from countries with a longer time-to-ship and in more financially vulnerable sectors. Since we focus on the export-side, we analyze this second dimension in the vein to run some robustness checks.

$$lnY_{ikt} = \beta_1 dist_i \times D_{crisis} \times X_k + D_{kt} + D_{ik} + D_{it} + \epsilon_{ikt} \quad (1)$$

The dependent variable is the log of Italian exports to (or imports from) country i[9], in sector k and quarter t, while the main explanatory variable is the triple interaction among the log of geographical distance between Italy and country i[10] (which approximates for time-to-ship), a dummy for the crisis period and a measure of sector financial vulnerability X_k. We define the crisis dummy equal to one for the period 2008Q4-2009Q3 and 2011Q3-2012Q2. The former period captures the first global financial crisis and the subsequent trade collapse in the aftermath of Lehman Brothers, while the latter period captures the peak of the sovereign debt crisis in Italy.[11] The choice of a static specification rather than a dynamic one is in line with related literature (Berman et al. 2013, Chor and Manova 2012, Eisenlohr-Schmidt 2013) and is more common when the number of fixed effects is large and the time period is relatively short.

As in Chor and Manova (2012) our specification is very demanding. We control for sector-time fixed effects (D_{kt}), country-sector fixed effects (D_{ik}) and country-time fixed effects (D_{it}). Sector-time fixed effects take into account industry-specific fluctuations that might affect world demand for exports (or internal demand for imports). Country-sector fixed effects capture comparative advantage and other time-invariant factors that affect the average pattern of bilateral trade across sectors. Country-time fixed effects control for country-specific shocks to the production for exports (or to the demand for imports).

[9] As our dependent variable is the log of exports (or imports), our regressions exclude country-sector-time pairs with zero flows. The incidence of zero flows is quite low for the export regressions (which include about 284 thousand observations, compared to a maximum of about 316 thousand observations). It is slightly higher for the import regressions (which include about 190 thousand observations). While other approaches, such as Poisson pseudo-maximum likelihood, may be considered to take into account the issue of zero flows, they may not necessarily be appropriate or easily converge, given the extensive set of fixed effects.

[10] It corresponds to the distance between the most populated cities in each country pair. The results are robust to various alternative measures of distance, such as the distance between capital cities or a population-weighted distance.

[11] The selection of the crisis periods is supported by a survey-based indicator published by Istat: a measure of the financial constraints on exports, as reported by a sample of manufacturing companies, shows indeed a clear peak around the end of 2008 and starts rising again towards the summer of 2011. Its subsequent decrease is observed during 2013; we prefer nonetheless to restrict the second crisis period until 2012Q2 in order to capture the most acute phase of the sovereign debt crisis only.

The inclusion of such a wide set of fixed effects, which is necessary to guard against omitted variable bias, implies that we are focusing on differential effects of financial crises on countries which differ in terms of time-to-ship and sectors which differ in terms of financial vulnerability.

As a measure of financial vulnerability, we consider several sector-level characteristics, which are built using firm-level data for a large sample of Italian manufacturing companies. The set of measures should be interpreted not as capturing only differences in financial dependence across sectors but as a more comprehensive set which approximates several aspects that are correlated with firms' financial fragility to external shocks.

The first measures the 'trade finance' intensity , i.e. the extent to which a sector relies on trade finance products (export or import loans, letters of credit, etc.) for its export or import activities. This is defined as the ratio of export loans and guarantees on exports.[12] Trade finance intensity is typically larger in sectors in which trade transactions are less frequent, with riskier counterparts, or originated by small exporters.

The second indicator measures the availability of tangible assets. Industries with more tangible assets such as plant, property and equipment may be less financially vulnerable, as firms in these sectors can easily pledge collateral to get access to external financing. This corresponds to the ratio of tangible assets on total assets.

The third indicator measures 'trade credit' intensity, which refers to the extent to which firms routinely give (or receive) buyer-supplier trade credit. On the one hand, this might be an alternative to bank finance, thus potentially attenuating the impact of negative bank credit supply shocks; on the other hand, a disruption in buyer-supplier trade credit, due for instance to a jump in direct counterparty risk, might weigh more on sectors which were especially dependent on this form of credit. Since we focus on exports, we compute a measures of trade credit, which is equal to the ratio of accounts receivable on total assets.[13]

[12]For the import regressions we define the variable as the ratio of import loans and guarantees on sales. We use sales as a denominator because our firm-level data do not include any information on imports.

[13]For the import regressions we use a trade debit index, which is equal to the ratio of accounts payable on total liabilities.

The final measure is the dependence on 'external finance': industries with a higher dependence on external finance might be more exposed to financial shocks. It is defined as the ratio of financial debt (the sum of loans from banks and other financial intermediaries and securities issued) over total liabilities.

We construct each of these variables in the following way. Using balance sheet data, we first compute firm-level measures for each year between 1997 and 2006[14]: this time period pre-dates the starting year of our estimates. We then take the NACE 3-digit industry medians of ratios over all firm-years (a similar approach is pursued, among others, by Fisman and Love 2003 and Chor and Manova 2012).

Two additional sector-level characteristics are considered. The first is the share of exports (or imports) accounted for by firms with less than 50 employees in a given sector: small firms tend to be more financially fragile and more dependent on external, especially bank, finance.[15] The second is the share of exports (or imports) accounted for by firms that are not part of multinational groups: domestic firms, without access to internal capital markets, might also be more financially vulnerable. Both measures are available at a more aggregate level (i.e. NACE 2-digit industry) in Eurostat's Trade by Entreprise Characteristics database.

We expect that export flows with more distant countries are more negatively affected during crisis periods especially in more financially vulnerable sectors, identified according to this set of indicators.

Descriptive statistics on the main variables are reported in Table 1, while the correlation among sector-level indicators of financial vulnerability is reported in Table 2.

[14]Measures of trade finance intensity are computed using data for the year 2006.

[15]By descriptive evidence on Italian banking sector, we know that small firms are those with more difficulties on loans' payments, generating a higher share of NPLs in bank balance sheets.

5.2 Bank counterparty risk

A more complete model including the role of banks in financing trade, *via* funding held in the interbank markets towards intermediaries located in destination countries, can be introduced because importers can also choose to use letters of credit issued by their banks (the issuing bank) as a means of assuring exporters that they will be paid. Although we do not directly observe the cost of trade finance, we can indirectly approximate this role by using various proxies, such as the amount of interbank positions between Italian banks and foreign banks and/or (mainly trade-finance related) guarantees provided by Italian banks to their foreign counterparts.

Suppose that interbank positions are a good (inverse) measure of cost of trade finance. Interbank levels are captured by country-time fixed effects. But if we interact them with industry-level indicators of financial vulnerability we can check whether the availability of trade finance (approximated by higher levels of interbank exposures) has a differential effect on exports towards different countries in more financially vulnerable sectors. We expect that exports (or imports) to destination countries with a higher availability of trade finance could be less negatively affected in more financially vulnerable sectors.

In this new framework, we estimate the impact of interbank exposure on bilateral trade flows, adding to the previous equation a double interaction between Italian interbank market positions across countries and financial vulnerability measures at sector-level. Following the main idea that the position of each Italian bank on the interbank market towards each country is a good proxy of trust among cross-country banks and for liquidity shocks, potentially affecting the real outcomes, we regress the log of Italian exports (or imports) to (from) country i, in sector k and quarter t on the level of outstanding interbank funding lent (or received) by Italian banks to (from) country i at quarter t. So, our econometric strategy is based on the estimation of the following equation:

$$lnY_{ikt} = \beta_1 dist_i \times D_{crisis} \times X_k + \beta_2 ibk_{it} \times X_k + D_{kt} + D_{ik} + D_{it} + \epsilon_{ikt} \qquad (2)$$

where the dependent variable is the log of exports. In principle, imports might also be considered as the intermediation role played by banks in trade finance operations might facilitate both sides of the transactions *via* the issuance or confirmation of letters of credit or *via* the supply of export and import loans (ICC 2010). However, in the empirical analysis, for the sake of brevity, we will focus only on the export-side.

We compute alternative measures of interbank exposures (ibk_{it}) in various alternative ways. We consider the log of interbank assets held by Italian banks vis-à-vis banks located in country i and the log of interbank liabilities of Italian banks vis-à-vis banks from country i. These two indicators (respectively used in correlation with Italian exports and imports) capture the extent of interbank linkages and represent our main variables of interest. We also consider the log of interbank guarantees held by Italian banks vis-à-vis foreign banks, reflecting positions that are mainly related to trade activities and thus are a better proxy of trade-finance related interbank exposures.

In order to identify the effect across countries and over time, our main variable for interbank positions is interacted with a sector-level measure of financial vulnerability, as previously defined (trade finance intensity; share of tangible assets; dependence on external finance; access to trade credit; share of domestic firms in trade flows; share of small firms in trade flows). The identification now comes only from the differential effect across sectors of movements in interbank exposures within countries over time.

We expect that higher levels of trust *vis-à-vis* domestic banks (as proxies of a larger availability of assets/liabilities on the interbank market) have a positive effect on more financially vulnerable sectors during the crisis. In other terms, we analyze if there are differential effects of cross-country bank risk perception on bilateral import/export for some clusters of sector characteristics, which can partially off-set those negative effects stemming from the distance and the time-to-ship, as a proxy of a direct risk of counterpart in international trade, exacerbated in crisis period for firms belonging to more fragile industries.

We then investigate whether the differential effect of shocks in the interbank market on

trade across sectors with varying degrees of financial vulnerability intensifies during crisis periods. The following specification (see equation (3)) adds a triple interaction between interbank positions from country i, sector-level financial vulnerability and a crisis dummy. As before, we define the crisis dummy equal to one for the period 2008Q4-2009Q3 and 2011Q3-2012Q2. The former period captures the tensions in the international interbank market in the aftermath of Lehman Brothers' collapse, while the latter period captures the peak of the sovereign debt crisis during which mainly interbank interest rates reacted to heterogeneous country risk premia.

$$lnY_{ikt} = \beta_1 dist_i \times D_{crisis} \times X_k + \beta_2 ibk_{it} \times X_k + \beta_3 ibk_{it} \times X_k \times D_{crisis} + D_{kt} + D_{ik} + \\ + D_{it} + \epsilon_{ikt} \quad (3)$$

6 Results

6.1 Baseline results

The baseline specification (equation (1)) allows us to study whether the fall in Italy's exports associated with a financial crisis in the exporting country is magnified by time-to-ship needed to reach the destination country and by sector-level financial vulnerability. Regressions are estimated with OLS, absorbing multiple levels of fixed effects.[16]

Table 3 supports the view that during crisis periods export flows are more negatively affected for firms in more financially vulnerable industries and exporting to more distant countries. The estimated coefficient on the triple interaction between a financial crisis dummy, distance and indicators of financial vulnerability is negative and statistically significant for sectors with a higher trade finance intensity (i.e. sectors that rely more

[16]Given that our sample includes 100 countries, 88 sectors, and 36 time periods, a typical regression includes more than 15,000 dummies.

frequently on letters of credit and other trade finance products), for sectors with a higher trade credit intensity (i.e. sectors in which firms are more likely to give trade credit to buyers) and for sectors with a larger share of small exporters and domestic (i.e. non-multinational) exporters, which are likely to be more financially vulnerable. The coefficients on the interaction term with the share of tangible assets and the share of financial debt on assets are not significant, although their sign is in line with our expectations (positive for the former, which is associated with lower financial vulnerability, while negative for the latter, which is associated with higher financial vulnerability). Overall, the results point to two transmission channels of the financial crisis to exports: the first *via* a shock to the supply of trade finance, presumably related to higher risk premia during financial crises, while the second *via* a lower willingness to extend buyer-supplier trade credit, as a result of the general liquidity crunch.

The estimated effects on the triple interaction terms are quantitatively important. Consider two countries such as a relatively 'close' country (e.g. Denmark, corresponding the 25th percentile of geographical distance from Italy) and a relatively 'distant' country (e.g. South Africa, at the 75th percentile). Consider also two sectors, at the 25th and 75th percentile, respectively, of a given indicator of financial vulnerability; for simplicity, the former can be defined a 'non financially vulnerable' sector, while the latter a 'financially vulnerable' sector. Our estimates show that during crisis periods the fall in exports to a distant country (relative to a close country) was between 0.8 and 1.2% larger in a financially vulnerable sector (relative to a non-financially vulnerable sector), depending on the sector-level indicator of vulnerability.[17]

Our specification is already quite demanding, as it includes country-sector, sector-time and country-time fixed effects. In order to run further robustness checks, we included additional controls based on the interaction between distance, financial vulnerability and initial GDP and GDP per capita of the destination country. These controls take into

[17]The estimated magnitude is larger if distance is included in the interaction term as a dummy (above or below the median) rather than as a continuous variable. It would also be considerably larger of course if we considered two sectors with the lowest and highest financial vulnerability, rather than sectors at the two ends of the interquartile range.

account the influence of cross-country initial differences in size and income on trade patterns. The results are robust to the inclusion of these additional variables. They are also robust to changes in the set of countries included in the estimates (either extending the sample to 150 countries or reducing it to the top 60 countries in terms of total trade with Italy). They are, to a very large extent, robust to changes in the starting year of our sample in 2004 (or 2005) instead of 2007, so as to include a longer period of normal financial conditions before the start of the global financial crisis.

Standard errors are clustered at country-level in the baseline specifications, to take into account within-cluster correlation; the results are very similar if we use alternative clusters at the country-sector level or at the country-time level.

The financial crisis dummy captures two very different periods of financial stress: the global financial crisis in 2008-09 and the peak of the euro area sovereign debt crisis in 2011-12. We have disentangled these two periods using distinct crisis dummies as interaction terms in equation (1). The results (see Table 4) suggest that the magnitude and the statistical significance are generally higher in the global financial crisis than in the sovereign debt crisis.

There might be various interpretations for the different results on the two crises. First, while the global financial crisis was characterized by a deep collapse in trade flows, the sovereign debt crisis occurred instead in a context of rising trade flows; this might have attenuated the impact of the financial shock on exporters. Second, while the global financial crisis hit a large number of countries worldwide, the impact of the sovereign debt crisis was restricted to just a few countries in the euro area; the prevalence of normal financial conditions in Italy's main trading partners during the sovereign debt crisis might have contributed to dampen the effect of the second shock on trade flows. Finally, another factor might be related to the significant expansion of central bank liquidity during the sovereign debt crisis *via* conventional and unconventional measures.

For a more comprehensive analysis, we have also considered Italy's imports as the dependent variable. Unreported results suggest that during crisis periods imports fell

less from more distant countries in sectors with higher levels of tangible assets (which can be easily pledged as collateral) and fell more for sectors with a higher share of trade debit. This points to a disruption in buyer-supplier trade credit during a financial crisis: upstream suppliers were no longer willing or able to continue extending trade credit to importers, which were presumably not able to offset the fall in trade debit with a rise in bank loans. Industries with greater access to trade debit in normal times therefore turned out to be less resilient during the crisis.[18]

6.2 The role of bank intermediation on bilateral trade

In a second step of the analysis, we introduce the role of bank intermediation in facilitating trade activities. If financial turmoil does affect trust among banks on the international interbank markets, this might negatively affect (bilateral) trade between Italy and its partner countries. Adding to the previous model the interaction between Italian banks' exposures (in terms of assets or liabilities) on interbank markets towards foreign banks located in a given country with sector-level measures of financial vulnerability (as in equation (2)), we are able to account for the impact of this 'bank risk' channel on trade flows, which is a novel contribution to the existing literature.

Focusing on exports, the estimated coefficients on the double interaction between Italian banks' assets towards foreign banks' of the destination country and sector-level measures of financial fragility are generally not significant, suggesting that shocks to interbank exposures do not seem to have a differential effect depending on sectors' financial vulnerability (Table 5). The inclusion of this new variable does not affect the estimated coefficients of the triple interaction between financial crisis dummy, distance and financial vulnerability, whose magnitude and statistical significance are unchanged. Adding the triple interaction term with crisis dummies for interbank assets (as in equation (3)), the results are not statistically significant, indicating that shocks on the interbank market

[18]The economic impact was even larger in the case of imports, where the differential effect rises to between 1.4 and 2.5% (depending on whether financial vulnerability is approximated by higher levels of trade debit or by lower levels of tangible assets).

during the turmoil do not seem to matter relatively more for exports of financially vulnerable sectors during crisis periods (Table 6).

Focusing the attention on a more restrictive definition of interbank exposures (which now includes only guarantees, that are mainly related to the financing of trade transactions), we find evidence of significant differential effects for those sectors that are more financially vulnerable in terms of leverage, while a higher trade finance intensity on exports as well as a higher trade credit availability in delay to foreign importers are positively correlated with exports (Table 7). The beneficial effect on export flows stemming from interbank guarantees is only partially offset during the crisis period; this is probably due to a higher risk perception that has reduced trust in the interbank markets and the specific liquidity devoted to trade finance (Table 8).[19]

As an alternative approach, we have also modified the model by including the interaction between interbank assets at the initial period, the crisis dummy and sector-level indicators. With respect to the previous approach, this specification has the advantage of attenuating the endogeneity issues related to the fluctuations of interbank exposures during the crisis. The coefficient on the triple interaction is almost always not significant, thus pointing to a negligible direct impact of interbank shocks to trade flows.

Overall, our findings seem to suggest that there is little evidence of a 'contagion effect' from shocks to interbank exposures to (bilateral) trade flows.

[19]For completeness, we have also used imports as our dependent variable and consider - as a measure of interbank exposures - the liabilities held by Italian bank's towards foreign banks' located in importing countries. The (unreported) evidence suggests that shocks on the interbank market seem to have very few significant effects also for imports of financially vulnerable sectors, with the exception of those industries where the share of small firms is larger. This differential effect does not however seem to intensify during crisis periods. Using interbank guarantees as an alternative measure of interbank positions of Italian banks towards importing countries, findings suggest that, on the import side, these types of assets are less relevant as sources of financial shocks hitting more financially vulnerable importing sectors; we obtain a significant result only for industries characterized by a lower share of tangible assets and a higher share of domestic firms.

7 Concluding remarks

Our paper investigates the transmission channels of financial shocks to bilateral trade, considering both 'corporate risk' and 'bank risk'. Focusing on Italy's exports during a period characterized by two, quite different, financial shocks (the global financial crisis and the sovereign debt crisis), we exploit the prediction of standard trade models according to which financial shocks should be amplified by the time needed to ship a good to the importer's country and by the extent of financial vulnerability in a given sector. A dimension along which international trade differs from intranational one is time-to-ship, which we can interpret as an amplification mechanism of financial shocks: the opportunity cost of funds for the exporter (or the probability of default of the importer) rise indeed as the distance between the exporter and the importer increases. To this end, our econometric strategy is based on a triple interaction between a financial crisis dummy, geographical distance and various sector-level indicators of financial vulnerability.

In addition, we also consider the fact that a significant portion of international trade (especially trade with riskier and more distant countries) requires the intermediation of exporters and importers' banks *via* letters of credit and other trade finance products. We therefore complement our research strategy with a set of variables, based on Italian banks' interbank assets and liabilities towards their foreign counterparts, which approximate the availability of trade finance in a given market. This framework, which is a novelty with respect to the existing literature, allows us to account for the bank counterparty risk.

Controlling for an extensive set of fixed effects, our findings suggest that during crisis periods the fall of trade flows was more acute in distant countries in financially vulnerable sectors. On the export side, this effect was relatively more intense for sectors that are dependent on trade finance products and buyer-supplier trade credit, and for sectors with a larger share of small and non-multinational exporters.

When we introduce the role of bank intermediation on trade, we find that shocks on interbank bilateral bank exposure have a less significant impact on trade flows, especially

when we use general measures of interbank assets and liabilities. However, when we focus on a subset of interbank activities which are more related to trade finance, we find evidence of a positive effect on exports in more financially vulnerable sectors, originating from traders' bank confirmation of guarantees in the interbank market.

Overall, our findings provide support to the hypothesis that financial shocks had a significant impact on exports and imports. The main channels seem to be mostly related to an increase in corporate risk (reflecting shocks to bank finance, including trade finance, and to buyer-supplier trade credit), while the 'contagion effect' of shocks to bank risk seems to be much less important. This result should be however read with some caution, as corporate and bank risks are to some extent interconnected and hard to disentangle.

References

Affinito M., Piazza M. (2018), Always look at the bright side? Central counterparties and interbank markets during the financial crisis, Bank of Italy Working Papers, no. 1181.

Angelini P., Nobili A., Picillo M.C. (2011), The interbank market after August 2007: what has changed and why?, Journal of Money, Credit and Banking, vol. 43(5), pp. 923-958.

Auboin M., Blengini I. (2014), The impact of Basel III on trade finance: the potential unintended consequences of the leverage ratio, World Trade Organization, Staff Working Paper ERSD, no. 2.

Berman N., de Souza J., Martin P., Mayer T. (2013), Time to ship during financial crises, NBER International Seminar on Macroeconomics 2012, Giavazzi F., West K. (eds), University of Chicago Press.

Bugamelli M., Fabiani S., Federico S., Felettigh A., Giordano C., Linarello A. (2018), Back on track? A macro-micro narrative of Italian exports, Italian Economic Journal, vol. 4(1), pp. 1-31.

Cappelletti G., De Socio A., Guazzarotti G., Mallucci E. (2011), The impact of the financial crisis on inter-bank funding: evidence from Italian balance sheet data, Bank of Italy Occasional Papers, no. 95.

Cappelletti G., Mistrulli P.E. (2017) Multiple lending, credit lines and financial contagion, Bank of Italy Working Papers, no. 1123.

Chor D., Manova K. (2012), Off the cliff and back: credit conditions and international trade during the global financial crisis, Journal of International Economics, 87(1), pp. 117-133.

CGFS (2014), Trade finance: developments and issues, CGFS Publications, no. 50.

Crinò R., Ogliari L. (2017), Financial imperfections, product quality, and international trade, Journal of International Economics, 104, pp. 63-84.

De Socio A. (2011), The interbank market after the financial turmoil: squeezing liquidity in a 'lemons market' or asking liquidity 'on tap', Bank of Italy Working Papers, no. 819.

Del Prete S., Federico S. (2014), Trade and finance: is there more than just trade finance? Evidence from matched bank-firm data, Bank of Italy Working Papers, no. 948.

Demir B., Michalski T. K., Ors E. (2017), Risk-Based Capital Requirements for Banks and International Trade, Review of Financial Studies, July.

Demir B., Javorcik B. (2018), Don't throw in the towel, throw in trade credit, Journal of International Economics, vol. 111(C), pp. 177-189.

Fisman R., Love I. (2003), Trade Credit, Financial Intermediary Development, and Industry Growth, The Journal of Finance, 58(1), pp. 353-374

ICC (2010), Report on findings of ICC-ADB Register on trade finance: statistical analysis of risk profile of trade finance products, no. 470/1147.

Niepmann F., Schmidt-Eisenlohr T. (2014 a), International Trade, Risk and the Role of Banks, Federal Reserve Bank of New York Staff Report, no. 633.

Niepmann F., Schmidt-Eisenlohr T. (2014 b), No Guarantees, No Trade: How Banks Affect Export Patterns, Federal Reserve Bank of New York Staff Report, no. 659.

Paravisini D., Rappoport V., Schnabl P., Wolfenzon D. (2014), Dissecting the effect of credit supply on trade: evidence from matched credit-export data, Review of Economic Studies, 82, pp. 333-359.

Schmidt-Eisenlohr T. (2013), Towards a theory of trade finance, Journal of International Economics, 91, pp. 96112.

UNECE (2003), Trade finance for small and medium-sized enterprises in CIS countries, United Nations, New York and Geneva.

Table 1: **Summary statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
exp_{ikt}	285,046	13.793	2.515	0	21.281
imp_{ikt}	192,008	13.072	3.087	0	21.923
$dist_i$	288,139	8.023	.962	6.199	9.829
$crisis_t$	288,139	.221	.415	0	1
$tang_k$	288,139	.190	.070	.065	.445
$tcred_k$	288,139	.338	.055	.079	.455
$tdeb_k$	288,139	.253	.039	.164	.322
$tfexp_k$	287,152	.027	.032	0	.172
$tfimp_k$	287,152	.005	.0167	0	.096
$debfin_k$	288,139	.384	.0438	.294	.564
$xdom_k$	283,054	.366	.153	.010	.761
$xsmall_k$	261,078	.087	.054	.000	.245
$mdom_k$	283,054	.334	.153	.013	.771
$msmall_k$	261,078	.091	.065	.000	.354
$ibka_{it}$	219,419	3.247	3.362	-11.176	11.040
$ibkl_{it}$	226,377	3.498	3.435	-8.111	11.565
$ibkg_{it}$	177,523	3.507	2.257	-4.196	10.312

Definition of the variables. exp_{it}: log of Italy's exports to country i in sector k in quarter t; imp_{it}: log of Italy's imports from country i in sector k in quarter t; $dist_i$: log of distance between most populated cities; $crisis_t$: dummy equal to one during the global financial crisis (2008Q4-2009Q3) and the peak of the sovereign debt crisis in Italy (2011Q3-2012Q2); $tang_k$: ratio of tangible assets on total assets; $tcred_k$: ratio of trade credit on total assets; $tdeb_k$: ratio of trade debit on total liabilities; $tfexp_k$: ratio of export loans and guarantees on exports; $tfimp_k$: ratio of import loans and guarantees on sales; $debfin_k$: ratio of financial debt on total liabilities; $xdom_k$: share of domestic (non-multinational) exporters; $xsmall_k$: share of micro and small exporters; $mdom_k$: share of domestic (non-multinational) importers; $msmall_k$: share of micro and small importers; $ibka_{it}$: log of Italian banks' interbank (non-collateralized) assets vis-a-vis banks in country i; $ibkl_{it}$: log of Italian banks' interbank (non-collateralized) liabilities vis-a-vis banks in country i; $ibkg_{it}$: log of Italian banks' interbank guarantees vis-a-vis banks in country i.

Table 2: **Cross-correlation table**

Variables	$tang_k$	$tcred_k$	$tdeb_k$	$debfin_k$	$tfexp_k$	$tfimp_k$	$xdom_k$	$mdom_k$	$xsmall_k$	$msmall_k$
$tang_k$	1.000									
$tcred_k$	-0.453	1.000								
$tdeb_k$	-0.348	0.535	1.000							
$debfin_k$	0.128	-0.312	-0.320	1.000						
$tfexp_k$	-0.240	-0.040	0.016	0.100	1.000					
$tfimp_k$	0.013	-0.125	-0.188	0.378	0.238	1.000				
$xdom_k$	0.205	-0.057	0.008	0.467	-0.041	0.261	1.000			
$mdom_k$	0.206	-0.056	-0.002	0.483	-0.045	0.295	0.976	1.000		
$xsmall_k$	0.020	-0.113	-0.129	0.467	0.017	0.317	0.828	0.830	1.000	
$msmall_k$	-0.030	-0.097	-0.111	0.485	0.072	0.250	0.851	0.820	0.963	1.000

See note to Table 1 for the definition of the variables.

Table 3: **Baseline estimates: exports**

	Dependent variable: exp_{ikt}					
	(1)	(2)	(3)	(4)	(5)	(6)
$dist_i \times D_{crisis} \times tfexp_k$	-0.361***					
	(0.135)					
$dist_i \times D_{crisis} \times tang_k$		0.091				
		(0.065)				
$dist_i \times D_{crisis} \times tcred_k$			-0.159*			
			(0.088)			
$dist_i \times D_{crisis} \times debfin_k$				-0.063		
				(0.101)		
$dist_i \times D_{crisis} \times xdom_k$					-0.070**	
					(0.035)	
$dist_i \times D_{crisis} \times xsmall_k$						-0.203**
						(0.082)
Observations	284147	284991	284991	284991	280277	258441
R^2	0.908	0.908	0.908	0.908	0.908	0.912
adjr2	0.903	0.903	0.903	0.903	0.903	0.907
clusters	100	100	100	100	100	100

Estimates of equation (1). All estimates include country-sector, country-time and sector-time fixed effects. Standard errors are clustered at the country level. See note to Table 1 for the definition of the variables. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 4: **Estimates with two distinct crisis dummies: exports**

	Dependent variable: exp_{ikt}					
	(1)	(2)	(3)	(4)	(5)	(6)
$dist_i \times D_{crisis0809} \times tfexp_k$	-0.488**					
	(0.211)					
$dist_i \times D_{crisis1112} \times tfexp_k$	-0.236					
	(0.201)					
$dist_i \times D_{crisis0809} \times tang_k$		0.197*				
		(0.106)				
$dist_i \times D_{crisis1112} \times tang_k$		-0.012				
		(0.092)				
$dist_i \times D_{crisis0809} \times tcred_k$			-0.168			
			(0.133)			
$dist_i \times D_{crisis1112} \times tcred_k$			-0.151			
			(0.136)			
$dist_i \times D_{crisis0809} \times debfin_k$				0.032		
				(0.191)		
$dist_i \times D_{crisis1112} \times debfin_k$				-0.155		
				(0.168)		
$dist_i \times D_{crisis0809} \times xdom_k$					-0.066	
					(0.047)	
$dist_i \times D_{crisis1112} \times xdom_k$					-0.073	
					(0.050)	
$dist_i \times D_{crisis0809} \times xsmall_k$						-0.294**
						(0.145)
$dist_i \times D_{crisis1112} \times xsmall_k$						-0.114
						(0.109)
Observations	284147	284991	284991	284991	280277	258441
R^2	0.908	0.908	0.908	0.908	0.908	0.912
adjr2	0.903	0.903	0.903	0.903	0.903	0.907
clusters	100	100	100	100	100	100

Estimates of equation (1) modified with the inclusion of the interaction with two distinct crisis dummies (global financial crisis in 2008Q4-2009Q3 and peak of the sovereign debt crisis in 2011Q3-2012Q2). All estimates include country-sector, country-time and sector-time fixed effects. Standard errors are clustered at the country level. See note to Table 1 for the definition of the variables. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 5: **Estimates with the inclusion of interbank assets: exports**

	Dependent variable: exp_{ikt}					
	(1)	(2)	(3)	(4)	(5)	(6)
$dist_i \times D_{crisis} \times tfexp_k$	-0.489***					
	(0.161)					
$ibka_{it} \times tfexp_k$	0.085					
	(0.067)					
$dist_i \times D_{crisis} \times tang_k$		0.217***				
		(0.080)				
$ibka_{it} \times tang_k$		-0.052				
		(0.041)				
$dist_i \times D_{crisis} \times tcred_k$			-0.192*			
			(0.106)			
$ibka_{it} \times tcred_k$			0.014			
			(0.045)			
$dist_i \times D_{crisis} \times debfin_k$				0.009		
				(0.128)		
$ibka_{it} \times debfin_k$				-0.089		
				(0.067)		
$dist_i \times D_{crisis} \times xdom_k$					-0.062*	
					(0.037)	
$ibka_{it} \times xdom_k$					0.003	
					(0.017)	
$dist_i \times D_{crisis} \times xsmall_k$						-0.210**
						(0.100)
$ibka_{it} \times xsmall_k$						-0.005
						(0.048)
Observations	216614	217314	217314	217314	213709	196975
R^2	0.915	0.915	0.915	0.915	0.915	0.919
adjr2	0.910	0.909	0.909	0.909	0.909	0.913
clusters	96	96	96	96	96	96

Estimates of equation (2). All estimates include country-sector, country-time and sector-time fixed effects. Standard errors are clustered at the country level. See note to Table 1 for the definition of the variables. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 6: **Estimates with the inclusion of interbank assets and crisis dummy: exports**

	Dependent variable: exp_{ikt}					
	(1)	(2)	(3)	(4)	(5)	(6)
$dist_i \times D_{crisis} \times tfexp_k$	-0.528***					
	(0.175)					
$ibka_{it} \times tfexp_k$	0.095					
	(0.068)					
$ibka_{it} \times D_{crisis} \times tfexp_k$	-0.035					
	(0.052)					
$dist_i \times D_{crisis} \times tang_k$		0.210**				
		(0.084)				
$ibka_{it} \times tang_k$		-0.051				
		(0.043)				
$ibka_{it} \times D_{crisis} \times tang_k$		-0.007				
		(0.025)				
$dist_i \times D_{crisis} \times tcred_k$			-0.192*			
			(0.113)			
$ibka_{it} \times tcred_k$			0.014			
			(0.047)			
$ibka_{it} \times D_{crisis} \times tcred_k$			-0.000			
			(0.029)			
$dist_i \times D_{crisis} \times debfin_k$				-0.022		
				(0.126)		
$ibka_{it} \times debfin_k$				-0.081		
				(0.068)		
$ibka_{it} \times D_{crisis} \times debfin_k$				-0.029		
				(0.042)		
$dist_i \times D_{crisis} \times xdom_k$					-0.058	
					(0.040)	
$ibka_{it} \times xdom_k$					0.002	
					(0.017)	
$ibka_{it} \times D_{crisis} \times xdom_k$					0.004	
					(0.012)	
$dist_i \times D_{crisis} \times xsmall_k$						-0.169*
						(0.101)
$ibka_{it} \times xsmall_k$						-0.015
						(0.048)
$ibka_{it} \times D_{crisis} \times xsmall_k$						0.036
						(0.032)
Observations	216614	217314	217314	217314	213709	196975
R^2	0.915	0.915	0.915	0.915	0.915	0.919
adjr2	0.910	0.909	0.909	0.909	0.909	0.913
clusters	96	96	96	96	96	96

Estimates of equation (3). All estimates include country-sector, country-time and sector-time fixed effects. Standard errors are clustered at the country level. See note to Table 1 for the definition of the variables. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 7: **Estimates with the inclusion of interbank guarantees: exports**

	Dependent variable: exp_{ikt}					
	(1)	(2)	(3)	(4)	(5)	(6)
$dist_i \times D_{crisis} \times tfexp_k$	-0.426**					
	(0.212)					
$ibkg_{it} \times tfexp_k$	0.285*					
	(0.152)					
$dist_i \times D_{crisis} \times tang_k$		0.142				
		(0.087)				
$ibkg_{it} \times tang_k$		-0.073				
		(0.070)				
$dist_i \times D_{crisis} \times tcred_k$			-0.273**			
			(0.137)			
$ibkg_{it} \times tcred_k$			0.220**			
			(0.089)			
$dist_i \times D_{crisis} \times debfin_k$				-0.056		
				(0.158)		
$ibkg_{it} \times debfin_k$				-0.364***		
				(0.111)		
$dist_i \times D_{crisis} \times xdom_k$					-0.085*	
					(0.050)	
$ibkg_{it} \times xdom_k$					-0.021	
					(0.032)	
$dist_i \times D_{crisis} \times xsmall_k$						-0.164
						(0.109)
$ibkg_{it} \times xsmall_k$						-0.089
						(0.083)
Observations	175337	175892	175892	175892	172937	159414
R^2	0.921	0.920	0.920	0.920	0.920	0.924
adjr2	0.915	0.914	0.914	0.914	0.914	0.918
clusters	97	97	97	97	97	97

Estimates of equation (2). All estimates include country-sector, country-time and sector-time fixed effects. Standard errors are clustered at the country level. See note to Table 1 for the definition of the variables. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 8: **Estimates with the inclusion of interbank guarantees and crisis dummy: exports**

	Dependent variable: exp_{ikt}					
	(1)	(2)	(3)	(4)	(5)	(6)
$dist_i \times D_{crisis} \times tfexp_k$	-0.543**					
	(0.238)					
$ibkg_{it} \times tfexp_k$	0.307**					
	(0.150)					
$ibkg_{it} \times D_{crisis} \times tfexp_k$	-0.181*					
	(0.108)					
$dist_i \times D_{crisis} \times tang_k$		0.133				
		(0.087)				
$ibkg_{it} \times tang_k$		-0.072				
		(0.070)				
$ibkg_{it} \times D_{crisis} \times tang_k$		-0.013				
		(0.037)				
$dist_i \times D_{crisis} \times tcred_k$			-0.249*			
			(0.137)			
$ibkg_{it} \times tcred_k$			0.215**			
			(0.090)			
$ibkg_{it} \times D_{crisis} \times tcred_k$			0.038			
			(0.060)			
$dist_i \times D_{crisis} \times debfin_k$				-0.049		
				(0.164)		
$ibkg_{it} \times debfin_k$				-0.365***		
				(0.111)		
$ibkg_{it} \times D_{crisis} \times debfin_k$				0.011		
				(0.068)		
$dist_i \times D_{crisis} \times xdom_k$					-0.082*	
					(0.049)	
$ibkg_{it} \times xdom_k$					-0.022	
					(0.033)	
$ibkg_{it} \times D_{crisis} \times xdom_k$					0.006	
					(0.022)	
$dist_i \times D_{crisis} \times xsmall_k$						-0.166
						(0.108)
$ibkg_{it} \times xsmall_k$						-0.089
						(0.084)
$ibkg_{it} \times D_{crisis} \times xsmall_k$						-0.004
						(0.052)
Observations	175337	175892	175892	175892	172937	159414
R^2	0.921	0.920	0.920	0.920	0.920	0.924
adjr2	0.915	0.914	0.914	0.914	0.914	0.918
clusters	97	97	97	97	97	97

Estimates of equation (3). All estimates include country-sector, country-time and sector-time fixed effects. Standard errors are clustered at the country level. See note to Table 1 for the definition of the variables. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

RECENTLY PUBLISHED "TEMI" (*)

N. 1193 – *The effect of grants on university drop-out rates: evidence on the Italian case*, by Francesca Modena, Enrico Rettore and Giulia Martina Tanzi (September 2018).

N. 1194 – *Potential output and microeconomic heterogeneity*, by Davide Fantino (November 2018).

N. 1195 – *Immigrants, labor market dynamics and adjustment to shocks in the Euro Area*, by Gaetano Basso, Francesco D'Amuri and Giovanni Peri (November 2018).

N. 1196 – *Sovereign debt maturity structure and its costs*, by Flavia Corneli (November 2018).

N. 1197 – *Fiscal policy in the US: a new measure of uncertainty and its recent development*, by Alessio Anzuini and Luca Rossi (November 2018).

N. 1198 – *Macroeconomics determinants of the correlation between stocks and bonds*, by Marcello Pericoli (November 2018).

N. 1199 – *Bank capital constraints, lending supply and economic activity*, by Antonio M. Conti, Andrea Nobili and Federico M. Signoretti (November 2018).

N. 1200 – *The effectiveness of capital controls*, by Valerio Nispi Landi and Alessandro Schiavone (November 2018).

N. 1201 – *Contagion in the CoCos market? A case study of two stress events*, by Pierluigi Bologna, Arianna Miglietta and Anatoli Segura (November 2018).

N. 1202 – *Is ECB monetary policy more powerful during expansions?*, by Martina Cecioni (December 2018).

N. 1203 – *Firms' inflation expectations and investment plans*, by Adriana Grasso and Tiziano Ropele (December 2018).

N. 1204 – *Recent trends in economic activity and TFP in Italy with a focus on embodied technical progress*, by Alessandro Mistretta and Francesco Zollino (December 2018).

N. 1205 – *Benefits of Gradualism or Costs of Inaction? Monetary Policy in Times of Uncertainty*, by Giuseppe Ferrero, Mario Pietrunti and Andrea Tiseno (February 2019).

N. 1206 – *Machine learning in the service of policy targeting: the case of public credit guarantees*, by Monica Andini, Michela Boldrini, Emanuele Ciani, Guido de Blasio, Alessio D'Ignazio and Andrea Paladini (February 2019).

N. 1207 – *Do the ECB's monetary policies benefit Emerging Market Economies? A GVAR analysis on the crisis and post-crisis period*, by Andrea Colabella (February 2019).

N. 1208 – *The Economic Effects of Big Events: Evidence from the Great Jubilee 2000 in Rome*, by Raffaello Bronzini, Sauro Mocetti and Matteo Mongardini (February 2019).

N. 1209 – *The added value of more accurate predictions for school rankings*, by Fritz Schiltz, Paolo Sestito, Tommaso Agasisti and Kristof De Witte (February 2019).

N. 1210 – *Identification and estimation of triangular models with a binary treatment*, by Santiago Pereda Fernández (March 2019).

N. 1211 – *U.S. shale producers: a case of dynamic risk management*, by Fabrizio Ferriani and Giovanni Veronese (March 2019).

N. 1212 – *Bank resolution and public backstop in an asymmetric banking union*, by Anatoli Segura Velez (March 2019).

N. 1213 – *A regression discontinuity design for categorical ordered running variables with an application to central bank purchases of corporate bonds*, by Fan Li, Andrea Mercatanti, Taneli Mäkinen and Andrea Silvestrini (March 2019).

(*) Requests for copies should be sent to:
Banca d'Italia – Servizio Studi di struttura economica e finanziaria – Divisione Biblioteca e Archivio storico – Via Nazionale, 91 – 00184 Rome – (fax 0039 06 47922059). They are available on the Internet www.bancaditalia.it.

2017

AABERGE, R., F. BOURGUIGNON, A. BRANDOLINI, F. FERREIRA, J. GORNICK, J. HILLS, M. JÄNTTI, S. JENKINS, J. MICKLEWRIGHT, E. MARLIER, B. NOLAN, T. PIKETTY, W. RADERMACHER, T. SMEEDING, N. STERN, J. STIGLITZ, H. SUTHERLAND, *Tony Atkinson and his legacy*, Review of Income and Wealth, v. 63, 3, pp. 411-444, **WP 1138 (September 2017).**

ACCETTURO A., M. BUGAMELLI and A. LAMORGESE, *Law enforcement and political participation: Italy 1861-65*, Journal of Economic Behavior & Organization, v. 140, pp. 224-245, **WP 1124 (July 2017).**

ADAMOPOULOU A. and G.M. TANZI, *Academic dropout and the great recession*, Journal of Human Capital, V. 11, 1, pp. 35–71, **WP 970 (October 2014).**

ALBERTAZZI U., M. BOTTERO and G. SENE, *Information externalities in the credit market and the spell of credit rationing*, Journal of Financial Intermediation, v. 30, pp. 61–70, **WP 980 (November 2014).**

ALESSANDRI P. and H. MUMTAZ, *Financial indicators and density forecasts for US output and inflation*, Review of Economic Dynamics, v. 24, pp. 66-78, **WP 977 (November 2014).**

BARBIERI G., C. ROSSETTI and P. SESTITO, *Teacher motivation and student learning*, Politica economica/Journal of Economic Policy, v. 33, 1, pp.59-72, **WP 761 (June 2010).**

BENTIVOGLI C. and M. LITTERIO, *Foreign ownership and performance: evidence from a panel of Italian firms*, International Journal of the Economics of Business, v. 24, 3, pp. 251-273, **WP 1085 (October 2016).**

BRONZINI R. and A. D'IGNAZIO, *Bank internationalisation and firm exports: evidence from matched firm-bank data*, Review of International Economics, v. 25, 3, pp. 476-499 **WP 1055 (March 2016).**

BRUCHE M. and A. SEGURA, *Debt maturity and the liquidity of secondary debt markets*, Journal of Financial Economics, v. 124, 3, pp. 599-613, **WP 1049 (January 2016).**

BURLON L., *Public expenditure distribution, voting, and growth*, Journal of Public Economic Theory,, v. 19, 4, pp. 789–810, **WP 961 (April 2014).**

BURLON L., A. GERALI, A. NOTARPIETRO and M. PISANI, *Macroeconomic effectiveness of non-standard monetary policy and early exit. a model-based evaluation*, International Finance, v. 20, 2, pp.155-173, **WP 1074 (July 2016).**

BUSETTI F., *Quantile aggregation of density forecasts*, Oxford Bulletin of Economics and Statistics, v. 79, 4, pp. 495-512, **WP 979 (November 2014).**

CESARONI T. and S. IEZZI, *The predictive content of business survey indicators: evidence from SIGE*, Journal of Business Cycle Research, v.13, 1, pp 75–104, **WP 1031 (October 2015).**

CONTI P., D. MARELLA and A. NERI, *Statistical matching and uncertainty analysis in combining household income and expenditure data*, Statistical Methods & Applications, v. 26, 3, pp 485–505, **WP 1018 (July 2015).**

D'AMURI F., *Monitoring and disincentives in containing paid sick leave*, Labour Economics, v. 49, pp. 74-83, **WP 787 (January 2011).**

D'AMURI F. and J. MARCUCCI, *The predictive power of google searches in forecasting unemployment*, International Journal of Forecasting, v. 33, 4, pp. 801-816, **WP 891 (November 2012).**

DE BLASIO G. and S. POY, *The impact of local minimum wages on employment: evidence from Italy in the 1950s*, Journal of Regional Science, v. 57, 1, pp. 48-74, **WP 953 (March 2014).**

DEL GIOVANE P., A. NOBILI and F. M. SIGNORETTI, *Assessing the sources of credit supply tightening: was the sovereign debt crisis different from Lehman?*, International Journal of Central Banking, v. 13, 2, pp. 197-234, **WP 942 (November 2013).**

DEL PRETE S., M. PAGNINI, P. ROSSI and V. VACCA, *Lending organization and credit supply during the 2008–2009 crisis*, Economic Notes, v. 46, 2, pp. 207–236, **WP 1108 (April 2017).**

DELLE MONACHE D. and I. PETRELLA, *Adaptive models and heavy tails with an application to inflation forecasting*, International Journal of Forecasting, v. 33, 2, pp. 482-501, **WP 1052 (March 2016).**

FEDERICO S. and E. TOSTI, *Exporters and importers of services: firm-level evidence on Italy*, The World Economy, v. 40, 10, pp. 2078-2096, **WP 877 (September 2012).**

GIACOMELLI S. and C. MENON, *Does weak contract enforcement affect firm size? Evidence from the neighbour's court*, Journal of Economic Geography, v. 17, 6, pp. 1251-1282, **WP 898 (January 2013).**

LOBERTO M. and C. PERRICONE, *Does trend inflation make a difference?*, Economic Modelling, v. 61, pp. 351–375, **WP 1033 (October 2015).**

MANCINI A.L., C. MONFARDINI and S. PASQUA, *Is a good example the best sermon? Children's imitation of parental reading*, Review of Economics of the Household, v. 15, 3, pp 965–993, **D No. 958 (April 2014).**

MEEKS R., B. NELSON and P. ALESSANDRI, *Shadow banks and macroeconomic instability*, Journal of Money, Credit and Banking, v. 49, 7, pp. 1483–1516, **WP 939 (November 2013).**

MICUCCI G. and P. ROSSI, *Debt restructuring and the role of banks' organizational structure and lending technologies*, Journal of Financial Services Research, v. 51, 3, pp 339–361, **WP 763 (June 2010).**

MOCETTI S., M. PAGNINI and E. SETTE, *Information technology and banking organization*, Journal of Journal of Financial Services Research, v. 51, pp. 313-338, **WP 752 (March 2010).**

MOCETTI S. and E. VIVIANO, *Looking behind mortgage delinquencies*, Journal of Banking & Finance, v. 75, pp. 53-63, **WP 999 (January 2015).**

NOBILI A. and F. ZOLLINO, *A structural model for the housing and credit market in Italy*, Journal of Housing Economics, v. 36, pp. 73-87, **WP 887 (October 2012).**

PALAZZO F., *Search costs and the severity of adverse selection*, Research in Economics, v. 71, 1, pp. 171-197, **WP 1073 (July 2016).**

PATACCHINI E. and E. RAINONE, *Social ties and the demand for financial services*, Journal of Financial Services Research, v. 52, 1–2, pp 35–88, **WP 1115 (June 2017).**

PATACCHINI E., E. RAINONE and Y. ZENOU, *Heterogeneous peer effects in education*, Journal of Economic Behavior & Organization, v. 134, pp. 190–227, **WP 1048 (January 2016).**

SBRANA G., A. SILVESTRINI and F. VENDITTI, *Short-term inflation forecasting: the M.E.T.A. approach*, International Journal of Forecasting, v. 33, 4, pp. 1065-1081, **WP 1016 (June 2015).**

SEGURA A. and J. SUAREZ, *How excessive is banks' maturity transformation?*, Review of Financial Studies, v. 30, 10, pp. 3538–3580, **WP 1065 (April 2016).**

VACCA V., *An unexpected crisis? Looking at pricing effectiveness of heterogeneous banks*, Economic Notes, v. 46, 2, pp. 171–206, **WP 814 (July 2011).**

VERGARA CAFFARELI F., *One-way flow networks with decreasing returns to linking*, Dynamic Games and Applications, v. 7, 2, pp. 323-345, **WP 734 (November 2009).**

ZAGHINI A., *A Tale of fragmentation: corporate funding in the euro-area bond market*, International Review of Financial Analysis, v. 49, pp. 59-68, **WP 1104 (February 2017).**

2018

ADAMOPOULOU A. and E. KAYA, *Young adults living with their parents and the influence of peers*, Oxford Bulletin of Economics and Statistics,v. 80, pp. 689-713, **WP 1038 (November 2015).**

ANDINI M., E. CIANI, G. DE BLASIO, A. D'IGNAZIO and V. SILVESTRINI, *Targeting with machine learning: an application to a tax rebate program in Italy*, Journal of Economic Behavior & Organization, v. 156, pp. 86-102, **WP 1158 (December 2017).**

BARONE G., G. DE BLASIO and S. MOCETTI, *The real effects of credit crunch in the great recession: evidence from Italian provinces*, Regional Science and Urban Economics, v. 70, pp. 352-59, **WP 1057 (March 2016).**

BELOTTI F. and G. ILARDI *Consistent inference in fixed-effects stochastic frontier models*, Journal of Econometrics, v. 202, 2, pp. 161-177, **WP 1147 (October 2017).**

BERTON F., S. MOCETTI, A. PRESBITERO and M. RICHIARDI, *Banks, firms, and jobs*, Review of Financial Studies, v.31, 6, pp. 2113-2156, **WP 1097 (February 2017).**

BOFONDI M., L. CARPINELLI and E. SETTE, *Credit supply during a sovereign debt crisis*, Journal of the European Economic Association, v.16, 3, pp. 696-729, **WP 909 (April 2013).**

BOKAN N., A. GERALI, S. GOMES, P. JACQUINOT and M. PISANI, *EAGLE-FLI: a macroeconomic model of banking and financial interdependence in the euro area*, Economic Modelling, v. 69, C, pp. 249-280, **WP 1064 (April 2016).**

BRILLI Y. and M. TONELLO, *Does increasing compulsory education reduce or displace adolescent crime? New evidence from administrative and victimization data*, CESifo Economic Studies, v. 64, 1, pp. 15–4, **WP 1008 (April 2015).**

BUONO I. and S. FORMAI *The heterogeneous response of domestic sales and exports to bank credit shocks,* Journal of International Economics, v. 113, pp. 55-73, **WP 1066 (March 2018).**

BURLON L., A. GERALI, A. NOTARPIETRO and M. PISANI, *Non-standard monetary policy, asset prices and macroprudential policy in a monetary union,* Journal of International Money and Finance, v. 88, pp. 25-53, **WP 1089 (October 2016).**

CARTA F. and M. DE PHLIPPIS, *You've Come a long way, baby. Husbands' commuting time and family labour supply,* Regional Science and Urban Economics, v. 69, pp. 25-37, **WP 1003 (March 2015).**

CARTA F. and L. RIZZICA, *Early kindergarten, maternal labor supply and children's outcomes: evidence from Italy,* Journal of Public Economics, v. 158, pp. 79-102, **WP 1030 (October 2015).**

CASIRAGHI M., E. GAIOTTI, L. RODANO and A. SECCHI, *A "Reverse Robin Hood"? The distributional implications of non-standard monetary policy for Italian households,* Journal of International Money and Finance, v. 85, pp. 215-235, **WP 1077 (July 2016).**

CECCHETTI S., F. NATOLI and L. SIGALOTTI, *Tail co-movement in inflation expectations as an indicator of anchoring,* International Journal of Central Banking, v. 14, 1, pp. 35-71, **WP 1025 (July 2015).**

CIANI E. and C. DEIANA, *No Free lunch, buddy: housing transfers and informal care later in life,* Review of Economics of the Household, v.16, 4, pp. 971-1001, **WP 1117 (June 2017).**

CIPRIANI M., A. GUARINO, G. GUAZZAROTTI, F. TAGLIATI and S. FISHER, *Informational contagion in the laboratory,* Review of Finance, v. 22, 3, pp. 877-904, **WP 1063 (April 2016).**

DE BLASIO G, S. DE MITRI, S. D'IGNAZIO, P. FINALDI RUSSO and L. STOPPANI, *Public guarantees to SME borrowing. A RDD evaluation,* Journal of Banking & Finance, v. 96, pp. 73-86, **WP 1111 (April 2017).**

GERALI A., A. LOCARNO, A. NOTARPIETRO and M. PISANI, *The sovereign crisis and Italy's potential output,* Journal of Policy Modeling, v. 40, 2, pp. 418-433, **WP 1010 (June 2015).**

LIBERATI D., *An estimated DSGE model with search and matching frictions in the credit market,* International Journal of Monetary Economics and Finance (IJMEF), v. 11, 6, pp. 567-617, **WP 986 (November 2014).**

LINARELLO A., *Direct and indirect effects of trade liberalization: evidence from Chile,* Journal of Development Economics, v. 134, pp. 160-175, **WP 994 (December 2014).**

NUCCI F. and M. RIGGI, *Labor force participation, wage rigidities, and inflation,* Journal of Macroeconomics, v. 55, 3 pp. 274-292, **WP 1054 (March 2016).**

RIGON M. and F. ZANETTI, *Optimal monetary policy and fiscal policy interaction in a non_ricardian economy,* International Journal of Central Banking, v. 14 3, pp. 389-436, **WP 1155 (December 2017).**

SEGURA A., *Why did sponsor banks rescue their SIVs?,* Review of Finance, v. 22, 2, pp. 661-697, **WP 1100 (February 2017).**

2019

CIANI E. and P. FISHER, *Dif-in-dif estimators of multiplicative treatment effects,* Journal of Econometric Methods, v. 8. 1, pp. 1-10, **WP 985 (November 2014).**

FORTHCOMING

ACCETTURO A., W. DI GIACINTO, G. MICUCCI and M. PAGNINI, *Geography, productivity and trade: does selection explain why some locations are more productive than others?,* Journal of Regional Science, **WP 910 (April 2013).**

ALBANESE G., G. DE BLASIO and P. SESTITO, *Trust, risk and time preferences: evidence from survey data,* International Review of Economics, **WP 911 (April 2013).**

APRIGLIANO V., G. ARDIZZI and L. MONTEFORTE, *Using the payment system data to forecast the economic activity,* International Journal of Central Banking, **WP 1098 (February 2017).**

ARNAUDO D., G. MICUCCI, M. RIGON and P. ROSSI, *Should I stay or should I go? Firms' mobility across banks in the aftermath of the financial crisis,* Italian Economic Journal / Rivista italiana degli economisti, **WP 1086 (October 2016).**

BELOTTI F. and G. ILARDI, *Consistent inference in fixed-effects stochastic frontier models*, Journal of Econometrics, **WP 1147 (October 2017).**

BUSETTI F. and M. CAIVANO, *Low frequency drivers of the real interest rate: empirical evidence for advanced economies*, International Finance, **WP 1132 (September 2017).**

CHIADES P., L. GRECO, V. MENGOTTO, L. MORETTI and P. VALBONESI, *Fiscal consolidation by intergovernmental transfers cuts? Economic Modelling*, **WP 1076 (July 2016).**

CIANI E., F. DAVID and G. DE BLASIO, *Local responses to labor demand shocks: a re-assessment of the case of Italy*, IMF Economic Review, **WP 1112 (April 2017).**

COLETTA M., R. DE BONIS and S. PIERMATTEI, *Household debt in OECD countries: the role of supply-side and demand-side factors*, Social Indicators Research, **WP 989 (November 2014).**

CORSELLO F. and V. NISPI LANDI, *Labor market and financial shocks: a time-varying analysis*, Journal of Money, Credit and Banking, **WP 1179 (June 2018).**

COVA P., P. PAGANO and M. PISANI, *Domestic and international macroeconomic effects of the Eurosystem Expanded Asset Purchase Programme*, IMF Economic Review, **WP 1036 (October 2015).**

D'AMURI F., *Monitoring and disincentives in containing paid sick leave*, Labour Economics, **WP 787 (January 2011).**

D'IGNAZIO A. and C. MENON, *The causal effect of credit Guarantees for SMEs: evidence from Italy*, Scandinavian Journal of Economics, **WP 900 (February 2013).**

ERCOLANI V. and J. VALLE E AZEVEDO, *How can the government spending multiplier be small at the zero lower bound?*, Macroeconomic Dynamics, **WP 1174 (April 2018).**

FEDERICO S. and E. TOSTI, *Exporters and importers of services: firm-level evidence on Italy*, The World Economy, **WP 877 (September 2012).**

GERALI A. and S. NERI, *Natural rates across the Atlantic*, Journal of Macroeconomics, **WP 1140 (September 2017).**

GIACOMELLI S. and C. MENON, *Does weak contract enforcement affect firm size? Evidence from the neighbour's court*, Journal of Economic Geography, **WP 898 (January 2013).**

GIORDANO C., M. MARINUCCI and A. SILVESTRINI, *The macro determinants of firms' and households' investment: evidence from Italy*, Economic Modelling, **WP 1167 (March 2018).**

NATOLI F. and L. SIGALOTTI, *Tail co-movement in inflation expectations as an indicator of anchoring*, International Journal of Central Banking, **WP 1025 (July 2015).**

RIGGI M., *Capital destruction, jobless recoveries, and the discipline device role of unemployment*, Macroeconomic Dynamics, **WP 871 (July 2012).**

RIZZICA L., *Raising aspirations and higher education. evidence from the UK's widening participation policy*, Journal of Labor Economics, **WP 1188 (September 2018).**

SEGURA A., *Why did sponsor banks rescue their SIVs?*, Review of Finance, **WP 1100 (February 2017).**