

Working Paper

International Sourcing and Employment in Times of Financial Crisis: The case of France

Jean-Charles Bricongne

Banque de France - European Commission

Fabrizio Coricelli

Paris School of Economics
University of Paris 1 Panthéon-Sorbonne

Margarita Lopez Forero

OFCE SciencesPo

18/2017 July



This project has received funding from the European Union Horizon 2020 Research and Innovation action under grant agreement No 649186

International Sourcing and Employment in Times of Financial Crisis: The case of France*

Jean-Charles Bricongne[†] Fabrizio Coricelli[‡] Margarita Lopez Forero[§]

Mars 2017

Abstract

This paper studies the transmission of global shocks during the Great Recession and its impact on French employment. Particularly, we explore the role of trade credit in the propagation of cross-border shocks. Using a sub-sample of importing enterprises that were active over 2004-2009, our findings imply that strong pre-crisis sourcing ties with countries that were more resilient to the global crisis, translated into better performance in terms of employment growth over 2008-2009. This effect dramatically varies with trade credit intensity. Strongly relying on trade credit made firms more vulnerable to unanticipated shocks, for whom the adverse impact of the crisis was exacerbated. This effect intensified among firms with important sourcing ties with severely shocked countries. By contrast, the negative effect of the crisis was mitigated for trade credit intensive firms when they had stronger sourcing relations with countries subject to milder shocks.

JEL classifications: F10, F14, F16, F42, G20, G23.

Keywords: Trade credit, Employment, Imports, Financial Frictions.

*We thank Julian Hinz, Angelo Secchi, Nicolas Berman and Charlotte Sandoz for extensive and insightful discussions, as well as Joaquin Blaum, Guillaume Horny, Jean Imbs, Lionel Fontagné and Daniel Herrera for their valuable comments on an earlier version of the paper. Margarita Lopez Forero gratefully acknowledges the financial support of the European Union's Horizon 2020 grant No. 649186 – Project ISIGrowth. The ideas and opinions expressed in this paper do not necessarily reflect the ones of the institutions to which the authors belong. All remaining errors remain ours.

[†]Banque de France - European Commission. E-mail: Jean-Charles.BRICONGNE@ec.europa.eu

[‡]Paris School of Economics - University of Paris 1 Panthéon-Sorbonne. E-mail: fabrizio.coricelli@univ-paris1.fr

[§]OFCE SciencesPo. E-mail: margarita.lopezforero@sciencespo.fr

“Moreover, the linkages between markets, and between markets and institutions, are now more pronounced. [...] it also exposes the system to large systemic shocks”

– Raghuram Rajan¹

1 Introduction

The Great Recession that has followed the global financial crisis has prompted an increasing interest in the role of financial factors in the propagation of shocks across countries. One of the salient features of the 2008-2009 crisis was the 20% decline in global trade relative to global GDP, dubbed as the “Great Trade Collapse”.^{2,3}

Evidence on whether trade finance magnified the Great Trade Collapse and more generally, to what extent it contributed to the downturn in real economic activity across borders is somewhat mixed. For instance, findings in Eaton et al. (2011), Levchenko et al. (2009), Bricongne et al. (2012) and Bems et al. (2010) suggest that trade finance played a minor role in the trade collapse in 2008-2009, with most of the collapse explained by the fall in demand. By contrast, Ahn et al. (2011), Chor and Manova (2012), Niepmann and Schmidt-Eisenlohr (2016) and Coulibaly et al. (2013) among others, argue that trade finance did play a significant role.

In this paper we add to the existing literature on the role of trade finance in explaining the slowdown of real economic activity across borders, by focusing on a channel that has been so far neglected, namely the role of pre-crisis import linkages in transmitting financial shocks through the trade credit channel. Specifically, our analysis concentrates on “open account” or “post-shipment payment”. Which is the type of payment contract in which the exporter finances the transaction and the importer only pays after the arrival of the good. Hence, it is a short-term financing that the supplier extends to its client, which is characterized by the fact that it doesn’t involve financial intermediaries.⁴ We explore the mechanism through which firms may be financed by their suppliers in the presence of a financial shock, that is, the global financial crisis. Even if the financial crisis was global, some countries were hit much harder than others and everything else equal, this may have led suppliers in different countries to react differently towards their clients. More precisely we are interested in answering the following question: *can the development of a*

¹Rajan (2006).

²As documented by Eaton et al. (2011).

³See Baldwin (2009) for a comprehensive analysis on the causes and consequences of the collapse.

⁴In the rest of the analysis, the term “trade credit”, “open account” and “post-shipment terms” will be used indistinguishably to denote the short-term financing extended to the importer by the exporter.

relationship between trade partners mitigate the adverse effects on employment associated with limited access to institutional finance?

Given that cross-border goods linkages involve a financial transaction, international trade has implications for the transmission of shocks across countries. These implications may depend on the type of payment contract related in the transaction. Hence, a crucial distinction must be made among the different types of financing instruments supporting international trade that are encompassed in the "trade finance" broad term. These include: 1) cash-in-advance, where the importer bears the risk and pays before the shipment of the good; 2) open account, where importer pays upon delivery and the exporter bears the risk; and 3) letters of credit, which involve a financial intermediary and insurance activities and where the bank guarantees the obligation on behalf of the importer upon confirmation that the exporter meets the contract conditions. Focusing on open account payments allows us to analyze an additional channel of transmission of shocks across borders given that firms are linked through a short-term financial relation. Thus, credit restrictions from banks to non financial companies in each respective country, alters the ability of a supplier to bear the risk of the transaction and export under open account contracts. Therefore, adding to the channels through which shocks across countries can be propagated. In this sense, besides accounting for banks lending and banks backing international transactions, a more comprehensive assessment of the contribution of trade finance to the cross-border transmission of shocks should also evaluate the way in which credit restrictions to non financial companies alter their trade financing terms towards their foreign partners. Where, besides their effects on trade, these cross-border contagion can have implications on demand and production across countries.

We focus on employment for two main reasons. First, there is a large literature on the potentially adverse effects of imports on employment. Second, financial crises tend to have disproportionate effects on employment (Bentolila et al. (2015), Chodorow-Reich (2014) and Calvo et al. (2014)). Emphasizing the novel channel of trade credit, our analysis provides evidence of a potentially positive effect of imports on employment during financial crises. Furthermore, our analysis may provide insights using microeconomic data on the role of financial factors for the behavior of employment.

We use a very rich set of French firm-level data to analyze the effects of the Great Recession on the French labor market and its connection with the cross-border transmission of shocks through the ability of foreign suppliers to finance their clients. More specifically, we explore how sourcing goods from countries that were subject to lower financial pressure helped firms mitigating the adverse employment effects of the crisis by alleviating firms' financial

constraints through the provision of inter-enterprise credit. Our strategy is to exploit the large differences in firms' exposure to global shocks and their reliance on trade credit at the onset of the Great Recession to uncover whether the financial health of its foreign suppliers (that we view as potential lenders) helped cushioning the negative effect of the crisis.

In summary, the exposure-to-crisis measure allows assessing the employment effects of the crisis due to shocks suffered by firms' international suppliers by comparing the evolution of employment at different firms with varying pre-crisis exposure to the global financial shocks. The interaction with Trade Credit intensity assesses the importance of the effect conditional on the average use of trade credit in the production of the firm. In order to assess any causal effect it is required that the exposure-to-crisis is as close to randomly assigned as possible. We argue that, conditional on firm-level characteristics, this is indeed the case given that firms could choose ex-ante their sourcing strategies conditional on gravity variables, technology and any other firm-level characteristics independent to their ex-post exposure to the crisis (through their suppliers) given that the Great Recession could not possibly be anticipated by firms.

Using a sub-sample of importing enterprises that were active over 2004-2009, our findings imply that strong pre-crisis sourcing ties with countries that were more resilient to the global crisis translated into better performance in terms of employment growth over 2008-2009. This effect dramatically varies with trade credit intensity. Strongly relying on trade credit made firms more vulnerable to unanticipated shocks, for whom the adverse impact of the crisis was exacerbated. This effect intensified among firms with important sourcing ties with severely shocked countries. By contrast, the negative effect of the crisis was mitigated for trade credit intensive firms when they had stronger sourcing relations with countries subject to milder shocks. More specifically, our findings suggest that the suppliers' ability to provide trade credit was weakened by the worsening of the economic and financial conditions in their own country. These conditions are reflected by the market perception of the country's creditworthiness, economic recessions, equity market collapses, credit contractions or sharp currency appreciations. This added to the adverse impact of the crisis for French importers, particularly if trade credit was an important source of short-term external finance for the firm.

The rest of the paper is organized as follows. In section 2 we briefly discuss the relevant literature related to our analysis; Section 3 describes our data sources; section 4 explains the econometric methodology. Results are analyzed in section 5, while a robustness analysis and a discussion about possible future paths is presented in section 6. Finally, section 7 concludes.

2 Literature

Living in an increasingly globalised world has brought new challenges to policymakers due to the higher vulnerability that a tight interconnectedness comes with. This has been crystallised during the global downturn in 2008-2009, where the world witnessed an acceleration of the speed at which economic shocks propagated around the world. As a consequence, understanding well the economic forces behind the cross-border transmission of shocks has become crucial. In this sense, our contribution to the literature adds to the debate on the role of trade finance in explaining the transmission of real economic downturn across borders. We emphasize an additional channel of transmission of global financial shocks to the labor market. We do this by linking different economic literature and bringing empirical micro-evidence of the mechanism put forward in the paper.

In what follows we briefly recall the theoretical and empirical studies closely related to our work. First, it naturally relates to the literature that seeks to assess the role of trade finance in explaining the slowdown of real economic activity across borders. As mentioned earlier, these include those claiming that trade finance played a minor role such as Eaton et al. (2011), Levchenko et al. (2009) and Bricongne et al. (2012); as well as those finding that trade finance did have an important contribution to the trade collapse in 2008-2009, such as Bems et al. (2010), Ahn et al. (2011), Chor and Manova (2012), Niepmann and Schmidt-Eisenlohr (2016) and Coulibaly et al. (2013). Furthermore, focusing on earlier crises Iacovone and Zavacka (2009)'s and Amiti and Weinstein (2011)'s findings suggest that trade finance plays a magnifying role during a financial downturn.

Second, linked to the specific channel where suppliers become potential lenders for their clients, a strand of the literature seeks to understand the role of open account contracts or inter-enterprise credit when institutional financing is scarce. In this sense, our work relates to the studies documenting the "substitutability" relation that arises between bank credit and inter-enterprise credit, when the former is unavailable. These range from the early contribution of Meltzer (1960), passing through Burkart and Ellingsen (2004), Fisman and Love (2003), Petersen and Rajan (1997) to the late contribution of Antras and Foley (2015), among others. Whether such substitutability applies to episodes of financial crises is questionable. In fact, Love and Zaidi (2010) find that during the Asian crises of the 1990s complementarity between bank credit and trade credit is at play, with a collapse of trade credit following bank credit contraction during those episodes.

Beyond the Trade Collapse, our paper is related to the growing literature investigating the real effects of financial crises and how financial shocks are transmitted across borders. For instance, Kalemli-Ozcan et al. (2013), Dedola and Lombardo (2012) and Cetorelli and Goldberg (2012) study how the propagation of shocks across countries is linked to the existence of global banks. While Calvo et al. (2014), Campello et al. (2010), Greenstone et al. (2012), Chodorow-Reich (2014) and Bentolila et al. (2015), among others, analyze how financial shocks affect the real economic activity.

Among the real effects of a financial downturn, our paper focuses on its effects on the labor market, where our findings suggest that firms with higher exposure to international shocks and relying more on trade credit before the crisis experienced the most severe employment declines during the crisis. These results are consistent with the literature on financial frictions and employment, which is still relatively undeveloped.⁵ Two studies are particularly related to ours, not only because of the focus on the effects of credit constraints on employment, but because of the econometric methodology employed. Such methodology assesses the firm level impact of the financial crisis due to pre-crisis exposure to shocks given the pre-established relations with more or less healthy banks during the crisis.

First, Chodorow-Reich (2014) studies the relation between the health of financial institutions and employment outcome in non-financial institutions in the US in 2008. The simultaneous sharp contraction of employment (the largest drop in 60 years) and bank lending (to non-financial institutions) motivates the analysis. This proves particularly relevant given the strong policy interventions backing the financial markets, that were extremely unpopular among the public and which policymakers defended arguing the need to avoid further employment losses⁶. Matching bank and firm level data, he finds that credit contraction was responsible for one third to one half of employment losses among small and medium enterprises in 2008.

In the same fashion, Bentolila et al. (2015) also rely on bank-firm level matched relations in Spain and conclude that credit shocks in 2008-2009 caused more severe employment losses among firms with stronger pre-crisis relations with less healthy banks. The theoretical channels implying the relation between credit disruptions and employment put forward by this paper rely on the existence of labor frictions (such as hiring and licensing costs) that make of employment a quasi-fixed factor of production.⁷ Which in turn induces a more conservative behavior in terms of its financial decisions given that the firm can't adjust

⁵Benmelech et al. (2011)

⁶See Chodorow-Reich (2014) for details.

⁷See Oi (1962).

labor costless. Additionally, complementarities between labor and capital in production can create a link between external finance and labor. Where lower investment, limited by the availability of external finance translates into lower employment which is adjusted for the decline in capital.

Finally, Calvo et al. (2014), document how financial crisis are particularly detrimental for employment compared to other "normal" recession episodes, notably in the presence of low inflation and nominal rigidities. They argue that tighter lending conditions may induce firms to use more capital-intensive technologies given that capital can be pledged as collateral for credit while labor can't, which in turn implies a *jobless recovery*.⁸ This is related to the literature on the *inalienability of human capital*.⁹ Though, as shown by the authors, this channel of transmission of the financial crisis on employment is relevant at the aggregate level and has macroeconomic effects, it relies on a micro argument which begs to be studied with the help of micro-data. On the one hand, one of the major interests of using disaggregated data is the fact that it allows a better empirical identification of the parameters and better assessing heterogeneous effects among firms. While data availability doesn't allow us assessing whether firms switched to a more capital intensive technology following the financial crisis, a direct implication of this mechanism is that employment effects of crisis are stronger among more financially constrained firms, which is consistent with our findings.

3 Data

In this section we provide a detailed description of our data sources, how we selected the data included in the analysis and the construction of our main variables of interest. Additional details are presented in Appendix B. Our analysis makes use of detailed French firm-level information for 14 703 importers, it contains firms' relations (imports, exports and FDI) with the rest of the world and covers the period 2004-2009. The main reason why the analysis stops in 2009 is because of data availability where the last year that we observe is 2009. However we do not think that the fact of not being able to expand the analysis beyond 2009 is problematic as we want to focus on the specific effects of the global financial shocks and its transmission. Whereas it is well-known that the crisis in 2009 was followed by the Eurozone crisis triggering additional sovereign debt problems

⁸While most studies on jobless recoveries focus on labor market frictions such as wage rigidities or inflexibility of markets. Some analyze the effect of credit constraints on the dynamics of unemployment, such as Acemoglu (2001) and Dromel et al. (2010) but they focus on long run rate of unemployment and not on recoveries from crisis.

⁹See Hart and Moore (1994).

related to the structure of the Eurozone being a currency union without a fiscal union. Thus, even if studying these additional implications of the Great Recession remain very interesting, extending the analysis to the following years would mix our results with additional implications of the crisis that are beyond the scope of the current analysis.

The firm-level base is constructed by merging three different data bases with the help of the French fiscal unique identifier for each firm (the siren number in French):

Balance-sheet data. We use the French fiscal files BRN (Benefices Réels Normaux) provided by the French statistical agency, the INSEE, in order to get firms' characteristics. Those firms whose turnover is above 730 000 Euros in the manufacturing sectors and 230 000 in the services sectors are subject to fiscal declaration by these means. Therefore, this base covers almost the whole universe of French importing firms given that these are usually big enterprises. From this base we use information on employment, principal economic activity, total sales, trade credit and total assets. Unfortunately, the analysis will be limited to some extent by data availability given that we only observe employment and sales until 2009, while the rest of the variables are only available until 2008. We exclude services because even if firms pertaining to these sectors might also source foreign goods for their functioning we also believe that the effect that we aim at testing is better identified in the production in manufacturing sectors.¹⁰ Additionally, since we want to analyze firms' employment behavior during the crisis, we only keep firms surviving in 2009. Finally, provided that our analysis is based on the assumption that trade credit is extended to clients with well-established relations with their suppliers and that we use pre-crisis variables in order to measure the firm's *international sourcing strategy* we focus only on firms that existed already in 2004. Thus, based on this sub-sample of importers conditional on existing in 2004 and surviving in 2009 we also drop firms for which we observe negative values for value added, or sales at some point of the whole period and drop those observations with other extreme values based on our variables of interest.¹¹

Trade flows. The second source of firm-level data that we use comes from the French Customs. It contains detailed information of values of imports and exports for each firm and month at the 8-digit (NC8) product level, discriminated by bilateral destination and origin, for exports and imports, respectively. In what concerns import flows, values aggregated at the firm, origin and year level are exploited in order to construct the firm-exposure variable, while for exports, only the exporter status for each firm is used in our analysis, as will be explained in the empirical section. Reporting is required for each firm and flow if the

¹⁰A complete list of the sectors included in the sample is available in the Appendix A.

¹¹Outliers were defined in terms of employment growth and imports-to-production ratios for values below the 1st and above the 95th percentiles, this will be discussed in detail later.

extra EU transaction value exceeds 1 000 Euros or 1 000 kilograms. As for the within EU flows, transactions have to be reported as long as the firm's annual trade value exceeds the threshold of 150 000 Euros. Our selection criteria for this base is based on importer status: we kept firms if they were importing from at least one country over the period 2004-2007 conditional on continuing importing in 2009, which is the moment where we expect them to be receiving trade credit from their suppliers.¹² Therefore, given that importers are typically the biggest and more productive firms, as will be shown in descriptive statistics in subsection 3.3, these thresholds do not affect our sample representativeness.

In the next subsections we describe how the main variables of interest are constructed and how they contribute in allowing to establish a causal effect on employment growth during the crisis. Our aim is to replicate as closely as possible the conditions of a natural experiment which requires the exposure-to-crisis variable to be randomly assigned among firms. This requires defining our strategy in such a way that the self-selection into exposure is minimized, we thus proceed as follows: we exploit cross-country differences in the severity of the crisis during 2008-2009 and weight them by the geographical composition of the firms' sourcing strategy in the onset of the crisis in order to assess the transmission of the global financial shocks and its effects on employment. In this sense, we obtain a firm-specific variable reflecting the "intensity" of exposure to the financial crisis given its pre-crisis international sourcing structure, which can reasonably be considered to be determined by gravity variables and other ex-ante firm characteristics but not chosen as a way to minimize its exposure to the global financial shocks. We argue that this is a fair proposition, given that firms could not possibly anticipate the global financial crisis as not even banks were able to do so.

Certainly, the existence of a pre-crisis relationship with more resilient suppliers during the crisis would be irrelevant if firms whose suppliers were hit harder by the crisis could readily switch to suppliers that were in a better financial shape. We think that this is not likely to be the case for two reasons: in order for the exposure variable not to be capturing the firm's ability to switch to "healthier suppliers" during the crisis, the variable should only reflect the firm's technological reliance on each foreign partner. Using the average pre-crisis geographical sourcing structure provides a proxy for this. On the other hand, as extensively documented in the literature, the provision of trade credit requires considerably trusting the counter-party, this is likely to happen if the partners have developed strong commercial ties through repeated interactions¹³. Hence, if we observe a firm with lower or null pre-crisis relations with a healthy partner, we believe that it is reasonable considering

¹²The year 2008 is excluded in order to avoid capturing any effect of the crisis.

¹³See for instance Antras and Foley (2015) and Fisman and Love (2003).

that the likelihood of receiving trade credit from this new partner is low.

Furthermore, provided that we aim at exploring the idea that suppliers are potential lenders for their clients helping them to overcome financial constraints, we need evaluating the exposure-to-crisis conditional on the use of trade credit. This will be done with the help of an additional variable. The same reasoning as before applies in terms of its construction, as we also expect this variable to be a proxy for the firm's technological trade credit intensity in order to safely assume that it is only affected by the financial health of the supplier. Sub-sections 3.1 and 3.2 describe in detail the way these variables are constructed.

3.1 Variables of interest: Imports-Exposure-to-Crisis

Given that our empirical strategy exploits differences in the severity of shocks during 2008-2009 across countries we begin by presenting the way we measure these shocks. Next we discuss the way these can be linked with the firm-level data which we use to obtain the firm-specific exposure variable.

The Financial Crisis. As it already argued by different authors, quantifying the cross-country intensity of the financial crisis, as well as the timing and its duration is not an easy task.¹⁴ Crises manifest in several dimensions and some of these dimensions can be the outcome of government policies. In this sense, GDP growth is the most standard indicator of the severity of the crisis, but one could think that an aggressive fiscal and monetary intervention could have made the GDP drop milder during the crisis, even in the case where the financial sector was severely harmed. On the other hand, each dimension might differently affect different countries.

For this reason, we use six alternative measures reflecting the manifestation of the crisis and evaluate each one at a time: (1) Growth Index ; (2) Credit Index; (3) Special Drawing Right (SDR) Index; (4) Equity Index; (5) Rating Index and (6) Resilience Index. Where except from Credit Index, which is constructed using World Bank data, we mainly rely on the work done by Rose and Spiegel (2012) who provide four different indicators of the consequences of the financial crisis as manifested between 2008-2009. Namely, the percentage change of the following variables during the financial crisis: real GDP, the national equity market, the country credit rating and the SDR exchange rate.¹⁵ Additionally, we construct an overall resilience to crisis measure where we account for its different

¹⁴For a further discussion on identifying the incidence and intensity of crises see: Rose and Spiegel (2012) and Berg et al. (2005).

¹⁵A full description of the way the authors construct these variables is presented in Appendix B.

manifestations by simple averaging the three of these indicators for which an increase translates into a stronger resilience: GDP, the stock market and country credit rating. Finally, since we are interested in the broad financial conditions in the supplier's country given that we aim at assessing its likelihood of providing trade credit to its foreign clients, we also include the standard proxy for overall financial conditions used in the literature. That is, credit to private sector over GDP from the World Bank, which we also transform to get the percentage change between 2008 and 2009. The interpretation for most of these measures is self-explanatory and except for the SDR measure, the higher the value taken by each of these, the less severe was the crisis. They reflect, therefore, the *resilience to the crisis* in the respective country. In what concerns the SDR measure, it reflects the country's currency depreciation during the crisis. Thus, a higher value taken by this variable means a greater severity of the crisis.

In order to avoid negative values and for the sake of comparability across the different resilience indicators, we transform each of these by normalizing the measure with the highest and the lowest values taken by the countries included in the sample. At this point it is convenient mentioning that oil-exporting countries were kept out of the sample given that these countries' specificities could introduce some noise in our analysis¹⁶. On top of this, we kept only the 71 countries for which all measures were available. Therefore, focusing on one measure at a time, we obtain an index ranging from zero to one, where the highest value of each index is assigned to the country that was the most resilient to the global shocks with the exception of the SDR index where the highest value should be interpreted as a stronger incidence of the crisis.

The cross-country crisis severity using each of these measures can be visualized in figures 1- 3. These figures display the Resilience Index (which summarizes the growth, equity market and credit rating indexes based on Rose and Spiegel (2012)), the SDR Index and the Credit Index (which are not included in the resilience measure).¹⁷

Table 1 reports the correlation between the six indicators where it can be seen that they are not particularly strongly related, except for the Resilience index which is tightly related to the Equity index and the Rating index (although, to a lower extent). This means that the consequences of the crisis manifested in various dimensions that differently affected different countries according to their specific characteristics. Which in turn, turns out

¹⁶The oil-exporting countries that were dropped are: Algeria, Ecuador, Indonesia, Iran, Kuwait, Libya, Qatar, Saudi Arabia and United Arab Emirates. Nevertheless, for the sake of robustness, we include these countries in our regressions and find the estimations unaltered. Results are available upon request.

¹⁷Appendix A presents the figures for each of the other 3 alternative measures: Growth Index, Equity Index and Rating Index.

Figure 1: Cross-country Crisis as measured by: Resilience Index

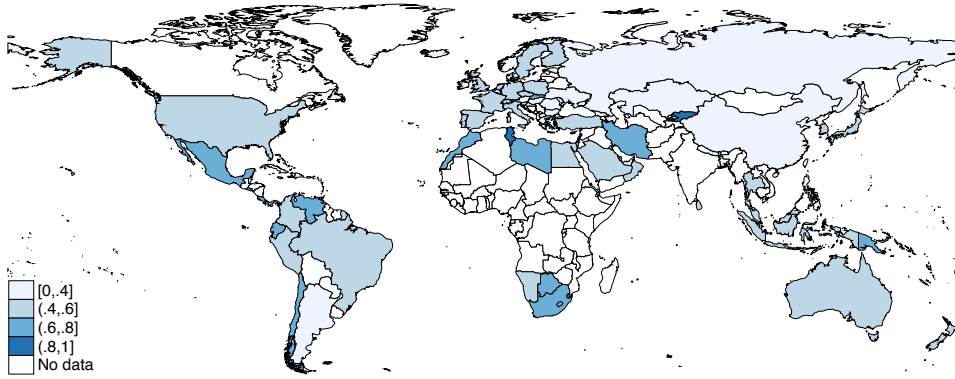


Figure 2: Cross-country Crisis as measured by: SDR Index

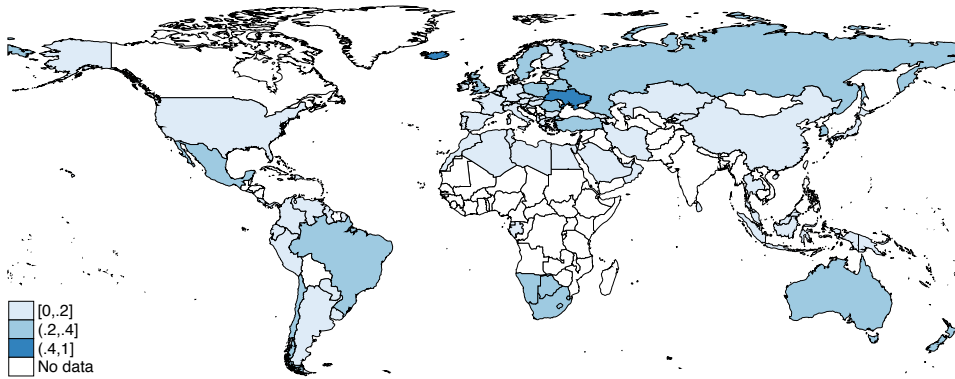
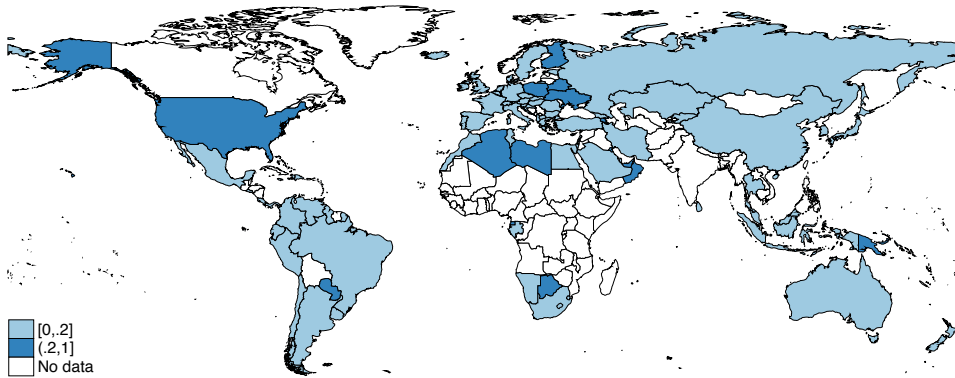


Figure 3: Cross-country Crisis as measured by: Credit Index



Source: Author's calculations using data from World Bank and Rose and Spiegel (2012)

to be convenient for the aim of our empirical analysis provided that the interest of using different measures is that they all reflect the severity of the crisis but there would be no point in considering them as alternative measures if there was no variation among them.

Geographical Composition of International Sourcing Strategy. Next, in order to get a firm-specific variable, we combine each of these indicators with the average reliance on imports coming from each country in the years before the crisis, this is what we call

Table 1: Cross-correlation between crisis indicators

	Growth Index	Credit Index	SDR Index	Equity Index	Rating Index	Res. Index
Growth Index	1.000					
Credit Index	0.032	1.000				
SDR Index	-0.315	-0.226	1.000			
Equity Index	0.168	-0.131	-0.140	1.000		
Rating Index	0.277	0.268	-0.542	0.459	1.000	
Res.Index	0.312	-0.068	-0.250	0.978	0.603	1.000

71 countries. *Source:* Author's calculations using data from World Bank and Rose and Spiegel (2012)

Table 2: Descriptive statistics: Imports ratios

	mean	sd	p50	min	max	N
imports/inputs	0.16	0.18	0.10	0.00	7.79	72988
imports/production	0.12	0.14	0.07	0.00	0.61	72988
imports/sales	0.11	0.12	0.06	0.00	1.70	72988

Source: BRN, French Customs. Units: Imports, Production and Sales given in euro.

"international sourcing strategy of the firm". More precisely, we compute the following measure for each firm f in our sample:

$$Imports\ Exposure\ Crisis_f = \sum_{t=2004}^{2007} \frac{1}{4 \cdot Inputs_{ft}} \sum_c (Imports_{fct} \cdot Res_c) \quad (3.1)$$

Where $Inputs_{ft}$ is total inputs of firm f in year t , $Imports_{fct}$ is the total value of inputs that the firm imports from country c in year t and Res_c is each one of the resilience indexes using the measures discussed above by focusing on one measure at a time.¹⁸ Since the resilience indexes are comprised between 0 and 1, ideally, this measure should also range between 0 and 1, giving us an indication of the share of inputs that are sourced internationally out of the total inputs needed for production. In fact, in some cases (81 out of 72 988 observations) from our final sub-sample (which already excludes outliers) import values are larger than total inputs, which are directly recovered from the balance-sheet data. Table 2. presents relevant statistics for this ratio, as well as for the share of imports in production and of total sales, which are undoubtedly more likely to be comprised between 0 and 1. Nonetheless, even for the imports to sales ratio, some observations remain higher than 1.

¹⁸Total inputs is measured by adding: "Achats de marchandises", "Achats de mat. prem. et autres approv." and "Autres achats et charges externes".

We think that the reason why imports might be larger than total inputs and sales is mainly due to two things. On the one hand, the level at which we actually observe the data is the firm. However, many firms are part of bigger economic groups and it can perfectly be the case that one firm of the group is in charge of importing for the whole group while total production takes place at the group level. In this case, the correct way of assessing any effect on employment would obviously be at the group level. Unfortunately, we are not able to observe the group structure and identify these cases. Nevertheless, this problem can be overcome with the help of the financial linkages LIFI base (Liaisons Financières). This base comes from the French national statistical institute (INSEE) and provides information about the composition of economic groups through firm's ownership (foreign and domestic) of companies residing in France. We plan to include this in future work when the data will be readily available.¹⁹

On the other hand, there may be another reason, linked to the fact that imports are not an information available in income statements, and must be taken separately, from Customs data, leading to possible mismatches. Hence imports and firm variables (such as sales or total inputs) that we use may not necessarily relate to the same period of time. Indeed, firms are not obliged to report their balance sheets and income statements over 12 months and they can choose to change over time both the date at which they display the figures, and the number of months under reporting. In this case, if a company chooses to settle its accounts over a period shorter than twelve months, making the ratio between annual imports and sales coming from the income statements may lead to inconsistencies such as imports to intermediate consumption or imports to sales higher than what they would be if the same period was used for the numerator and the denominator.

Finally, in the the case of imports to sales ratio, it may also be due to the fact that in the period where they are bought, imports can become inventories which are used or re-sold (in the case where these constitute final goods that the firm resells in the local market) in future periods.

Bearing these limits in mind, *Imports Exposure Crisis_f* still provides a sense of the extent to which the firm is exposed to international shocks in its suppliers' countries given their average sourcing ties before the crisis. More precisely, it should capture well the average reliance of a firm on a particular market and the extent to which this market was hit by the crisis. Finally, the importance of the normalization should also be highlighted. Even if a time-varying proxy for size will be included in the econometric analysis, we want

¹⁹The INSEE has already given us an official confirmation to our demand access for this base but the administrative procedure is currently in process under order to be able to use the data.

to avoid that the exposure measure captures time-varying heterogeneity in terms of firm size (which could be the case if we kept only the numerator of the exposure measure given that it will be interacted with crisis dummy in 2009).

3.2 Variables of interest: Trade credit

A crucial variable in the mechanism that is put forward in this paper is the provision of trade credit granted by the firm's supplier. Thus, one would ideally like to observe this variable as disaggregated as possible, that is, discriminated by foreign and domestic suppliers and in the best scenario by country of origin (as imports). In the absence of this data, we can still make use of the amount of yearly trade credit at the firm-level that we observe from the balance-sheet base in order to make conjectures about the mechanism that we are exploring.

The construction of this variable is guided by the same motivations as Imports-Exposure-to-Crisis as we want this to be determined by other things not related to the firms' ability to react to the crisis in order to be safe in terms of endogeneity. We thus view this variable as a technologically determined reliance of each firm on trade credit. In particular, this will allow us to make conjectures pointing towards the mechanism that we test, provided that we do not directly observe the share of trade credit coming from each country. Our reasoning is as follows: given that the granting of trade credit requires trust and reputation, benefiting from it should be the result of repeated interactions with the supplier. So firms with longer relations with suppliers may find it less difficult benefiting from trade credit financing. Hence, the use of an averaged pre-crisis measure covering a fair number of years can reasonably be thought as being determined by technology and the firm's establishment of relations with its supplier, which in turn, allows to assume that trade credit during the financial crisis is only affected by shocks. Thus, its interaction with the exposure-to-crisis during the crisis should reflect the ability of its suppliers to continue providing trade credit to its clients.

An additional motivation for this hypothesis is provided by Antras and Foley (2015), who show that as trade partners begin developing a relationship over time, they trade more frequently on "post-shipment terms" (or trade credit) than in cash in advance terms -in which case, the importer is required to pay before the shipping is done. Additionally, the authors show that the choice between all possible trade financing terms is closely related to the quality of institutions in each partner's country: the partner located in the country with the weakest institutions is more likely to finance the transaction. In this

sense, if the exporter’s client is located in a country with weak contractual enforcement then it is more likely that it requires the importer to pay in cash in advance in the absence of legal guarantees in case the importer defaults or doesn’t fully cover its payments. In consequence, given that in our case the importer is always a French firm where institutions are strong, we can safely assume that suppliers usually trust their French clients and we have no reason to believe that this trust was affected during the crisis. Thus, allowing French clients to trade on post-shipment terms should be only affected by their financial health.

We thus construct the following firm-level average of use of trade credit over total imports in the onset of the crisis (2004-2007),

$$Trade\ Cred_f = \frac{1}{4} \sum_{t=2004}^{2007} \left(\frac{Trade\ Cred_{ft}}{Inputs_{ft}} \right) \quad (3.2)$$

where $Trade\ Cred_{ft}$ is the total yearly value of *accounts payable* for a given firm f at year t as reported in the firm’s balance-sheet. We normalize by total inputs $Inputs_{ft}$, in order to get the average share of inputs that are financed by trade credit. One limit of this indicator is that we are not able to distinguish the extent to which payables are related to imports and domestic inputs. Being aware of this issue, the $Trade\ Cred_f$ still provides a sense of the extent to which the firm relies on inter-enterprise credit. While its interaction with foreign shocks and the extent to which the firm is linked to these shocks provides an indication of the transmission of these shocks conditional on the firm’s average reliance on inter-enterprise credit. Nonetheless, section 6.3 discusses possible paths for future work in order to overcome this limit.

3.3 Descriptive Statistics

Before presenting summary statistics, it is convenient to comment on the criteria used for selecting outliers. As already mentioned in the previous paragraphs, the construction of our data has some limits, and for this reason some extreme values in our sample can reflect real measurement issues related to this. On the other hand, even if some other extreme observations can indeed be informative, it is also undeniable that firms are extremely heterogeneous. Which in turn, makes it difficult to find an average effect among such different firms. Hence we were obliged to drop some extreme observations but it was done based on the minimum number of variables as possible: yearly employment growth and average pre-crisis imports-to-production ratio. Where the highest values at the right tail of the distribution of the latter should particularly reflect those cases in which a single firm imports goods for the whole group and that we are not able to identify from our current

Table 3: Descriptive statistics: Outliers definition

outlier	variable	mean	sd	min	p1	p50	p99	max	N
No	Employment growth	-1.67	12.08	-50	-40.00	0.00	26.53	30.00	72988
	Imports/production	0.12	0.14	0.00	0.00	0.07	0.56	0.61	72988
Yes	Employment growth	35.92	238.92	-99.70	-87.50	20.00	333.33	12500	8455
	Imports/production	0.69	1.90	0.00	0.00	0.50	3.94	65.23	8455
Total	Employment growth	2.22	78.52	-99.70	-50.00	0.00	83.33	12500	81443
	Imports/production	0.18	0.65	0.00	0.00	0.07	1.46	65.23	81443

Source: BRN, French Customs. Units: employment given in num. of employees, production and trade credit in euro.

data. Table 3 displays the relevant statistics for these variables based on the whole sample of *surviving importers* that were left after the data cleaning. Outliers were defined for values being below the 1st and above the 95th percentiles of the distribution of each of these variables. The figures show that there is extreme heterogeneity across observations, especially for employment growth, where the standard deviation for the whole sample is on average 35 times larger than the mean value. At this point it is worth noting that a possible explanation for these unreasonable numbers in terms of employment growth can be linked to the fact that a company can acquire one or several firms from one year to another, but we don't observe these mergers and acquisitions transactions in our data.²⁰ Motivating, therefore, the exclusion of extreme observations from the analysis in order to avoid that these observations drive the results. In this sense, all the following statistics are presented among the selected sub-sample excluding these outliers.

Now, why are only importers kept in the sample? An overall comparison between importers and non-importers is given in Table 4, where it can be seen that importers are on average much bigger in terms of employment and sales, as well as more productive. Furthermore, employment and sales fell much more among importers than among non-importers during the crisis, suggesting that the transmission of global shocks was more important for strongly internationally active firms. It should be reminded that even if importer and exporter status are tightly linked (with a correlation of 0.6), our definition of non-importers is not mutually exclusive with exporter status, where the former can be exporters as well but they just source their goods domestically. These big differences among importers and other firms, motivate our sample selection based on importer status. For instance one could argue that keeping other firms in the analysis could provide a control group for the econometric analysis when assessing the exposure effects during the crisis. Nonetheless, the two groups of firms significantly differ before the crisis and the way they face the

²⁰However, this issue can easily be solved with the LIFI database, which we will be able to use in the near future.

Table 4: Comparison among Importers and Non-Importers

	Non-Importers					Importers				
	Emp.	Sales	Prod.	Emp. % Δ	Sales % Δ	Emp.	Sales	Prod.	Emp. % Δ	Sales % Δ
2005	12	1,305	49.72	0.54	5.55	91	22,642	61.08	0.53	6.98
2006	12	1,377	51.51	0.69	6.48	90	24,076	63.84	0.77	9.20
2007	12	1,482	54.05	0.79	7.09	90	25,491	66.25	1.09	8.82
2008	12	1,589	55.14	0.60	4.44	92	26,655	67.40	0.51	4.19
2009	11	1,431	52.04	-2.09	-6.67	88	23,063	64.88	-3.24	-8.31

Source: BRN, French Customs. Units: Employment given in num. of employees, Sales in euro and Productivity is the ratio of value added to employment.

Table 5: Des. stat.: Imports-Exposure-to-Crisis and Trade Credit-Inputs ratio

	mean	sd	min	p1	p50	p99	max	N
Crisis measure								
Growth Index	0.07	0.09	0.00	0.00	0.04	0.37	2.35	72988
Credit Index	0.09	0.11	0.00	0.00	0.06	0.43	3.39	72988
SDR Index	0.04	0.05	0.00	0.00	0.02	0.18	1.35	72988
Equity Index	0.08	0.10	0.00	0.00	0.05	0.39	3.16	72988
Rating Index	0.13	0.15	0.00	0.00	0.08	0.56	4.57	72988
Resilience Index	0.09	0.11	0.00	0.00	0.06	0.43	3.54	72988
Trade Credit measure								
Trade credit/total inputs	0.24	0.15	0.00	0.05	0.23	0.61	15.37	72988

Source: Own calculations using data from World Bank, Rose and Spiegel (2012), French Customs and BRN.

shocks is certainly related to these differences (for example, productivity can be a strong determinant of how a firm reacts to shocks). Additionally, one of the interests of the Imports-Exposure-to-Crisis measure is its continuous nature, in which case the "control group" are the years prior to the crisis provided that the exposure variable is randomly assigned among importers.

Finally, Table 5 presents relevant statistics for our main variables of interest, Imports-Exposure-to-Crisis and trade credit intensity among the sub-sample of firms that were kept for the econometric analysis.

4 Empirical analysis

As mentioned above, our empirical strategy exploits exogenous variation in cross-country resilience during the financial crisis at varying levels of firm-level exposure to the shocks in order to study the link between the global financial shocks and firm's employment. Conditional on pre-crisis firm-level characteristics the firm's exposure is pre-determined and thus, it isolates the ability of the firm to switch to healthier partners according to the severity of the crisis shocks.

Nevertheless, before presenting the equations that will be estimated, it is convenient providing some clarifications on the particular choice of our empirical strategy. We are interested in the transmission of the financial shock in the supplier's country where we use the health of financial system to make conjectures about its ability to extend trade credit to its client. In other words, we explore the transmission of the global financial shock due to the exposure to these given international sourcing structure of the firm. Thus, we don't aim at evaluating the direct effect of the variation in imports, in which case the use of an instrumental regression methodology would be required. On top of this, we analyze the yearly growth rate of employment and not the level of employment given that we are analyzing a short term variation due to a financial shock and our aim is not to determine any effect on a long-term level of employment of the firm.

4.1 Financial crisis and Imports-Exposure-to-crisis

Our hypothesis is that firms that had stronger pre-crisis relations with suppliers from countries where the global financial crisis was less severe, were more able to maintain employment during the crisis if they could implicitly borrow from their suppliers by delaying their imports payments. The argument is as follows: if a supplier had established ties with the importer and it is in a good financial shape, then it will more easily grant trade credit to its client. This in turn, allows the importer overcoming its financial constraints due to the domestic banking credit contraction if the firms are able to substitute short-term banking finance with trade credit. We therefore begin our analysis by evaluating how shocks in suppliers' countries were transmitted to French importers given their exposure to these shocks which we measure using pre-crisis sourcing relations with each country. In a second step we evaluate whether the effects are stronger among firms that had higher levels of accounts payable before the crisis.

We rely on a panel data model with firm and year fixed effects. Our identification lies in the assumption that the intensity of the exposure variable is randomly assigned among firms.

In other words, we assume that conditional on gravity variables and firms' characteristics, the geographical international sourcing strategy is technologically determined and so is the exposure to shocks in suppliers' countries. Therefore, the exposure is exogenous from the point of view of the firm provided that it was not able to anticipate the global crisis; that is to say that $E(\epsilon_{ft}|Z_{ft}, \delta_f, \delta_t) = 0$. In this sense, we perform the following OLS regression where given the firm fixed effects, the identification comes from pure time variation within a given firm,

$$\begin{aligned} Emp\ Growth_{fit} = & \beta_1 Imports\ Exposure\ Crisis_f \times Crisis_t \\ & + \alpha_1 Z_{ft} + \delta_f + \delta_t + \epsilon_{ft} \end{aligned} \quad (4.1)$$

where $Emp\ Growth_{fit}$ is employment growth for firm f , pertaining to industry i in year t , $Crisis_t = 1$ [year=2009] is a dummy that takes the value of one in 2009 and zero otherwise, Z_{ft} is a set of time-varying firm-level characteristics used as control variables: size (measured by total sales) and exporter status during the crisis.²¹ The latter being an important control since importer and exporter status are highly correlated and we would not like the negative effects of the Trade Collapse to be captured by our coefficient of interest.²²

$Imports\ Exposure\ Crisis_f$ is the exposure measure and it represents the degree to which the firm is vulnerable to global financial shocks given its pre-crisis international sourcing structure. As explained earlier, it is constructed using the six different indexes reflecting the severity of the crisis in the suppliers' country by focusing on one measure at a time. Note that given the fixed-effects estimator, the main effect of this variable is not identified provided that it is constant over time. Nevertheless, since it is constructed in the spirit of a treatment effect, it does not really make sense interpreting it in a different context than the crisis. The double interaction $Imports\ Exposure\ Crisis_f \times Crisis_t$ provides the effect of interest since it captures the realization of the crisis and how the shocks are transmitted given the ex-ante exposure. More precisely, β_1 estimates the differential effect of crisis across sourcing partners and across firms with varying levels of exposure to these shocks. Since a higher value of the exposure measure reflects stronger input reliance on more resilient countries, we expect the sign of this coefficient to be positive. In other words, we expect to find a more adverse effect of the global financial shocks among firms whose

²¹Note that the period in under analysis for the growth regressions starts in 2005 given that the first year that is evaluated is 2004.

²²Note that even though firm-level productivity should be an important determinant of employment growth, it is not included in the current analysis given that the standard and easily computable proxy, which is apparent labor productivity, requires using the dependent variable in order to be computed (productivity = value added/employees). Which in turn generates an endogeneity problem. In future work, an alternative way of controlling for this variable could be including a more complex measure such as the firm's Total Factor Productivity.

pre-crisis ties with countries that were severely hit by the crisis were stronger.

Equation 4.1 is estimated using the fixed-effect estimator, δ_f , which allows accounting for time-invariant sources of firm heterogeneity that affects the average pattern of employment growth across firms. In particular, this controls for firm-level size, productivity and firms' characteristics that might influence the firms' ability to face the crisis. Most importantly, this allows accounting for the initial level of employment which can be a great source of employment growth heterogeneity across firms. Additionally, we include time dummies, δ_t , in order to account for year-specific aggregate shocks and trends that are common to all firms. Nevertheless, it could be argued that some sectors suffered a larger drop in demand and therefore, employment was more vulnerable during the crisis in some specific industries. Thus, we alternatively include firm and 4 digits industry-year pair fixed effects (δ_{it}) in order to control for sector-level heterogeneity varying over time. Particularly, this accounts for the demand drop during the crisis that was particularly severe for some sectors.²³ The results for this alternative specification are reported in Appendix C. It should be noted that the interest of reporting estimation results with time effects instead of industry-time effects, lies in the fact that we want to recover the average main effect of the crisis which allows computing the total average effect conditional on exposure (given by equation 5.1, as described in the next section). Finally, in order to allow for correlation of errors at the level of the firm we report standard errors that are clustered at the firm-level.

With this strategy, we assess the transmission of international financial shocks given the firm's exposure to the crisis and its effects on employment growth. Now, what are the channels through which these shocks are transmitted across borders? This paper argues that a better financial health in the supplier's country makes it is more likely that the importer receives trade credit from its partner, which in turn will help the firm face the adverse effects of the lack of short-term liquidity due to the crisis. Thus, we next examine the trade credit channel and expect the effect to be concentrated among firms that heavily rely on trade credit.

4.2 Is the effect conditional on the use of trade credit?

We now extend the regression specification by allowing the employment effect of Imports-Exposure-to-Crisis to vary with the firms' technological use of trade credit. We do this by interacting the Imports-Exposure-to-Crisis measure with the average use of trade credit over total imports during the years prior to the global crisis and the crisis dummy. We

²³For instance, Eaton et al. (2011) and Levchenko et al. (2009) analyze the disproportionate drop in durable goods sectors during the crisis, those that contribute the most to international trade.

basically re-estimate equation 4.1 augmented by this interaction term as follows,

$$\begin{aligned}
 Emp\ Growth_{fit} = & \beta_1 Imports\ Exposure\ Crisis_f \times Crisis_t \\
 & + \beta_2 Trade\ Cred_f \times Crisis_t \\
 & + \beta_3 Imports\ Exposure\ Crisis_f \times Trade\ Cred_f \times Crisis_t \\
 & + \alpha_1 Z_{ft} + \delta_f + \delta_t + \epsilon_{ft}
 \end{aligned} \tag{4.2}$$

where the same control variables as before (Z_{ft}) and firm and time effects are kept and errors are clustered at the level of the firm. $Trade\ Cred_f$ is constant at the firm-level, thus, given the fixed-effects estimator it is only possible identifying its effect conditional on a variable that changes over time. That is, its interactions with the crisis dummy. In this way, $Trade\ Cred_f \times Crisis_t$ establishes whether firms strongly relying on trade credit were more vulnerable during the crisis period. Note that the double interaction between Trade Credit and Imports-Exposure-to-Crisis as well as the main effect of this variable are absorbed by the firm-effects.

The triple interaction $Imports\ Exposure\ Crisis_f \times Trade\ Cred_f \times Crisis_t$ is our main effect of interest. Our assumption is that a firm's supplier was more willing or better able to extend trade credit to its client, the less severe the financial shock in its country was. This can't be directly tested without observing the proportion of trade credit coming from each country but β_3 provides an alternative way of evaluating this conjecture as it allows establishing whether the effect of the global crisis was lessened for firms that were less exposed given their sourcing strategy and whether this effect was concentrated among firms having a greater propensity to use inter-enterprise credit with their suppliers. Since β_3 tests whether the effect was stronger for the most trade-credit intensive firms, we expect this coefficient to be positive.

As for β_2 , we do not have any particular expectation in terms of the direction of its sign. One could argue that higher reliance on trade credit helps firms facing the crisis - through short term liquidity provision- but it could also be the case that this makes them more vulnerable to unexpected shocks. Especially, in the case where their partners are severely hit by the shock and thus not able to grant any trade credit. This particular argument is what is taken into account in the triple interaction term, that is, the health of the firm's (potential) lender and how strongly they were attached through commercial ties.

5 Results and discussion

This section presents the main empirical findings. We start with our baseline specifications where the transmission of the firms suppliers' financial shock is analyzed using different measures of resilience to crisis in section 5.1. Next, we present the results of this effect conditional on the firm's reliance on trade credit in order to assess our main empirical question in subsection 5.2.

5.1 Baseline specification: Imports-Exposure-to-Crisis

Table 6: Baseline regressions

Dependent Variable: Yearly employment growth						
Crisis resilience measure:	Growth Index	Credit Index	SDR Index	Equity Index	Rating Index	Resilience Index
	(1)	(2)	(3)	(4)	(5)	(6)
$Crisis_t$	-4.64 ^a (-15.04)	-4.63 ^a (-14.95)	-4.61 ^a (-14.88)	-4.61 ^a (-14.90)	-4.63 ^a (-14.92)	-4.62 ^a (-14.93)
$Crisis_t \times Exposure_f Index 1$	5.59 ^a (3.75)					
$Crisis_t \times Exposure_f Index 2$		3.95 ^a (3.23)				
$Crisis_t \times Exposure_f Index 3$			8.60 ^a (2.96)			
$Crisis_t \times Exposure_f Index 4$				4.30 ^a (3.05)		
$Crisis_t \times Exposure_f Index 5$					2.83 ^a (3.14)	
$Crisis_t \times Exposure_f Index 6$						3.87 ^a (3.17)
Observations	72988	72988	72988	72988	72988	72988
R^2	0.291	0.291	0.291	0.291	0.291	0.291
Adjusted R^2	0.096	0.096	0.096	0.096	0.096	0.096
F	261.96	261.26	261.08	261.24	261.19	261.30

t statistics in parentheses.

All regressions include firm and time F.E., errors clustered at firm level.

^c $p < 0.10$, ^b $p < 0.05$, ^a $p < 0.01$

How does the crisis transmission vary at different levels of firm-exposure to the shocks? The coefficient estimate of the interaction term in equation 4.1 assesses this effect on the firm's employment growth. Estimation results are reported in Table 6, where each column displays one of the 6 alternative measures for the severity of shocks, as described above in section 3.1. If it is the case that sourcing ties with more resilient partners contribute to relaxing a firm's financial constraints, we expect to find a positive coefficient for all measures with the exception of the exchange rate index (SDR).

The sign and significance of most of the coefficients confirm our hypothesis. The estimates suggest that firms facing a lower pre-crisis exposure to global shocks given the geographical

composition of their sourcing strategies tend to have higher employment growth during the crisis period ($\hat{\beta}_1 > 0$). The effect is positive and significant at the highest levels regardless of the resilience measure used. Nonetheless, we can't exclude the possibility that this positive effect reflects the direct relation between labor and imports. Even if the exposure measure has been constructed in such a way that it reflects cross-country shocks during the crisis, it could also be capturing the direct effect that international sourcing can have on employment changes regardless of the crisis shocks, which can be either positive or negative depending on whether imports substitute or complement with labor.²⁴ For this reason, it is important evaluating the exposure effect conditional on the use of trade credit in order to better identify the impact that we intend to capture.

Perhaps, the most adequate way of interpreting the estimates is by analyzing the marginal effects for those firms reporting the highest and lowest exposure level in our sample as well as for the average firm exposure. Before doing this, however, it is convenient discussing the coefficient sign of exposure-to-crisis when the SDR index is used, reported in column (3). Given that a higher value for the SDR index indicates a greater exchange rate depreciation, which in itself is considered as one of the manifestations of the severity of the crisis, the coefficient on this measure was expected to be negative. Surprisingly, it turns out to be positive, statistically significant at the 1-percent level and the one with the highest magnitude across all measures. We believe that a possible explanation behind this result could be the fact that a currency depreciation translates into more competitive prices for the exporter, which might in turn provide an incentive for the supplier to extend trade credit by the anticipation of higher future payments. Conversely, a currency appreciation translates into sudden lower revenues for the exporter, which in turn might leave her illiquid and less able to accept delayed payments. Particularly, the supplier can be strongly discouraged to allow delayed payments if she anticipates further currency appreciation, in which case her expected income is lower and decreases proportionally with time.

The main message that can be drawn from the results in Table 6 is that, not surprisingly, the average effect of the crisis is strongly negative, statistically significant at the highest levels and very stable across the alternative specifications. Conditional on the highest exposure to the crisis (that is, when *Imports Exposure Crisis_f* is zero) on average, firms experienced a 4.6 percentage drop in employment growth with respect to 2005.²⁵ Additionally, the exposure-effect is always positive and also statistically significant at the 1-percent level, albeit very small (evaluated at the mean value of the exposure measure) for

²⁴See Biscourp and Kramarz (2007) for a discussion on the effects of imports on domestic French employment.

²⁵Where the interpretation of the crisis effect is made with respect to employment growth in 2005, the latter being the year dummy that was dropped, hence the reference year.

the six specifications. Given that all variables are introduced in levels, our coefficients of interest are interpreted as marginal effects. In this sense, the effect of the exposure-to-crisis variable, given by β_1 can be interpreted as the change in employment growth for a given firm in 2009 (relative to 2005) at different levels of exposure, holding everything else constant. Thus, the total employment effect of the crisis is given by:

$$E (Emp Growth_{fit} | 1[year = 2009]) = \hat{\delta}_{t=2009} + \hat{\beta}_1 \times Imports Exposure Crisis_f \quad (5.1)$$

Now, we turn to the estimates interpretation focusing on one exposure-measure at a time beginning with column 1 which reports the results using the Growth index. As mentioned above, for the highest exposure value (that is when the measure takes the value of 0) the employment consequence of the crisis is -4.6 percent, represented by the coefficient on the crisis year. The effect evaluated at the mean value of exposure is not sizeably different from the latter, provided that the magnitude of average value of the indexes is very small. Nevertheless, when the effect is evaluated at the firm displaying the lowest exposure value (hence, the maximum level of the index) a positive total employment effect arises, 8.5 percent.²⁶ Thus, the exposure effect largely counterbalances the strong negative effect of the main coefficient on crisis. Nonetheless, these results evaluated at the maximum values of the exposure variable (i.e., the most resilient ones) are to be interpreted with caution given the extreme heterogeneity of our observations. More precisely, the negative effect of the crisis can only be counterbalanced by the positive effect due to β_1 for the 194 firms at the right tail of the distribution. Given that it would require a value of the index of 0.8 in order to offset the negative effect of the crisis, the total effect of the crisis remains negative at the 99th percentile of the distribution, where the effect is equal to -2.6 percent.

In the same way, given the size of $\hat{\beta}_1$ and the mean value of the rest of the exposure measures, the effects evaluated at the sample mean will not significantly differ from the main crisis effect provided by $\hat{\delta}_{t=2009}$. We will therefore comment uniquely the effects evaluated at the lowest levels of exposure for each measure. Keeping in mind that this concerns only the very few firms at the 100th percentile of the distribution of each index. Column 2 reports estimates using the Credit index, the total employment effect for the least exposed firm in this case is a 8.4 percentage growth. Column 3 reports estimates for the SDR currency index, which as already explained, is different from what we were expecting: a negative sign. The results suggest that the total effect of the crisis for the firm having the strongest sourcing ties with the country that suffered the greatest currency depreciation

²⁶Table 5 provides the mean, maximum and minimum values for all indexes.

was a 7 percent employment growth. Turning to the effects using the Equity Market Index in column 4, the total effect is 9 percent, while for the alternative measure using the Rating Index as a proxy for the severity of the crisis in column 5, the effect is 8.5 percent. Finally, the Resilience Index, which summarizes the severity of shocks by averaging the GDP growth, national stock markets and the country's creditworthiness indexes provides an average total effect of the crisis on employment of 9.1 percent for the least exposed firm.

Therefore, almost invariably, our results always imply that when firms have stronger pre-crisis ties with suppliers in countries that were less affected by the global crisis, employment growth performs better. Where results suggest that the interaction term softens the negative main effect of the crisis for those with the strongest ties with more resilient countries. The exception to this are the results given by the SDR measure, which for the reasons provided above, we interpret as a possible willingness from the supplier to allow delayed payments given the better terms of trade due to the currency depreciation. At the same time, it is also true that this measure differs from the other ones in the sense that European partners share the same currency shocks as French firms, however we are not sure about the implications that this could have on our estimates when using this index.

Finally, we alternatively estimate a more stringent version of equation 4.1 where time dummies are dropped and instead industry-time effects are included (δ_{it}) to account for time-varying effects specific to each 4-digits industry i as given by the firm's principal activity (NAF). The results are displayed in Table 16 in Appendix C and we find that the main effect of the crisis becomes positive and its magnitude is extremely high, but it is not significant anymore at any acceptable level. We don't find surprising given that demand, productivity and financial shocks during the crisis should have very different effects across different sectors. Concerning the coefficients of interest, their magnitude decreases across all measures and remain significant at the 1-percent level for the growth measure and at 5-percent for the rest.

Next section presents the estimations of crisis exposure conditional on trade credit intensity in order to assess whether these findings are concentrated among firms that ex-ante were more reliant on trade credit.

5.2 Is trade credit the channel of transmission?

Is the employment effect of importing from more resilient countries conditional on the existence of trade credit? In order to assess this question we examine pre-crisis firm-level

reliance on trade credit and interact it with our measure of *Imports-exposure-to-crisis* and the crisis indicator variable. In order to do so, we estimate equation 4.2, where β_3 tests whether the effect was concentrated on the firms that were the most trade-credit intensive. Results from this procedure are reported in Table 7.

As anticipated, we find that the exposure-to-crisis effect is intensified significantly for trade credit intensive firms ($\hat{\beta}_3$ is positive and statistically significant at the highest levels for all measures). This means that stronger pre-crisis sourcing ties with more resilient countries during the crisis, had a positive impact on firms' employment provided that they extensively used trade credit before the crisis. This suggests, therefore, that trade credit can soften the firm's short-term credit constraints if the supplier is able to allow a delayed payment. Nevertheless, strongly relying on trade credit can in itself translate into higher vulnerability to unanticipated shocks. This is confirmed by the negative and highly significant coefficient of trade credit during the crisis ($\hat{\beta}_2 < 0$). Hence, the main effect of the crisis can either be softened or aggravated by the firm's average reliance on trade credit, depending on the behavior of the supplier during the crisis. Which clearly has opposite consequences when the firm is under financial stress. This behavior is precisely what the triple interaction term captures: the extent to which suppliers continued extending trade credit. Where we assume that the suppliers' ability to allow some delay for the payment of goods during the crisis depended on the severity of shocks that took place in their respective country.

Interestingly, the effect of exposure-to-crisis is lower in magnitude and loses some statistical significance across all the alternative crisis measures (5-percent level for the Growth and Credit indexes and 10-percent level for the rest). Additionally, its magnitude is considerably lower relative to the estimates obtained without conditioning the effect on trade credit use. These results point strongly to our hypothesis concerning the coefficients given above. Where our exposure measure might also be capturing the direct relationship between imports and employment, which should be negative if domestic labor and imports are substitutes. Although the coefficients remain positive, this potential substitutability emerges only once the positive effects of resilience are purged out by the triple interaction. Explaining the smaller magnitude of the new coefficients on exposure-to-crisis during the crisis.

A negative impact of international sourcing on employment, is in line with the findings in Biscourp and Kramarz (2007), who, using French firm-level data show that increasing imports (in particular, of finished goods) is strongly correlated with job destruction. Nonetheless, it should be kept in mind that providing evidence of the direct relationship

between imports and employment is beyond the scope of our analysis. In which case, a clean analysis would require accounting for different dimensions, such as the different types of imported goods, their country of origin and the type of workers involved.²⁷

Now, we turn to the quantification of the total crisis effect, conditional on trade credit intensity and crisis exposure given the sourcing ties with each country. This effect is given by the following expression:

$$\begin{aligned}
E (Emp Growth_{fit} | 1[year = 2009]) &= \hat{\delta}_{t=2009} \\
&+ \hat{\beta}_1 \times Imports Exposure Crisis_f \\
&+ \hat{\beta}_2 \times Trade Cred_f \\
&+ \hat{\beta}_3 \times Imports Exposure Crisis_f \times Trade Cred_f
\end{aligned} \tag{5.2}$$

This estimated effect is summarized in table 8. It displays employment growth impact in 2009 conditional on different values for trade credit intensity and exposure-to-crisis, across the alternative exposure measures. Both, Trade Credit and the Exposure indexes are evaluated at their mean, minimum, median, 99th percentile and maximum values. Where the different values taken by Trade Credit are reported in rows, while those for the Exposure Indexes are reported in columns. While we don't find it surprising that some firms grow exponentially, even in times of crisis, the total effect for its maximum values provide unreasonably big numbers for employment growth (ranging between -45 to 132 percent). Perhaps, in future work, this motivates performing an analysis accounting for this extreme heterogeneity with the help of quintile regression methods.

The first finding that arises is that when both variables are evaluated at the mean (the green shaded area in the column (1)), the total effect is stronger than the main effect of the crisis. This means that at the average firm, the negative effect of the crisis was magnified by the trade credit channel due to a sudden unavailability of this type of short-term financing. Or alternatively, out of the two competing effects of trade credit during the crisis (i.e., β_2 vs. β_3), the negative effect dominated on average.

In order to examine these figures, it is convenient evaluating the effects relative to the main effect of the crisis which ranges between -3.93 and -3.97 across the alternative specifications. These are the grey shaded cells, reported in column (2). That is, when both trade credit and exposure take the value of zero, so that only the main effect of the

²⁷In this line, a new paper by Harrigan et al. (2016) studies the employment polarization in France due to trade conditional on technological change.

crisis is accounted for in expression 5.2. This is precisely the total impact for firms for whom trade credit is not usually a source of short-term financing. It can be seen that the exposure to international shocks is relatively less relevant for these firms than for the more trade credit intensive ones. In this sense, the total effect among different exposure levels ranges between -4 percent and 4.5 percent for the firms relying the least on trade credit, while it ranges between -4.6 and 6.2 for the median value of trade credit intensity and between -45.8 and 132.8 in the most extreme cases (the ones at the maximum level of trade credit usage). This smaller range of the total effect of the crisis is due to the fact that trade credit intensity has completely opposite effects depending on the exposure to international shocks.

In this sense, taking the main effect of the crisis as a reference, the more the firm is connected with more resilient countries (moving towards the right of the table) the more the impact of the crisis is softened due to the positive effect of β_2 in 5.2. Additionally, the more the firm relies on trade credit (moving towards the bottom of the table) the more the main effect of the crisis is either softened or aggravated, depending on the extent to which the firm is tied to more or less resilient countries, respectively.

Thus, when trade credit happens to be a source of finance for the firm, the exposure measure begins to matter and becomes a strong determinant of the total crisis effect. Where the main message drawn from this table is that strong reliance on trade credit amplifies the adverse impact of the crisis, notably when the firm's suppliers faced a severe shock or a large currency appreciation (that is, the lowest value for the exposure index). These are the red figures and they suggest an average 0.6 percent exacerbation of the crisis impact (across all exposure indexes) for firms at the 99th percentile of the distribution of trade credit intensity. While the exacerbation on the most extreme values of trade credit reliance attains 40 percent on average. On the contrary, when suppliers were located in countries more resilient to the crisis (or with a large currency depreciation) and the firm had stronger ties with these, a strong reliance on trade credit softened the negative effects of the crisis. These figures are the blue figures, where the positive effect of the interaction largely counterbalances the direct negative impact of the crisis and trade credit intensity during the crisis. While these extreme values are illustrative, perhaps, the mean and median values are more informative.

When both measures are evaluated at the median, the total effect results in a larger employment drop relative to the main effect of the crisis. As we have seen, this is also the case with the average total effect displayed in green. This suggests, therefore, that the impact of the crisis was exacerbated by stronger reliance on trade credit and stronger ties

with suppliers subject to more severe shocks during the crisis (or experiencing a stronger currency appreciation).

Finally, we alternatively estimate a more stringent version of equation 4.2 where time dummies are dropped and instead 4 digits industry-time effects are included. The results are displayed in Table 17 in the Appendix C. As it was the case for the baseline regressions with imports-exposure-crisis, we find that the main effect of the crisis dummy is again positive, very big and insignificant. In the same vein, the coefficient of the interaction between crisis and trade credit becomes very small and is not significant anymore at any level of acceptance. While the estimates of exposure-to-crisis decrease moderately in magnitude but are not anymore estimated with precision (being only significant for the Growth Index at the 10-percent level).

We believe that this should be explained by the fact that firms inside the same sector should have both similar trade credit intensity determined by technological characteristics of each specific sector, as argued by Fisman and Love (2003), and similar sourcing strategies (e.g., countries have comparative advantages). Therefore, when firm heterogeneity is accounted for as well, very little variation in the data should be left. This is particularly true when there are very few firms within an industry.²⁸ The lack of significance of these coefficients suggests that there is no overall effect of trade credit intensity during the crisis, given that it crucially depends on whether suppliers continued extending trade credit or not. Nevertheless, our coefficients of interest, those of the triple interaction term, are slightly altered in terms of magnitude and remain significant at the highest level of acceptance. However, with the inclusion of less stringent effects, that is, by defining the industry at the 2-digits level, all results on the double interaction term remain significant at the 5 and 10-percent level as the benchmark results. Where the coefficients are very similar to the the ones found with the 4-digits industry-year fixed effects.²⁹

Summing up, our estimates across 5 of our alternative measures of severity of crisis show that the global downturns over 2008-2009 differently affected firms with varying levels of interconnectedness to these shocks, given their different international sourcing strategies. Additionally, we find heterogeneous effects of these transmission across firms differing in their average usage of trade credit in production: firms who don't usually use trade credit as a source of finance, are marginally affected by their international sourcing ties. On the other hand, the effect is dramatically different for firms who rely on trade credit depending on the level of exposure. Trade credit mitigates the drop in employment for

²⁸Table 15 in the Appendix B summarises the number of observations in each of the 2-digits industry in our sub-sample.

²⁹Table not reported but available upon request.

firms with strong relations with more resilient partners. While with strong relations with countries where the incidence of the crisis was higher intensifies the drop in employment. Nevertheless, when the severity of crisis is measured by the country's currency depreciation, the results point in the same direction as the resilience measures: stronger ties with countries under strong currency depreciation tempered the adverse effects of the crisis for trade credit intensive firms.

Table 7: Baseline Trade Credit

Crisis resilience measure:	Dependent Variable: Yearly employment growth					
	Growth Index	Credit Index	SDR Index	Equity Index	Rating Index	Resilience Index
	(1)	(2)	(3)	(4)	(5)	(6)
$Crisis_t$	-3.97 ^a (-9.85)	-3.96 ^a (-9.79)	-3.93 ^a (-9.68)	-3.93 ^a (-9.69)	-3.95 ^a (-9.74)	-3.94 ^a (-9.73)
$Crisis_t \times Trade\ Cred_f$	-2.70 ^b (-2.53)	-2.70 ^b (-2.51)	-2.72 ^b (-2.50)	-2.72 ^b (-2.51)	-2.71 ^b (-2.51)	-2.72 ^b (-2.51)
$Crisis_t \times Exposure_f\ Index\ 1$	3.61 ^b (2.39)					
$Crisis_t \times Exposure_f\ Index\ 2$		2.47 ^b (2.09)				
$Crisis_t \times Exposure_f\ Index\ 3$			4.80 ^c (1.69)			
$Crisis_t \times Exposure_f\ Index\ 4$				2.47 ^c (1.79)		
$Crisis_t \times Exposure_f\ Index\ 5$					1.71 ^c (1.95)	
$Crisis_t \times Exposure_f\ Index\ 6$						2.30 ^c (1.93)
$Crisis_t \times Trade\ Cred_f \times Exposure_f\ Index\ 1$	4.36 ^a (3.39)					
$Crisis_t \times Trade\ Cred_f \times Exposure_f\ Index\ 2$		3.08 ^a (3.53)				
$Crisis_t \times Trade\ Cred_f \times Exposure_f\ Index\ 3$			8.29 ^a (4.07)			
$Crisis_t \times Trade\ Cred_f \times Exposure_f\ Index\ 4$				3.50 ^a (4.32)		
$Crisis_t \times Trade\ Cred_f \times Exposure_f\ Index\ 5$					2.32 ^a (3.61)	
$Crisis_t \times Trade\ Cred_f \times Exposure_f\ Index\ 6$						3.06 ^a (4.03)
Observations	72988	72988	72988	72988	72988	72988
R ²	0.291	0.291	0.291	0.291	0.291	0.291
Adjusted R ²	0.097	0.097	0.097	0.097	0.097	0.097
F	205.19	204.78	205.15	206.12	204.79	205.56

t statistics in parentheses.

All regressions include time-varying firm level controls, firm and time F.E..

Errors clustered at firm level. ^c $p < 0.10$, ^b $p < 0.05$, ^a $p < 0.01$

Table 8: Total crisis effect conditional on exposure and trade credit intensity

	Exposure Index	mean	min	p50	p99	max
Trade Credit		(1)	(2)	(3)	(4)	(5)
at mean	Growth Index	-4.29	-4.62	-4.43	-2.90	6.31
	Credit Index	-4.31	-4.60	-4.41	-3.22	6.27
	SDR Index	-4.31	-4.58	-4.45	-3.36	4.58
	Equity Index	-4.32	-4.58	-4.42	-3.29	5.87
	Rating Index	-4.31	-4.60	-4.42	-3.33	5.74
	Resilience Index	-4.32	-4.59	-4.41	-3.29	6.16
at min	Growth Index	-3.72	-3.97	-3.82	-2.63	4.50
	Credit Index	-3.73	-3.96	-3.81	-2.89	4.41
	SDR Index	-3.74	-3.93	-3.84	-3.07	2.55
	Equity Index	-3.73	-3.93	-3.80	-2.97	3.87
	Rating Index	-3.73	-3.95	-3.81	-3.00	3.85
	Resilience Index	-3.73	-3.94	-3.80	-2.95	4.21
at median	Growth Index	-4.27	-4.59	-4.41	-2.89	6.24
	Credit Index	-4.29	-4.58	-4.39	-3.21	6.19
	SDR Index	-4.29	-4.56	-4.42	-3.35	4.50
	Equity Index	-4.29	-4.55	-4.39	-3.28	5.79
	Rating Index	-4.28	-4.57	-4.39	-3.32	5.66
	Resilience Index	-4.30	-4.57	-4.39	-3.27	6.07
at p99	Growth Index	-5.18	-5.62	-5.37	-3.30	9.10
	Credit Index	-5.21	-5.60	-5.34	-3.73	9.14
	SDR Index	-5.20	-5.59	-5.39	-3.82	7.72
	Equity Index	-5.22	-5.59	-5.36	-3.79	8.96
	Rating Index	-5.20	-5.60	-5.35	-3.86	8.66
	Resilience Index	-5.22	-5.60	-5.35	-3.81	9.15
at max	Growth Index	-40.59	-45.53	-42.70	-19.40	120.42
	Credit Index	-40.91	-45.39	-42.41	-23.98	123.41
	SDR Index	-40.40	-45.69	-43.05	-21.89	132.84
	Equity Index	-41.29	-45.79	-42.98	-23.84	132.14
	Rating Index	-40.72	-45.57	-42.59	-24.67	125.05
	Resilience Index	-41.25	-45.69	-42.73	-24.50	128.74

Total crisis effect based on OLS estimates of equation (4.2) when $1[year = 2009]$ evaluated at different values of Trade Credit Intensity and Exposure-to-Crisis.

6 Robustness and future work

6.1 Placebo Tests

For the sake of robustness, in this section we re-estimate equation 4.2 by setting the crisis dummy equal to one for each of the years different from 2009 at a time (i.e., a separate analysis for each of the following years: 2008, 2007 and 2006, where 2005 is kept as the base year as in the benchmark regressions). The interest of this strategy is to perform a placebo test, where we hypothetically assume that the crisis occurred in another year. In case the estimated coefficients were similar or point in the same direction as our benchmark regressions, it would mean that our "treatment" variable fails to capture the effects of the crisis on employment.

These estimations are presented in Tables 9 - 12. The results from this strategy show that no significant effects concerning the triple interaction term arises in any of these regressions. Hence, the mechanism put forward in this analysis is only at play in the year 2009, where the transmission of shocks across borders was more pronounced for firms that strongly relied on trade credit before the crisis. Therefore, providing a strong support for the hypothesis that financial shocks suffered by trading partners had an employment consequence on importers in our sample. Additionally, the negative effects of the crisis (provided by the coefficient on the year dummy in the two specifications) began to appear in 2008, although the size of the coefficient is smaller with respect to 2009 (from the benchmark results).

Finally, one additional interesting result arises at the beginning of the financial crisis. The coefficient on the interaction term between trade credit intensity and the year 2008 (i.e., $Crisis_t \times Trade\ Cred_f$) in Table 14 turns out to be positive and significant at the highest levels. One possible explanation for this is that by the end of 2008, the crisis was beginning to emerge and probably few firms started to be credit rationed at this point. While among those firms that begun being affected, the ones usually relying more on trade credit were able to partly finance their activity by relying on the short-term financing provided by their suppliers. This is in sharp contrast with the coefficient results for this variable in 2009 (Table 7) where the coefficient is negative and significant. Suggesting therefore, that with respect to 2008, suppliers' ability to provide trade credit was significantly reduced in 2009.

Now, the following sections 6.3 and 6.2 provide a discussion about the limits of our this analysis, additional extensions in which we are currently working on and possible future research paths in sections.

Table 9: Placebo Crisis Year 2006: Baseline regressions

Dependent Variable: Yearly employment growth						
Crisis resilience measure:	Growth Index	Credit Index	SDR Index	Equity Index	Rating Index	Resilience Index
	(1)	(2)	(3)	(4)	(5)	(6)
$Crisis_{t=2006}$	0.32 (1.17)	0.31 (1.11)	0.28 (1.02)	0.30 (1.08)	0.29 (1.06)	0.30 (1.08)
$Crisis_t \times Exposure_f Index 1$	0.51 (0.41)					
$Crisis_t \times Exposure_f Index 2$		0.66 (0.68)				
$Crisis_t \times Exposure_f Index 3$			2.57 (1.06)			
$Crisis_t \times Exposure_f Index 4$				0.93 (0.85)		
$Crisis_t \times Exposure_f Index 5$					0.63 (0.88)	
$Crisis_t \times Exposure_f Index 6$						0.80 (0.83)
Observations	72988	72988	72988	72988	72988	72988
R^2	0.290	0.290	0.290	0.290	0.290	0.290
Adjusted R^2	0.096	0.096	0.096	0.096	0.096	0.096
F	257.29	257.40	257.51	257.37	257.51	257.41

t statistics in parentheses.

All regressions include firm and time F.E., errors clustered at firm level.

^c $p < 0.10$, ^b $p < 0.05$, ^a $p < 0.01$

Table 10: Placebo Crisis Year 2007: Baseline regressions

Dependent Variable: Yearly employment growth						
Crisis resilience measure:	Growth Index	Credit Index	SDR Index	Equity Index	Rating Index	Resilience Index
	(1)	(2)	(3)	(4)	(5)	(6)
$Crisis_{t=2007}$	0.32 (1.16)	0.33 (1.17)	0.28 (1.02)	0.30 (1.09)	0.31 (1.12)	0.31 (1.10)
$Crisis_t \times Exposure_f Index 1$	-0.08 (-0.06)					
$Crisis_t \times Exposure_f Index 2$		-0.14 (-0.14)				
$Crisis_t \times Exposure_f Index 3$			1.45 (0.62)			
$Crisis_t \times Exposure_f Index 4$				0.34 (0.29)		
$Crisis_t \times Exposure_f Index 5$					0.07 (0.10)	
$Crisis_t \times Exposure_f Index 6$						0.21 (0.20)
Observations	72988	72988	72988	72988	72988	72988
R^2	0.290	0.290	0.290	0.290	0.290	0.290
Adjusted R^2	0.096	0.096	0.096	0.096	0.096	0.096
F	257.95	257.95	258.11	257.97	257.96	257.96

t statistics in parentheses.

All regressions include firm and time F.E., errors clustered at firm level.

^c $p < 0.10$, ^b $p < 0.05$, ^a $p < 0.01$

Table 11: Placebo Crisis Year 2008: Baseline regressions

Dependent Variable: Yearly employment growth						
Crisis resilience measure:	Growth Index	Credit Index	SDR Index	Equity Index	Rating Index	Resilience Index
	(1)	(2)	(3)	(4)	(5)	(6)
$Crisis_{t=2008}$	-1.58 ^a (-4.85)	-1.59 ^a (-4.87)	-1.57 ^a (-4.80)	-1.57 ^a (-4.82)	-1.58 ^a (-4.82)	-1.57 ^a (-4.81)
$Crisis_t \times Exposure_f Index 1$	-2.86 ^b (-2.00)					
$Crisis_t \times Exposure_f Index 2$		-1.93 ^c (-1.71)				
$Crisis_t \times Exposure_f Index 3$			-5.40 ^b (-2.03)			
$Crisis_t \times Exposure_f Index 4$				-2.69 ^b (-2.11)		
$Crisis_t \times Exposure_f Index 5$					-1.53 ^c (-1.84)	
$Crisis_t \times Exposure_f Index 6$						-2.28 ^b (-2.05)
Observations	72988	72988	72988	72988	72988	72988
R^2	0.291	0.290	0.291	0.291	0.290	0.291
Adjusted R^2	0.096	0.096	0.096	0.096	0.096	0.096
F	258.16	258.00	258.20	258.22	258.11	258.19

t statistics in parentheses.

All regressions include firm and time F.E., errors clustered at firm level.

^c $p < 0.10$, ^b $p < 0.05$, ^a $p < 0.01$

Table 12: Placebo Crisis Year 2006: Trade Credit

Dependent Variable: Yearly employment growth						
Crisis resilience measure:	Growth Index	Credit Index	SDR Index	Equity Index	Rating Index	Resilience Index
	(1)	(2)	(3)	(4)	(5)	(6)
$Crisis_t=2006$	0.09 (0.27)	0.06 (0.19)	0.03 (0.08)	0.06 (0.18)	0.04 (0.14)	0.05 (0.17)
$Crisis_t \times Trade\ Cred_f$	1.00 ^c (1.68)	1.03 ^c (1.73)	1.06 ^c (1.76)	1.02 ^c (1.71)	1.05 ^c (1.74)	1.03 ^c (1.72)
$Crisis_t \times Exposure_f\ Index\ 1$	0.50 (0.36)					
$Crisis_t \times Exposure_f\ Index\ 2$		0.72 (0.66)				
$Crisis_t \times Exposure_f\ Index\ 3$			2.89 (1.07)			
$Crisis_t \times Exposure_f\ Index\ 4$				0.98 (0.78)		
$Crisis_t \times Exposure_f\ Index\ 5$					0.71 (0.88)	
$Crisis_t \times Exposure_f\ Index\ 6$						0.85 (0.78)
$Crisis_t \times Trade\ Cred_f \times Exposure_f\ Index\ 1$	0.02 (0.04)					
$Crisis_t \times Trade\ Cred_f \times Exposure_f\ Index\ 2$		-0.16 (-0.42)				
$Crisis_t \times Trade\ Cred_f \times Exposure_f\ Index\ 3$			-0.68 (-0.71)			
$Crisis_t \times Trade\ Cred_f \times Exposure_f\ Index\ 4$				-0.14 (-0.31)		
$Crisis_t \times Trade\ Cred_f \times Exposure_f\ Index\ 5$					-0.16 (-0.56)	
$Crisis_t \times Trade\ Cred_f \times Exposure_f\ Index\ 6$						-0.14 (-0.36)
Observations	72988	72988	72988	72988	72988	72988
R ²	0.290	0.290	0.290	0.290	0.290	0.290
Adjusted R ²	0.096	0.096	0.096	0.096	0.096	0.096
F	200.64	200.79	200.90	200.75	200.88	200.78

t statistics in parentheses.

All regressions include time-varying firm level controls, firm and time F.E..

Errors clustered at firm level. ^c $p < 0.10$, ^b $p < 0.05$, ^a $p < 0.01$

Table 13: Placebo Crisis Year 2007: Trade Credit

Crisis resilience measure:	Dependent Variable: Yearly employment growth					
	Growth Index	Credit Index	SDR Index	Equity Index	Rating Index	Resilience Index
	(1)	(2)	(3)	(4)	(5)	(6)
$Crisis_t=2007$	0.05 (0.15)	0.13 (0.36)	0.07 (0.19)	0.12 (0.32)	0.08 (0.22)	0.10 (0.26)
$Crisis_t \times Trade Cred_f$	1.11 (1.15)	0.81 (0.82)	0.89 (0.90)	0.77 (0.77)	0.96 (0.97)	0.87 (0.87)
$Crisis_t \times Exposure_f Index 1$	1.01 (0.47)					
$Crisis_t \times Exposure_f Index 2$		0.02 (0.01)				
$Crisis_t \times Exposure_f Index 3$			2.13 (0.45)			
$Crisis_t \times Exposure_f Index 4$				0.36 (0.14)		
$Crisis_t \times Exposure_f Index 5$					0.42 (0.31)	
$Crisis_t \times Exposure_f Index 6$						0.48 (0.24)
$Crisis_t \times Trade Cred_f \times Exposure_f Index 1$	-4.23 (-0.57)					
$Crisis_t \times Trade Cred_f \times Exposure_f Index 2$		-0.42 (-0.06)				
$Crisis_t \times Trade Cred_f \times Exposure_f Index 3$			-2.16 (-0.12)			
$Crisis_t \times Trade Cred_f \times Exposure_f Index 4$				0.18 (0.02)		
$Crisis_t \times Trade Cred_f \times Exposure_f Index 5$					-1.23 (-0.25)	
$Crisis_t \times Trade Cred_f \times Exposure_f Index 6$						-0.88 (-0.12)
Observations	72988	72988	72988	72988	72988	72988
R^2	0.290	0.290	0.290	0.290	0.290	0.290
Adjusted R^2	0.096	0.096	0.096	0.096	0.096	0.096
F	200.83	200.85	200.98	200.89	200.85	200.87

t statistics in parentheses.

All regressions include time-varying firm level controls, firm and time F.E..

Errors clustered at firm level. ^c $p < 0.10$, ^b $p < 0.05$, ^a $p < 0.01$

Table 14: Placebo Crisis Year 2008: Trade Credit

Dependent Variable: Yearly employment growth						
Crisis resilience measure:	Growth Index	Credit Index	SDR Index	Equity Index	Rating Index	Resilience Index
	(1)	(2)	(3)	(4)	(5)	(6)
$Crisis_t=2008$	-2.31 ^a (-5.45)	-2.33 ^a (-5.39)	-2.30 ^a (-5.32)	-2.30 ^a (-5.45)	-2.31 ^a (-5.34)	-2.30 ^a (-5.41)
$Crisis_t \times Trade Cred_f$	3.00 ^a (2.67)	3.08 ^a (2.60)	3.03 ^a (2.58)	3.01 ^a (2.71)	3.02 ^a (2.58)	3.02 ^a (2.68)
$Crisis_t \times Exposure_f Index 1$	-1.62 (-0.86)					
$Crisis_t \times Exposure_f Index 2$		-0.88 (-0.53)				
$Crisis_t \times Exposure_f Index 3$			-2.94 (-0.76)			
$Crisis_t \times Exposure_f Index 4$				-1.57 (-0.93)		
$Crisis_t \times Exposure_f Index 5$					-0.84 (-0.72)	
$Crisis_t \times Exposure_f Index 6$						-1.30 (-0.87)
$Crisis_t \times Trade Cred_f \times Exposure_f Index 1$	-3.69 (-1.06)					
$Crisis_t \times Trade Cred_f \times Exposure_f Index 2$		-3.43 (-0.82)				
$Crisis_t \times Trade Cred_f \times Exposure_f Index 3$			-8.02 (-0.80)			
$Crisis_t \times Trade Cred_f \times Exposure_f Index 4$				-3.37 (-1.22)		
$Crisis_t \times Trade Cred_f \times Exposure_f Index 5$					-2.14 (-0.75)	
$Crisis_t \times Trade Cred_f \times Exposure_f Index 6$						-2.96 (-1.06)
Observations	72988	72988	72988	72988	72988	72988
R ²	0.291	0.291	0.291	0.291	0.291	0.291
Adjusted R ²	0.096	0.096	0.096	0.096	0.096	0.096
F	201.39	201.18	201.32	201.51	201.24	201.40

t statistics in parentheses.

All regressions include time-varying firm level controls, firm and time F.E..

Errors clustered at firm level. ^c $p < 0.10$, ^b $p < 0.05$, ^a $p < 0.01$

6.2 Sensitivity analysis: Are there any other mechanisms consistent with our results?

We aim at testing a mechanism that links ex-ante geographical ties to transmission of ex-post shocks. However, our results could also be consistent with an alternative hypothesis, which is that shocks in the country of either (and mostly) the parent of the firm or one of its affiliates could also be transmitted to the firm during the crisis. This particular mechanism is studied by Kolasa et al. (2010) and Alfaro and Chen (2010). The former use Polish firm-level data and find that foreign ownership resulted in a higher degree of resilience to the crisis, which was possibly due to intra-group lending supporting affiliates' problems of external credit availability. Similarly, Alfaro and Chen (2010) explore the role of FDI in helping affiliates facing credit constraints during the crisis using a firm-level worldwide dataset. It closely relates to our analysis in the sense that they explore financial linkages among groups conditional on the incidence of the crisis in the host and home countries. Their findings suggest that multinationals whose headquarters are located in countries with a greater incidence of the crisis, performed worse than their local competitors.

In this sense, ruling out this alternative explanation is of particular importance given that intra-group loans can directly affect firms' financial constraints, which is central to the mechanism explored in this paper. Therefore, we are currently working on this robustness check with the help of FDI firm-level data from Banque de France.

6.3 Future work

As mentioned above, the current data at our disposal limit the scope of our analysis in some dimensions. Nevertheless, in the near future we plan to extend our analysis when access to new data is obtained: an extension of the data we currently use (BRN beyond 2008), as well as access to the Financial linkages French data (LIFI) and the employment base DADS (Déclaration Annuelle des Données Sociales). In this sense, we plan to extend our study to account for financial constraints and specific employment categories effects as explained in the following subsections.

Are financial constraints the channel of transmission?

Given that the mechanism that we explore assumes a relaxation of the firm's financial constraints, it is then convenient testing whether the existence of financial constraints is the relevant channel of transmission of the shocks. However, as already mentioned, the balance-sheet data at our disposal at the moment is only available until 2008 and this limits the scope of our analysis, particularly, testing whether financial constraints are

responsible for the results presented in this paper. Nonetheless, these data do exist and we will have access to the years 2009-2010. In this sense, we plan to directly introduce a variable reflecting the firm's credit constraints during the crisis and evaluate how these related to its employment growth during the crisis and expect the effect of exposure to crisis during the financial crisis to become insignificant. More precisely, we anticipate that if the financial constraints channel is really the mechanism behind our results, then by re-estimating equation 4.1 and 4.2 with the introduction an interaction term between the firm's financial constraint proxy and the crisis dummy our results should become irrelevant.

Robustness with respect to Trade Credit measure

Our analysis focuses on the propagation of financial shocks through inter-enterprise financing between firms across borders. Therefore, this channel is only relevant for foreign inter-enterprise credit. In this sense, the main shortcoming with the trade credit measure used in this analysis is that we are not able to distinguish payables that are related to imports from those related to domestic purchases. This could turn out to be problematic in cases where a firm receives only trade credit from domestic suppliers (which we do not observe), at the same time as we observe an important amount of trade credit and a low exposure to crisis -due to sourcing from a more resilient partner. In this sense, we could falsely interpret these cases as evidence supporting our hypothesis. In future work, a possibility to circumvent this problem could be to rely on proxies for the use of open account contracts based on country, sector and firm-level characteristics, that have been put forward by recent studies on trade finance.³⁰

Are the effects heterogeneous among different types of employees?

Our current analysis provides an employment average effect at the firm-level. However, one could think that the effects are certainly not the same among different types of employees. Notably if they are more or less substitutable with capital (the collateral channel implies that firms use more capital at the expense of labor) and also depending on the type of contract with the firm. French institutions are known for protecting employees in several ways, hence one could think that part-time jobs as well as the "interim" ones might be more affected when the firm faces a financial shock given that these are less subject to regulation. Additionally, the number of hours worked provides an additional information allowing to assess how firms adjust employment, both at the intensive and extensive margins.

In this way, a decomposition of the firm-level employment effects could be done with the help of the DADS database (where we will observe our period of interest). This database is based on mandatory annual reports filled by all firms with employees; it

³⁰See for instance: Antras and Foley (2015), Demir and Javorcik (2015) and Hoefele et al. (2013).

contains annual hours paid in a firm, as well as the number of workers employed by different socio-professional occupation types. The use of this data is particularly interesting given that for each worker, it provides information on gross and net wages, hours paid, occupation, tenure, gender and age.

7 Conclusion

The dramatic cross-border consequences the Great Recession and the speed at which shocks propagated around the world, raised an increasing need of understanding the implications of living in highly interconnected world. This paper adds to the growing literature aiming at doing so. We use French firm-level data on importers and focus on the role of trade credit (or inter-enterprise credit, which doesn't involve financial intermediaries) in shaping the transmission of global shocks and assess its impact on employment growth.

Given that (at least a part of) firm's capital can be seized by lenders in case of credit default, capital can be pledged as collateral in order to raise external funds. While this is obviously not the case for employment. Thus, the inalienability of human capital implies that when external finance becomes scarce, the need of pledging collateral in order to secure loan repayment provides an incentive for the firm to shift towards a more capital intensive production. On the other hand, suppliers may finance their clients by requiring the importer to pay goods in the future, as they develop a commercial relationship over time. In this sense they substitute to financial institutions as lenders by providing trade credit. Motivated by this, we evaluate how foreign suppliers can alleviate the firm's short-term financial constraints by accepting delayed payments. Which in turn translates into lower pressure on employment when credit from financial institutions is limited.

Without directly observing trade credit from each foreign partner, our econometric analysis is based on the assumption that suppliers' ability to provide trade credit during the global financial crisis depended on the severity of shocks in each country over 2008-2009 (and pre-established trade relations). Therefore, we exploit cross-country differences in the severity of the crisis and different levels of firm-level exposure to these shocks in order to assess the transmission of these and its impact on employment growth. Next, we evaluate this effect conditional on firm-level technological reliance on trade credit. This allows us uncovering whether the financial health of its foreign suppliers (that we view as potential lenders) helped cushioning the negative effect of the crisis and whether the effect was concentrated among trade credit intensive firms.

Using various measures of the crisis, our findings show that the global downturns over 2008-2009 differently affected firms with varying levels of interconnectedness to these shocks, given their different international sourcing strategies. Where the results point to a particular channel of transmission : trade credit. Our findings summarize as follows, strong pre-crisis sourcing ties with countries that were more resilient to the global crisis, translated into better performance in terms of employment growth over 2008-2009. This effect dramatically varies with trade credit intensity. Strongly relying on trade credit made firms more vulnerable to unanticipated shocks, for whom the adverse impact of the crisis was exacerbated. This effect intensified among firms with important sourcing ties with severely shocked countries. While the negative effect of the crisis was mitigated when sourcing relations with countries subject to milder shocks were stronger. Supporting, therefore, the hypothesis that trade credit was an alternative source of financing for enterprises during the crisis. Where implicitly borrowing from suppliers helped importers overcoming financial constraints.

References

- Acemoglu, D. (2001). Credit market imperfections and persistent unemployment. *European Economic Review* 45(4), 665–679.
- Ahn, J., M. Amiti, and D. E. Weinstein (2011). Trade finance and the great trade collapse. *The American Economic Review* 101(3), 298–302.
- Alfaro, L. and M. X. Chen (2010). Surviving the global financial crisis: Foreign direct investment and establishment performance. *Harvard Business School BGIE Unit Working Paper* (10-110).
- Amity, M. and D. E. Weinstein (2011). Exports and financial shocks. *The Quarterly Journal of Economics* 126(4), 1841–1877.
- Antras, P. and C. F. Foley (2015). Poultry in motion: A study of international trade finance practices. *Journal of Political Economy* 123(4).
- Baldwin, R. (2009). *The great trade collapse: Causes, consequences and prospects*, Volume 100. Centre for Economic Policy Research London.
- Bems, R., R. C. Johnson, and K.-M. Yi (2010). Demand spillovers and the collapse of trade in the global recession. *IMF Economic review* 58(2), 295–326.
- Benmelech, E., N. K. Bergman, and A. Seru (2011). Financing labor. Technical report, National Bureau of Economic Research.

- Bentolila, S., M. Jansen, G. Jiménez, and S. Ruano (2015). When credit dries up: Job losses in the great recession.
- Berg, A., E. Borensztein, and C. Pattillo (2005). Assessing early warning systems: how have they worked in practice? *IMF staff papers*, 462–502.
- Biscourp, P. and F. Kramarz (2007). Employment, skill structure and international trade: firm-level evidence for france. *Journal of International Economics* 72(1), 22–51.
- Bricongne, J.-C., L. Fontagné, G. Gaulier, D. Taglioni, and V. Vicard (2012). Firms and the global crisis: French exports in the turmoil. *Journal of international Economics* 87(1), 134–146.
- Burkart, M. and T. Ellingsen (2004). In-kind finance: A theory of trade credit. *The American economic review* 94(3), 569–590.
- Calvo, G., F. Coricelli, and P. Ottonello (2014). Labor market, financial crises and inflation: Jobless and wageless recoveries.
- Campello, M., J. R. Graham, and C. R. Harvey (2010). The real effects of financial constraints: Evidence from a financial crisis. *Journal of Financial Economics* 97(3), 470–487.
- Cetorelli, N. and L. S. Goldberg (2012). Banking globalization and monetary transmission. *The Journal of Finance* 67(5), 1811–1843.
- Chodorow-Reich, G. (2014). The employment effects of credit market disruptions: Firm-level evidence from the 2008–9 financial crisis. *The Quarterly Journal of Economics* 129(1), 1–59.
- Chor, D. and K. Manova (2012). Off the cliff and back? credit conditions and international trade during the global financial crisis. *Journal of international economics* 87(1), 117–133.
- Coulibaly, B., H. Sapriza, and A. Zlate (2013). Financial frictions, trade credit, and the 2008–09 global financial crisis. *International Review of Economics & Finance* 26, 25–38.
- Dedola, L. and G. Lombardo (2012). Financial frictions, financial integration and the international propagation of shocks. *Economic Policy* 27(70), 319–359.
- Demir, B. and B. Javorcik (2015). Grin and bear it: Producer-financed exports from an emerging market.
- Dromel, N. L., E. Kolakez, and E. Lehmann (2010). Credit constraints and the persistence of unemployment. *Labour Economics* 17(5), 823–834.

- Eaton, J., S. Kortum, B. Neiman, and J. Romalis (2011). Trade and the global recession. Technical report, National Bureau of Economic Research.
- Fisman, R. and I. Love (2003). Trade credit, financial intermediary development, and industry growth. *The Journal of Finance* 58(1), 353–374.
- Greenstone, M., A. Mas, F. Goncalves, E. Liu, S. Mello, W. Daron, R. Mas, and H.-l. Nguyen (2012). Do credit market shocks affect the real economy. In *Quasi-Experimental Evidence from the Great Recession and “Normal” Economic Times*, IMF Working Paper. Citeseer.
- Harrigan, J., A. Reshef, and F. Toubal (2016). The march of the techies: Technology, trade, and job polarization in france, 1994-2007. Technical report, National Bureau of Economic Research.
- Hart, O. and J. Moore (1994). A theory of debt based on the inalienability of human capital. *The Quarterly Journal of Economics* 109(4), 841–879.
- Hoefele, A., T. Schmidt-Eisenlohr, and Z. Yu (2013). Payment choice in international trade: Theory and evidence from cross-country firm level data.
- Iacovone, L. and V. Zavačka (2009). *The great trade collapse: Causes, consequences and prospects*, Chapter Banking crises and exports: Lessons from the past for the recent trade collapse. Volume 100 of Baldwin (2009).
- Kalemli-Ozcan, S., E. Papaioannou, and F. Perri (2013). Global banks and crisis transmission. *Journal of international Economics* 89(2), 495–510.
- Kolasa, M., M. Rubaszek, and D. Taglioni (2010). Firms in the great global recession: The role of foreign ownership and financial dependence. *Emerging Markets Review* 11(4), 341–357.
- Levchenko, A., L. Lewis, and L. Tesar (2009). The collapse of us trade: in search of the smoking gun. *The great trade collapse: Causes, consequences and prospects*, 71.
- Love, I. and R. Zaidi (2010). Trade credit, bank credit and financial crisis. *International Review of Finance* 10(1), 125–147.
- Meltzer, A. H. (1960). Mercantile credit, monetary policy, and size of firms. *The Review of Economics and Statistics*, 429–437.
- Niepmann, F. and T. Schmidt-Eisenlohr (2016). No guarantees, no trade: how banks affect export patterns. *FRB International Finance Discussion Paper* (1158).
- Oi, W. Y. (1962). Labor as a quasi-fixed factor. *The Journal of Political Economy*, 538–555.

Petersen, M. A. and R. G. Rajan (1997). Trade credit: theories and evidence. *Review of financial studies* 10(3), 661–691.

Rajan, R. G. (2006). Has finance made the world riskier? *European Financial Management* 12(4), 499–533.

Rose, A. K. and M. M. Spiegel (2012). Cross-country causes and consequences of the 2008 crisis: Early warning. *Japan and the World Economy* 24(1), 1 – 16.

Appendix A Descriptive Statistics

A.1 Alternative Severity of Crisis Indexes

Figure 4: Cross-country Crisis as measured by: Growth Index

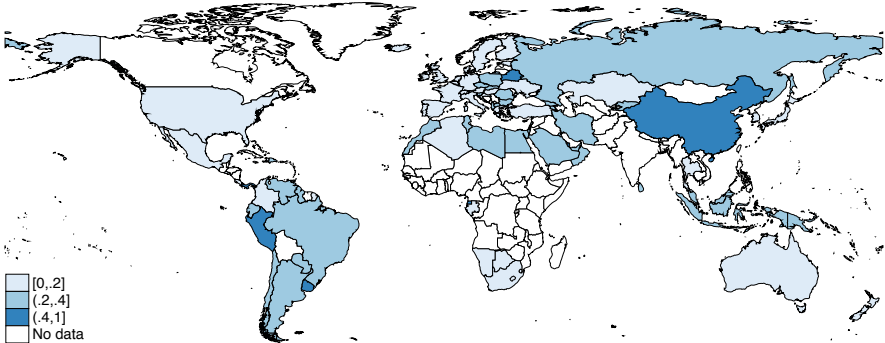


Figure 5: Cross-country Crisis as measured by: Equity Index

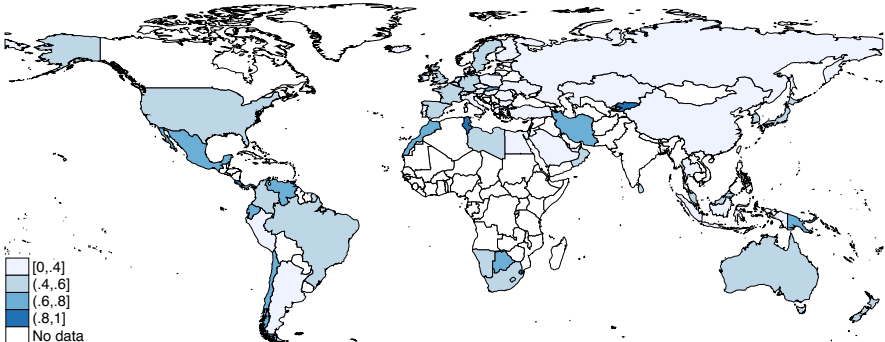
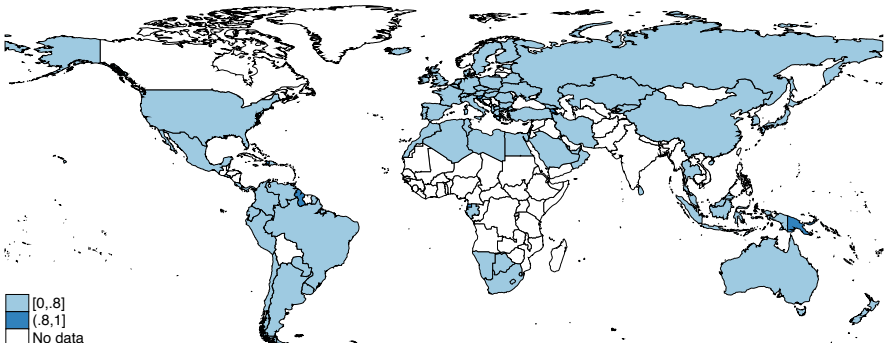


Figure 6: Cross-country Crisis as measured by: Rating Index



Source: Author's calculations using data from World Bank and Rose and Spiegel (2012)

A.2 Industries

Table 15: NAF 2 digits industries included in the analysis

Division Code	Heading	N
2	Forestry and logging	78
5	Mining of coal and lignite	4
6	Extraction of crude petroleum and natural gas	18
7	Mining of metal ores	6
8	Other mining and quarrying	552
10	Manufacture of food products	7113
11	Manufacture of beverages	846
12	Manufacture of tobacco products	11
13	Manufacture of textiles	2489
14	Manufacture of wearing apparel	1913
15	Manufacture of leather and related products	773
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	3148
17	Manufacture of paper and paper products	1955
18	Printing and reproduction of recorded media	2436
19	Manufacture of coke and refined petroleum products	87
20	Manufacture of chemicals and chemical products	2961
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	690
22	Manufacture of rubber and plastic products	5529
23	Manufacture of other non-metallic mineral products	2796
24	Manufacture of basic metals	1136
25	Manufacture of fabricated metal products, except machinery and equipment	10954
26	Manufacture of computer, electronic and optical products	2727
27	Manufacture of electrical equipment	2070
28	Manufacture of machinery and equipment n.e.c.	5965
29	Manufacture of motor vehicles, trailers and semi-trailers	1657
30	Manufacture of other transport equipment	678
31	Manufacture of furniture	1807
32	Other manufacturing	2386
33	Repair and installation of machinery and equipment	3623
Total		66408

Note: 2-digits Industry NAF (Nomenclature d'Activité Française) division codes and headings.

Appendix B Definitions and sources of crisis variables used in the analysis

Data from World Bank

Credit Measure: Percentage change over 2007-2009 in Domestic credit to private sector by banks (% of GDP).

Data from Rose and Spiegel (2012)

Growth Measure: Real GDP growth over 2008, as estimated by the Economic Intelligence Unit (EIU) in early March 2009.

Equity Measure: Percentage change in the national stock market over the 2008 calendar year (collected from national sources)

SDR Measure: Percentage change in the SDR exchange rate over 2008, measured as the domestic currency price of a Special Drawing Right and taken from the IMF's International Financial Statistics

Rating Measure: Change in the country credit rating from Institutional Investor. The latter are ratings created by Institutional Investor that rank 177 countries on a scale between 0 and 100 where 100 represents the least likelihood of default.

List of suppliers' countries kept

Argentina, Austria, Australia, Barbados, Belgium, Bulgaria, Bahrain, Brazil, Bahamas, Botswana, Switzerland, Chile, China, Colombia, Costa Rica, Cyprus, Czech Republic, Germany, Denmark, Estonia, Egypt, Spain, Finland, UK, Greece, Hong Kong, Croatia, Hungary, Ireland, Israel, Iceland, Italy, Jamaica, Japan, Kyrgyz Republic, Korea, Kazakhstan, Lebanon, Sri Lanka, Morocco, Macedonia (FYR), Malta, Mauritius, Mexico, Malaysia, Namibia, Netherlands, New Zealand, Oman, Panama, Peru, Papua, New Guinea, Poland, Portugal, Romania, Russia, Sweden, Singapore, Slovenia, Slovakia, El Salvador, Swaziland, Thailand, Tunisia, Turkey, Trinidad & Tobago, Ukraine, United States, Venezuela and South Africa.

Appendix C Additional tables

Table 16: Alternative F.E.: Baseline

Dependent Variable: Yearly employment growth						
Crisis resilience measure:	Growth Index	Credit Index	SDR Index	Equity Index	Rating Index	Resilience Index
	(1)	(2)	(3)	(4)	(5)	(6)
$Crisis_t$	165.83 (0.00)	164.39 (0.00)	157.09 (0.00)	168.97 (0.00)	163.43 (0.00)	168.13 (0.00)
$Crisis_t \times Exposure_f Index 1$	4.64 ^a (2.77)					
$Crisis_t \times Exposure_f Index 2$		3.15 ^b (2.30)				
$Crisis_t \times Exposure_f Index 3$			6.55 ^b (2.01)			
$Crisis_t \times Exposure_f Index 4$				3.70 ^b (2.33)		
$Crisis_t \times Exposure_f Index 5$					2.35 ^b (2.33)	
$Crisis_t \times Exposure_f Index 6$						3.28 ^b (2.39)
Observations	72963	72963	72963	72963	72963	72963
R^2	0.312	0.312	0.312	0.312	0.312	0.312
Adjusted R^2	0.105	0.105	0.105	0.105	0.105	0.105
F	1.95	1.60	1.43	1.62	1.62	1.66

t statistics in parentheses

All regressions include time-varying firm controls, firm and 4 digits industry-time F.E., errors clustered at firm level.

^c $p < 0.10$, ^b $p < 0.05$, ^a $p < 0.01$

Table 17: Alternative F.E.: Trade Credit

Dependent Variable: Yearly employment growth						
Crisis resilience measure:	Growth Index	Credit Index	SDR Index	Equity Index	Rating Index	Resilience Index
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Crisis_t</i>	1923.15 (0.00)	1899.11 (0.00)	1864.49 (0.00)	1924.60 (0.00)	1898.40 (0.00)	1921.46 (0.00)
<i>Crisis_t × Trade Cred_f</i>	-0.93 (-1.48)	-0.92 (-1.46)	-0.95 (-1.50)	-0.93 (-1.48)	-0.92 (-1.47)	-0.93 (-1.48)
<i>Crisis_t × Exposure_f Index 1</i>	2.80 ^c (1.71)					
<i>Crisis_t × Exposure_f Index 2</i>		1.70 (1.34)				
<i>Crisis_t × Exposure_f Index 3</i>			2.89 (0.94)			
<i>Crisis_t × Exposure_f Index 4</i>				1.92 (1.27)		
<i>Crisis_t × Exposure_f Index 5</i>					1.28 (1.35)	
<i>Crisis_t × Exposure_f Index 6</i>						1.78 (1.36)
<i>Crisis_t × Trade Cred_f × Exposure_f Index 1</i>	3.82 ^a (3.13)					
<i>Crisis_t × Trade Cred_f × Exposure_f Index 2</i>		2.77 ^a (3.45)				
<i>Crisis_t × Trade Cred_f × Exposure_f Index 3</i>			7.53 ^a (4.16)			
<i>Crisis_t × Trade Cred_f × Exposure_f Index 4</i>				3.09 ^a (4.17)		
<i>Crisis_t × Trade Cred_f × Exposure_f Index 5</i>					2.04 ^a (3.41)	
<i>Crisis_t × Trade Cred_f × Exposure_f Index 6</i>						2.69 ^a (3.85)
Observations	72963	72963	72963	72963	72963	72963
R ²	0.312	0.312	0.312	0.312	0.312	0.312
Adjusted R ²	0.105	0.105	0.105	0.105	0.105	0.105
F	3.06	3.03	3.61	4.54	3.03	3.89

t statistics in parentheses

All regressions include time-varying firm controls, firm and 4 digits industry-time F.E., errors clustered at firm level.

^c $p < 0.10$, ^b $p < 0.05$, ^a $p < 0.01$