Trade Finance and Trade Flows into Industrialized, Emerging and Developing Economies: What is the Role of Trade Openness?

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Abstract. The limited availability of trade finance can be an important barrier for international trade. This paper analyses the effect of trade credit on the trade flows of industrialized, emerging and developing economies in normal and in crisis times and focuses in particular on the role of trade openness. We use Berne Union data on export credit insurance, the most extensive dataset on trade finance currently available, for the period 2005-2013. Using a two-stage instrumentation approach, we find a significantly positive effect of the availability of trade credit on trade. A one percent increase in commitments is followed by a 0.3-0.45 percent increase in total imports in the next year. This is a rather large effect and underlines the importance of trade financing for the smooth exchange of goods across countries and regions. The financial crisis strongly negatively affected the import volumes, but the crisis did not change the effect of trade credit insurance on imports. Moreover, we find that trade openness is a very important determinant not only of import flows but also of how trade credit insurance impacts on trade flows and how the crisis has affected a country’s imports. The more open a country is to trade, the less important is the trade credit insurance effect on imports. When a country is more open to trade, the more frequent goods exchanges support reliable importer-exporter relationships, so that the trade partners do not have to rely as much on trade finance instruments. These effects are intensified in times of crisis.

JEL codes: F10, F13, F14, G01, G20, G22.

Key words: trade finance, international trade, financial crisis, trade credit, export credit insurance, Basel III regulation

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1 Introduction

The limited availability of trade finance can be an important barrier for international trade. Recent surveys underline the significance of the availability of trade finance (e.g. ICC, 2013b). The global financial crisis has limited the availability of trade finance. Moreover, currently, it is being debated to what extent trade finance has not only come under strain because of the financial crisis directly but also because of more stringent financial regulation, above all Basel III, that has been introduced as a reaction to the crisis.

The literature has made progress in assessing the link between trade finance and international trade flows. Yet, the role of trade finance in developing countries and emerging economy has mostly been overlooked. This paper seeks to contribute to closing this gap by putting the spotlight on the significance of trade finance for the trade flows of developing and emerging economies, in particular in comparison to industrialized countries. This paper analyses the effect of trade credit on the trade flows of industrialized, emerging and developing economies in normal and in crisis times and putting a special focus on trade openness. We use Berne Union data on export credit insurance, the most extensive dataset on trade credits currently available, for the period 2005q1-2013q1.

The remainder of the paper is structured as follows: Section 2 explains the need for trade finance to address information asymmetries, introduces various trade finance instruments and outlines the ways in which trade finance might matter for developing countries and emerging economies. Section 3 reviews the literature on trade finance and international trade and underlines that there is a research gap with regard to an assessment of trade finance with a specific focus on developing countries and emerging economies. Section 4 outlines the data we employ as well as our specification. Section 5 presents our estimation findings before Section 6 summarizes the findings and sketches implications and next steps.

2 Trade Finance and International Trade

What is trade finance needed for? The time lag between the export of goods and the payment, on average 90-100 days, generates payment uncertainty. Trade finance contributes to tackling the information asymmetry between importers (buyers) and exporters (sellers). Trade finance enhances international trade in terms of facilitating
payment, financing, mitigating risks and providing information about the status of payments or shipments.

The various trade finance instruments differ in terms of the balance of risk between exporter and importer (see Fig. 1). From the perspective of the exporter, *cash in advance* is least risky (and the most risky for the importer). The importer pays for the goods at an agreed date before the goods are shipped and the exporter receives payment while keeping control of the goods.

**Figure 1: Methods of Payment and Risk Allocation for Importers and Exporters**

![Methods of Payment Diagram](image)

Source: (Humphrey, 2009)

*Open account* trading (i.e. the exporter ships the goods to the importer before receiving payment) is the most risky transaction for the exporter (and the least risky for the importer). *Letters of credit* (L/C) can cover the exporter’s risks by transferring it to the banks involved. In the case of *documentary collections*, the seller instructs his bank to forward documents related to the export of goods to the buyer’s bank with a request to present these documents to the buyer for payment, indicating when and on what conditions these documents can be released to the buyer.

There is a lack of data on trade finance and, according to a recent review of a Study Group of the Committee on the Global Financial System (CGFS) (2014) of the Bank for International Settlements (BIS), there is no readily available data on the international bank-intermediated trade finance market.

The latest data from the trade register of the International Chamber of Commerce (ICC) shows that there was about US$ 6.5-8 trillion of bank-intermediated trade finance in 2011, with US$ 2.8 trillion comprising L/Cs (Committee on the Global Financial System, 2014). According to estimations by a Study Group of the Committee on the
Global Financial System of the Bank for International Settlements, around one third of international trade is supported by one or more bank-intermediated trade finance products with the remaining two thirds being financed by inter-firm credit (see Figure 2).

**Figure 2: Financing Global Trade (as a share of global trade in per cent)**

Inter-firm trade credit includes open account transactions, where goods are shipped in advance of payment, and cash-in-advance transactions, where payment is made before shipment.

Source: (Committee on the Global Financial System, 2014)

There are considerable differences across countries and regions with regards to the intensity of the use of trade finance, both with a view to advanced economies as well as with a view to emerging markets (see Figure 3).

**Figure 3: Trade Finance Intensity (per cent)**

1 Ratio of trade finance over merchandise trade; derived by assuming a 90-day maturity of trade finance stocks, expect in India, where maturities are known to be six and 12 months respectively, and in Brazil, where the information on the flow of new loans is used.

2 Trade finance data are break adjusted.

Source: (Committee on the Global Financial System, 2014)
National data show a variation that ranges from 2 per cent for Mexico to more than 40 per cent for China, India, Italy and Korea (Committee on the Global Financial System, 2014). Trade finance is especially intensively used in Asia. The Asia-Pacific-Region represents more than half of the L/C-based as well as overall trade finance usage. Europe accounts for around one quarter and North America, Latin America, Africa and the Middle-East each for around 5-10 per cent (Committee on the Global Financial System, 2014).

Currently, the availability of trade finance is being debated in two main contexts:

The first question is to what extent the availability of trade finance is affected by financial crises. While many authors agree that the great trade collapse of late 2008 to late 2009 after the global financial crisis was strongly driven by the reduction of global demand, recent research demonstrates that the lack of trade finance also played a significant role.

The second question is to what extent availability of trade finance is affected by more stringent financial regulation. A hotly debated question at the moment is to what extent treatment of trade finance under Basel III threatens to hurt trade because of its approach to liquidity standards and off-balance-sheet financing (Brandi et al., 2014). For example, it is currently under discussion whether Basel III makes adequate allowances for the relevant characteristics of trade finance and whether and to what extent it contributes to raising its costs. The effect of Basel III on trade finance has not been thoroughly investigated yet. There are a number of questions that have not yet been examined in detail, including the following: To what extent and how is Basel III being implemented (differently) across different regions?

From a developing country perspective, trade finance – and challenging trade finance conditions – can be relevant from both an export and an import point of view. First, from the export point of view, challenging trade finance conditions might cause products from developing countries to have limited access to other markets. Second, from the import point of view, challenging trade finance conditions might generate difficulties for developing countries to import goods (including food). Moreover, challenging trade finance conditions might imply that developing countries are excluded from global value chains.
3 Literature Review

The link between trade finance and trade in developing countries and emerging economies has not yet been thoroughly investigated. At the same time, as mentioned above, the literature more generally has made progress.

The current literature makes use of three different approaches in order to analyze impact of trade finance on international trade: (1) The first strand of literature uses the different degrees of financial vulnerability of different sectors for the identification of the impact of financing conditions on aggregate trade flows. (2) A second strand puts the focus on the financing relations between banks and companies or exporters. (3) A third strand assesses specific products or product groups of trade finance and analyses the data of specific providers of trade finance.

(1) The first strand of literature assesses trade flows at the sector level and makes use of the different degrees of dependencies of these sectors on external finance in order to determine the impact of different financing conditions on aggregate trade flows.

Manova (2013) shows that financial market imperfections affect international trade flows due to the dependence of exporters on external finance. She uses a panel data set with 107 countries and 27 sectors over the period from 1985 until 1995 in order to distinguish the degree of the countries’ financial market development and the industrial sectors’ dependence on external finance and links these with sectoral trade data. Manova finds that the credit restrictions have a significant effect on aggregate trade. More specifically, she finds that one third of that effect on trade flows is due to fewer firms being active as exporters and that two thirds of that effect are due to fewer export volumes of goods.

Chor and Manova (2012) study a similar relationship for all US imports during the global crisis 2008-2009. They make use of a data set that includes monthly US imports that is disaggregated by country and by sector and link these data with information about the pre- and post-crisis financing costs of the respective countries and with data about the financial vulnerability of the various sectors in the data set. Their findings show that tense financial market conditions have reduced exports in the US and that this effect is stronger for more vulnerable sectors, e.g. due to the strong need for wide-ranging external financing or restricted access to trade credit.
Iavocone und Zavacka (2009) examine the effect of banking crises on manufacturing exports on the basis of panel data on 23 banking crises episodes involving both developed and developing countries during the earlier period from 1980 until 2000. They find that there is a robust effect of the banking crises on export growth, which is additional to external demand shocks and particularly significant for sectors producing durable goods. Their findings also indicate that exports of sectors that are more dependent on external finance and banking finance as opposed to inter-firm finance grow significantly less than other sectors.

Berman and Martin (2012) study Sub-Saharan Africa and assess the impact of past banking crises (1976–2002) on trade and find that African exporters are especially vulnerable to a banking crisis in the countries they export to. They also find that the “disruption effect (a banking crisis disrupts the financing of trade channels)” is much larger and long-lasting for African exporters than the “income effect (during a banking crisis, income and exports to the country fall)”. Their empirical findings also support the hypothesis that exporters in African countries depend more on bank-based trade finance than exporters in other regions and that this dependence on trade finance is a key reason for their vulnerability to banking crises in the countries they export to.

(2) The second strand of literature puts the spotlight on the financing relations between banks and companies or exporters and their effects on the exporting activities of the companies under consideration.

Amiti and Weinstein (2011) assess firm-level data on Japanese companies and study the effects of the Japanese financial crisis of the 1990s on exports. They analyze the links between firms’ exports, their ability to obtain credit and the health of their banks. They find that the health of negotiating banks affects the trade finance conditions and thus the exports of the respective companies. One third of the decline of Japanese exports to the US can be explained by the reduction of bank equity. Export growth of companies is more strongly affected than domestic sales. This underlines the importance of financing conditions for international trade and the heterogeneous effects on exports and domestic activities.

In their study on exports from Peru, Paravisini et al. (2012) expand this approach and distinguish between the credit elasticity of the export volume and the spectrum of goods (intensive and extensive effect). Their data set contains data on all Peruvian exports, all participating firms and banks, the relevant product categories as well as the recipient
countries and tariff and transport conditions. On the basis of this extensive data set with the respective transaction details, the authors can control for the demand effects at the level of product categories and recipient countries. A decline of the credit supply of banks by 10 percent generates a decline of the export volume by 1.8 percent due to the intensive effect and by an addition 0.3 percent due to the extensive effect. 15 percent of the decline in trade in Peru can thus be explained by deteriorating refinancing conditions of banks.

On the basis of their Italia data set, Del Prete und Federico (2014) measure not only credit supply of a bank for a single company but also those credits that are specifically designated for exports and imports. Their findings show that companies export less if they are financed through banks that are subject to greater refinancing shocks. At the same time, this effect is only significant for domestic credits and credits for importing activities while export credits are not directly affected. The authors conclude that export credits are less risky and thus less strongly restricted and thus come to the conclusion that the general financing condition of exporting firms are relevant for the respective export volume.

Ahn (2013) studies data from Columbia for the years 2008 and 2009 that enables him to not only link banks and exporters but also the respective importers. On that basis, he is able to estimate the effect of liquidity shocks of the banks on the supply of letters of credit while controlling for importer-exporter-banking-combinations and product effects. He shows that a reduction of deposit growth (liquidity shock) of a bank by 1 percent generates a reduction of goods of a given category by 4.2 percent and that the probability not to be able to supply the respective goods markets rises by 8.4 percent.

Bricogne et al. (2012) use a similar strategy by linking firm data with detailed export data and information on credit information files on the basis of data on all French exporters. They show that export-oriented firms in sectors that are more dependent on external finance have been most strongly affected by the global financial crisis. They conclude that credit restricted firms do in fact reduce their export activities. But the aggregate effects on overall French exports are rather small since this applies only to few French firms during the crises.

Building on a data set of all trade finance claims of US banks, Niepmann und Schmidt-Eisenlohr (2013) show in addition that supply shocks of individual banks regarding letters of credit do not only affect overall export growth in the US but also have
heterogeneous effects for different export destinations. Since the banks’ extent of engagement vary across different countries and letters of credit are country-specific, the decline in supply of letters of credit of a single bank generates a reduction of export in very specific countries. The authors can also show that a supply shock regarding trade finance has stronger effects on the exports of smaller and more risk-prone countries and larger affects in times of general insecurity.

(3) The third strand of literature assesses specific products or product groups of trade finance and analyses the data of specific providers of trade finance. Often, the data stem from one single company that dominate the domestic market or have a substantial market share in international markets.

For example, Egger and Url (2006) assess export guarantees for Austria, while Felbermayer and Yalcın (2013) study them for Germany (Euler Hermes). Both studies can show that export guarantees increase export volumes. The latter study stresses that export guarantees are concentrated on few sectors and export destinations but that there is little evidence that export guarantees can moderate frictions in terms of financing conditions.

Van den Veer (2014) studies the firm data set of a large credit insurance company and its export credit insurance for 25 OECD countries for exports to 183 countries worldwide. The study suggests that private export credit insurance does not only increase the volume of exports but that, due to the multiplicator effect, each Euro of insured exports generates around 1.3 Euros of exports.

In general, the different strands of literature entail different strength and weaknesses. The first strand of literature measures the supply effect of financing conditions only indirectly, thereby making a convincing identification difficult. Compared to the first strand of literature, the second strand with its focus on bank-firm-relations is more successful in doing that. On the basis of their detailed data sets, the latter type of studies succeed on showing which specific effect trade finance conditions have on specific firms or export sectors. On the other hand, the explanatory power of these studies regarding aggregate effects with a view to international trade is relatively limited since these studies, due to the available, can only focus on one country (so far USA, Italy, Columbia, Peru). The third strand is able to include a larger number of exporting and importing countries. But since the respective data sets are limited to one product of one
single company, it is usually possible to only assess a small share of overall aggregate trade finance.

An additional, more general observation is that there are hardly any studies of the link between the availability of trade finance and trade flows of developing and emerging economies – despite their rising importance in the global economy. This is especially striking in light of the fact that it is particularly the trade flows of these countries that is subject to various country risks and whose financial development is often not in tune with their economic development. This in turn suggests that trade finance might play a more important role in these countries.

Developing and emerging economies are a highly heterogeneous group of countries, including with a view to their integration into global trade. They differ in terms of the goods they export and import (e.g. raw materials, agricultural products, and manufactured goods) and in terms of their role in global value chains. These heterogeneities in turn affect the importance of international trade for the economic development of these countries (e.g. with a view to import dependency, value-added trade) and thus the interest of these countries regarding international trade rules and financial market regulations. In the literature, these determinants have so far not been subject to detailed study and their effects on international trade and financing conditions have not received the attention they deserve.

4 Data and Specification
Against the background of this literature review, this paper seeks to contribute to closing the above-mentioned gaps and aims to address first the following main questions:

- Which significance does trade finance have for the trade flows for industrialized, emerging and developing economies in normal and in crisis times?
- Are the effects of a reduced availability of trade finance for the trade flows of economies more open to trade stronger than for the trade flows of more closed economies and what happens in times of crisis?

4.1 Data
For data on the availability of trade finance, we employ the most extensive dataset on trade finance currently available. We use data on insured trade credit collected by the members of the Berne Union, an association of export credit agencies and private export
credit insurers. It is available on quarterly basis for 218 countries covering the period from 2005 first quarter to 2013 first quarter. The Berne Union provides for credit insurance data by destination country, not by country of origin. Against this background, the first option is to focus on the link between trade finance and developing country imports. As our variable of interest we use short term commitments, which are actual insurance given to cover actual loans. Thus, a commitment means that a loan agreement (as well as the underlying project or export transaction agreement) has been signed, the insurance for this loan is in place, and the insurance premium has been paid or invoiced. In some cases a part of a loan may not yet have been disbursed however the non-disbursed amount typically represents only a minor share of the total amount reported as commitment.

The data set covers one trade finance product but, in contrast to the third strand of literature outlined above, the data set provides aggregate data at the country level for a large country panel. This entails the following advantage: the data enable us to analyze a clearly circumscribed market, which enhances our identification strategy, while, at the same time, it enables us to study the effect of trade finance on relevant share of international trade flows.

**Figure 4: Coverage (commitments/total imports)**

![Figure 4: Coverage (commitments/total imports)](image)

Figure 4 depicts the distribution of the trade finance intensity or as we call it here the credit insurance coverage of import flows. We define coverage as commitments over
total imports. While the average country for an average year uses trade credit insurance for about 20 per cent of imports, this ratio varies widely over the sample.

4.2 Specification
To estimate the effect of export credit insurance on trade we use a “one-sided” gravity model of trade. The gravity model explains trade between a pair of countries with the distance and their economic “masses”. We employ the following specification:

\[
\log(\text{realimports}_{it}) = \beta_0 + \beta_1 \cdot \log(\text{commitments}_{i,t-1}) + \beta_2 \cdot \log(\text{realGDP}_{t-1}) + \beta_3 \\
\cdot \log(\text{REER}_{i,t-1}) + \beta_4(\text{crisis}) + \beta_5(\text{commitments}_{i,t-1} \cdot \text{crisis}) \\
+ \beta_6(\text{openess}_{i,t-1}) + \beta_7(\text{commitments}_{i,t-1} \cdot \text{openess}_{i,t-1}) \\
+ \beta_8(\text{openess}_{i,t-2} \cdot \text{crisis}) + \beta_9(\text{crisis} \cdot \text{openess}_{i,t-1} \cdot \text{commitments}_{i,t-1}) \\
+ \text{time dummies} + \alpha_i + \varepsilon_{it}
\]

Since we only have credit insurance data by destination country we use as dependent variable total real imports by country. As independent variables we use real GDP, the real effective exchange rate and the trade credit insurance measure. We augment this basic specification with a crisis variable and a measure for trade openness. While many authors agree that the great trade collapse of late 2008 to late 2009 after the global financial crisis was strongly driven by the reduction of global demand, recent research demonstrates that the lack of trade finance also played a significant role. So one question of interest to us is to what extent the availability of trade finance was affected by financial crises and how this reduced availability impacted on trade flows, we include a crisis dummy. The financial crisis dummy is set to one for the period 2008q4 to 2009q4 for all countries.

Trade openness is one of the other characteristics of interest to us. On the one side, countries more open to trade were more heavily affected by the great trade collapse. But a higher openness to trade usually means also a higher frequency of trade. More frequent trade relationships can come along with a stronger reputation. And a better reputation may reduce the need for trade finance in good and in particular in bad times. Figure 5 and 6 show that indeed trade openness is distributed heterogenously in the sample and this large range of values is also present for developing and emerging countries.
Country and time dummies are included to control for time and country specific effects. We use a panel fixed effects estimator with clustered standard errors by country. Import volumes are taken from the Direction of Trade Statistics and are total merchandise imports from the rest of the world by country and on a quarterly basis. GDP data are taken from the International Financial Statistics, real effective exchange rate index data are taken from the Bruegel Institute’s Real Effective Exchange Rate Database. Trade...
openness is defined as the sum of total exports and total imports over nominal GDP. Correlations are given in Table 1.

Table 1: Correlation of Variables

<table>
<thead>
<tr>
<th>log real imports</th>
<th>log commitments</th>
<th>log trade risk</th>
<th>log real GDP</th>
<th>log REER</th>
<th>openness to trade</th>
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<td>log commitments</td>
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<td>1.0000</td>
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<td>0.5454</td>
<td>-0.2192</td>
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<td>-0.0298</td>
<td>-0.0952</td>
<td>-0.1718</td>
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<td>openness to trade</td>
<td>0.0021</td>
<td>-0.0573</td>
<td>-0.1619</td>
<td>0.1171</td>
<td>-0.0398</td>
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</table>

On the basis of the average of all countries, Figure 7 depicts insured trade credit and imports between 2005q1 and 2013q1. It illustrates that both imports and short-term insured trade credits increased until 2008, with trade credit dropping sharply in the second quarter of 2008 and imports dropping at the end of 2008 and imports recovering in the course of 2009 until they are back to pre-crisis levels in 2010.

Figure 7: Real Imports and insured trade credits (in million US$, average of all countries)

Despite the seeming correlation between insured trade credit and the collapse of international trade after the beginning of the financial crisis in 2008, no causal relation can be assumed. Reverse causality could cause an endogeneity bias here. Instead of
some exogenous factor leading to higher trade insurance coverage, growth in trade could also explain growth in insured exports. Clearly, this would bias the estimate of trade credit insurance on trade upwards.

We apply therefore an instrumental variable approach and use the claims ratio as an instrument for commitments. Claims paid is the total amount that Berne Union members have paid to the insured. This data series is also available by country on a quarterly basis. The claims ratio is then defined as claims paid over commitments. The claims ratio is a key performance indicator for insurers, and an important determinant of an insurer’s decision to adjust its supply of insurance.

**Figure 8: Insured Trade Credits and Claims Paid (in million US$, average of all countries)**

Figure 8 illustrates short-term insured trade credits and short-term claims paid (albeit on different scales), which seem to be negatively correlated over time. In the wake of the financial crisis in 2009, short-term claims paid were growing while insured trade credits fell. The low ratio of claims paid to short-term insured trade credits suggests that the risk has been limited. The instrumental variable estimation uses only part of the variability in insured exports to estimate the relationship between insured exports and total exports. So, in a case of a shock, claims increase. The claims ratio also increases, as the insurers only raise the premia of new contracts. However, in order to limit the rise in claims, the private trade credit insurer reduces its exposure by using its right to cancel a credit limit on any buyer at any given time.
<table>
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<td>log trade risk (t-5)</td>
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<td>0.0054</td>
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</table>
We use the current value and four lags of the claims ratio in the first stage regression. As a robustness check we also show in Table 2 the first stage results for other lag choices. We also add real GDP, time dummies and a constant and use a fixed effects estimator. We find a negative and statistically significant effect of the claims ratio/trade risk on commitments up to one year ahead. Longer lags are no longer significantly different from zero. If we were using a shorter lag structure we would miss a significant part of the impact of the claims ratio on commitments. Real GDP has the expected positive effect (representing higher demand) on commitments. Column 3 shows our preferred specification for the first stage, which is also then used for all regressions of the second stage.

As a further robustness check we also follow the estimation strategy of Auboin and Engemann (2014) and use as a further instrument a liquidity variable in the first stage and real GDP and the real effective exchange rate besides the commitments variable in the second stage. For more details please refer to the robustness section.

5. Estimation Results
The results of estimating the specification presented in Section 4.2 are presented in Table 3. The model is estimated with two sets of fixed effects (year and country). The explanatory variables are entered in lags to mitigate potential endogeneity problems. The model in general fits the data well. We get a large R2 and the estimates of the control variables are sensible and all highly significantly different from zero. Imports increase with higher demand, a one percent higher real GDP leads to a 0.2-0.5 percent higher real imports in the following year. An increase in the real effective exchange rate increases imports by about 0.5-0.6 percent.

Trade credit insurance appears to be an important stimulator of imports. A one percent increase in commitments is followed by a 0.3-0.45 percent increase in total imports in the next year. This is a rather large effect and underlines the importance of trade financing for the smooth exchange of goods across countries and regions. The financial crisis strongly negatively affected the import volumes.

In column 2, we analyze whether trade credit insurance becomes more important in bad (crisis) times. We interact the crisis dummy with the commitments variable, but the coefficient estimate is not significantly different from zero. So, at least for our sample, the crisis did not change the effect of trade credit insurance on imports.
<table>
<thead>
<tr>
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<th>1</th>
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<tr>
<td>log real imports</td>
<td></td>
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<tr>
<td>log commitments(t-1)</td>
<td>.440***</td>
<td>.306***</td>
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<td>.345***</td>
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<td>log REER (t-1)</td>
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<td>.541***</td>
<td>.593***</td>
<td>.593***</td>
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<tr>
<td></td>
<td>.0979</td>
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<td>.1078</td>
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<tr>
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<td>-.344***</td>
<td>-.240***</td>
<td>-.118***</td>
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<tr>
<td></td>
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<td>.0951</td>
<td>.0133</td>
<td>.1112</td>
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<tr>
<td>crisis*commitments (t-1)</td>
<td>.011</td>
<td></td>
<td></td>
<td>-.011</td>
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<tr>
<td></td>
<td>.0096</td>
<td></td>
<td></td>
<td>.0114</td>
</tr>
<tr>
<td>openness to trade (t-1)</td>
<td></td>
<td></td>
<td>1.379***</td>
<td>1.286***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.3008</td>
<td>.3235</td>
</tr>
<tr>
<td>openness*commitments (t-1)</td>
<td></td>
<td></td>
<td>-.125***</td>
<td>-.117***</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>.0321</td>
<td>.0345</td>
</tr>
<tr>
<td>openness*crisis (t-1)</td>
<td></td>
<td></td>
<td>-.280*</td>
<td>.1657</td>
</tr>
<tr>
<td>crisis<em>openness</em>commitments (t-1)</td>
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<td></td>
<td>.028*</td>
<td>.0165</td>
</tr>
<tr>
<td>R2</td>
<td>0.55</td>
<td>0.74</td>
<td>0.81</td>
<td>0.80</td>
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<td>fixed effects</td>
<td>fixed effects</td>
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<tr>
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<td>clustered</td>
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<tr>
<td>constant</td>
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<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>time dummies</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>
In the regression set ups of columns 3 and 4, we investigate if the effects found so far are similar across all degrees of trade openness. We find that trade openness is a very important determinant not only of import flows but also of how trade credit insurance impacts on trade flows and how the crisis has affected a country’s imports. Openness to trade has a large positive effect on imports, not surprisingly and often shown in the empirical literature. And openness to trade comes with a reputation effect. When a country is more open to trade, the more frequent goods exchanges support reliable importer exporter relationships, so that the trade partners do not have to rely as much on trade finance instruments. The coefficient of the interaction variable between openness and commitments is negative and strongly significantly different from zero. The more open a country is to trade, the less important is the trade credit insurance effect on imports. Finally, we are interested whether these effects persist in crisis times or are even intensified. The regression results in column 4 show that countries that are very open to trade were hit more strongly by the crisis. This should not be a big surprise for trade economists. But interesting to see is the positive and significant coefficient on the threefold interaction between crisis, openness and commitments. This implies that even if countries are harder hit when very open to trade, in crisis times trade credit insurance helps to increase import flows. One explanation could be that due to the reputation effect, in crisis times it is easier to get access to trade financing.

4.4 Robustness Check

As a robustness check of our identification strategy, we also apply the empirical approach that has been used by Auboin and Engemann (2014). They use also a two-stage approach. In a first step, they link trade credit insurance to global economic and financial conditions (GDP and liquidity) and trade credit availability. In a second step, they relate import flows to trade credit availability, aiming to establish the impact of trade credits on imports using the predicted value of the first stage.

Table 1 contains the result of the robustness check. The first column depicts the first-stage results. It indicates that global and economic financial conditions, measured by real GDP, liquidly and credit, as measured by M1, and risk, as measured by the claims on trade credit insurance, have a strong explanatory effect on insured trade credit. Table 5 shows that risk, as expected, has a significant negative impact on insured trade credits. Real GDP has a significant positive effect on short-term insured trade credits.
The results suggest that 1 per cent increase in real GDP generates a 0.6 per cent increase in short-term insured trade credits. Liquidity and credit, as measured by M1, has a significant positive effect on insured trade credits. The real effective exchange rate is insignificant. The crisis dummy is significant but the fact that it is positive, although small, which may be counter-intuitive. One possible explanation is that while short-term insured trade credits decreased during the crisis, the average level of short-term insured trade credits per country has grown strongly and more than doubled (Auboin and Engemann, 2014).

**Table 4: Robustness Check**

<table>
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<tr>
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<td></td>
<td>log commitments (t-1)</td>
<td>log real imports</td>
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<tr>
<td>log trade risk (t-2)</td>
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<td>-0.2155***</td>
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<tr>
<td>crisis</td>
<td>0.1321***</td>
<td>-0.0172</td>
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<tr>
<td>log real GDP (t-1)</td>
<td>0.6394***</td>
<td>0.4617***</td>
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<tr>
<td>log M1 (t-2)</td>
<td>0.4684***</td>
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</tr>
<tr>
<td>log REER (t-1)</td>
<td>0.6215</td>
<td>0.4796**</td>
</tr>
<tr>
<td>log commitments (t-1) fitted</td>
<td>0.1624***</td>
<td></td>
</tr>
</tbody>
</table>

The second column contains the second-stage results. It shows that short-term insured credits have a positively significant effect on real imports. In our specification, for an increase by 1 per cent of insured trade credits in country j, country j’s imports increase by 0.16 per cent, confirming the findings that the lack of trade finance, at the macro level, has a significant impact on trade flows. The Table also illustrates that the crisis
dummy has a significantly negative effect. Table 5 also shows that real GDP has a statistically significant effect on real imports. A 1 per cent increase in real GDP generates a 0.4 per cent increase in real imports.

6 Summary and Outlook
This paper has investigated the effect of trade credit on the trade flows of industrialized, emerging and developing economies in normal and in crisis times and focuses in particular on the role of trade openness.

We use Berne Union data on export credit insurance, the most extensive dataset on trade finance currently available for a wide range of countries for the period 2005-2013. Using a two-stage instrumentation approach, we find a significantly positive effect of the availability of trade credit on trade. A one percent increase in commitments is followed by a 0.3-0.45 percent increase in total imports in the next year. This is a rather large effect and underlines the importance of trade financing for the smooth exchange of goods across countries and regions. The financial crisis strongly negatively affected the import volumes, but the crisis did not change the effect of trade credit insurance on imports.

Moreover, we find that trade openness is a very important determinant not only of import flows but also of how trade credit insurance impacts on trade flows and how the crisis has affected a country’s imports. The more open a country is to trade, the less important is the trade credit insurance effect on imports. When a country is more open to trade, the more frequent goods exchanges support reliable importer exporter relationships, so that the trade partners do not have to rely as much on trade finance instruments. These effects are intensified in times of crisis.

The next three steps are: First, we will assess to what extent the trade structure of the trading countries matters important, e.g. with respect to the share of imports of that consists of manufactured goods versus agricultural commodities or fuels and ores. Second, we will assess to what extent trading partners matter, i.e. whether we analyze North-North, South-South or North-South trade. Third, we will continue working on how the crisis period can be modeled, because the crises period on the financial markets is different from the crisis period for trade (The Great Trade Collapse). The former could also be modeled endogenously by using sovereign risk ratings or the relevant short term spread.
# Appendix

## Import letters of credit (L/Cs)
- Company in one country (importer) wants to import goods from a company in another country (exporter) \( \rightarrow \) necessary: agreement on payment of goods
- Exporter: risk of shipment
- With LC: exporter asks importer for a guarantee from a bank for the assurance of the payment
- Importer requests LC from his/her bank to assure exporter of the payment
- Exporter needs to issue the required documents (e.g. invoices, bills of lading) to the bank
- If documents compliant: payment to the exporter
- Import LC: risk reduction of non-payment to the exporter due to, in general, the lower risk profile of banks compared to companies
- Source: ICC, 2013a and Humphrey, 2009

## Export confirmed letters of credit
- Issue of import LC: risk reduction of non-payment for the importer but risk is borne by bank issuing the LC (who might not make the payment) \( \rightarrow \) if the exporter does not trust/is not confident with the issuing bank, there is a risk that the exporter will not ship the goods
- Therefore: export confirmed LC \( \rightarrow \) exporter consults his/her bank of choice and requests a guarantee to assure the payment from the issuing bank (importer’s bank)
- Risk borne by confirming bank (exporter’s bank)
- Same as with import LCs: issuance of documents on behalf of the importer in favor of exporter
- Risk reduction of non-payment for the exporter
- Source: ICC, 2013a

## Loans for export
- Problem with LCs above for the exporter: long period of time for the payment in which time period the exporter might be faced with other payments he/she has to made (e.g. staff etc.) \( \rightarrow \) need for working capital
- Given that exporter has a LC, the LC can be used as collateral for a loan at a bank which can be used for further export \( \rightarrow \) reduction of liquidity risks for the exporter
- Examples: negotiable LCs, discounted LCs, forfeiting and factoring, supply chain finance
- Source: ICC, 2013a

## Loans for import
- Clean import loan:
  - Bank advances cash to the importer on presentation of supplier invoices and evidence of shipment
  - Importer is able to pay for the goods, usually in order to bridge the gap between the receipt of goods and selling them on
- Other structure: bank is allowed to release goods to the importer under trust receipts; therefore the importer is able to use the goods immediately but the ownership remains with the bank until the importer settles the loan
- Both structures: loan secured against the goods being imported
- Source: ICC, 2013a

## Performance guarantee and performance standby letters
- Performance guarantee: guarantee a seller’s obligations to deliver and perform according to the contract to act to mitigate any distrust between parties and to reduce cash outlay in situations where cash deposits are require
- Standby LC: written by a bank on behalf of a client and is used as a ‘payment of last resort’ should the client fail to fulfill a contractual obligation to a third party
- Guarantees typically remain undrawn, unless an exporter fails to deliver or the importer defaults
- Most commonly used where the commercial relationship extends into the medium or long term, such as arrangements including services beyond delivery
- Source: ICC, 2013a

## Trade credit
- Companies extend credit to each other when buyers delay or advance payments to suppliers
- Open account: involves importers paying invoices once goods are received
  - Exporter bears the risk: importer only commits to pay for the goods at one point in time after the goods have been received
- Cash in advance: importers can extend credit to exporters if they pay for goods (all or in part) in advance
  - Importer bears all of the risks, relating not only to non-supply of the goods, but also exchange rate fluctuations and other uncertainties
- Source: Humphrey, 2009
Figure 9: How does a Letter of Credit work?

Figure 2 illustrates a Letter of Credit transaction. After the importer and the exporter have agreed on contract of sale (1), the importer asks for the Letter of Credit (2), which the bank issues in favor of the exporter (3). After the exporter has agreed (4), he send the goods to the importer (5) and the required papers to the bank (6). If the documents are in order, the bank issues the payment to the exporter (7) and the importer issues a transfer to the bank (8). Finally, the bank transfers the documents to the importer (9). 

Source: ICC, 2013a
References
Berman, N. und Martin, P. (2012): The Vulnerability of Sub-Saharan Africa to Financial Crises: The Case of Trade. IMF Economic Review 60 (30),


