

# Relationship between exports and trade



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## **Methodology**

### **Empirical Strategy**

The primary objective of this paper is to determine whether there is a main difference in the causal relationship between exports and trade finance among two groups of countries classified based on their financial systems; bank-based and market-based.

As outlined in the literature review section, there are contradicting empirical and theoretical evidence on the impact of trade finance on exports and thus, the secondary objectives are first to determine the significance of this impact using my own proxy for trade finance and then, to capture the effect of the financial crisis on this causal link between exports and trade finance.

### **Data Sources and Measurement Technique**

Annual data for 19 countries ranging in the period 2001 to 2011 have been used for the empirical analysis of this paper. All data used for the 10 annual observations for these countries were obtained from the World Bank's World Development Indicators.

The estimation technique in this paper generally follows the model used by Liston and McNeil (2013) but contains several modifications and extensions due to unavailability of data and different objective. They constructed both an export volume equation and an import volume equation to analyze international trade. The common variables included in both equations are real exports ( $\text{exports}_{t,j}$ ), real imports ( $\text{imports}_{t,j}$ ), real gross domestic product which is equivalent to real gross national income ( $\text{GNI}_{t,j}$ ), export demand ( $\text{EXDEM}_{t,j}$ ), real effective exchange rates ( $\text{REER}_{t,j}$ ), trade finance

( $FIN_{t,j}$ ) and a dummy variable ( $D_{crisis}$ ) that takes a value of 1 from the period starting 2000 to 2007 and zero otherwise. Additionally, there are other dummy variables which classified countries based on their financial systems and they are structure size dummy ( $DUMMY1_{t,j}$ ) and structure activity dummy ( $DUMMY2_{t,j}$ ). Structure size dummy takes a value of 1 for countries with higher means ratio of market cap to bank credit as compared to structure activity variable which takes a value of 1 for countries with higher means ratio of value of shares traded to bank credit and 0 otherwise.

Real exports and real imports are measured in constant 2005 U. S dollars and as for export demand, it represents market share. In this paper, the proxy for export demand differs from that of Liston and McNeil (2013) due to model modification and instead, the ratio of individual country's export to world exports is used to represent market share as opposed to the ratio of the sum of imports to the sum of exports. Similarly, the proxy for trade finance is different in this paper due to data unavailability. Nevertheless, short-term net flows on external debt are instead used as the proxy for trade finance. Short-term net flows on external debt represent net lending received by the borrower during the year where the maturity of the debt is one year or less. The rationale behind using this proxy for trade finance is that trade finance is basically a short term debt used to carry on trade and hence, an increase in trade finance should be reflected in an increase in the proxy used. Moreover, due to unavailability of data for real domestic product, it is substituted by gross national income and in theory, they should be equivalent. The last discrepancy from the paper of Liston and McNeill (2013) is that as a substitute for real exchange rate, real effective exchange rate

index is used in this paper where 2005= 100 for the index and REER  $i, j$  is included to account for relative prices between countries.

### **Empirical Model**

To investigate whether financial system and trade finance affect trade flows, panel data models are estimated. The models consist of 16 countries which most of them are developing or under-developed countries. Interestingly, empirical studies such as Liston and McNeil (2013) demonstrated that countries with lower level of financial development give a higher importance to trade finance compared to developed countries and hence, the relationship between trade finance and exports should be high in this paper.

The export volume specification is described as:

$$\text{Log}(\text{exports}_{t,j}), = \alpha_0 + \alpha_1 \log(\text{EXDEM}_{t,j}) + \alpha_2 \text{REER}_{t,j} + \alpha_3 \text{FIN}_{t,j} + \alpha_4 \text{FIN}_{t,j} * \text{DUMMY1}_{t,j} + \alpha_5 \text{FIN}_{t,j} * \text{DUMMY2}_{t,j} + \alpha_6 \text{FIN}_{t,j} * \text{DUMMY3}_{t,j} + \mu_{t,j} \quad (1)$$

Where  $\text{exports}_{t,j}$  are real exports for the  $j$ th country at time  $t$ ,  $\text{EXDEM}_{t,j}$  represents export demand,  $\text{REER}_{t,j}$  is the real effective exchange rate index,  $\text{FIN}_{t,j}$  is the trade finance proxy,  $\text{DUMMY}_t$  captures effects of the financial crisis as it is 1 for the years 2008 and onwards and 0 otherwise and  $\text{DUMMY1}_{t,j}$ ,  $\text{DUMMY2}_{t,j}$  and  $\text{DUMMY3}_{t,j}$  represent the classification of countries into 2 groups by financial system upon structure size, structure activity and financial structure respectively.

As for import volume specification, it is arranged as:

$$\text{Log}(\text{imports}_{t,j}) = \alpha_0 + \alpha_1 \log(\text{GDI}_{t,j}) + \alpha_2 \text{REER}_{t,j} + \alpha_3 \text{FIN}_{t,j} + \alpha_4 \text{FIN}_{t,j} * \text{DUMMY1}_{t,j} + \alpha_5 \text{FIN}_{t,j} * \text{DUMMY2}_{t,j} + \alpha_6 \text{FIN}_{t,j} * \text{DUMMY3}_{t,j} + v_{t,j} \quad (2)$$

Where  $\text{imports}_{t,j}$  are real imports for the  $j$ th country at time  $t$  and  $\text{GNI}_{t,j}$  is the real gross domestic income for the  $j$ th country. All other variables are the same as that in the export volume specification.

### Expected Signs of Variables

All the variables included are expected to have some impact on international trade and the expected effect of these variables on exports and imports are given in table 1.

Table 1. Overview of expected effects of variables used on exports and imports

Variable	Expect	Expecte
	ed	d
	effects	effects
	on	on
	Exports	Imports
Export demand	positive	-
Real Effective Exchange	negative	positive

ge Rate

Trade    positiv  
                         positive

Finance e

Gross

Domesti  
                 -            positive

c

Income

As export demand in this paper represents exports market share, an increase in export demand should also generate an increase in exports. Real effective exchange should have a negative impact on exports and a positive impact on imports respectively because when a country's currency strengthen, its exports become less competitive whereas its price of imports become cheaper and imports tend to increase. Moreover, an increase in trade finance should have a positive effect on both exports and imports. Trade finance is used to fund firms for them to be able to continue exports and imports also should increase due to the imports of raw materials used for exports. Also, as gross domestic income increases, demand for foreign goods increases and thus, imports are also expected to increase.

### **Estimation Technique**

Both equations (1) and (2) are estimated first by their base models to analyze the common explanatory variables for export and import volumes. In the export volume equation, the base model includes export demand (EXDEM) and real effective exchange rate (REER) whereas in the import

volume equation, instead of including export demand (EXDEM), real gross domestic income (GNI) is included.

Then the base models are extended by including the proxy for trade finance (FIN).

$$\text{Log(exports}_{t,j}) = \alpha_0 + \alpha_1 \log(\text{EXDEM}_{t,j}) + \alpha_2 \text{REER}_{t,j} + \alpha_3 \text{FIN}_{t,j} + \mu_{t,j} \quad (3)$$

$$\text{Log(imports}_{t,j}) = \alpha_0 + \alpha_1 \log(\text{GDI}_{t,j}) + \alpha_2 \text{REER}_{t,j} + \alpha_3 \text{FIN}_{t,j} + v_{t,j} \quad (4)$$

Equations 5 and 6 are then extended by adding dummy variables which represent financial system of a country. The dummy variable takes the value of 1 when a country is classified as market based and 0 otherwise.

Separately, they are interacted with proxy for trade finance which will enable the analysis of whether between market and bank based economies are more dependent on trade finance or there is no difference at all.

$$\text{Log(exports}_{t,j}) = \alpha_0 + \alpha_1 \log(\text{EXDEM}_{t,j}) + \alpha_2 \text{REER}_{t,j} + \alpha_3 \text{FIN}_{t,j} + \alpha_4 \text{FIN}_{t,j} * \text{DUMMY1}_{t,j} + \alpha_5 \text{FIN}_{t,j} * \text{DUMMY2}_{t,j} + \mu_{t,j} \quad (5)$$

$$\text{Log(imports}_{t,j}) = \alpha_0 + \alpha_1 \log(\text{GDI}_{t,j}) + \alpha_2 \text{REER}_{t,j} + \alpha_3 \text{FIN}_{t,j} + \alpha_4 \text{FIN}_{t,j} * \text{DUMMY1}_{t,j} + \alpha_5 \text{FIN}_{t,j} * \text{DUMMY2}_{t,j} + v_{t,j} \quad (6)$$

Finally, equations 5-8 are enhanced to include a dummy variable  $D_{\text{crisis}}$  which captures the effect of the financial crisis and which takes the value of 1 for the period 2008 to 2011 and 0 for the period of 2000 to 2007. By adding this structural break, during the crisis, it is expected that exports will be more reliant on trade finance in general due to turmoil in financial

markets and the presence of a liquidity crunch. Additionally, whether how this affected the analysis made from the interactions of the dummy variables in equation 5 and 6 needs to be tested and analyzed. The results of the panel data regression and its analysis are provided in the next section.

$$\text{Log(exports}_{t,j}) = \alpha_0 + \alpha_1 \log(\text{EXDEM}_{t,j}) + \alpha_2 \text{REER}_{t,j} + \alpha_3 \text{FIN}_{t,j} + D_{\text{crisis}} + \mu_{t,j} \quad (7)$$

$$\text{Log(imports}_{t,j}) = \alpha_0 + \alpha_1 \log(\text{GDI}_{t,j}) + \alpha_2 \text{REER}_{t,j} + \alpha_3 \text{FIN}_{t,j} + D_{\text{crisis}} + v_{t,j} \quad (8)$$

$$\text{Log(exports}_{t,j}) = \alpha_0 + \alpha_1 \log(\text{EXDEM}_{t,j}) + \alpha_2 \text{REER}_{t,j} + \alpha_3 \text{FIN}_{t,j} + \alpha_4 \text{FIN}_{t,j} * \text{DUMMY1}_{t,j} + \alpha_5 \text{FIN}_{t,j} * \text{DUMMY2}_{t,j} + D_{\text{crisis}} + \mu_{t,j} \quad (9)$$

$$\text{Log(imports}_{t,j}) = \alpha_0 + \alpha_1 \log(\text{GDI}_{t,j}) + \alpha_2 \text{REER}_{t,j} + \alpha_3 \text{FIN}_{t,j} + \alpha_4 \text{FIN}_{t,j} * \text{DUMMY1}_{t,j} + \alpha_5 \text{FIN}_{t,j} * \text{DUMMY2}_{t,j} + D_{\text{crisis}} + v_{t,j} \quad (10)$$