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Trade and Access to Credit in Import Destinations: Evidence from India's Exports to Africa

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Abstract: In this paper, we examine the question of whether improvements in credit access institutions in developing and least developed countries can better facilitate their imports. Particularly, we focus on India's exports to African countries. Since India is not part of many of the major pluri-lateral trade negotiations, one trade-expansion strategy being proposed by Indian policymakers is to expand trade to under-explored destination countries, many of which exist in Africa. Access to credit in many African countries has been historically poorer than other countries, but it has been improving over the years. Our objective is to empirically examine whether the improved access to credit leads to expansion of exports from India to these countries. Compiling a rich and unique dataset from multiple data sources for trade in 25 African countries and other variables, we estimate the effects of credit access on India's exports to these countries using the well-established PPML method. We find positive effects of credit access on India's exports to African countries; we also find that the gravity model that does not factor in credit variables yields different results on GDP and income effects, implying the importance of accounting for credit variables in Gravity-based studies.

1. Introduction

Today is an era of pluri-lateral negotiations of trade. Beginning from the days of insulated trade in early twentieth century, trade blocs in the middle part of the century and multi-lateral negotiations since the 1970s, the global trade scenario has evolved into negotiations between many countries in the world, which need not be geographically, militarily or ideologically aligned. The best example is the Trans-Pacific Partnership negotiation that is going on between USA and over a dozen partners in Asia and Australasia. Major emerging market economies, particularly countries like India and China have been deprived of a role in some of these major negotiations. India has been particularly singled out, since China has been part of a few other partnerships, where India has no role to play.

Given this scenario, the top policy-makers in India have been considering a strategy of strengthening partnership between India and several countries that have had weaker trade relationships with India, than the potential. African countries remain the most important amongst them;for example, Africa has been emphasized in the statements made by Secretary of Ministry of Commerce, in August 2014, in a Conference on Implications of TPP on India held in New Delhi.

Trade finance issues in Africa remain one of the most important hurdles in India-Africa trade(WTO, 2013)[1]. However, empirical literature on the links between credit access and trade has been rather limited. In this paper, we attempt to fill this gap by examining the impact of credit access in Africa on the exports from India to African countries. Our study is unique in many ways. Firstly, this is the first study that incorporates the element of credit access in a gravity model in general. Secondly, this is the first comprehensive attempt to examine trade between India and African countries. Thirdly, we collate a unique and novel dataset drawing on from multiple publicly available and reliable data sources on trade, credit and other gravity variables. Employing such a dataset, we use the widely used and the state-of-the-art estimation technique of PPML (Pseudo Poisson Maximum Likelihood) first propounded by Silva and Tenreyro (2006), to estimate the determinants of India's exports to 25 African countries. We find significant and positive effects of credit access in Africa on India's exports to Africa. We also find that gravity model behaves differently with and without credit access variables, in terms of the macro-economic and size effects on trade.

A couple of important policy and methodological conclusions emerge out of this paper's findings. Firstly, credit access matters in India's exports to Africa. Therefore, unless policies are framed to improve credit access in Africa, India may not be able to expand its exports to Africa. Countries like India may play an active role in this by providing aid and investing in African banking and credit system, for example. Secondly, gravity models may not perform well without credit access variables, strengthening the case for including these variables in the list of standard gravity model variables.

This paper is organized as follows: Section 2 reviews the literature; section 3 describes the methodology; section 4 elucidates the data sources; section 5 shows the results and section 6 concludes.

2. Literature Review

There are several studies which reveal trade finance techniques have facilitated export import activities. Among the studies, the one that has set the earliest footage at the sparse evidence on the role of trade credit and

trade finance on international trade is the study by Chor and Manova (2009) and Amiti and Weinstein (2009).

Chor and Manova (2009) while studying the U.S. importsduring the 2008-09 global crises argues that the decline in import is larger for countries of origin and sectors with adverse credit conditions, including limited reliance on trade credit.

Following this, a study by Amiti and Weinstein (2009)found that trade finance received from banks plays a key rolein the transmission of financial shocks to exporting firms during the crisis that affected the countryin the 1990s.Amiti and Weinstein while studying the financial crisis in Japan from 1990 through 2010 assesses the importance of trade finance by matching exporters with the institutions that provide them with finance and thereby establish a causal link between the health of these banks and the output and export growth of their clients. The results provide support for the channels such as transport by sea and air by showing that declines in bank health have a smaller impact on the exports of firms with foreign affiliates (where default risk is not an issue) and no effect on the exports of firms in industries that ship principally by air (where the transit times and therefore working capital needs are not much different than for domestic sales).The study takes the monthly market-to-book value of financial institutes as a proxy for financial health.

In 2011, Kohler and Saville's analysis on the impact of trade finance on trade flows of South Africa further added on to the growing literature. The report hypothesize that traders in developing countries are dependent on the cost and availability of finance in the financial systems of their trading partners and access to trade credit more specifically the cost of credit, stands out as a key explanatory factor. In order to prove the relationship between trade flows and the availability of trade finance, the report has considered two additional factors i.e. the Rand-US dollar exchange rate which is a proxy for price competitiveness of South African exports and GDP in export market measured in domestic currency as a proxy for demand conditions in South Africa's export markets.Kohler and Saville used one-month interbank lending rate in the importing country as a proxy for the cost of short-term trade finance. Eventually, the study found that one percentage point increase in interbank lending rate reduces South African exports by 11.2 percent.

Yet another study by Felbermayr and Yalcin (2011) estimates the effect of export credit insurance on exports using data of the German export credit agency Euler-Hermes applying a fixed effects estimator and not instrumenting the credit insurance variable. The study finds that 1% increase

in trade credit granted to a country leads to a 0.4% increase in real imports of that country.

A study by Ecky *et al.,* (2012) also supports the assertion that trade credit has a positive impact on firm's exporting and importing activities. The paper focuses on a firm's performance with and without external finance assuming the importer pays the exporter after delivery as soon as the importer generates own revenues and argues that the use of trade credits effect the German firms' exporting and importing behavior at theextensive and intensive margins.

Further, in 2012, Arespa and Gruber's study on role of trade finance on dynamics of international trade performance provides empirical evidence to this growing literature and finds that on an average $1 of insured exports generates $2.3 of total exports and trade credit insurance improves buyer's access to supplier credit.

Recently, a WTO report by Auboin and Engemann (2013), proves that there is a significant positive impact of insured trade credit as a proxy for trade credits, on trade and this impact remains stable over the cycle, not varying between crisis and non-crisis periods. The study uses the largest and most consistent database that is insured trade credit collected by the members of the Berne Union of export credit agencies and private export credit insurers, available quarterly per destination country (almost 100 countries and 70 export credit agencies) covering the 2005-2011 period. This study generalised the notion that there is a significant impact of trade credit on trade between two countries.

In our study, we are trying to add evidence to the growing literature by analysing India's export to Africa.

3. Methodology

For this paper, we employ the widely used gravity equation, propounded by seminal papers such as Tinbergen(1962). The equation we estimate is as follows:

$$\text{Exports}_{\text{India,s}} = A + XB + YC + e \qquad (1)$$

Where,

$\text{Exports}_{\text{India,s}}$ is the value of exports from India to an African country 's'.

A, B and C are the estimated parameters

X is the set of all gravity model variables used in general in the literature (GDP of the source and destination, per-capipta income of the source and destination, geographical, political and cultural distance between the two countries, etc.)

Y is the set of all credit access variables including Commercial bank branches (per 100,000 adults), Domestic credit to private sector by banks (% of GDP), Real interest rate (%), Risk premium on lending (lending rate minus treasury bill rate, %), Domestic credit provided by financial sector (% of GDP), Private credit bureau coverage (% of adults), Public credit registry coverage (% of adults), Credit depth of information index (0=low to 6=high)

We follow the methodology propounded by Silva & Tenreyro(2006). Several papers in the literature have used similar methodology (Herrera and Baleix (), Silva & Tenreyro(2009)).

However, there are some criticisms against this methodology; for example, (Charbonneau, 2012)suggests that "a Poisson model with two fixed effects does suffer from the incidental parameter problem". Thisis not an issue in our paper on two counts; firstly, other papers such as Fernández-Val and Weidner (2014) suggest that this claim does not hold asymptotically, but just for the example shown in Charbonneau (2012) for 2 countries and 2 years; secondly, we do not include two fixed effects in our paper; thirdly, we have many zeroes in our dataset and Silva and Tenyero (2012) provide solid evidence for a well-behaved performance of PPML in a dataset with many zeroes.

4. Data Sources

The Data sources include GTAP (Global Trade Analysis Project) bilateral trade dataset from 1995 to 2009 is based on UN COMTRADE dataset, further reconciled using the methodology explained in Gehlhar (2008). GTAP data base construction is documented in Narayanan *et al.* (2012).

For other macro indicators we have used the Gravity database of CEPII for the time period 1995-2009. The following CEPII variableshave been taken in our study:

*comlang_off:*Indicates the common official primary language. It takes 1 if the common official of primary language is same for both exporter and importer country or 0 otherwise.

*comcol:*The variable indicates the existence of Common colonizer for importer and exporter country post 1945.

Weighted distance (in Km): The distance between exporter and importer country. In tour study, this variable holds the distance between India and corresponding African country.

gdp_o : GDP of Exporter (origin) country in million US $. In our study, gdp_o holds the GDP of India.

gdpcap_o : GDP per cap for Exporter (origin) country in US $. In our study, gdpcap_o holds the GDP per capita of India.

*gdp_d:*GDP of the importer (destination) country in million US$. In our study, gdp_d holds the GDP of respectiveAfrican countries.

gdpcap_d: GDP per cap for importer (destination) country in US $. In our study, gdp_d holds the GDP of respectiveAfrican countries.

tdiff: Hours of difference between exporter and importer country. In our study, the variable holds the time difference between India and corresponding African country.

gatt_d: Indicates whether Origin of importer country is a GATT/WTO member. It takes 1 if the country is a member of GATT/WTO member or 0 otherwise. In our study, the variable holds the value for African countries.

*common legal origin:*Indicates the legal origin of importer and exporter's country. The value of the variable is 1 if India and the corresponding African country has the same legal origin or 0 otherwise.

For the CEPII macro-economic dataset on GDP and GDP per-capita and the GTAP trade dataset, we deflated the nominal values in current prices to constant US$ with 1995 base. We employ the Consumer Price Index (CPI) data provided by the Bureau of Labor Statistics, USA.

Credit Indicators were collected from World Bank Open Data source for the time period 1995 to 2009. The following is the list of credit variables taken in our study.

Commercial bank branches (per 100,000 adults): Indicates the retail locations of resident commercial banks and other resident banks that function as commercial banks and provide financial services to customers. This is measured per 100,000 adults. In our study it is the number of commercial bank branches per 100,000 adults in respectiveAfrican countries.

Domestic credit to private sector by banks (% of GDP): Domestic credit to private sector by banks refers to financial resources provided to the private sector by other depository corporationsthrough loans, purchases of non-equity securities, and trade credits and other accounts receivable that establish a claim for repayment.In our study it is the credit given to private sector in African countries.

Real interest rate (%): The lending interest rate of Importer's country after removing inflationary pressure.In our study, the variable holds the real interest rate of respectiveAfrican countries.

*Risk premium on lending:*Risk premium on lending is the interest rate charged by banks on loans to private sector customers minus the "risk free" Treasury bill interest rate at which short-term government securities are

issued or traded in the market. In our study, the variable holds the Risk premium interest rate of respective African countries.

*Domestic credit provided by financial sector (% of GDP):*Domestic credit provided by the financial sector includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. The financial sector includes monetary authorities and deposit money banks, as well as other financial corporations where data are available. Examples of other financial corporations are finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange companies. In our study, the variable indicates Domestic credit provided by financial sectors of African countries as a percentage of its GDP.

*Private credit bureau coverage (% of adults):*Private credit bureau coverage reports the number of individuals or firms listed by a private credit bureau with current information on repayment history, unpaid debts, or credit outstanding. The number is expressed as a percentage of the adult population.In our study, the variable holds the credit bureau coverage for corresponding African countries.

*Public credit registry coverage (% of adults):*Public credit registry coverage reports the number of individuals and firms listed in a public credit registry with current information on repayment history, unpaid debts, or credit outstanding. The number is expressed as a percentage of the adult population.In our study, the variable holds the public credit coverage for corresponding African country.

*Credit depth of information index (0=low to 6=high):*Credit depth of information index measures rules affecting the scope, accessibility, and quality of credit information available through public or private credit registries. The index ranges from 0 to 6, with higher values indicating the availability of more credit information, from either a public registry or a private bureau, to facilitate lending decisions.In our study, the variable holds the index forcorrespondingAfrican countries.

5. Results

Table 1 summarizes the results from our analysis. We estimated many different variants of the model shown in equation 1 and show the results for three different variants in this table. The first model has all variables explained in the previous section. The second model excludes all credit variables. The third model excludes the variables capturing credit access, for which some extrapolation was needed. To begin with, the R-Squared estimates suggest that the model with all variables performs the best, and

even if we exclude the extrapolated variables, such a model would still perform better than the standard gravity estimation. This underlines the importance of considering credit access in gravity models.

Further, accounting for credit access improves some estimates; for example, the effect of per-capita income on trade, which is a key gravity relationship, is insignificant in the standard gravity model, while it turns out to be significant and negative after controlling for credit variables. This means that, given better credit access, even poorer countries in Africa can import more from India than the richer countries.

We also find significant results of several credit variables.

Table 1
Results from our estimation

Model with all variables			*Model excluding credit variables*			*Model excluding extrapolated credit variables*		
Variables	*Coeff.*	*P Value*	*Variables*	*Coeff.*	*P Value*	*Variables*	*Coeff.*	*P Value*
comlang_off	0.257	0.438	comlang_off	-0.307	0.098	comlang_off	-0.349	0.028
Comcol	1.737	0.149	comcol	0.742	0.000	comcol	0.887	0.000
Distance	0.001	0.003	distance	0.000	0.025	distance	0.000	0.814
realgdp_o	0.000	0.653	realgdp_o	0.000	0.073	realgdp_o	0.000	0.897
realgdp_d	0.000	0.000	realgdp_d	0.000	0.000	realgdp_d	0.000	0.000
realgdpcap_o	0.009	0.298	realgdpcap_o	-0.008	0.247	realgdpcap_o	0.003	0.661
realgdpcap_d	-0.001	0.000	realgdpcap_d	0.000	0.606	realgdpcap_d	-0.001	0.000
Timediff	-1.466	0.001	timediff	0.094	0.368	timediff	-0.108	0.266
gatt_d	-1.774	0.002	gatt_d	0.398	0.052	gatt_d	0.144	0.529
commlegalo~g	-0.462	0.644	Intercept	3.929	0.000	bankcredit~t	0.044	0.000
bankbranch	0.187	0.045	R-Squared	0.703		creditfinsec	-0.009	0.001
bankcredit~t	0.018	0.038				Intercept	2.182	0.009
realinterest	-0.006	0.183				R-Squared	0.758	
riskpremium	-0.019	0.210						
creditfinsec	-0.007	0.023						
pvtcreditb~u	0.003	0.872						
pubcredreg~y	-0.039	0.081						
creditdept~o	0.162	0.269						
Intercept	0.938	0.461						
R-Squared	0.799							

6. Conclusions

Considering the case of India's exports to African countries, we examined the effect of credit access on trade. We find that credit access in the export destinations is crucial for exports into them. Not accounting for credit access may lead to lower explanatory power in gravity model as well as some misleading results. The major policy implication from this analysis is that

trade partners of Africa, including India, may need to play a proactive role in enhancing trade finance and credit access in these countries, for their own self-interest of expanding their exports to Africa.

Note

1. Available online at http://www.wto.org/english/tratop_e/devel_e/a4t_e/ global_review13prog_e/india_africa_report.pdf

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