

Brunner, Hans-Peter

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Testing the Link between Accessible Export Finance and Insurance, and Regional Trade Growth in Africa and Asia: A Role for Regional Export Credit and Investment Guarantee Agency (ECIGA)

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TESTING THE LINK BETWEEN ACCESSIBLE EXPORT FINANCE AND INSURANCE, AND REGIONAL TRADE GROWTH IN AFRICA AND ASIA: A ROLE FOR REGIONAL EXPORT CREDIT AND INVESTMENT GUARANTEE AGENCY (ECIGA)

Hans-Peter Brunner

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Testing the Link between Accessible Export Finance and Insurance, and Regional Trade Growth in Africa and Asia: A Role for Regional Export Credit and Investment Guarantee Agency (ECIGA)

Hans-Peter Brunner

No. 433 | June 2015

Hans-Peter Brunner (hbrunner@adb.org) is Senior Economist at the Asian Development Bank (ADB).

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ABSTRACT

Using panel data regressions, this paper analyzes the effect of imperfections in the formal export credit and insurance market on trade growth in the regions of Africa and Asia. An exclusive comparison of trade performance of the two regions with respect to export credit and insurance is novel in the literature. I employ Berne Union data on export credit insurance for the period 2005 to quarter 1 (Q1) 2012, which is the most extensive dataset of its kind at the moment. As further novelty, I extend the data specification of Auboin and Engemann (2014) to the interaction of export diversification and complexity, intermediated by an agency variable representing the existence of insurance institutions (Export Credit and Investment Guarantee Agency, or ECIGA), with trade growth, and export credit and insurance. The paper can identify a significantly positive effect from the reinforcing interaction of the export credit and insurance market, and export diversity-complexity on trade.

Keywords: export finance, product market diversification, regional trade growth

JEL Classification: F13, F36, G14, O16

I. BACKGROUND AND MOTIVATION

The development potential of many emerging economies is fundamentally linked to their capacity to set in motion a cumulative causation process of manufacturing expansion and export development.¹

Inclusive growth is intimately linked to the nexus between manufacturing development and exports, and the latter is itself an important determinant of the sustainability of growth.² As a 2009 UNIDO report puts it, “as labour-intensive manufacturing-based development proceeds, it creates jobs. On the supply side, this process is explosive: much of manufacturing benefits from economies of scale in production so that as an industry grows its costs fall. In the past, when demand was oriented principally to the domestic market, the explosive forces on the supply side were countered by the dampening forces on the demand side: as production expanded the market became saturated.” But global and regional integration enables countries (especially small and medium-sized ones) to break through the constraints imposed by the size of their domestic demand. Growth in nonresource-related tradable activities by small and medium-sized enterprises (SMEs) is the only sustainable way forward for the private sector in these economies.

In this context, export development is a crucial prerequisite for manufacturing growth (and agriculture). In general, firms, and in particular those in tradable activities, actually become more productive and competitive once they start exporting. It is thus a cross-country empirical regularity that an economy’s exposure to international trade constitutes a powerful conduit for productivity growth and technological upgrades. But a firm’s export success (export discovery and survival) is actually dependent on how many other enterprises in the same country export the same product. This type of externality is well-known, and typically justifies the adoption of the sort of successful export promotion initiatives that can be observed around the developed world. The case for policy strategies toward export development is made even stronger in view of the observable and unmitigated information and financial market frictions that impair firms in developing countries, especially SMEs, when they attempt to tap on foreign markets as growth “avenues.” Manova (2012) showed that the cost of external finance prevents competitive firms from exporting. In the People’s Republic of China (PRC), when firms have limited access to credit, it limits their ability to move up the global value chain (GVC), and thus precludes them from pursuing more profitable opportunities, limiting firm growth and job creation (Manova and Yu 2012). German government-backed export credit guarantees have the largest effect for export markets with poor or lacking financial institutions, such as export insurance and guarantee institutions (Felbermayr and Yalcin 2013). Austrian firm-level data reveal that larger firms make more of available export guarantees and that such usage increases firm exports from some 80% to 100% compared to the control group (Badinger and Url 2013).

Export product and market diversification combined with moving up GVCs, and simultaneously closer to the center of global product space, are considered key if not the key drivers of export growth, and thus of an economy’s development prospects. Development is a process of transforming an economy’s economic structure towards the manufacture and export of more complex products (Felipe et al. 2012). The successful manufacture of export products with rising complexity, reflect increases in the set of capabilities that are available with the firms in an economy. It also reflects increasing institutional capacity which redirects firms to high complexity export production.

¹ See Thirlwall, 2002, Chapter 3 for the detail of theory.

² There is empirical evidence on what determines the sustainability of growth episodes. For example, Berg, Ostry, and Zettelmeyer (2012) conclude that “more equal income distribution, democratic institutions, openness to trade and foreign direct investment, and an export or production structure that favors relatively sophisticated exports (...) predict longer growth spells.”

Chapter 2 of the same UNIDO report “presents evidence that over a wide range of income the diversification of manufacturing raises productivity and that in small low-income countries manufacturing for export is particularly useful for productivity growth.” Export development, especially in non-resource tradable activities, is both a huge opportunity and a difficult objective to achieve in those economies. As a recent World Bank report (2013) put it, “both market and government failures tend to afflict low-income countries as they seek to expand exports and growth. Policies that focus solely on achieving low tariffs are rarely sufficient to prompt dynamic export drives or overcome obstacles in other areas. In many cases these constraints to competitiveness impinge more on higher quality and differentiated products and require specific interventions and institutions.” Effective export promotion and export diversification (into new products) policies are urgent in most low-income countries (World Bank 2009). Because of information and financial frictions, many small firms that could export, actually end up staying domestic and “vulnerable” to competing imports.

There has been considerable progress in financial sector development in these economies. But the absence, in most of them, of the trade-related financial instruments that could address trade-related financial frictions (e.g., export credit insurance, or GVC finance) acts as a significant disincentive to many firms, when it comes to taking export risks. As a result, many firms end up not trying to initiate export activities, even if they can manufacture products that would actually be competitive on both price and quality terms. In sum, there are many firms in small low-income countries that already manufacture products that would, in view of their price-quality nexus, be competitive in foreign markets, but that due to these information and financial frictions, remain domestic-focused. These difficulties are often insurmountable. Firms in many low-income countries are at an obvious disadvantage in export markets. Their foreign competitors, which can get access to trade finance, and export credit and investment guarantee agencies (ECIGAs) in their country (e.g., for subsidized financing and export credit insurance), have the commercial ability to extend payment terms, and in that way, outbid the competitors that can’t have access to the same financial instruments.

This issue of “trade competitiveness” is especially relevant in the international trade of non-homogeneous products in which foreign markets are dominated by large-scale distributors and retail chains that have significant bargaining power, and for whom financial arbitrage is an important component of profits. As a result of these market failures, and of the narrow base of exporting firms that results from them, small low-income economies are “robbed” of a crucial process of productivity growth.

This paper focuses on the interactions of financial market imperfection with the positive externality of firms, and especially SMEs, acquiring capacities for export diversification and productivity improvement, on export growth. One essential market failure that we propose to address is the financial access constraints that international trade is very prone to, and that most developing member countries have yet to address (as opposed to developed high-income countries).

Economic theory behind the paper determines, in general, the choice of explanatory variables. However, there is still a lack of one-to-one link between theory and empirical model specification. The approach of the paper by Auboin and Engemann (2014) is well-established in the literature and this paper extends the approach. It uses model averaging estimators as a fully coherent way of making inference on the regression parameters of interest. This way, it improves the statistical properties of the estimated focus parameters by determining the auxiliary regressors that can be excluded in the

empirical specification.³ My main results are robust to the use of different econometric methods, including Ordinary Least Squares (OLS), Fixed Effects (FE), and Random Effects (RE), and to different specifications of regressors, and to different ways to deal with zero quarterly trade credit and insurance commitments.

The rest of the paper is structured as follows: Section II introduces the data set and gives summary statistics. Section III explains the empirical strategy. Section IV presents empirical results and robustness test results with the use of model averaging estimators. Section V concludes.

II. DATA

A. Use of Berne Union Data

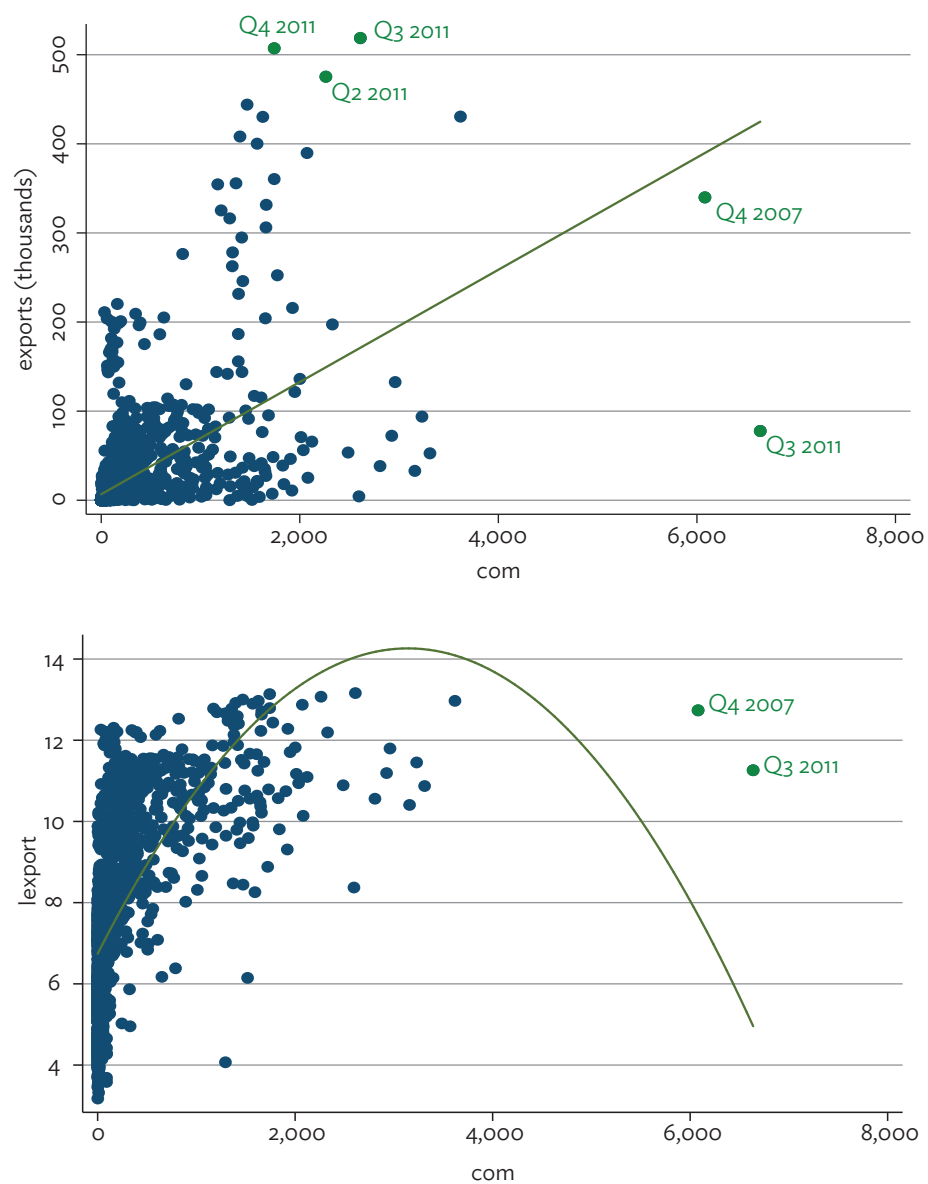
The Berne Union is the international trade association for credit and investment insurers, and world-wide trade and export credit insured covers more than 10% of international trade. The Berne Union provides data on insured, short term trade credit and medium- to long-term export credit by destination countries. The average tenor of short-term trade credit and insurance transactions is around 95 days. Medium- to long-term export credit and insurance finance multi-annual contracts for SMEs. Data collection is on a quarterly basis, which allows a database with quarterly observations (2005 to Q1 2012) by destination countries. It is, at the moment, the best possible proxy for overall export credit (Auboin and Engemann 2014). This research uses new medium- and long-term trade insurance commitment. In smaller economies, the data has gaps in some quarters. It is a fair assumption that these gaps represent zero new commitment for trade credit and insurance in the respective quarter. For the regressions, gaps were filled with zeroes and with yearly average values. In the analysis, we used both versions of the data set. As the summary statistics show, working with averages or zeros does not alter results significantly.

The paper has used export credit and insurance data to relate credit and insurance commitment to quarterly flows, such as gross domestic product (GDP), money (M1), the real effective exchange rate (REER), exports, and export growth. Furthermore, I relate both credit and insurance commitment (com) and the complexity of an economy's export to export growth. A regional dummy is used to compare the African experience with experience in Asia (see list of economies in Table A1, and also relate to scatter diagrams 1 to 5 (Figure 1), on the reinforcing interaction of the export credit and insurance market, and export diversity-complexity on trade). Further, I test if the presence of a "domestic" ECIGA has a significant influence on trade performance.

The financial crisis has significantly influenced the flow of trade credit and insurance since 2008, when Berne Union members extended trade credit and insurance worth about \$1 trillion (See Auboin and Engemann 2014 for details). This amount fell to about \$700 billion worldwide in 2009, and then recovered to \$900 billion by 2011 (Auboin and Engemann 2014, 720). Similarly the financial crisis had the effect of reducing medium- to long-term trade credit and insurance volume in Asia by about \$5 billion by 2009. Africa was affected much less proportionally, as Figure 2 shows. In both continents, trade credit and insurance growth, however, is significantly positive again since 2009.

³ In detail, see de Luca and Magnus (2011), and Doppelhofer, Miller, and Sala-i-Martin (2000).

Figure 1: Scatter Diagrams 1 to 5: Interrelate Log Exports with Com, and with Complexity



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Figure 1 continued

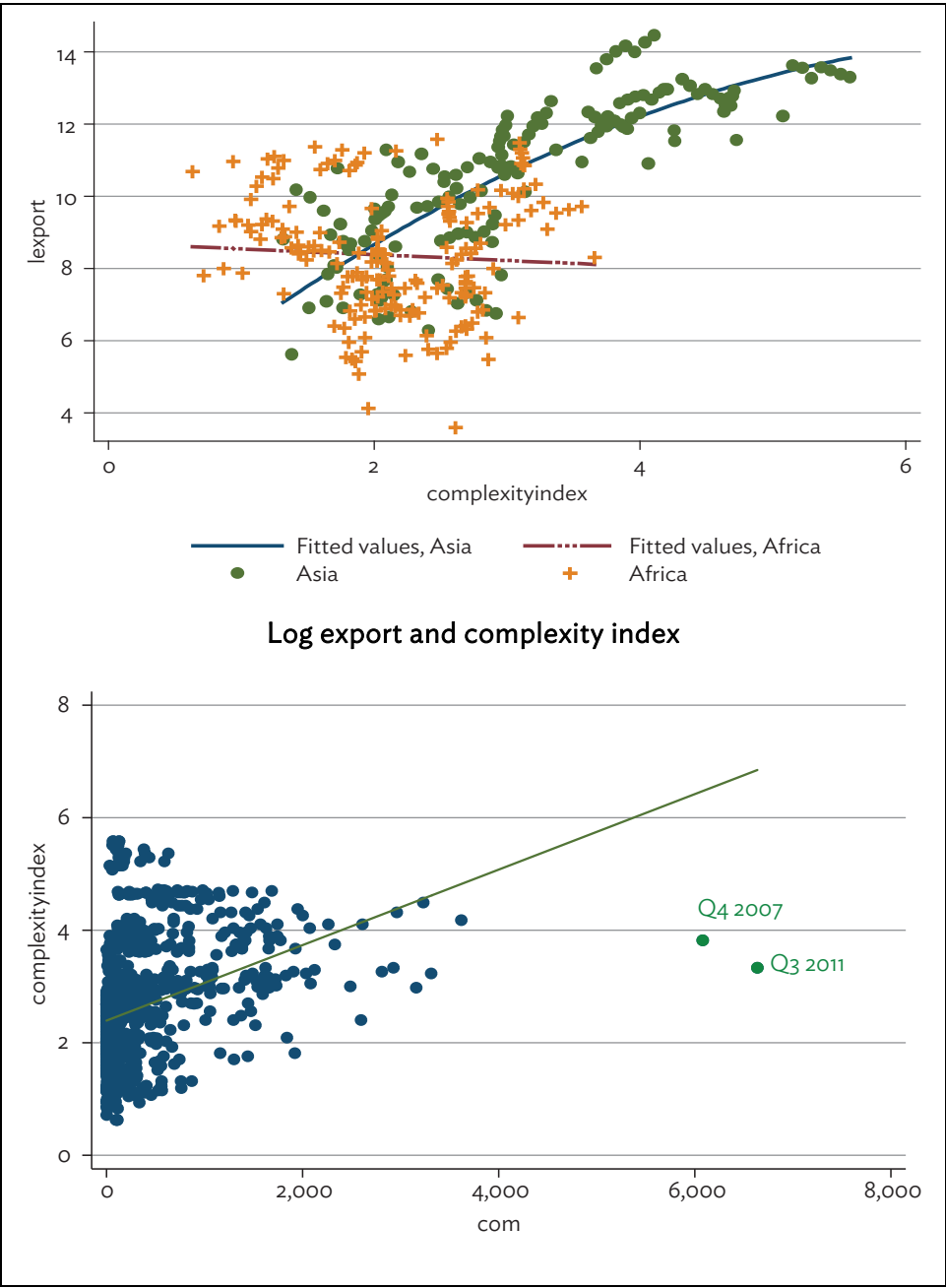


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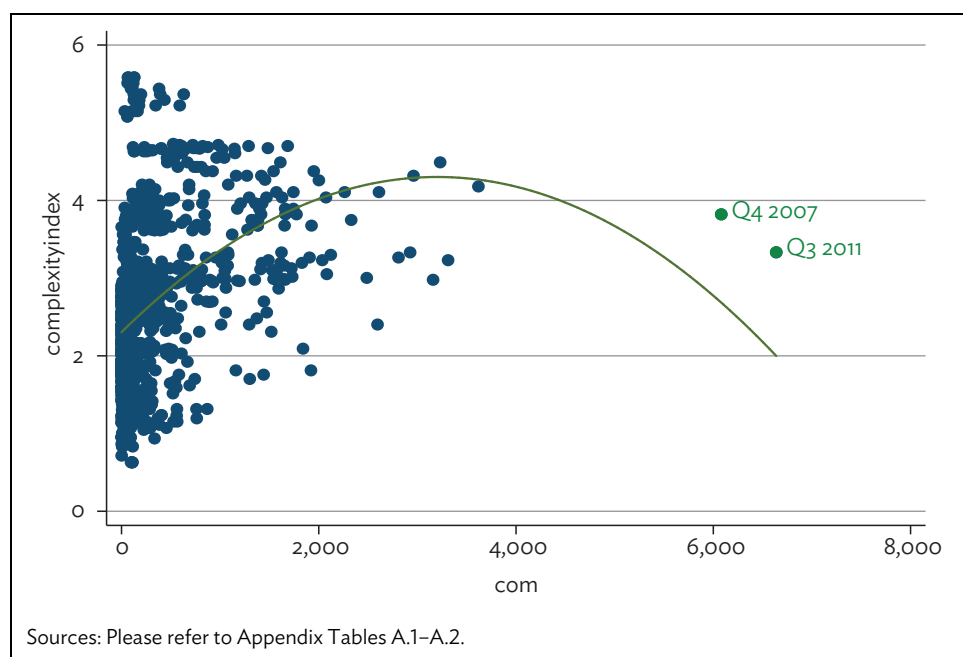
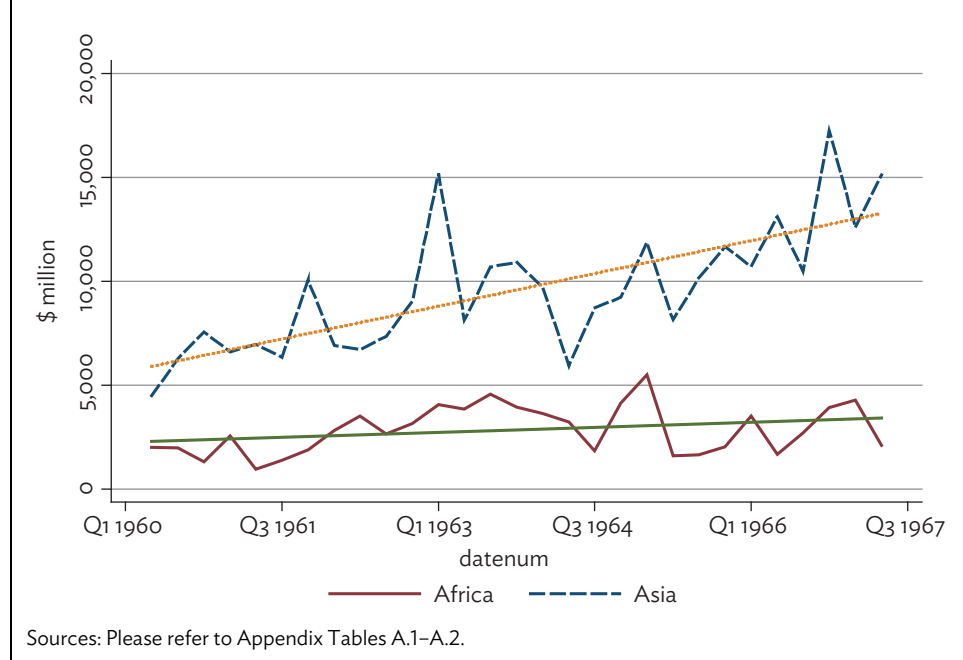


Figure 2: Export Credit and Insurance Flows



B. Characteristics of the Economy by Region

The data sample comprises 54 economies from Africa and Asia, from Q1 2005 to Q1 2012 (see Tables A1 and A2), resulting in a total of 1,566 observations. Of the 54 economies, 25 are Asian, and 29 are African. Real trade volumes have been obtained by applying a deflator. The GDP figures for this study are using 2005 PPP\$). M1 is used as a measure of the amount of money in circulation. According to

Auboin and Engemann (2014, 722), broader money statistics could be potentially misleading when attempting to establish a relationship between the credit market, and trade credit and insurance. For the relative price measure, a recent data set of REER, produced by the Bruegel Institute, was used (for details, see Auboin and Engemann 2014, and Darwas 2012). The complexity index variable is available only for 43 economies, resulting in 1,247 panel observations.

The complexity variable is a relative indicator, and it reflects the production capabilities contained in an economy's export basket relative to all other exporters (Hidalgo and Hausmann 2009). The complexity index is a truncated variable ranging from 0 (least complex) to 3 (most complex, but in theory, is open-ended upwards). It shows the degree of complexity (product differentiation) in an economy's trade. According to this index in this data set, Japan is the most complex trade economy, and Mauritania the least complex in the data set (2008). Only data for 2005 and 2008 exist, so linear interpolation was done for the other years. Furthermore, since the original data had numbers with positive and negative signs centered around zero, the researchers added three to each observation to shift the scale to a purely positive index.

C. Summary Statistics on the Relation between Export Growth, Export Credit, and Insurance Committed ECIGA, and Complexity, by Economy and Region

Table 1 compares the means of data by region. It is notable that Africa has a much lower average quarterly GDP compared to Asia, \$19.5 billion versus \$217.5 billion, and correspondingly lower trade values, \$7 billion versus \$82.5 billion. While the insurance mean commitment in Africa is also lower, about \$100 million versus \$380 million in Asia, it shows that the insurance ratio relative to trade volume is slightly higher in Africa than in Asia (0.013 versus 0.005). Particularly the high-income economies in Asia have a low insurance ratio. In the total sample, about half of the 54 economies do have ECIGAs, the other half doesn't. Low-income countries in Africa have a better ECIGA coverage, compared to Asia.

The 54 economies are also classified by World Bank income classes (1 for low-income economies, 2 for lower-middle-income economies, 3 for upper-middle-income economies, and 4 for high-income economies). There are 18 low-income economies, 18 lower-middle-income economies, 13 upper-middle-income economies, and 4 high-income economies included. All high-income economies of the sample are in Asia. The complexity of export index in Asia (3.09) is above the sample average (2.58), and Africa's is below average (2.13). The average complexity index increases from low-income economies (2.13) to high-income economies (4.64).

Table 1: Descriptive Statistics

Variables	Combined and by regions (Africa/Asia)					Africa		Asia	
	Obs. All no.	Mean (\$ million, except logs, index and dummy)	Std. Dev.	Min.	Max.	Obs. no.	Mean	Obs. no.	Mean
Exports	1,566	21,236.13	54,884.08	23.86	518,772.00	841	3,048.61	725	42,333.66
Exports (real)	1,566	19,451.45	49,725.60	21.98	447,387.70	841	2,789.30	725	38,779.55
Log export	1,566	7.55	2.33	3.09	13.01	841	6.60	725	8.64
Imports	1,566	20,688.89	49,338.67	92.79	458,349.00	841	3,787.60	725	40,294.38
Imports (real)	1,566	18,925.19	44,543.53	94.31	395,881.10	841	3,458.37	725	36,866.00
GDPUSD (real)	1,566	111,189.70	332,228.00	545.46	3,273,780.00	841	19,574.56	725	217,463.30
Log GDP USD	1,566	9.78	1.78	6.30	15.00	841	9.11	725	10.55
ComZero	1,566	225.10	489.33	0.00	6,638.50	841	91.75	725	379.78
Com Avg. ComZero	1,566	230.10	487.36	0.10	6,638.50	841	97.92	725	383.43
(share of trade)	1,566	0.005				841	0.013	725	0.005
Com Avg. (share of trade)	1,566	0.005				841	0.014	725	0.005
Complexity index	1,247	2.58	0.97	0.63	5.58	667	2.13	580	3.09
Institution (dummy)	1,566	0.48	0.50	0.00	1.00	841	0.45	725	0.52
Log (m1)	1,566	8.70	2.29	4.43	15.72	841	7.99	725	9.51
Log (reer)	1,566	4.63	0.11	4.20	5.45	841	4.64	725	4.62

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Table 1 continued

Variables	Economies by World Bank Class							
	Obs. 1 no.	1 Mean	Obs. 2 no.	2 Mean	Obs. 3 no.	3 Mean	Obs. 4 no.	4 Mean
Exports	522	526.97	522	8,287.17	377	37,027.62	145	101,347.50
Exports (real)	522	481.55	522	7,566.47	377	33,840.71	145	93,116.98
Log export	522	5.51	522	7.77	377	8.59	145	11.36
Imports	522	1,486.65	522	10,519.78	377	32,180.57	145	96,547.34
Imports (real)	522	1,354.51	522	9,592.30	377	29,379.71	145	88,596.23
GDPUSD (real)	522	8,254.40	522	85,651.04	377	189,917.90	145	369,002.90
Log GDP USD	522	8.53	522	9.95	377	10.35	145	12.12
ComZero	522	23.93	522	261.01	377	332.43	145	540.98
Com Avg.	522	28.30	522	263.47	377	343.73	145	540.98
ComZero (share of trade)	522	0.012	522	0.014	377	0.005	145	0.003
Com Avg. (share of trade)	522	0.014	522	0.014	377	0.005	145	0.003
Complexity Index	290	2.13	464	2.36	377	2.56	116	4.64
Institution (dummy)	522	0.39	522	0.44	377	0.46	145	1.00
Log (m1)	522	7.12	522	8.84	377	9.29	145	12.32
Log (reer)	522	4.65	522	4.62	377	4.62	145	4.61

GDP = gross domestic product, USD = US dollar.
Sources: Please refer to Appendix Tables A.1–A.2.

III. EMPIRICAL STRATEGY

A. Objectives

The paper examines three intriguing questions.

1. The leading question is whether and to what extent trade credit and insurance causes improved trade performance in economies differentiated by region (Africa or Asia).
2. Another important question is the extent of interaction between the complexity variable, and the trade credit and insurance variable, as well as the institutional dummy. As per the literature, complex manufacturing economies experience higher trade volumes, trade with more markets, but high complexity lowers export growth, other things being equal.
3. Lastly, it is important to examine to what extent the institutional policy dummy, having established an ECIGA in a country/region, does influence an economy's trade performance. Is the impact of an ECIGA more pronounced in lower income economies, or in higher income economies?

B. Panel Regressions for African and Asian Economies

I formulate a simple econometric model where the dependent variable is change in exports,

$$\Delta X = \alpha + \beta_1 Y_1 + B_2 EximDummy + \varepsilon$$

where ΔX is export growth, and Y_1 denotes exports credit and insurance flows, and other control variables (log reer, GDP), *EximDummy* represents the existence of a domestic export credit and insurance (ECIGA) and ε is the corresponding disturbance term.

Panel regression equations include institutional dummy (1 being the existence of ECIGA), medium- to long-term export credit and insurance amount, (commitment), the complexity index available for 43 out of 54 economies, control variables log reer and GDP in real US dollars, comparing the Africa data and experience over time with the Asian lower and higher income groups.

Instead of a two-stage approach, I use two period lags of the export credit and insurance variable with a dynamic panel model in form of Arellano-Bond regressions, to address potential reverse causality problems between export credit and insurance and export growth. Use of a two-stage approach would require regression of medium- to long-term insured trade credit on its measure of risk, which is the share of medium- to long-term insurance claims paid. Given the nature of medium- to long-term credit claims, data for low- and middle-income economies on insurance claims paid is very sparse, and the values of claims are a very small share of credit and insurance commitments. Testing for endogeneity as proposed by Hausman, I find trade credit and insurance amounts to be endogenous at the 1% significance level using pooled OLS, 1% significance level for fixed effects, and 1% significance level for random effects (corresponding p-values of 0.000 for all the three estimation strategies). I also use the Hausman test to check whether RE or FE should be the preferred specification. Table A3 finds FE is the preferred specification. In my specification, I use robust standard errors, taking into account the time-series structure of our data.

We need not only solve the reverse causality problem, but also the potential omitted variable bias. Since the model equation is a ‘limited form type’, and some of the omitted variables may not be captured by the use of the fixed and random effects models, there is thus the need to perform a robustness procedure (using for instance model averaging estimators, such as Bayesian Model Averaging [BMA]).

IV. RESULTS

A. Main Specification

Tables 2 to 4 contain the results in standard OLS, FE, and RE, of the main specifications. I performed several specifications to check the stability of the signs of the variables. Furthermore, I performed specifications by World Bank income classes to see if the stability and significance varies across classes. To ensure enough observations across all income classes, the paper has tested for differences between the aggregate of low-income and lower-middle-income economies (income group 0, and upper-middle-income and high-income economies (income group 1).

I take the OLS estimates from each regression output and we see that the signs are consistent, statistically significant, and interact positively with the real export growth, and show robust standard errors ($p < 0.05$). The existence of an ECIGA in an economy, and the medium- to long-term export credit and insurance interact significantly positive with real export growth. However, it is noted that the impacts of com, institutional dummy and complexity index are lower for economies excluding Japan, India, and the PRC. Upper- and middle-income economies also benefit slightly higher from ECIGA than lower income economies. Export complexity also increases export growth substantially in higher income economies, in comparison to lower income economies.

Table 2: Ordinary Least Squares Estimates

Variables	Full Sample	Without IND, PRC, JPN	Low-Income Economies	High-Income Economies
lreer	0.238 (0.353)	1.120*** (0.340)	0.449 (0.414)	1.734*** (0.527)
GDP USD	1.07e-06*** (1.11e-07)	1.45e-05*** (1.04e-06)	3.08e-06*** (3.28e-07)	5.31e-07*** (9.10e-08)
region	1.008*** (0.0877)	0.744*** (0.0781)	0.934*** (0.104)	1.447*** (0.175)
com	0.000889*** (0.000161)	0.000676*** (0.000166)	0.000730*** (0.000256)	0.000906*** (0.000197)
Institutional dummy	0.673*** (0.105)	0.409*** (0.0928)	0.939*** (0.113)	0.222 (0.261)
Complexity index	0.572*** (0.0594)	0.212*** (0.0750)	-0.186 (0.117)	0.600*** (0.0745)
Constant	4.284*** (1.626)	0.789 (1.576)	4.480** (1.928)	-2.040 (2.458)
Observations	1,247	1,160	754	493
R-squared	0.571	0.562	0.465	0.625
F-Statistic	351.91	199.16	185.67	128.79
Prob> F	0.0000	0.0000	0.0000	0.0000

GDP = gross domestic product, IND = India, JPN = Japan, PRC = People's Republic of China.

Note: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Sources: Please refer to Appendix Tables A.1–A.2.

B. Fixed Effect and Random Effect Models

Economies in middle or higher income classification also experience higher export growth, as shown in the RE models. For both FE and RE models, the amount of insurance commitment has also strong and positive impacts on export growth. A 1\$ increase in export credit and insurance is significantly associated with a 0.00983 to 0.01 increase in the mean of export growth. However, this is a weaker predictor for lower income economies. The presence of an ECIGA impacts significantly on export growth in the RE model. Its effect is more pronounced in higher income economies compared to lower income economies. Overall, the effect of a domestic ECIGA is large. The existence leads to a 132.7 % increase in the mean of export growth. The results also show that financial conditions prevailing in the economy and the volatility of the real effective exchange rate, as well as the overall level of real economic activity (as measured by real GDP), have strong explanatory effects.

The paper performs the Hausman specification test to compare FE versus RE. The null hypothesis is that the individual effects are uncorrelated with the other explanatory variables in the model (Hausman 1978). If the H_0 is rejected (if p-value is less than 0.05), it implies that estimates from RE produce biased estimates, which implies that an FE model is preferred. In the four pairs of FE–RE estimates above, we reject the null hypothesis, except for the estimates where we exclude India, Japan, and the PRC. This implies that we get consistent and unbiased estimates for FE models, in the

full sample, lower and upper income economy estimates. Results are more consistent, on the other hand, with RE, in the case of the sample excluding Japan, India, and the PRC. The results of the test are summarized in Table A3.

Export complexity also matters considerably for export growth, however, with opposing effects depending on the income classification. Economies with higher export complexity experience lower export growth, in comparison to economies with lower complexity scores. For higher income classes, complexity interacts negatively with export growth. This is contrary to earlier findings presented by the OLS estimates. The likely reason is that lower income economies enjoy robust export growth from lower complexity labor-intensive industries. There is visibly nonlinearity between complexity and export growth, which is reflected in FE, RE models, and not in OLS. This result in effect raises endogeneity issues because the growth of the export sector eventually becomes conditional on product complexity.

Table 3: Fixed and Random Effects Estimates

Variables	Full Sample	Full Sample	Without IND, PRC, JPN	Without IND, PRC, JPN	Low-Income Economies	Low-Income Economies	High-Income Economies	High-Income Economies
	FE	RE	FE	RE	FE	RE	FE	RE
com	9.83e-05*** (2.31e-05)	0.000100*** (2.32e-05)	6.32e-05** (3.14e-05)	6.22e-05** (3.14e-05)	4.82e-05* (2.87e-05)	4.72e-05 (2.89e-05)	9.14e-05** (3.85e-05)	9.47e-05** (3.87e-05)
lreer	1.215*** (0.0968)	1.207*** (0.0971)	1.021*** (0.102)	1.008*** (0.101)	1.015*** (0.113)	1.005*** (0.113)	1.211*** (0.167)	1.213*** (0.168)
GDP USD	3.05e-07*** (9.67e-08)	3.33e-07*** (9.61e-08)	9.13e-06*** (1.08e-06)	9.62e-06*** (1.04e-06)	1.57e-06*** (3.53e-07)	1.69e-06*** (3.48e-07)	3.12e-07*** (1.13e-07)	3.27e-07*** (1.12e-07)
Complexity index	0.0780* (0.0459)	0.0860* (0.0456)	0.0453 (0.0464)	0.0470 (0.0460)	0.301*** (0.0468)	0.297*** (0.0470)	-0.542*** (0.0991)	-0.492*** (0.0978)
Institutional dummy		1.327*** (0.414)		0.784** (0.393)		0.953** (0.438)		2.205** (0.924)
wbclass2		1.383*** (0.425)		1.184*** (0.406)				
region		1.537*** (0.420)		1.003** (0.400)		1.032** (0.449)		2.168** (0.914)
Constant	2.169*** (0.452)	0.239 (0.570)	2.535*** (0.466)	1.327** (0.573)	1.779*** (0.514)	0.988 (0.630)	5.209*** (0.843)	2.473** (1.042)
Observations	1,247	1,247	1,160	1,160	754	754	493	493
R-squared	0.158	.5552	0.190	.5933	0.233	.3915	0.192	
F-stat	56.37		65.41		55.01		28.09	
Wald Chi		285.85		320.61		238.92		124.06
Prob> F	0	0	0	0	0	0	0	0
Number of economies	43	43	40	40	26	26	17	17

FE = fixed effect, GDP = gross domestic product, IND = India, JPN = Japan, PRC = People's Republic of China, RE = random effect.

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Sources: Please refer to Appendix Tables A.1–A.2.

As such, any model specification should deal with the reverse causality issue. I conducted a Davidson-Mackinnon Test, a robust modification of the Hausman-Wu test. At $F=0.455$ and with $p=0.5003$, the test cannot reject the null hypothesis of exogeneity. With the presence of endogeneity, the paper cannot make inferences on the causal impact of the endogenous variables on growth.

One strategy proposed was to adopt panel instrumental variable regression. This poses a challenge and an issue due to the difficulty of identifying an appropriate variable to instrument for product complexity. Such instrument must be correlated with the endogenous variable identified but not with the error term. Since export complexity is computed annually and was imputed as a four-quarter constant variable, and integrated in our panel dataset, it may raise measurement bias in the model.

Collapsing the quarterly dataset into annual does resolve the endogeneity problem of the data with respect to com and improves our understanding of how the explanatory variables explain export growth. It diminishes data measurement problems associated with the export complexity and still clearly shows that higher export intensity reinforces export growth in succeeding periods. The estimation further reinforces our earlier finding in the quarterly data, that the amount of commitments and the presence of an export guarantee institution improve export growth. Nonetheless, export complexity remains endogenous to our specifications, as export complexity reinforces export growth, which in reverse causes export complexity to change (increase).

In the Arellano Bond regressions (Table 4), the specifications are robust based on the Hansen-Sargan tests of overidentifying restrictions. Sargan tests indicate the rejection of the null hypothesis of strict exogeneity, as our estimates show a p-value of 0.0000. Strict exogeneity implies that the instruments are valid instruments, i.e., they are uncorrelated with the error term.

Table 4: Arellano Bond Regressions

Variables	Quarterly				Annual			
	Full Data	Full Data ex IND, PRC, JPN	Low Income	Upper Income	Full Data	Full Data ex IND, PRC, JPN	Low Income	Upper Income
L.lexportr	0.759*** (0.0316)	0.741*** (0.0323)	0.657*** (0.0395)	0.859*** (0.0476)	-0.684*** (0.139)	-0.569*** (0.129)	-0.610*** (0.173)	-0.561*** (0.174)
L2.lexportr	-0.0858*** (0.0314)	-0.0856*** (0.0319)	-0.0405 (0.0394)	-0.130*** (0.0464)				
Complexity index	0.0964** (0.0461)	0.0769* (0.0463)	0.146*** (0.0438)	-0.202*** (0.075)	-0.0223 (0.17)	0.0277 (0.158)	0.292 (0.191)	-0.890*** (0.329)
com	2.29E-05 (1.58E-05)	1.44E-05 (2.20E-05)	1.52E-05 (2.09E-05)	5.47E-06 (2.42E-05)	0.000329** (0.000134)	0.000720*** (0.000178)	8.05E-05 (0.000179)	0.000231 (0.000171)
GDP USD	1.21e-07* (6.81E-08)	4.17e-06*** (7.87E-07)	8.13e-07*** (2.78E-07)	1.22E-07 (7.53E-08)	3.33e-07*** (5.84E-08)	3.11e-06*** (3.14E-07)	6.15e-07*** (1.86E-07)	3.01e-07*** (7.16E-08)
lreer	0.173* (0.0914)	0.104 (0.0938)	0.198* (0.104)	0.0729 (0.127)	-0.451 (0.778)	0.468 (0.666)	0.0152 (0.699)	-1.011 (0.99)
Constant	1.581*** (0.386)	1.840*** (0.4)	1.500*** (0.442)	2.771*** (0.615)	17.83*** (2.891)	11.50*** (2.469)	13.07*** (2.534)	23.65*** (4.65)
Observations	1,118	1,040	676	442	258	240	156	102
Number of economies	43	40	26	17	43	40	26	17

GDP = gross domestic product, IND = India, JPN = Japan, PRC = People's Republic of China,

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Sources: Please refer to Appendix Tables A.1–A.2.

C. Robustness Checks

In order to provide evidence of the robustness of findings, the paper addresses the issue that the impact of SME support for export credit and insurance may be contingent on the level of development of economies considered. As indicated, we divided the economies into two income groups (0 and 1) according to World Bank class: Into a lower income group (World Bank class 1 for low-income economies, plus World Bank class 2 for lower-middle-income economies), and into a higher income group (World Bank class 3 for upper-middle-income economies, and World Bank class 4 for high-income economies). I estimate the model separately for the two subsamples.

Furthermore, the paper performs a robustness procedure of “Bayesian Averaging of the Classical Estimates (BACE), to determine the importance of variables in cross-country export growth regressions. For this I use the “BMA estimator,” which introduces the distinction between focus and auxiliary regressors (de Luca and Magnus 2011). Focus regressors need inclusion with certainty in a model, and auxiliary regressors’ inclusion is of significant less certainty. The table below provides the output of the BMA on estimated coefficients and their standard errors, t-ratios, posterior inclusion probabilities, and two standard error bands. An auxiliary regressor is considered to be robustly correlated with the outcome if either the t-ratio on its coefficient is greater than one in absolute value or, equivalently, the corresponding two-standard error band does not include zero (de Luca and Magnus 2011, 15). Alternatively, robustness of the regressors can be judged on the basis of their posterior inclusion probabilities. As a rough guideline, Raftery (1995) and Masanjala and Papageorgiou (2008) suggest that a posterior inclusion probability of 0.5 corresponds approximately to a t-ratio of one in absolute value. The results in the table show com robustly correlated for all income classes, institutional dummy is robustly correlated for the two income classes separately, and complexity is robustly correlated only for the lower income class. Our BMA results for all specification show robustness, as the posterior inclusion probabilities are all equal to one (Table 5). This implies that the variables contribute to the explanatory power of the model in explaining export growth. The model is correctly specified.

Table 5: Bayesian Model Averaging: Full Sample, Income Classes 0, 1 and without Three Outlier Countries

Variables	Quarterly Full	Annual Full	Quarterly Without IND, PRC, JPN	Quarterly Low Income	Quarterly High Income
Constant	2.534 (1.744)	6.151* (3.386)	-1.128 (1.653)	-2.279 (2.767)	4.243* (2.221)
lreer	0.645* (0.375)	0.23 (0.729)	1.553*** (0.356)	1.773*** (0.595)	0.44 (0.48)
GDP USD	9.74e-07*** (1.34E-07)	2.83e-07*** (7.20E-08)	1.45e-05*** (8.24E-07)	5.16e-07*** (1.61E-07)	3.03e-06*** (4.01E-07)
com	0.000861*** (8.72E-05)	0.00119*** (0.000199)	0.000545*** (0.000122)	0.000932*** (0.000134)	0.000707*** (0.000128)

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Table 5 continued

Variables	Quarterly Full	Annual Full	Quarterly Without IND, PRC, JPN	Quarterly Low Income	Quarterly High Income
Complexity index	0.324*** (0.0602)	0.117 (0.154)	-0.000202 (0.0104)	0.650*** (0.0681)	-0.0293 (0.0791)
Institutional dummy	0.829*** (0.0931)	0.881*** (0.204)	0.533*** (0.0784)	0.0179 (0.0813)	0.860*** (0.103)
wbclass2	1.091*** (0.0846)	1.121*** (0.172)	1.071*** (0.0761)		
region	1.038*** (0.0892)	1.075*** (0.185)	0.753*** (0.0784)	1.481*** (0.154)	0.855*** (0.108)
Observations	1,247	344	1,160	493	754

GDP = gross domestic product, IND = India, JPN = Japan, PRC = People's Republic of China.

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

BMA Estimates	Quarterly Full		Annual Full	
lexportr	t	pip	t	pip
cons	1.08	1.00	3.99	1.00
ltreer	(0.35)	1.00	(3.57)	1.00
gdpusd	1.42	1.00	(3.06)	1.00
com	3.28	1.00	4.16	1.00
complexityindex	(4.13)	1.00	(1.64)	1.00
Institutional~y	5.86	1.00	2.57	1.00
wbclass2			6.71	1.00

() = negative, BMA = Bayesian Model Averaging.

Sources: Please refer to Appendix Tables A.1–A.2.

V. CONCLUSION

Using panel data regressions, this paper analyzes the effect of imperfections in the formal export credit and insurance market on trade growth in the regions of Africa and Asia. This paper establishes a causal link between medium- to long-term trade credit and insurance, and trade (export) growth in Asia and Africa. Using quarterly country-level data from the Berne Union for the period Q1 2005 to Q1 2012, we extend the data specification of Auboin and Engemann (2014) to the interaction of export diversification and complexity, intermediated by an agency variable representing the existence of insurance institutions, with trade growth, and export credit and insurance.

Export complexity matters considerably for export growth. The direction of causality remains still unclear. For higher income classes, complexity interacts negatively with export growth. As a result of the successful tackling of market failures, of having achieved a more complex export economy, upper-middle and higher income economies experience no higher export growth than lower income economies. However, in their interaction with a more developed institutional and financial sector infrastructure, middle and higher income economies experience a proportionally higher impact on trade from domestic export credit and insurance institutions. The effect of a domestic ECIGA is large. The existence leads to a 132.7% increase in the mean of export growth.

Instead of a two-stage approach, I used two-period lags of the export credit and insurance variable with a dynamic panel model in the form of Arellano-Bond regressions, to successfully address potential reverse causality problems between export credit and insurance, and export growth. I also used robustness tests and checked for omitted variables. There is visibly nonlinearity between complexity and export growth, which is reflected in FE, RE models, and not in OLS. This result, in effect, raises endogeneity issues because the growth of the export sector eventually becomes conditional on product complexity. Despite the correction of the measurement error in the complexity index, complexity remains endogenous to specifications. In sum, the explanatory power of our modeling turns out to be high, and the results are shown to be robust. However, the role of the complexity variable on export growth, intermediated by an agency variable, requires further research with improved data to overcome measurement errors.

Due to common institutional arrangements, low-income economies in Africa have a better ECIGA coverage compared to Asia, and thus, these economies experience higher trade growth in comparison with their Asian peers, everything else being equal. Put together, these results stress the importance of trade credit and insurance for export development and diversification, especially in least developed economies in Asia.

Future research with firm-level data could explore the differential impact of export credit and insurance institutions on different firm sizes, i.e., on SMEs, in terms of export growth.

APPENDIX

Table A1: List of 54 Economies in Africa and Asia

World Bank Class 1	World Bank Class 2
Afghanistan	Armenia
Bangladesh	Bhutan
Benin	Cameroon
Burkina Faso	Congo
Congo Democratic Republic	Egypt
Ethiopia	Georgia
Kenya	Ghana
Lao People's Democratic Republic	India
Madagascar	Indonesia
Malawi	Morocco
Mali	Nigeria
Mozambique	Pakistan
Nepal	Philippines
Rwanda	Senegal
Sierra Leone	Sri Lanka
Tajikistan	Sudan
Tanzania	Viet Nam
Uganda	Zambia
World Bank Class 3	World Bank Class 4
Algeria	Hong Kong, China
Angola	Japan
Azerbaijan	Korea, Republic of
Botswana	Singapore
China, People's Republic of	Taipei, China
Gabon	
Kazakhstan	
Malaysia	
Namibia	
South Africa	
Thailand	
Turkmenistan	
Tunisia	

Source: Berne Union Data.

Table A2: Description of Variables and Data Sources

Variable	Definition	Data Source
Real effective exchange rates (REER)	<p>REER is the weighted average of a country's currency relative to an index or basket of other major currencies adjusted for the effects of inflation. The weights are determined by comparing the relative trade balances, in terms of one country's currency, with other countries within the index.</p> <p>The REER data set used in this study is comprised of monthly data for 138 countries. The data were collapsed into quarterly figures via averaging.</p>	REER data were sourced from http://www.bruegel.org . Since the available data were up to Q4 2011 only, extrapolation was done to get Q1 2012 figures.
Gross domestic product (GDP)	<p>GDP is the value of all final goods and services produced within a nation in a given year. It can be expressed either in real or in nominal terms. The main difference between the two is that real values are adjusted for inflation, while nominal values are not. As a result, nominal GDP figures often appear higher than real GDP.</p> <p>A nation's GDP at purchasing power parity (PPP) exchange rates is the sum value of all goods and services produced in the country valued at prices prevailing in the United States in the year noted. This is the measure most economists prefer when looking at per-capita welfare and when comparing living conditions or use of resources across countries. The measure is difficult to compute, as a US dollar value has to be assigned to all goods and services in the country regardless of whether these goods and services have a direct equivalent in the United States. As a result, PPP estimates for some countries are based on a small and sometimes different set of goods and services. In addition, many countries do not formally participate in the World Bank's PPP project that calculates these measures, so the resulting GDP estimates for these countries may lack precision. For many developing countries, PPP-based GDP measures are multiples of the official exchange rate (OER) measure.</p> <p>The differences between the OER- and PPP-denominated GDP values for most of the wealthy industrialized countries are generally much smaller.</p> <p>The GDP figures for this study were expressed in real terms using 2005 PPP\$.</p>	GDP data were downloaded from Haver Analytics, whose source is the Economist Intelligence Unit (EIU).

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Table A2 continued

Variable	Definition	Data Source
Money supply (M1)	<p>M1 is a category of the money supply that includes all physical money, such as coins and currency. It also includes demand deposits, which are checking accounts, and negotiable order of withdrawal (NOW) accounts.</p> <p>M1 is used as a measurement for economists trying to quantify the amount of money in circulation. The M1 is a very liquid measure of the money supply, as it contains cash and assets that can quickly be converted to currency.</p>	<p>Most of the M1 data were sourced from the International Financial Statistics of the International Monetary Fund (IMF). For Thailand, monthly data were obtained from the national source, which is the Bank of Thailand. These monthly data were collapsed into quarterly figures via averaging. For Afghanistan, Ethiopia, Tajikistan, Lao People's Democratic Republic, and Sri Lanka, the researchers referred to the IMF Article IV Consultations. The rest of the data gaps were filled by Haver Analytics, whose source is the EIU.</p> <p>Since the M1 data set used in this study are expressed in local currencies, the researchers used quarterly US dollar exchange rates to convert the M1 figures into US dollars. Source for most of these exchange rates is Berne Union. For Afghanistan and Turkmenistan, Asian Development Bank Treasury rates (http://forex.asiandevbank.org) were used. Likewise, exchange rates for Azerbaijan, Lao People's Democratic Republic, Malawi, Taipei, China, and Viet Nam were obtained from Haver Analytics. For the M1 data of Turkmenistan and Sierra Leone, adjustments were done to make the dimensions consistent with GDP figures (i.e., multiplying their M1 figures by 1,000). National sources (i.e., central banks) were also checked to verify the data dimensions.</p>
Exports	By definition, exports refer to the goods and services sold by one nation to another.	Data on exports were downloaded from Haver Analytics, whose source is the IMF.
Imports	By definition, imports refer to the goods and services bought by one nation from another.	For commercial services, most of the data came from the Eurostat balance of payments database, the European Central Bank, and national central banks. For merchandise, the source is the World Trade Organization (WTO). Gaps were filled using data from Haver Analytics, whose source is the IMF.

continued on next page

Table A2 continued

Variable	Definition	Data Source
Insurance commitment	<p>The original data set has short-term commitments/turnover (stock variable), short-term claims (flow variable), medium- to long-term new commitments (flow variable), medium- to long-term total commitments (stock variable), and medium- to long-term claims (flow variable).</p> <p>This research uses new medium-term and long-term trade insurance commitments, which are flow measures.</p> <p>Gaps were addressed in two ways: putting in zeroes or putting in average values. Thus, the merged data set had two versions, each corresponding to how gaps in commitment data were treated. Zeros may be explained by the fact that export insurers have not had significant transactions in a particular period observation. In the analysis, the researchers use both the database with zeros, and with zeros replaced by the average of four quarters on a year-to-year basis. As the summary statistics show, working with averages does not alter very much the summary statistics when compared with the “zero” data option.</p>	Berne Union Data
Complexity index	<p>Complexity index is a truncated variable ranging from 0 (least complex) to 3 (most complex, but in principles open-ended upwards). It shows the degree of complexity (product differentiation) in a country's trade.</p> <p>According to this index, Japan is the most complex trade economy, and Mauritania the least complex in the data set (2008). Only data for 2005 and 2008 exist, so linear interpolation was done for the other years.</p> <p>Furthermore, since the original data had numbers with positive and negative signs, the researchers added three to each observation to shift the scale to a purely positive index.</p>	
Regional dummy variable	Asia = 1, Africa = 0	
Institutional dummy variable	presence = 1, absence = 0, of ECIGA	

Table A3: Results of the Hausman Specification Tests

	Full Sample	Full Sample without IND, PRC, JPN	Low-Income Economies	High-Income Economies
Chi-square computed value	10.63	2.07	9.06	6.69
Prob>Chi	0.0139	0.3551	0.0285	0.0353
Conclusion	Reject Ho; Choose FE over RE	Fail to reject Ho; Choose RE over FE	Reject Ho; Choose FE over RE	Reject Ho; Choose FE over RE

FE = fixed effects, IND = India, JPN = Japan, PRC = People's Republic of China, RE = random effects.
Source: Author.

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* ADB recognizes “China” as the People’s Republic of China.

Testing the Link between Accessible Export Finance and Insurance, and Regional Trade Growth in Africa and Asia: A Role for Regional Export Credit and Investment Guarantee Agency (ECIGA)

Using panel data regressions, this paper analyzes the effect of imperfections in the formal export credit and insurance market on trade growth in the regions of Africa and Asia. The author identifies a significantly positive effect on trade from the reinforcing interaction of the export and insurance market and export diversity.

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