



Financial Development and International Trade in Manufactures: An Evaluation of the Relation in Some Selected Asian Countries

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Abstract

This paper analyzes the relationship between the level of financial development of a country and its comparative advantage in international trade. In fact the link between the two notions seems to perform in a two-side direction: A number of researchers have stressed the key role a country's financial development is likely to play in its specialization in international trade, thus leading to a comparative advantage in the financially intensive goods, alongside capital and human resources. At the same time, it is argued that countries with comparative advantage in financially intensive goods experience a higher demand for external finance, and therefore financial development. In this paper, we aim to check the existence and the sense of the relation between the two variables within East Asian countries. A time-series approach using the VAR Model has been used to provide long run relationships between financial development and international trade in manufactured goods. Our main result suggests that for most of the countries considered, international trade in manufactured goods enhances financial development.

Keywords: Financial development, Heckscher-Ohlin model, VAR model, Trade openness, comparative advantage, Cointegration

1. Introduction

Usually, classical theories of international trade explain the comparative advantage of countries through their differences in technology and factor endowments. For those theories, trade is profitable because it allows countries to export goods for which production process uses more intensively the relatively abundant factors of the economy and import goods for which the production process uses more intensively the relatively rare factors of the economy (Heckscher-Ohlin model)(Note 1).

Recent studies (Krueger and Obstfeld, 1994) however consider that countries engage in international trade in order to benefit from economies of scale.

Financial development for its part is one of the most important resource allocation mechanisms in a capitalist economy (Ribeiro de Lucinda, 2003). Many economists think that the efficiency with which financial resources are channelled by the financial system is very important for the economy. Since the primary works of Bagehot(1873), Hicks(1969), and Schumpeter(1912), number of studies(Gurley and Shaw,1967; King and Levine ,1993a,1993b,1993c; Diamond,1984; Levine,1997, 2005; Levine and Zervos,1996; Beck, Demirgüç-Kunt and Levine,2000; Chinn and Ito, 2005) have been conducted to show the positive impact of financial development on the overall economic performance in general, and on economic growth in particular.

Levine (1997) centres his argumentation on the functional approach of the financial system. He considers that financial markets and institutions may arise to ameliorate problems created by information and transaction frictions. They then facilitate the allocation of resources across space and time, in an uncertain environment. Levine breaks this primary function into five basic functions. Specifically, financial systems

- facilitate the trading, hedging, diversifying, and pooling of risk
- allocate resources
- monitor managers and exert corporate control
- mobilize savings, and

- Facilitate the exchange of goods and services.

For him, a higher financial market development degree is likely to lead to a further reduction of transaction costs and the mitigation of the effects of asymmetrical information, increasing therefore the allocative efficiency of the economy.

Rajan and Zingales (1998), using accounting data from the American market, established the existence of a strong positive relation between needs of external funds for firms and their growth. It is also shown that this effect is bigger in countries with a high degree of financial development. According to these authors, one of the main consequences from an unequal financial market development one must expect would be an inter-sectoral difference in export pattern of manufactured goods.

While a large literature suggests that financial development fosters economic growth, considerably less research examines the cross-firm, cross-industry distributional effects of financial development. Some theories imply that financial development boosts economic growth by disproportionately fostering small firm growth (Beck, Demirgüç-Kunt, Laeven, and Levine, 2005). If smaller, less wealthy firms face higher credit constraints than large firms face due to greater informational barriers or high fixed costs associated with accessing financial system, then financial development that ameliorates market frictions will exert an especially positive impact on smaller firms (Banerjee and Newman, 1993; Aghion and Bolton, 1997). In contrast, another line of research suggests that most small, less wealthy firms, especially in poor countries, cannot afford financial services, so that financial development disproportionately facilitates the growth of large firms (Greenwood and Jovanovic, 1990). The Greenwood and Jovanovic's hypothesis also apply for poor people or poor households. These authors state that getting involved in the financial sector or subscribing to financial services such as screening and risk pooling requires an initial set-up cost. For them, poor people are not in a position to incur this cost. Although empirical support for Greenwood and Jovanovic (1990) proposition has been mixed (Li et al., 1998; Rajan and Zingales, 2003), their contribution raises the possible link between financial development and poverty alleviation (Note 2). In a recent work, Daly and Akhter (2009), using a new methodology called fixed effect vector composition (FEVC) in a sample of 54 developing countries, demonstrate that financial development has direct and indirect effects on poverty alleviation (Note 3).

In general, if there is a strong positive relation between financial development and economic growth, there are large differences across countries and time, in the quality of financial services and the type of financial instruments, markets and institutions that arise to provide these services (Levine, 1997). Yongfu and Temple (2005) notice that in general, entrepreneurs and firms appear to have easier access to external finance in some countries than in others. And when industries differ in their reliance on external finance in the sense of, for example, Rajan and Zingales (1998), these differences would be expected to interact with cross-country variation in financial development to serve as a source of comparative advantage on trade. This leads to the notion of "Financial Comparative Advantage", as formalized theoretically by Kletzer and Bardhan (1987) and Baldwin (1989).

Baldwin (1989) developed one of the first models in which financial markets are a source of comparative advantage. He shows that in economies with better developed financial markets and therefore better possibilities of diversifying risk stemming from the demand shocks, firms producing the risky good face lower risk premium and therefore lower marginal costs. Countries with better developed financial markets and therefore diversification possibilities thus specialize in the risky good.

While Baldwin stresses the risk diversification function of financial markets, Kletzer and Bardhan (1987) focus on the role of financial institutions and markets in channelling external finance to industries that are in need of it. They present two international trade models in the Heckscher-Ohlin tradition with two countries, two sectors and two factors. They show that the country with a lower level of credit market restrictions specializes in the sector that uses external finance. The country with the higher level of credit market restrictions faces either a higher price of external finance or credit rationing and will therefore specialize in the sector that does not require working capital or external finance.

The research line concerning the link between international trade and finance might be understood as related to this vast field of research dealing with the relationship between financial development and economic growth. More generally, the various functions accomplished by the financial system might be determinant in the pattern of specialization of a capitalist economy in several ways (Ribeiro de Lucinda, 2003).

For instance, a well-developed function of channelling of funds between savers and borrowers may enable firms to exploit more fully the scale economies in different industries. Thus, countries with a well-developed financial system tend to show comparative advantages in industries with economies of scale.

On the other hand, a more efficient financial sector in term of risk diversification can enable firms to easily bear Research and Development costs. As a consequence, these firms and countries shall show comparative advantages in goods intensive in R&D.

Finally, according to the monitoring and control functions performed by the financial market, a sophisticated financial system allows a better resource allocation due to lower monitoring costs. The monitoring action would have a positive

effect on economic productivity, increasing corporate control and mitigating agency problems, as shown by Diamond (1984).

In this paper, we then investigate on a possible relation between financial development and international trade. By so doing, our paper is closed to Beck (2001, 2002) who is the pioneer of this field of research. But since we are also interested as Beck, on the possibility of a reverse causality from manufactured trade to financial development, our study also has some similarities with those produced for instance by Rajan and Zingales(2003) or Do and Levchenko(2007), at least theoretically.

In fact we try to solve the scepticism on the sense of the relationship between the two variables using the well-known vector error correlation methodology (VECM). This enables us to derive long-run relations between financial development and international trade, and even short term relations. The rest of the paper is organized as follows: Section 2 provides a review of the literature on the link between financial development and international trade. In section 3, we present our methodology and describe our data. Results are given in section 4, while robustness tests are run in section 5. Section 6 concludes.

2. Financial Development and International Trade: a Review of the Existing Literature

The various studies interested in the relationship between financial development and international trade can be divided in two main streams. The first line of research deals with the effect of financial development on international trade, while the second focuses more on the reverse causality between these two variables.

Thorsten Beck (2002) is the one who launched researches on the possible relation between financial development and international trade. Exploiting the conclusions of Baldwin (1989) and Kletzer and Bardhan(1987), Beck(2002) studies a possible link between financial development and international trade. In the theoretical part of his paper, he first builds a model in which countries endowed with a well developed financial system tend to specialize in sectors with increasing returns to scale. His empirical test builds on the assumption that the production of manufactured goods exhibits higher scale economies than the production of agricultural goods or the provision of services. Using both cross-country and panel estimations in a sample of 65 countries, he tests the hypothesis that countries with a higher level of financial development experience higher export shares and trade balances in manufactured goods. Then in a second study (Beck,2003) the author verify successfully the hypothesis that countries with better developed financial sectors have higher exports and trade balances in industries that rely more on external financing. Indeed, if in every paper, the methodology used leads to some goods results; it doesn't help to better understand the concrete relationship in each of the countries in the sample

Like Beck (2002, 2003) many other economists have studied the effects of financial development on international trade (e.g. Slaveryd and Vlachos, 2005; Ju and Wei, 2005; Wynne, 2005; Becker and Greenberg, 2005; Ribeiro de Lucinda, 2003). Their main conclusions are in line with those of Beck: Differences in financial development across countries have become beside differences in technology and factors endowments, a source of comparative advantage and specialization in international trade.

In the meantime, various works are being conducted by number of authors to study the reverse relation between financial development and international trade. Authors (e.g., Yongfu and Temple, 2005; Slaveryd and Vlachos, 2002; Aizenman, 2003; Aizenman and Noy, 2004a, 2004b; Ginebri, Giacomo Petrioli, and Sabani, 2001) consider that increases in goods market openness are typically followed by sustained increases in financial depth. Rajan and Zingales(2003) argue that trade openness, especially when combined with openness to capital flows, weakens the incentives of incumbent firms to block financial development in order to reduce entry and competition. Furthermore, the relative political power of incumbents may decrease with trade as well. Thus, these authors argue that trade has a beneficial impact on financial development. Braum and Raddatz(2005) explore the political channel further. They demonstrate that countries in which trade liberalization reduced the power of groups most interested in blocking financial development saw an improvement in the financial system. When on the other hand, trade opening strengthened those groups, external finance suffered. While these two studies are about how trade affects the supply of external finance, the paper of Do and levchenko(2007) focuses instead on the demand side. It then can be considered as complementary to Rajan and Zingales(2003) and Braum and Raddatz(2005). Do and Levchenko(2007) argue that financial development is endogenous and that it is determined in part by demand for external finance in each country. Comparative advantage in trade will affect a country's production pattern, and in turn its demand for external finance. They consider that countries specializing in financially dependent goods will have a high demand for external finance and thus a high level of financial intermediation. In contrast, the financial system will be less developed in countries that specialize in goods not requiring external finance. Do and levchenko(2007) use a simple model in which goods differ in their reliance on external finance to illustrate their view. Then they demonstrate this effect empirically, using industry-level export data and information on each industry's reliance on external finance. Our paper might be thought as a continuation of the overall literature aiming at relating financial development and trade. We internalize both the empirical results of the above two lines of research to consider financial development and international trade both as

endogenous. This enables us to derive long-run relationship between the two variables in each of the countries of our interest.

3. The Empirical Methodology

3.1 Data Description

The present paper aims at investigating the relation between financial development and international trade in seven East Asian countries (China, P.R; Indonesia, Korea, Malaysia, Philippines, Singapore and Thailand) (Note 4). We therefore need some useful measures for these two variables. As argued by Do and Levchenko(2007), the preferred indicator of financial development is domestic credit by banks and other financial institutions to the private sector as a share of GDP ("Domcrep ") (Note 5). This will be used as our main indicator of financial development. Although it measures only part of the mobilized savings, it measures the part that is channelled to private firms. Although it is not a direct measure of efficiency, it captures part of it, since it excludes credit to the private sector by the central bank, assuming that the later is less efficient than private intermediaries in allocating resources (Beck, 2002). We also use, for completeness, two alternative measures of financial development. The first, "Domcrebs" is the ratio of domestic credit by the banking sector to GDP. The second alternative measure of financial development is liquid liability to GDP ("LILIA"). In his study, Beck (2002) states that the production of manufactured goods exhibits higher scale economies than the production of agricultural goods or the provision of services. Those goods are therefore financially intensive. Moreover, he argued that countries with well developed financial sectors experience large export shares and balance shares in manufactured goods. We therefore use three main indicators of international trade in our study. We use manufactured exports relative to total merchandise exports (MANUEXP), manufactured imports relative to total merchandise imports (MANUIMP) and the difference between both as a measure of the trade balance in manufactured goods (TRADEBAL).

We also include in our model measures reflecting the endowment of factors of each economy through time. More specifically, we introduce a measure of per capita physical capital and a measure of the labour force qualification, variables which are considered to play a key role in the Heckscher-Ohlin model.

Referring to the per capita physical capital measure-PHYCAP- we use Gross Fixed Capital Formation data to derive the annual stock of capital, taking the 1978 as our benchmark year and assuming a depreciation rate of 8%. To compute the capital per worker ratio we divide the stock of capital in period t by the working age population of the same period.

The construction of a labour force qualification creates an additional problem for the analysis. This problem is the lack of statistics for a significant number of countries for the whole span of the sample. The best variable that fulfils this need is the illiteracy rate, denoted ILL. All data were obtained from the World Development Indicators database (2003). The time span goes from 1978 to 2001.

Our data indicate that about one fifth of the population is illiterate in China, Indonesia and Malaysia in our period of study, while Korea appears to possess the best qualified labour force. Of the seven countries in the sample, Indonesia is the one with the less developed financial sector with mean values of 35.91%, 31.29%, and 36.41% representing ratios of Domestic credit to the private sector, credit by the banking sector and liquid liability to GDP respectively. The highest levels of financial development are recorded in Malaysia where the ratio of domestic credit to the private sector as a share of GDP reaches a maximum of 168% and a mean of 112% for the whole period. It is also useful to mention that, for all the countries, all financial development measures are highly correlated among each other. Manufactured exports (MANUEXP) are also highly correlated to Trade balance (TRADEBAL). Descriptive statistics are reported in Table 1.

3.2 Financial Development and International Trade in a VECM Analysis

To investigate the possible link between financial development and international trade in manufactured goods we use Vector autocorrelation models. This enables us to consider all of our variables as endogenous in the spirit of Sims (1980). Besides measures of financial development and those for international trade(Note 6), we include per capita physical capital and the illiteracy rate. A part from ILL, all variables are in Log. As most of the variables we analyse are I(1) or I(0) and cointegration can be established for all specifications, the appropriate model is a vector error-correlation model (VECM). In fact, when it has been determined that all the data series are integrated of order I(1), The Johansen technique is used to test whether cointegrating vectors exist between data representing financial development in one hand, and data representing international trade in the other hand. These can be thought of as long-run relationships between the different variables. This technique uses maximum-likelihood procedures to determine the number of cointegrating vectors among a vector of time series. If it is assumed that the vector of n I(1) time series, y_t , can be written as a VAR,

$$y_t = \Pi_1 y_{t-1} + \Pi_2 y_{t-2} + \dots + \Pi_k y_{t-k} + \varepsilon_t \quad (1)$$

Then the vector can be reformulated in a vector error-correlated model (VECM) as follows:

$$\Delta y_t = \mu + \Pi y_{t-k} + \sum_{i=1}^q \Gamma_i \Delta y_{t-i} + u_t \quad (2)$$

Where $q = k - 1$, $\Pi = \sum_{j=1}^k B_j - 1$, B_j is an $(n \times n)$ matrix from the lags of the VAR, and $\Gamma = -\sum_{j=i+1}^k B_j$ for $i=1 \dots q$.

The rank r of the matrix Π in (2) determines the number of cointegrating vectors in the VAR. The Johansen procedure is designated to statistically determine the number of cointegrating vector r in the VAR. The complete testing procedure is reported in Johansen (1988). Johansen provides two different likelihood ratio tests to determine the value of r . These are the trace test, with a test statistic

$$LR = T \sum_{i=r+1}^n \ln(1 - \lambda_i) \quad (3)$$

And the maximum eigenvalue test

$$LR = T \ln(1 - \lambda_{r+1}) \quad (4)$$

Where λ are the eigenvalues from Π

Precisely, we include all endogenous variables in a vector $Y_t = [\text{Financial development, Manufactures, Illiteracy rate, Per capita physical capital}]$ where Financial development stands for one of the three measures of financial development, Manufactures for an indicator of international trade in manufactured goods as stated above, Illiteracy rate for the rate of illiteracy of total adults as a share of people ages between 15 and above. Per capita physical capital is computed as described above.

Stationary property of the series and for every country has been analysed using the Augmented Dickey-Fuller (ADF) and Phillips-Perron unit root tests. Results are reported in Table 2. The unit root tests indicate that, apart from ILL or TRADEBAL which are mainly $I(0)$, most of the variables are integrated of order 1. We can then go on checking cointegration among variables. Potential cointegration is checked by applying the Johansen ‘trace test’. Although we ran VARs in levels to determinate the number of lags, we were unable to choose models which include more than two lags. The reason might be the loss of the degree of freedom due to our limited sample (24 observations). Moreover, we employed the Pantula principle to select the most suitable model. We ran our cointegration tests and VECMs country by country. Variables for international trade were introduced one after another to avoid multicollinearity. Finally, we performed a series of residual tests for all the VECM specifications including autocorrelation, normality and R-squared. Globally, results show that residuals are normally distributed and that there is no error correlation. Results for those tests can be obtained from the authors in request.

4. Results

A full summary of the various VECMs including LDOMCREP (Note 7), our main indicator of financial indicator and all the 3 measures of international trade in manufactures is found in Tables 3A, 3B and 3C. As we focus more in long-run relation, Tables 3A to 3C retrace the main cointegration equations we obtained in the various VECMs.

4.1 Financial Development and International Trade in China

The results of the VECMs for China do not show a consistent relationship between financial development and international trade in manufactured goods. Neither LMANUEXP nor LMANUIMP is related to LDOMCREP, our main measure of financial development. However, the relationship holds with the integration of TRADEBAL in the specification. In the VECM including (ILL, LDOMCREP, LPHYCAP and TRADEBAL), the cointegration test indicates the existence of two vectors of cointegration. When normalized to TRADEBAL, it can be seen that there is a positive relation between LDOMCREP and TRADEBAL with a significant elasticity. This feature is consistent with Beck (2002, 2003) who argues that countries with a high level of financial development experience large export shares and trade balances in manufactured goods. This seems to be the case for China, where a 1% increase in the level of domestic credit to private sector by banks and other financial institutions as a share of GDP produces a 2.7% increase in the trade balance of manufactured goods. In the same cointegration equation, it's noteworthy to indicate that physical capital also has an expected positive effect on Trade balance. The t-Student values of both LDOMCREP and LPHYCAP indicate that the variables are significant at 5% level.

4.2 Financial Development and International Trade in Manufactured Goods in Indonesia

As shown in Tables 3 A, 3B and 3C, the various features of VECMs for Indonesia do not lead to strong positive links between financial development and trade in manufactured goods. On the contrary, both manufactured exports and manufactured imports exert a negative and significant effect on the main indicator of financial development. Moreover, there is no apparent long-run relation between TRADEBAL and LDOMCREP. As we saw In Section 3, Indonesia has the less developed financial sector compared to the other countries in the study. Its capital endowment is also one of the poorest of the sample countries. Moreover, the country's mean of exports of Manufactured goods as a share of merchandise exports is only 30% compared to the same ratio for manufactured imports which is 70%. All those factors may explain the weak or perverse relation between financial development and international trade in manufactured goods for this country.

4.3 Financial Development and International Trade in Manufactured Goods in Korea

From the results in Table 3A, 3B, and 3C, it appears that there is a good support of a link between financial development and international trade in Korea. Our main indicator of financial development (LDMCREP) appears to be significantly and positively related to (LMANUEXP) and (LMANUIMP) but is negatively linked to (TRADEBAL). And the relation holds from manufactured trade to financial development. For illustration, it can be seen that a 1% increase in manufactured exports produces an increase of more than 25% in the level of financial development represented by LDMCREP. This increase is little bit mitigated for manufactured imports, but still positive (a 0.9% increase). This underlines the huge importance of the Korean structure of international trade to this country's financial development. Because Korean firms are specialized in the production and exportation of manufactured goods, their needs for external finance are high, which leads to more intermediation of financial activities. The above feature is supportive of the hypothesis of Do and Levchenko (2007) and Rajan and Zingales(2003) This is understandable on the extend Korean manufactured exports as a share of total merchandise exports has a mean of 91.58% on the whole period. We will also remark that the Korean performance in international trade helps this country to improve the level of its labour force with an elasticity of more than 4%.

4.4 Financial Development and International Trade in Manufactured Goods in Malaysia

Malaysia in our sample is the country with the highest financial development. Results from VECMs show that this performance is explained partly by the country's specialization in international trade. For instance, a 1% increase in manufactured exports leads to a 2% increase in the level of domestic credit to the private sector, our main indicator of financial development, while the same increase in trade balance of manufactured goods produces a 5% innovation effect in the same measure. All those relationships run from international trade to financial development, thus supporting the idea that a country's advantage in international trade has a positive impact on its level of financial development.

4.5 Financial Development and International Trade in Manufactured Goods in Philippines

Results of VECMs show that financial development and international trade are linked in Philippines. All the three indicators of international trade appear to strengthen the domestic credit to private sector by banks and other financial institutions. For an illustration, a 1% increase in LMANUEXP produces a 0.90% shift in LDMCREP. The other elasticities are respectively 1.42% and 1.70% for LMANUIMP and TRADEBAL. It is also noteworthy to remark that while manufactured exports and trade balance in manufactures worsen the labour force quality, manufactured imports and physical capital appear to improve it.

4.6 Financial Development and International Trade in Manufactured Goods in Singapore

In some extend there is a link between financial development and international trade in Singapore. Our main indicator of financial development (DOMCREP) is positively and significantly influenced by the level of manufactured exports (LMANUEXP). A part from this, results also show that manufactured imports and domestic credit to private sector both contribute to diminish the level of illiteracy rate. In total, the 67% share of manufactured goods exports on the total of merchandise exports of Singapore benefits substantially to the financial sector through the improvement of the domestic credit to the private sector.

4.7 Financial Development and International Trade in Manufactured Goods in Thailand

As it's the case in the other countries, the VECMs specifications show the existence of a positive and significant relation between financial development and international trade in Thailand. Both LMANUEXP and TRADEBAL appear to have a good influence on LDMCREP. Therefore, we can assert that the Thailand's quite good level of financial development is in part enhanced by the relative comparative advantage this country has on exporting manufactured goods. Not only the financial sector, but also the skills of the labor force are improved by international trade. As can be seen in the VECM, the elasticity of LMANUEXP to ILL is quite high and negative, to mark the reduction of the illiteracy rate by manufactured exports. We therefore conclude that the above results corroborate the

hypothesis of Do and Levchenko (2007) and Rajan and Zingales(2003) who argue that comparative advantage in international trade leads to a huge demand of external finance thus, to financial development.

In summary, as shown in our VECMs methodology, there is a positive link between financial development and international trade in most of East Asian countries we use in our sample. The only atypical feature was registered in Indonesia where international trade exerts a perverse effect on financial development. As we argued, this can be explained by the lack of development of the financial sector in one hand, and the weakness of the international trade in this country in the other hand. The situation in China is more critical. Although the country appears to have a good level of financial intermediation, there is actually no apparent relationship between this good level of financial development and China's exports in manufactured goods. As for Korea, Malaysia, the Philippines, Singapore and Thailand, our VECMs indicate that international trade in manufactured goods is one of the factors which enhance financial development in those countries. Therefore the hypothesis that a country's comparative advantage in international trade influences positively this country's financial sector. An idea developed by Rajan and Zingales(2003) and Do and Levchenko (2007) to name a few. Moreover, international trade also helps to improve the skills of the labor force by diminishing the rate of illiteracy in these countries.

5. Robustness Tests

The aim of our paper is to investigate on a possible link between financial development and international trade in selected Asian countries. In the previous section, we performed this task using our main indicator of financial development LDOMCREP. For more accuracy of the results obtained, we ran other VECMs with the two alternative indicators of financial development: LDOMCREBS and LLILIA. A summary of the various results of the VECMs are available on request from the authors. However, we summarize below our main results.

When we include LDOMCREBS and LLILIA in our VECMs, the results show that both indicators are negatively related to international trade in China. Concretely, it appears that international trade in manufactured goods is harmful to the development of the financial sector. LMANUEXP, LMANUIMP and TRADEBAL all have negative and significant coefficients in long run equations normalized to LDOMCREBS and LLILIA. This is also the same tendency in Indonesia. In this country, the domestic credit by the banking sector (LDOMECEBS) has a negative and significant effect on the imports of manufactured goods (LMANUIMP). At the other side, liquid liability (LLILIA) is perverse to all measures of international trade. This is not surprising, for the financial sector in Indonesia is still less developed compared to the other selected Asian countries. In the case of Korea, the VECMs including LDOMCREBS and LLILIA confirm the results obtained by the one including LDOMCREP. Although the trade balance is negatively related to liquid liability, the VECM show that LMANUIMP has a positive effect on this variable. Manufactured exports (LMANUEXP) also enhance the domestic credit offered by the banking sector. The robustness tests also confirm the beneficial effects exports and trade balance in manufactured goods have on the qualification of the labor force. The relationships between LDOMCREBS and LMANUEXP, and LDOMCREBS and TRADEBAL are all insignificant in Malaysia. However, LMANUEXP and TRADEBAL all have positive and significant coefficients in long-run relations with LLILIA. In Philippines, our results show that manufactured exports (LMANUEXP) exert a positive impact on LDOMCREBS, while LDOMCREBS on it part affects positively LMANUIMP. This supposes a two-side relation between financial development and international trade in Philippine, as far as domestic credit provided by the banking sector is concerned. All the VECM with liquid liability indicate that this variable is strengthened by all the indicators of international trade. In Singapore, if the relation between LLILIA and indicators of international trade is insignificant, the VECMs including LDOMCREBS confirm the positive impact international trade has on the level of financial development. Finally, the introduction of our alternative measures of financial development does not change substantially our results in Thailand. It can be seen that LLILIA affects significantly and positively LMANUEXP and TRADEBAL, while regressions with LDOMCREBS does not lead to better conclusions.

6. Conclusion

The aim of this paper was to investigate for a possible link between financial development and international trade in some selected Asian countries. In this process, we were guided by the ongoing literature relating financial development and international trade. In this debate, while some authors argue that financial development boosts international trade; many others affirm that the relation holds in the other sense. To reconcile the two points of view, we applied a vector-error correlation methodology. This methodology enabled us to treat both financial development indicators and international trade measures as endogenous. By so doing we were able to obtain not only long-run relations but also the sense of the direction of the relation. Using domestic credit to private sector by banks and other financial institutions (LDMCREP), our results of the VECMs support the idea that international trade triggers financial development in most of the countries in the sample. Therefore, our conclusion corroborates the hypothesis for example of Do and Levchenko(2007) or Rajan and Zingales(2003) for who, comparative advantage in international trade of a country affects the financial needs of entrepreneurs in this country and undoubtedly leads to the development of its financial sector. As it has been established that financial development reduces poverty, one can then argue that

East Asian countries, because of their relative comparative advantage in international trade which boosts their respective financial systems; are better skilled to alleviate poverty. Nonetheless, China is the only country where the relation goes in the inverted direction, thus in line with Beck(2002) who states that countries with well developed financial sectors experience large export shares and trade balances in manufactured goods.

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Notes

Note 1. A good exposition of the Heckscher-Ohlin model reference can be found at Gandolfo (1998).

Note 2. We thank an anonymous referee for this suggestion.

Note 3. In fact, Daly and Akhter (2009) base their research in the well-known “conduit effect” or complementary hypothesis of McKinnon. But they use both the saving and credit channels of financial intermediation to derive their conclusion. But they also find that financial instability is detrimental to economic growth and therefore to poverty alleviation.

Note 4. All along the paper, China and Korea will be referred to as Mainland China and South Korea respectively.

Note 5. The same indicator is suggested by Levine (2000) and used by Beck (2002).

Note 6. Both measures of financial development and of international trade are included in logs, so that the results can be interpreted as elasticities. The trade balance is calculated as the difference of the logs of manufactured exports and imports.

Note 7. For all but Illiteracy rate (ILL) and Trade Balance (TRADEBAL), the prefix “L” indicates that the variable is in Log value. All the variables, except ILL were included in Log.

Table 1. Countries' correlation Matrix

China	mean	median	maximum	minimu	std.Dev
ILL	23.29	22.16	35.85	14.22	6.55
Domcep	85.4	85.56	140.59	38.43	27.76
Domcrebs	83.16	83.56	127.17	50.5	23.7
Lilia	78.53	73.26	142.64	24.54	36.78
Manuexp	68.36	73.64	88.6	26.43	19.05
Manuimp	73.65	78.33	84	50.84	10.11
Phycap	215.6	138.6	539.96	82.42	144.41

Correlation Matrix of China

	ILL	LDOMCREBS	LDOMCREP	LLILIA	LMANUEXP	LMANUIMP	LPHYCAP	TRADEBAL
ILL	1	-0.972	-0.973	-0.995	-0.730	-0.675	-0.922	-0.677
LDOMCREBS	-0.97	1	0.999	0.978	0.695	0.639	0.907	0.647
LDOMCREP	-0.97	0.999	1	0.980	0.684	0.630	0.903	0.636
LLILIA	-0.995	0.978	0.980	1	0.702	0.658	0.917	0.644
LMANUEXP	-0.730	0.69	0.684	0.702	1	0.889	0.649	0.950
LMANUIMP	-0.675	0.639	0.630	0.658	0.889	1	0.499	0.704
LPHYCAP	-0.922	0.907	0.903	0.917	0.649	0.499	1	0.671
TRADEBAL	-0.677	0.647	0.636	0.644	0.950	0.704	0.671	1

Indonesia	Mean	Median	Maximum	Minimum	Std.Dev
ILL	21.76	20.97	33.4	12.66	6.43
Domcrep	35.91	39.6	66.05	9.85	19.94
Domcrebs	31.29	22.42	60.84	8.83	16.89
Lilia	36.41	36.4	59.86	15.15	15.53
Manuexp	30.63	33.69	57.12	1.77	2.69
Manuimp	70	71.65	76.86	57.84	5.67
Phycap	365.13	317.55	687.45	203	131.12

Correlation Matrix of Indonesia

ILL	1	-0.972	-0.710	-0.982	-0.92	0.048	-0.288	-0.944
LDOMCREBS	-0.972	1	0.799	0.98	0.936	0.085	0.379	0.945
LDOMCREP	-0.710	0.799	1	0.797	0.819	0.591	0.593	0.782
LLILIA	-0.982	0.984	0.797	1	0.935	0.071	0.348	0.944
LMANUEXP	-0.925	0.936	0.819	0.935	1	0.239	0.305	0.996
LMANUIMP	0.048	0.085	0.591	0.071	0.239	1	0.401	0.158
LPHYCAP	-0.288	0.379	0.593	0.348	0.305	0.401	1	0.276
TRADEBAL	-0.944	0.945	0.782	0.944	0.996	0.157	0.276	1

Korea R	Mean	Median	Maximum	Minimum	Std.Dev
ILL	4.56	4.25	8.12	2.13	1.8
Domcrep	68.81	64.7	110.43	45.54	16.1
Domcrebs	65.95	63.52	108.03	41.27	16.66
Lilia	55.35	52.17	91.36	33.03	19.38
Manuexp	91.58	91.39	93.52	88.23	1.45
Manuimp	59.74	62.92	67.93	43.09	7.28
Phyca	3590.44	3477.91	7867.62	1114.03	2236.23

Correlation Matrix for Korea

	ILL	LDOMCREBS	LDOMCREP	LLILIA	LMANUEXP	LMANUIMP	LPHYCAP	TRADEBAL
ILL	1	-0.834	-0.900	-0.958	-0.595	-0.701	-0.894	0.677
LDOMCREBS	-0.834	1	0.988	0.857	0.187	0.325	0.550	-0.325
LDOMCREP	-0.900	0.988	1	0.914	0.285	0.432	0.663	-0.428
LLILIA	-0.958	0.857	0.914	1	0.398	0.620	0.866	-0.615
LMANUEXP	-0.595	0.187	0.285	0.398	1.000	0.62	0.653	-0.540
LMANUIMP	-0.701	0.325	0.432	0.620	0.622	1	0.769	-0.994
LPHYCAP	-0.894	0.550	0.663	0.866	0.653	0.769	1	-0.742
TRADEBAL	0.677	-0.325	-0.428	-0.615	0.540	-0.994	-0.742	1

Malaysia	Mean	Median	Maximum	Minimum	Std.Dev
ILL	20.47	19.75	31.27	12.12	5.86
Domcrep	112.46	113.55	168.66	57.75	35.21
Domcrebs	95.4	88.08	158.5	38.48	39.02
Lilia	99.74	106.8	132.67	59.03	24.63
Manuexp	50.54	51.22	80.43	17.47	24.27
Manuimp	77.77	80.79	86.18	64.02	7.71
Phycap	2106.89	1706.02	4679.8	801.99	1143.11

Correlation Matrix for Malaysia

	ILL	LDOMCREBS	LDOMCREP	LLILIA	LMANUEXP	LMANUIMP	LPHYCAP	TRADEBAL
ILL	1	-0.788	-0.929	-0.622	-0.981	-0.948	-0.688	-0.984
LDOMCREBS	-0.788	1	0.942	0.926	0.725	0.669	0.447	0.734
LDOMCREP	-0.929	0.942	1	0.839	0.888	0.845	0.631	0.893
LLILIA	-0.622	0.926	0.839	1	0.558	0.502	0.269	0.568
LMANUEXP	-0.981	0.725	0.888	0.558	1	0.982	0.709	0.999
LMANUIMP	-0.948	0.669	0.845	0.502	0.982	1	0.708	0.973
LPHYCAP	-0.688	0.447	0.631	0.269	0.709	0.708	1	0.706
TRADEBAL	-0.984	0.734	0.893	0.568	0.999	0.973	0.706	1

Philippine	Mean	Median	Maximum	Minimum	Std.Dev
ILL	8.61	8.45	13.3	4.83	2.56
Domcrep	50.93	52.11	84.47	23.04	18.94
Domcrebs	36.98	39.46	62.22	17.42	13.07
Lilia	43.08	37.34	68.21	28.82	14.8
Manuexp	47.1	36.99	92.44	20.66	27.03
Manuimp	57.63	54.27	80.17	37.06	13.86
Phycap	428.3	419.71	672.2	225.34	120.71

Correlation Matrix for Philippine

ILL	1	-0.218	-0.143	-0.901	-0.930	-0.765682	-0.294	-0.935
LDOMCREBS	-0.218	1	0.955	0.565	0.289	0.400868	0.658	0.179
LDOMCREP	-0.143	0.955	1	0.520	0.254	0.430585	0.769	0.104
LLILIA	-0.901	0.565	0.520	1	0.905	0.879	0.544	0.817
LMANUEXP	-0.930	0.289	0.254	0.905	1	0.898	0.305	0.953
LMANUIMP	-0.765	0.400	0.430	0.879	0.898	1	0.488	0.724
LPHYCAP	-0.294	0.658	0.769	0.544	0.305	0.488	1	0.143
TRADEBAL	-0.935	0.179	0.104	0.817	0.953	0.724	0.143	1

Singapore	Mean	Median	Maximum	Minimum	Std.Dev
ILL	12.27	11.48	18.91	7.45	3.56
Domcrep	80.09	80.57	102.01	38.99	16.48
Domcrebs	101.19	99.4	128.36	70.23	13.73
Lilia	109..1	115.38	126.48	78.59	14.99
Manuexp	67.77	71.69	86.28	44.74	15.84
Manuimp	69.89	73.25	84	52.25	12.12
Phycap	8658.44	6722.7	17707.7	2699.98	4617.76

Correlation Matrix for Singapore

	ILL	LDOMCREBS	LDOMCREP	LLILIA	LMANUEXP	LMANUIMP	LPHYCAP	TRADEBAL
ILL	1	-0.592	-0.811	-0.843	-0.980	-0.954	-0.909	-0.954
LDOMCREBS	-0.592	1	0.887	0.649	0.487	0.381	0.526	0.699
LDOMCREP	-0.811	0.887	1	0.705	0.710	0.637	0.787	0.821
LLILIA	-0.843	0.649	0.705	1	0.849	0.814	0.657	0.856
LMANUEXP	-0.980	0.487	0.710	0.849	1	0.989	0.876	0.935
LMANUIMP	-0.954	0.381	0.637	0.814	0.989	1	0.852	0.872
LPHYCAP	-0.909	0.526	0.787	0.657	0.876	0.852	1	0.856
TRADEBAL	-0.954	0.699	0.821	0.856	0.935	0.872	0.856	1

	Thailand	Mean	Median	Maximum	Minimum	Std.Dev
ILL	8.27	7.83	13.73	4.34	2.89	
Domcrep	98.5	87.27	164.09	56.5	33.28	
Domcrebs	87.08	77.65	165.71	40.8	40.42	
Lilia	75.61	73.93	118.2	40.54	25.35	
Manuexp	53.43	59.73	75.56	21.44	20.25	
Manuimp	69.47	74.01	80.7	50.82	9.16	
Phyca	785.05	630.25	1969.01	264.06	512.38	

Correlation Matrix for Thailand

	ILL	LDOMCREBS	LDOMCREP	LLILIA	LMANUEXP	LMANUIMP	LPHYCAP	TRADEBAL
1	-0.936	-0.932		-0.986	-0.973	-0.892	-0.763	-0.972
-0.936	1	0.983		0.929	0.898	0.855	0.753	0.881
-0.932	0.983	1		0.909	0.916	0.898	0.840	0.888
LLILIA	-0.986	0.929	0.909	1	0.950	0.877	0.672	0.946
LMANUEXP	-0.973	0.898	0.916	0.950	1	0.940	0.826	0.987
LMANUIMP	-0.892	0.855	0.898	0.877	0.940	1	0.817	0.875
LPHYCAP	-0.763	0.753	0.840	0.672	0.826	0.817	1	0.797
TRADEBAL	-0.972	0.881	0.888	0.946	0.987	0.875	0.797	1

Table 2. Augmented Dickey-Fuller and Phillips-Perron Unit root Test Results

China (Mainland)

Variables	ADF statistics	Order	PP Statistic	Order
LMANUEXP	-3.356588*	0	-3.561533**	1
LMANUIMP			-6.790343**	1
TRADEBAL	-3.939944**	0	-2.715682**	1
LDOMCREP	-4.613173**	1	-5.263471**	1
LDOMCREBS	-3.889167**	0	-3.889167**	0
LPHYCAP	-3.402003**	1	-3.402003**	1
ILL	-2.206727**	0	-18.03095**	0
LLILIA	-4.700325**	1	-7.552679**	0

Indonesia

Variables	ADF Statistic	Order	PP Statistic	order
LMANUEXP	-4.382031**	1	-4.408752**	1
LMANUIMP	-5.210673**	1	-4.545600	1
TRADEBAL	-4.855025**	0	-4.700177**	0
LDOMCREP	-3.882504**	1	-3.844862**	1
LDOMCREBS	-3.108813**	1	-3.090556**	1
LLILIA	-2.111620**	1	-2.067003**	1
LPHYCAP	-4.554741**	1	-4.607571	1
ILL	-19.990**	0	-17.65572**	0

Korea (South Korea)

Variables	ADF Statistic	Order	PP Statistic	order
LMANUEXP	-5.106850**	1	-6.468425**	1
LMANUIMP	-3.302894**	1	-3.251363	1
TRADEBAL	-3.346582**	1	-3.286507**	1
LDOMCREP	-3.701613**	1	-3.701613**	1
LDOMCREBS	-2.495403**	1	-2.355455**	1
LLILIA	-5.194875**	1	-5.292971**	1
LPHYCAP	-3.515989**	1	-3.550162**	1
ILL	-37.95349**	0	-33.29437**	0

Malaysia

Variables	ADF Statistic	Order	PP Statistic	order
LMANUEXP	-5.395062**	1	-5.395062**	1
LMANUIMP	-5.281530**	1	-5.281530**	1
TRADEBAL	-3.770684**	0	-3.580107**	0
LDOMCREP	-4.505961**	1	-4.518564**	1
LDOMCREBS	-4.012333**	1	-4.013110**	1
LLILIA	-5.016596**	1	-5.015703**	1
LPHYCAP	-3.488932**	1	-3.414975**	1
ILL	-5.601334**	1	-51.81991**	1

Philippines

Variables	ADF Statistic	Order	PP Statistic	order
LMANUEXP	-3.662427**	0	-3.654466**	0
LMANUIMP	-5.40001**	1	-5.398476**	1
TRADEBAL	-2270509**	0	-2.544150**	0
LDOMCREP	-2.688824**	1	-2.758250**	1
LDOMCREBS	-3.118523**	1	-3.118523**	1
LLILIA	-2.104987**	1	-4.475858**	1
LPHYCAP	-3.095638**	1	-3.095638**	1
ILL	-1.685566*	0	-8.024671**	0

Singapore

Variables	ADF Statistic	Order	PP Statistic	order
LMANUEXP	-1.962871**	1	-1.962871**	1
LMANUIMP	-3.181775**	1	-3.186033**	1
TRADEBAL	-3.566754**	0	-3.751688**	0
LDMCREP	-2.900463	1	-2.776474**	1
LDMCREBS	-3.244999**	0	-3.24499**	0
LLILIA	-6.153131**	1	-6.423812**	1
LPHYCAP	-1.912028**	1	-1.926962	1
ILL	-2.706148**	0	-21.98560**	0

Thailand

Variables	ADF Statistic	Order	PP Statistic	order
LMANUEXP	-2.967026*	0	-2.514439*	0
LMANUIMP	-5.324382**	1	-4.881010**	1
TRADEBAL	-4.799214**	0	-5.540794**	0
LDMCREP	-1.610707*	1	-1.697117*	1
LDMCREBS	-1.695363*	1	-1.811489*	1
LLILIA	-3.256508**	1	-3.131529**	1
LPHYCAP				
ILL	-58.31908**	0	-58.31908**	0

LMNUEXP= Log of the ratio of manufactured exports relative to total merchandise exports

LMANUIMP= Log of the ratio of manufactured imports relative to total merchandise imports

TRADEBAL= Trade balance in manufactured goods

LDMCREP= Log of the domestic credit provided by the banking sector and other financial institutions to the private sector on percentage of GDP

LDMCREBS= Log of the domestic credit by the banking sector relative to GDP

LLLIA= Log of the liquid liability relative to GDP

LPHYCAP= Log of Per capita physical capital. For its computation, see section 3..

ILL= illiteracy rate adult

*and** Denote significance at the 10% and 5% level respectively and the rejection of the null hypothesis of non stationarity. Critical values are obtained from MacKinnon 1996.

Table 3A. Summaries of VECM tests (LDMCREP, LMANUEXP, ILL, LPHYCAP

China						
normalized on	LPHYCAP		LMANUEXP		Constant	
ILL	-29.1011	(-3.8154)			271.5974	(4.999)
LDMCREP	4.494188	(4.02104)			-46.9832	(-5.901)
LMANUEXP	-0.76475	(-6.8987)			1.11147	(1.4076)
INDONESIA						
ILL	23.192	(2.2014)	23.933	(5.7368)		
LDMCREP	-4.4206	(-2.5533)	-4.1373	(-6.035)		
MALAYSIA						
ILL	0.303821	(0.6131)	3.0816	(2.8311)	-18.849	(-2.307)
LDMCREP	-1.0459	(-2.8694)	2.23069	(2.7861)	-10.7237	(-1.784)
PHILLIPINES						
ILL	-3.6418	(-3.5632)	2.478242	(3.5215)	9.563449	(2.1125)
LDMCREP	-3.768	(-11.233)	0.906368	(3.9244)	13.52595	(9.1041)
SINGAPORE						
ILL	3.785627	(7.4935)	4.917078	(6.8365)	-66.6511	(-20.13)
LDMCREP	-1.40955	(-5.5465)	1.992727	(5.5076)	0.356474	(0.2140)
THAILAND						
ILL	3.229918	(1.84945)	-21.9883	(-5.934)	94.5123	(4.2095)
LDMCREP	-0.17418	(-1.2927)	0.943016	(3.299)	-9.4263	(-5.441)
KOREA						
ILL	0.573586	(2.61333)	-4.2639	(-0.384)	13.78717	(0.28042)
LDMCREP	-0.34545	(-4.6511)	25.38157	(6.75647)	-116.128	(-6.9798)

The table displays the various long-run equations between the endogenous variables in each country. Equations are normalized in one variable. Short-run equations are available on request.

China refers to as Mainland China while Korea refers to as South Korea

LDMCREP= Log of domestic credit by banks and other financial institutions to the private sector relative to GDP

LMANUEXP= Log of manufactured goods exports relative to total merchandise exports

ILL= illiteracy rate

LPHYCAP= Per capita physical capital

T-student statistics are in brackets.

Table 3B. VECM (LDMCREP, LMANUIMP, LPHYCAP, ILL)

China						
normalized on	LPHYCAP/ LDMCREP		LMANUIMP		constant	
ILL	6.773417	(4.85150)			-54.3585	(-5.7152)
LDMCREP	-0.62712	(-3.5082)			-0.42586	(-0.3497)
LMANUIMP	0.058336	(1.69841)			-5.14122	(-21.972)
INDONESIA						
ILL	-4.4202	(-2.3257)	-36.993	(-4.3790)		
LDMCREP	-0.3423	(-1.4872)	-5.62648	(-5.4998)		
MALAYSIA						
ILL	0.9881	(0.22894)	2.106816	(4.46691)	-12.0409	(-0.5735)
PHILIPINES						
ILL	-0.15679	(-1.2273)	-1.30937	(-8.0731)	-	-
LDMCREP	-4.01224	(-10.636)	1.42136	(2.96803)	-	-
SINGAPORE						
ILL	-11.012**	(-3.8010)	-19.9337	(-4.9448)	-	-
LPHYCAP	10.7060**	(5.41088)	17.8779	(6.49408)	-	-
THAILAND						
ILL	0.360216**	(0.68555)	2.763785	(2.6049)	-	-
LPHYCAP	-2.93872**	(-6.0684)	3.250615	(3.32430)	-	-
KOREA						
ILL	-0.02402	(-0.0873)	-0.30189	(-0.2921)	-	-
LDMCREP	0.25297	(2.94109)	0.966882	(2.99034)	-	-

LDMCREP= Log of domestic credit by banks and other financial institutions to the private sector relative to GDP

LMANUIMP= Log of manufactured goods imports relative to total merchandise imports

ILL= illiteracy rate

LPHYCAP= Per capita physical capital

** Denote coefficients of the variable LDMCREP

Table 3C. VECM (LDMCREP, TRADEBAL, LPHYCAP, ILL)

CHINA				
normalized on	LDMCREP		PHYCAP	TRADEBAL
ILL	3.064600	(3.41547)	0.192753	(0.58151)
TRADEBAL	2.724291	(20.2385)	1.059727	(21.3106)
INDONESIA				
ILL			-2.034	(-2.51991)
LDMCREP			-0.085613	(-0.30054)
TRADEBAL			0.952387	2.39047)
MALAYSIA				
ILL			-0.132001	(-0.29982) 5.414004 (3.98317)
LDMCREP			-1.406071	(-2.91776) 5.191084 (3.48918)
PHILIPINES				
ILL			--1.463628	(-1.83479) 4.9343243 (3.3696)
LDMCREP			-3.283504	(-11.4864) 1.703802 (3.24693)
SINGAPORE				
TRADEBAL			-0.085545	(-4.69275)
ILL			4.974038	(5.13353)
LDMCREP			-0.048990	(-1.51391)
THAILAND				
ILL			0.283647	(1.06570) 1.520306 (1.39708)
LDMCREP			-1.114398	(-3.80853) 6.356633 (5.31345)
KOREA				
ILL	0.882680	(1.18012)	0.434285	(2.32134)
TRADEBAL	-0.709389	(-2.81585)	-0.105402	(-1.67269)

LDMCREP= Log of domestic credit by banks and other financial institutions to the private sector relative to GDP

TRADEBAL= Trade balance in manufactured goods

ILL= illiteracy rate

LPHYCAP= Per capita physical capital