

Chapter 8

Trade Financing and Export Performance: Experiences of Indonesia, Korea and Thailand

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Chapter 8

Trade Financing and Export Performance: Experiences of Indonesia, Korea and Thailand^a

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Abstract

The objective of this study is to examine the role of trade financing in explaining recent slowdowns of export activities in Indonesia, Korea and Thailand. In general, our findings confirm the vital role of trade credit in shaping export flows of these 3 economies during the past 2 decades. Nonetheless, the impacts of trade financing on the export demand differ from one country to another. In particular, the experiences of the 3 countries appear to suggest that the more developed a country's financial sector the more significant the role of trade financing would likely to be. As expected, the adverse consequences of falling trade credit on the export performance amplify during the financial crisis. This last finding highlights the importance of crisis contagion channels from the financial sector to the real sector of an economy.

Keywords: export, price and income effects, trade credits, economic and financial crises

JEL Classifications: F1, F41

^a The views expressed are of the author's only and do not necessarily represent those of the SEACEN Centre

1. Introduction

The rate of decline in global trade during the recent sub-prime crisis has been more severe and more widely spread than during the era of Great Depression of the 1930s. Accompanying the sharp fall in global trade, the joint IMF–Banker’s Association for Trade and Finance (BAFT) survey further found that the decrease in the value of trade finance accelerated between October 2008 and January 2009 in almost every region of the world (BAFT, 2009). Furthermore, the World Bank estimates that 85–90 percent of the fall in world trade since the second half of 2008 is due to falling international demand, and 10–15 percent is attributable to a fall in the supply of trade finance (Auboin, 2009).

Two contrasting trends emerged at the outset of the recent global financial crisis (GFC) in a number of key East and Southeast Asian economies. On the one hand, the resilient financial sectors, particularly the banking sector, in these Asian economies generally withstood the crisis and emerged relatively unscathed. In contrast to the period of the 1997 East Asian financial crisis, the capital adequacy and liquidity positions of the banking sector of these countries remain above the Basel requirements, and the level of non-performing loans has been kept at a very low level during recent years (Table 1). Yet the exports of key Asian economies have been indiscriminately impaired by the recent global financial meltdown (Table 2 and Figures 1–3). For those economies most acutely affected by the 1997 financial crisis, namely Indonesia, Thailand and Korea, export contractions were significantly more severe during the GFC than in 1997.

During the past 1997 financial crisis, 2 key factors have frequently been underlined by early studies as the root causes of poor export/trade performance in the East and Southeast Asian economies (Lane, 1999; Stephens, 1998). The first factor is the exchange rate factor. The large swings, especially severe depreciation, of the local currencies have exacerbated the fundamental weaknesses of the effected economies. Depreciated currencies brought more financial institutions and their customers into insolvency. The second factor is the scarcity of short-term trade financing facilities. The sudden drop in trade financing contributed to the sharp drops in Indonesia’s exports and

Table 1. Soundness Indicators of Selected East and Southeast Asian Countries

	Non-Performing Loans (% of Bank Loans)			Risk-Weighted Capital Adequacy Ratio			Bank Return on Assets	
	1999	2007	2009	1999	2007	2009	1999	2009
Indonesia	32.9	4.02	3.9 ^{Oct/}	-6.7	19.18	17.5 ^{Oct/}	-8.7	2.7 ^{Apr/}
Korea	8.3	0.64	1.2 ^{Sep/}	10.8	11.95	14.3 ^{Jun/}	-1.3	0.5 ^{Dec 08/}
Malaysia	16.6	6.4	4.6 ^{Apr/}	12.5	13.2	14.1 ^{Nov/}	0.7	1.5 ^{Dec 08/}
Philippines	14.6	4.45	3.25 ^{Sep/}	17.5	15.93	15.48 ^{Mar/}	0.4	0.8 ^{Mar/}
Singapore	5.3	1.5	2.3 ^{Sep/}	20.6	13.5	16.5 ^{Sep/}	1.2	1.1 ^{Dec 08/}
Taiwan	4.9 ^{Dec/}	1.83	1.38 ^{Sep/}	11.2 ^{Dec/}	10.8	11.6 ^{Sep/}	0.49	0.3 ^{Jun/}
Thailand	38.6	7.28	5.31 ^{Sep/}	12.4	15.38	16.4 ^{Sep/}	-5.7	1.0 ^{Dec 08/}

Source: James et al. (2008) and Siregar and Lim (2010)

imports. Establishing possible links between trade financing and trade sector performance is indeed crucial to gather better understanding on the impacts of a financial sector meltdown on real sectors.

Supporting those early works on the 1997 financial crisis, more recent studies such as Auboin (2009), BAFT (2009) and Claudio (2008) underline further the importance of trade financing in explaining slowdowns in trade activities. Claudio (2008) has further claimed that the role of trade financing has been strengthened by the structure of production lines through regional supply chains and the move to the greater importance of cross-border dispersion of component production and assemblies within vertically integrated production processes in Asia.

The objective of our study is to empirically explore the role of trade financing in inducing the recent slowdowns of trade activities in key economies of East and Southeast Asia, namely Indonesia, Korea and Thailand. These 3 countries were selected because of their acute collapse in trade financing during the 1997 East Asian financial crisis. Yet, despite the severity of this crisis, to my knowledge virtually no empirical work has assessed the dependency of these countries' export sectors on the availability of trade financing on a country-by-country case. The availability of official data on trade financing or credit remains a major hurdle to carrying out comprehensive empirical studies, which partly explains why early works on trade financing for emerging markets are relatively scarce and are mostly based on panel testing.¹

My paper extends the early works by focusing on individual countries and conducting empirical testing on each of those 3 countries' cases, individually. This allows me to highlight and contrast different cross-country experiences. In particular, I wish to address the following set of policy concerns. First, did these economies experience equally severe export drops during the GFC as in the 1997 crisis? At the same time, has trade financing contracted more sharply in the recent crisis when compared to the 1997 crisis? Has trade financing played a role in explaining the drastic fall in exports of major Southeast and East Asian economies during the past 2 decades, including in the recent sub-prime financial crisis? Furthermore, has the export sector's degree of dependence

¹ One of the few empirical works including the East and Southeast Asian economies is Ronci (2005), which works on panel data of 10 countries in Asia, Latin America, Turkey and Russia.

on trade financing heightened during times of economic crisis? More interestingly, is there any conclusive evidence to suggest that the impact of trade credit on export performance is highly dependent on the depth of financial development of the country?

The rest of the chapter is as follows. The next section presents the literature review and analyses key facts. Section 3 discusses the data, model specification and econometric testing. Key empirical findings are analyzed and highlighted in Section 4. Discussions on the appropriateness of the stimulus policy measures implemented in these 3 economies are presented in Section 5. Brief conclusions end the paper.

2. Literature Review and Stylized Facts

2.1. Literature Review

A number of studies have, either directly or indirectly, addressed the question of whether trade financing matters for export activities. However, it is important to first underscore that trade financing, especially trade credit, has been commonly extended by both financial and non-financial institutions. The role of non-financial firms in providing trade credits is even more important in a country where the quality of financial intermediation is low (Fisman and Love, 2003). In short, trade credit may provide access to capital for firms that are unable to raise it through more traditional channels, such as the banking sector. Why do industrial firms extend trade credit when financial institutions, such as banks, could provide that facility? A number of possible motives have been theoretically supported (Petersen and Rajan, 1997). More importantly, the motives clearly accentuate the benefits of trade credits on export performance.

According to the financing motive, imperfect capital markets enable suppliers to finance borrowing firms at a lower cost than financial institutions (Smith, 1987). In their work, Petersen and Rajan (1995) demonstrate that suppliers of trade credit have a long-term interest in the survival of the borrower. Credit suppliers are willing to subsidize borrowers with lower interest rates since they expect to reap a higher return from future activities.

In addition, according to the transaction theory of trade credit, firms can economize on the joint costs of exchange by using trade credits. Many have demonstrated theoretically that trade credit providers have information advantages to sort 'buyers' of their trade financing (Biais et al., 1993; Brennan et al., 1998; Smith, 1987). Banks could get such necessary information, but, through their normal course of business activities, firms may be able to get them faster and more accurately. In addition, suppliers of trade credit have the advantage over collateral. In particular, the more durable the goods exchanged in the business transactions, the better collateral they provide and the greater the credit the supplier can extend (Mian and Smith, 1992). Ferris (1981) has also demonstrated that trade credit may reduce transaction costs for the borrower. Rather than paying bills every time goods are delivered, the firm might want to schedule the payment on a monthly basis, for instance. Transaction costs could also be lowered as trade finance could allow the firm to stock inventory and manage it better.

Some empirical work has closely examined the bond between the availability of finance and firm/sector performance and found that the growth of firms depends heavily on the availability of trade finance. Fisman and Love (2003) further claim that, where the quality of financial intermediation is low, firms relying more on trade finance tend to grow faster. Studies have also arrived at a general agreement that the role of trade finance/credit on export performance is even more formidable during crises or recessionary periods. Dell'Ariccia et al. (2008) show that during periods of financial distress, industries that depend more on external finance are hurt disproportionately more. In a related study, Borensztein and Panizza (2006) find that industries with a higher propensity to export are more adversely affected during periods of sovereign defaults. Similarly, Braun and Larrain (2005) demonstrate that during a recession industries that depend relatively more on external finance get hurt more.

Despite anecdotal evidence that the contraction of trade financing may have affected the trade performance of the emerging economies, including those in Asia, only a few empirical studies have been conducted. In addition, past empirical works have largely applied panel testing, hence have failed to capture country-specific experiences. Ronci (2005), for instance, carried out panel testing on 10 countries, including a number of the Southeast and East Asian economies. The study examines the impacts of world trade

volume, price factors (export and import prices), trade finance and banking crisis on export and import volumes.² Given data availability, my study revisits the set of issues discussed above, and further enhances the analyses by comparing and contrasting the experiences of the 3 major Asian economies.

2.2. Brief Facts

While Asia has not been the epicenter of the recent global financial meltdown, the real sectors, particularly the trade sectors, of major economies in the region have been indiscriminately affected and the real GDP of Thailand and Korea contracted during the first 2 quarters of 2009. In fact, the adverse impacts of the recent GFC on the export performance of our 3 economies have been much more severe than during the 1997 East Asian crisis. In particular, Thailand and Korea have seen their exports in recent years contract by more than twice the reported rates in the 1997/1998 period (Table 2).

As the financial crisis unfolded, the availability of trade finance declined and its cost increased. Liquidity pressure in matured markets led to general scarcity of capital in the global market in recent years. The fall in trade finance was also fueled by the collapse and closure of critical market participants, such as Lehman Brothers. Banks in developed countries are required to hold more capital at home and provide less liquidity to the banks and non-bank financial institutions in the emerging economies (ICC, 2009).

However, the magnitudes of collapse (in percentage) in trade financing during the recent GFC have been significantly less for Indonesia and Korea, and only marginally higher for Thailand, when compared to the corresponding rates recorded during the 1997 financial crisis (Table 2 and Figures 1–3). By eyeballing the reported trends on export and trade credit, one could be tempted to argue that the cut in trade finance had a rather limited contribution, or was not the main determining factor of the sharp falls in exports of these 3 major Asian economies during the recent economic turmoil.

² The countries included in the panel testing are the East and Southeast Asian economies (Malaysia, Philippines, Thailand, Indonesia, Korea), Russia, Brazil, Argentina, Mexico and Turkey.

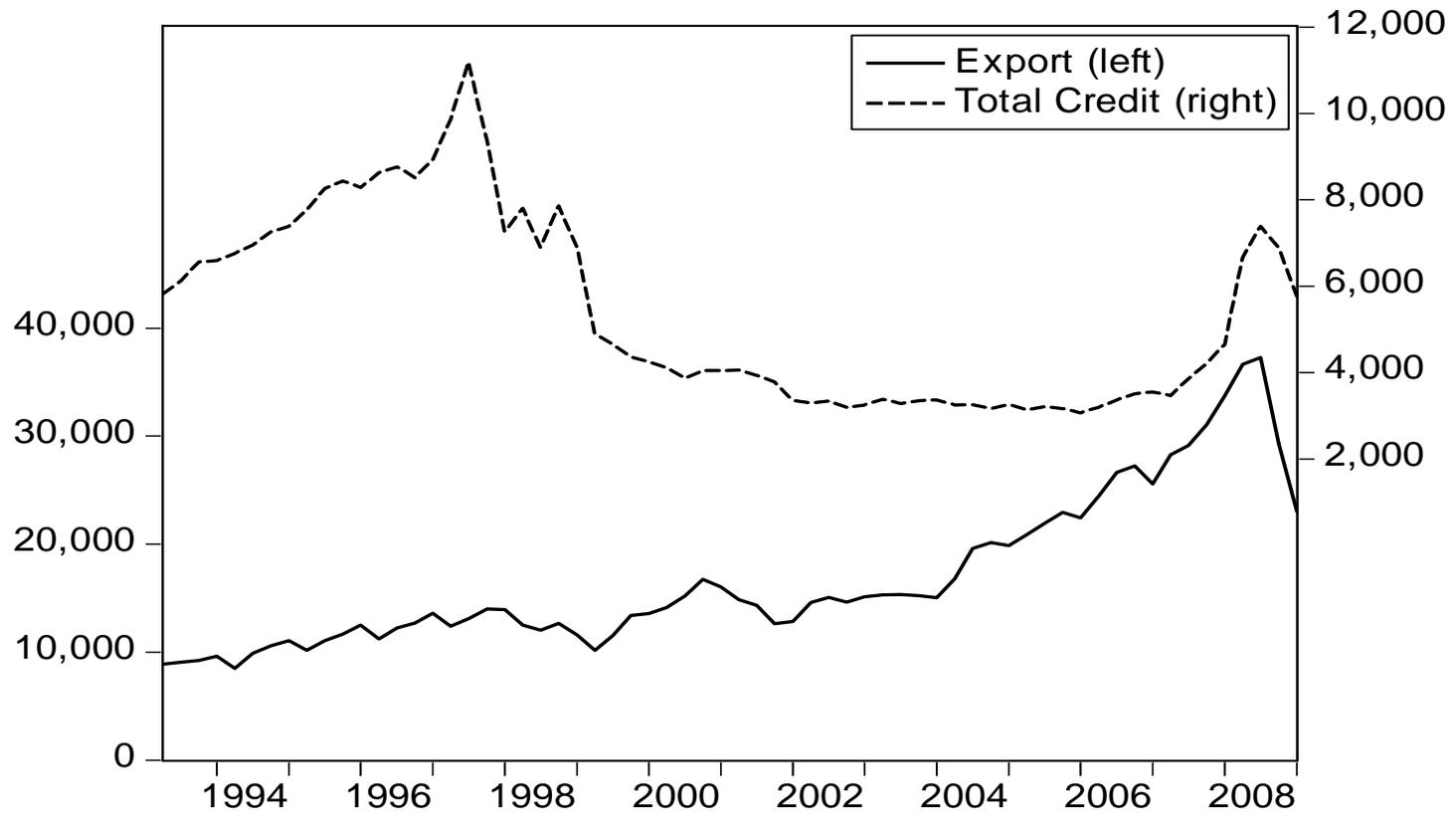
Table 2. The Tales of Two Crises*

Country	The 1997 Financial Crisis		The Sub-prime Crisis	
	Export	Trade Financing	Export	Trade Financing
Indonesia	-27% (Quarter 3, 1997– Quarter 1, 1999)	-38% (Quarter 3, 1997– Quarter 3, 1998)	-38% (Quarter 3, 2008– Quarter 1, 2009)	-22% (Quarter 3, 2008– Quarter 1, 2009)
Korea	-17% (Quarter 4, 1997– Quarter 3, 1998)	-17% (Quarter 2, 1997 – Quarter 1, 1998)	-35% (Quarter 3, 2008 – Quarter 1, 2009)	-7% (Quarter 3, 2008 – Quarter 3, 2009)
Thailand	-11% (Quarter 4, 1997– Quarter 2, 1998)	-35% (Quarter 1, 1997– Quarter 3, 1998)	-31% (Quarter 3, 2008– Quarter 1, 2009)	-38% (Quarter 3, 2008– Quarter 1, 2009)

*Note: I limit the observation period to an 8-quarter span following the peak amount prior to the outbreak of the crisis.

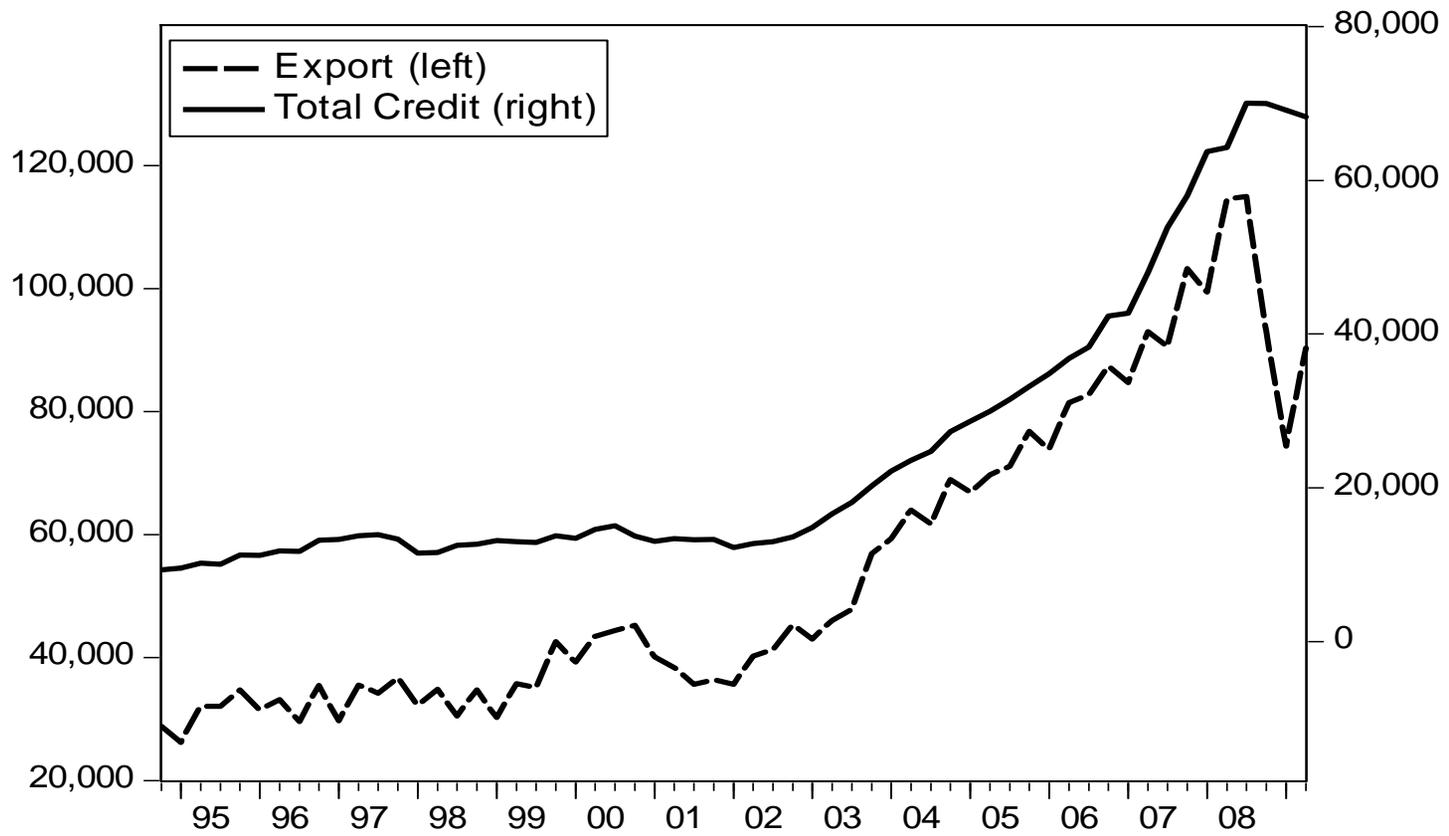
Source: CEIC database, the websites of Bank Indonesia, Bank of Korea and Bank of Thailand, and the author's own calculation.

Figure 1. Quarterly Export and Export Credit of Indonesia (in million US\$)



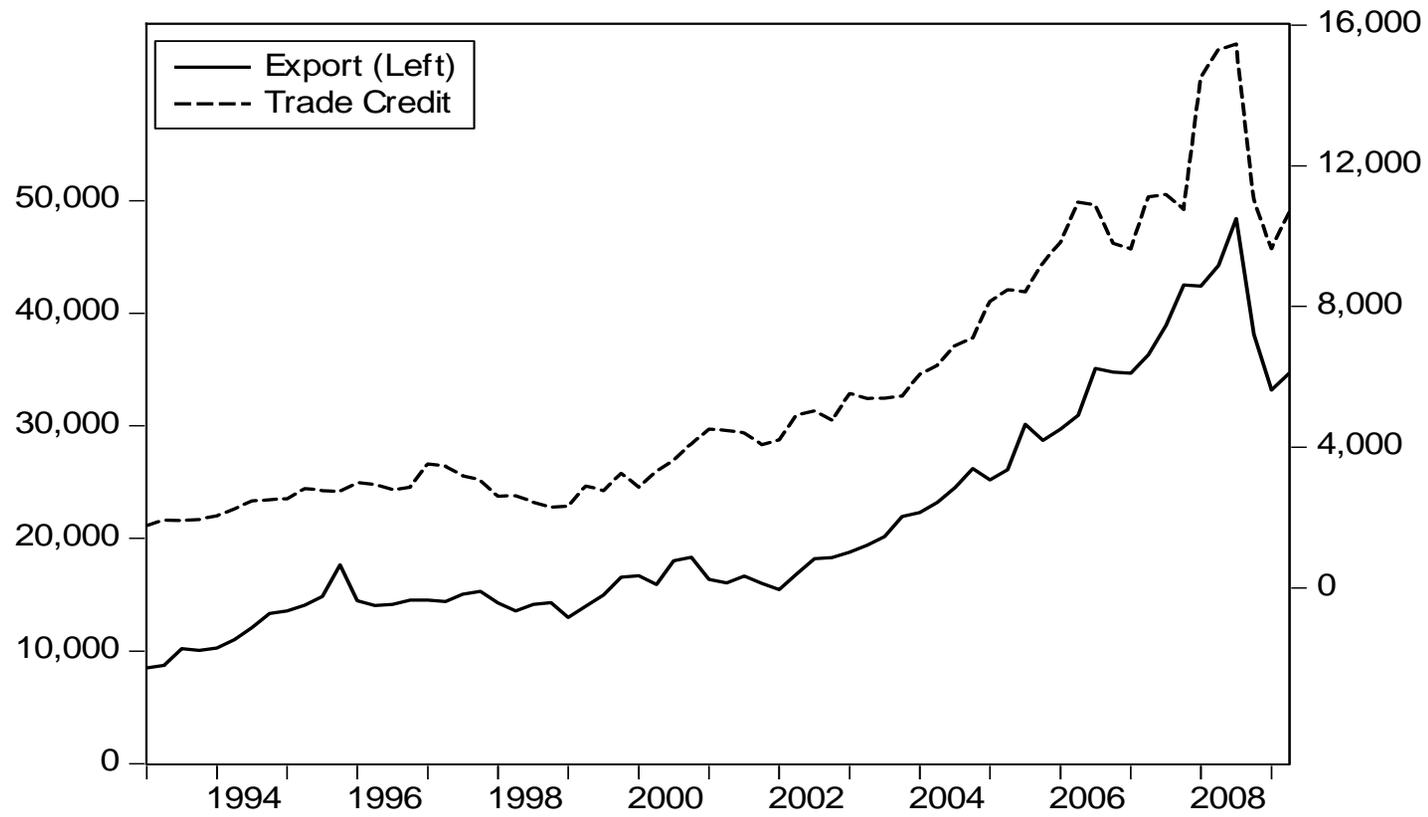
Source: Bank Indonesia database and CEIC database.

Figure 2. Quarterly Export and Trade Credit of Korea (in million US\$)



Source: Bank of Korea website.

Figure 3. Quarterly Export and Trade Credit of Thailand (in million US\$)



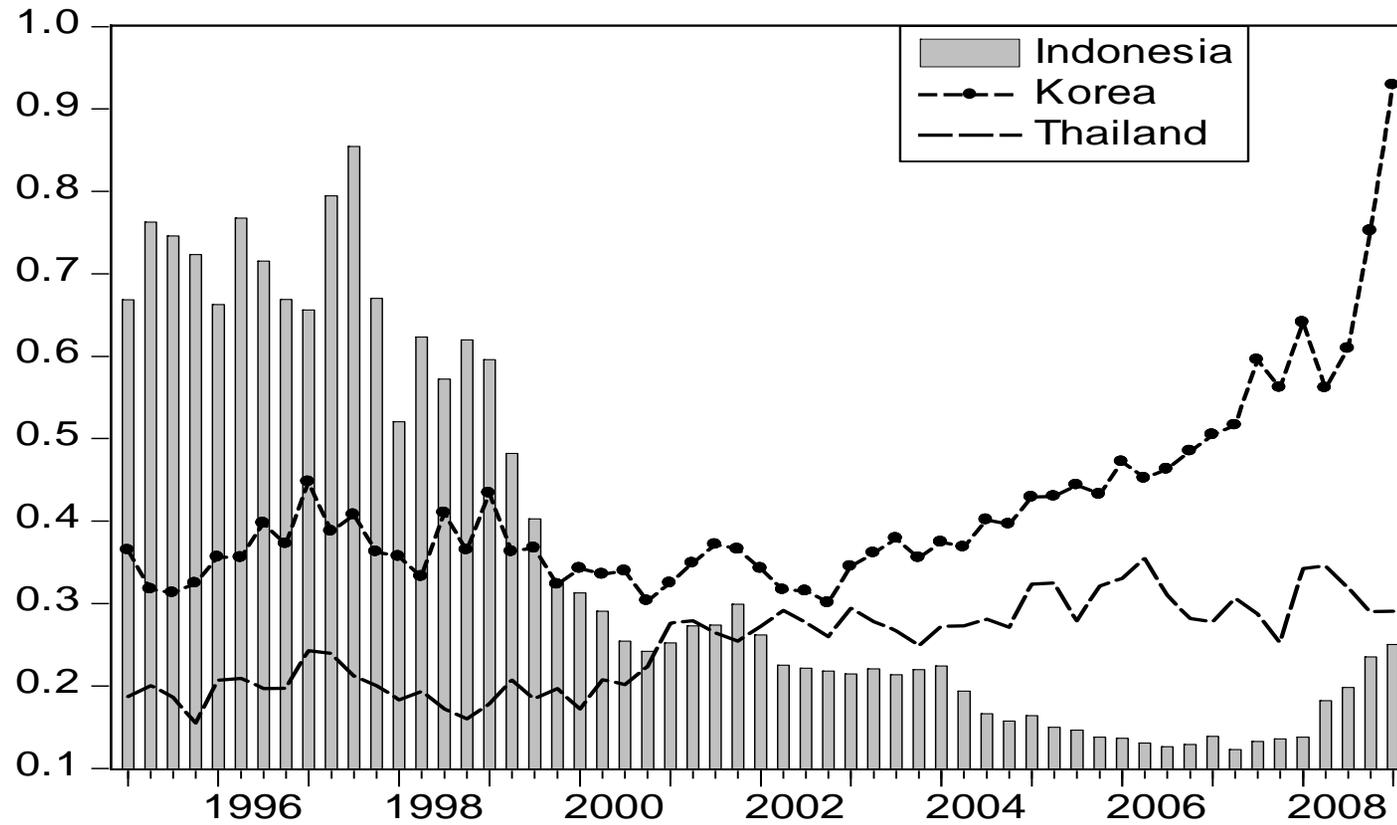
Source: Bank of Thailand website and CEIC database.

Moreover, the relative amount of trade credit over total exports is the highest for Korea when compared to Indonesia and Thailand (Figure 4). In fact, it is clear that the actual amount of trade financing to Korea dwarfed the amounts enjoyed by the other 2 countries. This seems to suggest that the Korean trade sector has the most access to trade credit, and that Korean traders have been more heavily dependent on trade credit. This fact is indeed consistent with the analyses of Iacovone and Zavacka (2009) and Kroszner et al. (2007) that exporters from developed economies with a more developed financial sector are likely to have more access to trade financing.

It is interesting to compare the trends of trade financing of these 3 countries during the past 2 decades. Indonesia and Korea, in particular, reported distinctive experiences. On the one hand, Indonesia attracted steady and strong flows of export credits, ranging from 65 percent to 85 percent of total exports on a quarterly basis during the pre-1997 financial crisis. However, since the outbreak of financial and political turmoil in 1998, export credit continued to slide from the 3rd quarter of 1998 to the 1st quarter of 2006. By the 2nd quarter of 2007, the ratio of export credit over total exports was only marginally above 12 percent. Like a mirror image, the trend for Korea was the opposite: between early 1993 and late 2003, the ratio of trade credit over total exports was in the range of 35–40 percent. From late 2005 and early 2006, the ratio surged to as high as 90 percent. Interestingly, Thailand seems to have managed a very steady ratio of around 20 to 30 percent for the last 15 years.

The overall impact of trade credit on export performance should arguably be influenced not only by the severity of the fall, but also the persistence of weak trade credit. During the 1997 financial crisis, export credit in Indonesia contracted for 12 quarters from the 1st quarter of 1997. In Korea, the reported total credit, particularly short-term credit, contracted from the 3rd quarter of 1997 to the 1st quarter of 1999. The persistence of the contraction in trade credit was also reported for Thailand for about 9 quarters from the 1st quarter of 1997. Unfortunately, data availability only allows us to analyze up to the 2nd quarter of 2009, but seems to suggest that the degree and persistence of trade credit contraction during the recent sub-prime crisis were less than reported in the 1997 financial crisis. It is interesting to note that the amount of quarterly export credit to

Figure 4. Quarterly Ratio of Trade Financing over Total Export



Source: Bank of Indonesia, Bank of Korea, Bank of Thailand and author's own calculations.

Indonesia (in US dollars) has never returned to its peak of the 3rd quarter of 1997. In contrast, the average value of trade credits to Korea and Thailand in 2008 were more than 5 times the levels in 1997.

3. Empirics

3.1. Model Specification

There are 2 primary determinants of export demand (Dornbusch, 1988; Hooper and Marquez, 1993). The first is the foreign income variable, which measures the economic activity and the purchasing power of the trading partner country (“income effect”). The second is the relative price or the terms-of-trade factor. Capturing the price effect in international trade, the terms-of-trade factor implicitly captures the impacts of exchange rate fluctuations on export demand. As noted above, another instrumental determinant of export performance is the availability of trade financing. Furthermore, economic crises or downturns have been argued to adversely affect export performance. Incorporating all of these possible determinant factors, I derive the following model specification of export demand function.

$$\Delta X_t = \alpha + \sum_i \beta_i \Delta X_{t-i} + \sum_i \delta_i \Delta TOT_{t-i} + \sum_i \theta_i \Delta GDPTP_{t-i} + \sum_i \eta_i \Delta TCR_{t-i} + \sum_i \chi_i \Delta (DGDP * TCR)_{t-i} + e_t \quad (1)$$

where (Δ) denotes the quarterly growth rate from $(t-1)$ to (t) ; (X) is the export value in US dollars; (TOT) denotes the terms of trade, measured as the ratio of unit value of exports over unit value of imports; $(GDPTP)$ represents the major trading partners’ trade-weighted GDP; (TCR) is the trade credit; and $\Delta(DGDP * TCR)$ represents the interactive variable of domestic GDP and trade credit; (e) is the error term and is assumed to have 0 mean, constant variance and not be autocorrelated. Note: $i = 1, 2$.

Theoretically, I expect $\left(\sum_i \delta_i \right)$ to be positive. A rise in the terms of trade (TOT) should have a positive impact on export growth. The inclusion of (TOT) allows us to capture the impact of

price, including exchange rate, shocks in the global market. Similarly, fluctuations in external demand would have consequences on export performance. To account for the external demand, ($GDPTP$), the trade-weighted trading partners' GDP is included in the regression model (Equation 1). The rise in the purchasing power of trading partners, reflected by a positive growth of ($GDPTP$), should lead to a higher demand for export products. Hence, $\left(\sum_i \theta_i\right)$ is expected to be positive. The importance of external demand shocks has been shown to be very significant in recent works by Freund (2009) and Freund and Klapper (2009).

Next, a sharp decline in trade credit (TCR) is likely to have a number of adverse consequences and to disrupt trade and growth performance (Wang and Tadesse, 2005). As already discussed, the availability of trade credit should enable export producers to meet demand. The loss of liquidity in the trade sector may also force exporters (and importers) to obtain spot foreign exchange to make necessary payments, thereby increasing demand in foreign exchange and possibly creating delays in payment. Furthermore, exports may have a high import content in some countries. In these cases, a collapse in import financing could end up adversely affecting exports. Hence, $\left(\sum_i \eta_i\right)$ is expected to be positive.

Finally, the impact of a trade financing shortage during a financial crisis on export performance would be likely to be more severe. As discussed, studies such as Braun and Larrain (2005) have demonstrated that during recessions the performance of an industry is heavily influenced by its dependence on the availability of finance. Moreover, the deeper the crisis (higher GDP loss) the further the tightening of credit, including trade credit, which in turn has a much more severe adverse impact on trade sectors.

To test the role of trade financing during the crisis on export performance, I introduce an interactive variable between the growth rates of domestic GDP and total trade credit $\Delta(DGDP * TCR)$. The growth rate of domestic GDP ($DGDP$) captures the boom and bust of the local economy. For this study in particular, the GDP growth captures the deepness of the economic slowdown/crisis. This series is adopted, instead of the frequently applied crisis dummy, to allow for a continuous time series. During a period of economic crisis, macroeconomic volatility sharpens and causes severe restrictions to firms' access to external

finance, especially from the banking sector (Braun and Larrain, 2005). This situation in turn raises the demand for trade finance, and thus enhances the role of trade finance in explaining export performance (Nielsen, 2002).

The adoption of this interactive variable has been reported in many studies, including recent work such as Dell’Ariccia et al. (2008) and Iacovone and Zavacka (2009). Finding a positive $\left(\sum_i \chi_i\right)$ suggests that during a crisis or economic slowdown the adverse impact of trade credit on the export sector would be more significant. Hence, this variable confirms the existence of a trade credit channel operating during a period of economic crisis. The case of Brazil in 2002, for instance, demonstrates that the initial impact of a drop in trade credit on export performance created further selling pressure on the local currency. In turn, it worsened external debt payment and increased country risk, leading to further cutbacks in all funding, including trade financing (Mori, 2005). Hence, $\left(\sum_i \chi_i\right)$ is expected to be positive.

3.2. Data and Empirical Testing

3.2.1. Data

Our quarterly observation covers the period from quarter 1, 1993 to quarter 2, 2009. The observation set is particularly dictated by the availability of trade credit/financing data for each country. The trade finance data series are all sourced from the respective central banks’ databases, namely Bank Indonesia, Bank of Thailand and Bank of Korea. The export series (X) is the total export in US dollars of Indonesia, Korea and Thailand. They are all from the CEIC database. The terms-of-trade series (TOT), calculated as the ratio of unit value of exports over unit value of imports, are gathered from the CEIC Asia database for Korea and Indonesia. The terms of trade data for Thailand, on the other hand, are obtained from the Bank of Thailand’s database. The real trading partner GDP ($GDPTP$) is the trade-weighted combination of the GDPs of the top 3 major export destination countries for each country included in our study. The ($GDPTP$) variable is calculated by the following standard formula:

$$GDPTP = \omega_1 GDPTP_1 + \omega_2 GDPTP_2 + \omega_3 GDPTP_3 \quad (2)$$

$$\omega_1 = \frac{X_1}{(X_1 + X_2 + X_3)} \quad (3)$$

$$\omega_2 = \frac{X_2}{(X_1 + X_2 + X_3)} \quad (4)$$

$$\omega_3 = \frac{X_3}{(X_1 + X_2 + X_3)} \quad (5)$$

where $(GDPTP_1)$, $(GDPTP_2)$ and $(GDPTP_3)$ are the GDPs for trading partner countries #1, #2 and #3, respectively. Accordingly, $(\omega_1, \omega_2, \omega_3)$ are the trade weights for trading partners #1, #2 and #3, respectively. Finally, (X_1) , (X_2) and (X_3) are the exports of Indonesia, Korea and Thailand, individually, to each country's respective 3 major trading partners. For all 3 countries in our study, the first 2 major export destinations during our sample period are the United States of America and Japan. The People's Republic of China has emerged as a key trading partner for Indonesia, Korea and Thailand in recent years.⁴ However, as I do not have a complete set of quarterly GDP data for China, Korea is listed as the third partner for Indonesia and Thailand. For Korea, Germany is the third major export destination. The raw data needed to construct the real trading partner GDP are sourced from the CEIC database.

The variable $\Delta(DGDP * TCR)$ is computed as the first difference of the product of the quarterly domestic GDP ($DGDP$) and the quarterly trade credit (TCR) for each country included in our study. The domestic GDP series are adopted from the CEIC Asian database. All variables in regression equation (1) are log-normalized.

3.2.2. Empirical Testing

In this study, I employ the frequently applied ARDL (Autoregressive Distributed Lag) testing with the general-to-specific approach (Hendry, 1976).⁵ The ARDL testing includes lags up to 4 quarters.⁶ The combination of the ARDL and the general-to-specific approach allows us to start

⁴ For Indonesia and Thailand, Singapore has also been a key trading partner and a primary export destination. However, as exports to Singapore from these two economies are largely re-exported and Singapore is not the final main destination of the export goods, I do not include Singapore.

⁵ The application of the ARDL approach with the general-to-specific approach is common. Recent studies applying the ARDL framework include Siregar and Goo (2010), Campa and Goldberg (2002) and Gagnon and Ihrig (2004).

⁶ Because of the degree of freedom, I only consider 4-quarter lags. Pesaran and Shin (1999) suggested up to two lags for annual data. Since I work with quarterly data, I expanded the lags to four.

from the general model by including all key explanatory variables and their time lags supported by various theoretical frameworks. The general-to-specific procedure is then adopted to reduce the complexity of the model by eliminating the statistically insignificant variables. This process should ensure the consistency of the final reduced model. The final outcomes of the ARDL and general-to-specific approach should enable us to capture not only the significant determinants and eliminate the insignificant ones, but to arrive at the number of lags/periods needed for the impacts of changes in the explanatory variables on the dependent variable.

Before conducting the ARDL testing, I test the unit root properties for each of the variables in Equation 1. To anticipate the possible presence of structural breaks, I employ Banerjee et al. (1992) (henceforth BLS) in addition to standard unit root tests, i.e. the ADF test, the Phillip–Perron test and the KPSS test.⁷ Depending on the unit root properties of the series, I then test for the possible cointegration relationship among the variables listed in Equation 1 at their levels. If a cointegration relationship is found, then the error correction component series (ECM_{t-1}) will be included in the ARDL testing.

A battery of test statistics will be reported to ensure that our coefficient estimates are valid and robust. In addition to the standard F-statistics to confirm the significance of one or more explanatory variables, I also report the Breusch–Godfrey serial correlation LM test statistics to verify that autocorrelations in the residuals are not a problem in any of the regressions.

4. Key Results and Lessons Learned

Based on our set of unit root tests, all relevant series are found to be non-stationary and integrated of order 1 at their level $I(1)$ series.⁸ Hence, I cannot rule out the presence of a cointegration relationship among the variables presented in Equation 1 for all 3 countries'. The standard Johansen cointegration test was carried out. Based on the trace statistics, no cointegration relationship is found at the 5% level of significance. I do however find a weak

⁷ The BLS provides a more in-depth investigation of the possibility that the aggregate economic time series can be characterized as being stationary around 'a single or multiple structural break'. It extends the Dickey–Fuller t -test by the construction of the time series of rolling computed estimators and their t -statistics. Following the BLS procedure, I compute the smallest (minimal) and the largest Dickey–Fuller t -statistics.

⁸ For the sake of brevity, the test results of the unit root testing are not reported but are available upon request.

cointegration relationship at 10% for Indonesia. The number of lags included in the cointegration for each country case is determined by the Akaike Information Criterion (AIC).⁹

The overall ARDL test results are reported in Tables 3–5. The adjusted R^2 values suggest that the explanatory variables can clarify around 44 to 55 percent of the quarterly changes in the export values of these 3 economies, with Korea having the largest adjusted R^2 and Indonesia the smallest. The F-statistics confirm that one or more of the independent variables are non-zero. In addition, the Breusch–Godfrey serial correlation LM test statistics confirm that no autocorrelation in the residuals is found in any of the 3 regressions. All key explanatory factors, namely income, terms of trade and trade financing, contribute at 10 percent or more significance level to the ups and downs of export values of these countries. In addition, I find the coefficient estimates of these key factors to be theoretically consistent.

Several key lessons from the experiences of these 3 countries can be highlighted from the ARDL test. First, trade financing has a positive effect on exports, as theoretically expected. However, the size and significance of the estimated parameters vary significantly from one country to another. Based on the sum of the coefficient estimates

⁹ Based on the AIC, each of the cointegration tests includes around 2 to 3 quarter lags. No robust cointegration relationship is reported at the 5% significance level from any of the 3 countries' test results. For Indonesia, I do find a weak cointegration relationship at the 10% level when I consider lags at least for 4 quarters. I included the error correction component for the case of Indonesia, but did not find the variable to be significant at the 10% significance level.

Table 3. IndonesiaDependent Variable: (ΔX)

Variable	Coefficient	Std. Error	t-statistics
(ΔTOT_t)	0.713	0.341	2.091**
(ΔTCR_t)	0.744	0.132	5.633***
(ΔTCR_{t-1})	-0.875	0.149	-5.876***
(ΔTCR_{t-4})	0.172	0.077	2.220**
$(\Delta GDPTP_{t-2})$	0.960	0.365	2.633**
$\Delta(DGDP*TCR)_{t-1}$	-1.784	0.494	-3.612***
(α)	0.021	0.009	2.369**
Adjusted R-squared: 0.443		Prob (LM test): 0.409	
F-statistics: 8.677		Prob (F-statistics): 0.000	

Note: * significant at 10%; ** significant at 5%; and *** significant at 1%.

Source: Author's own calculations.

Table 4. KoreaDependent Variable: (ΔX)

Variable	Coefficient	Std. Error	t-statistics
(ΔX_{t-1})	-0.208	0.114	-1.181*
(ΔTOT_{t-1})	0.725	0.287	2.525**
$(\Delta GDPTP_{t-1})$	0.986	0.481	2.050**
(ΔTCR_t)	0.437	0.195	2.239**
(ΔTCR_{t-2})	0.393	0.195	2.008**
$(\Delta DGDP * \Delta TCR)_t$	3.749	1.679	2.231**
$(\Delta DGDP * \Delta TCR)_{t-2}$	4.162	1.659	2.507**
(α)	-0.025	0.015	-1.686*
Adjusted R-squared: 0.468		Prob (LM test): 0.747	
F-statistics: 7.921		Prob (F-statistics): 0.000	

Note: * significant at 10%; ** significant at 5%; and *** significant at 1%.

Source: Author's own calculations.

Table 5. ThailandDependent Variable: (ΔX)

Variable	Coefficient	Std. Error	t-statistics
(ΔTOT_{t-3})	0.572	0.288	1.980**
$(\Delta GDPTP_{t-1})$	1.189	0.240	4.945***
(ΔTCR_t)	0.223	0.075	2.962***
(ΔTCR_{t-1})	0.242	0.074	3.286***
$(\Delta GDP * \Delta TCR)_{t-1}$	-3.874	1.430	-2.708***
$(\Delta GDP * \Delta TCR)_{t-2}$	4.141	1.515	2.734***
(α)	0.004	0.006	0.681
Adjusted R-squared: 0.559		Prob (LM-test): 0.112	
F-statistics: 13.172		Prob (F-Statistics): 0.000	

Note: * significant at 10%; ** significant at 5%; and *** significant at 1%.

Source: Author's own calculations.

of (TCR) , $\left(\sum_i \eta_i\right)$, the role of trade credit on export performance is found to be the largest for Korea, and the least for Indonesia. This finding supports the claim that exporters in countries with a more developed financial system are perceived to be more reliable and thus have access to more trade credit (Iacovone and Zavačka, 2009). As discussed, the ratio of trade credit over exports for Korea is relatively more significant than reported for Thailand and Indonesia (Figure 4).

Looking at the significant lags of $\left(\sum_i \eta_i\right)$, I can also conclude that the consequences of falling trade credit would immediately be felt and would influence the export performance of these economies within the same quarter (t). The results seem to also suggest that the impact of trade finance on exports is most persistent in the case of Indonesia – up to 4 quarters ($t - 4$).

Among the 3 primary determinant factors, namely price, income and trade financing, income effect has been consistently the most significant determinant of the export performance in all 3 countries. The size of the coefficient estimate for $(GDPTP)$, $\left(\sum_i \theta_i\right)$, suggests that the full

implication of income movement is felt on the export demand within the first quarter. That is, a rise of 1 percent in a trade-weighted trading partners' GDP would result in an average of about 1 percent increase in export demand, and vice versa. The most significant income impact is reported in the case of Thailand, with the size of the coefficient estimate to be significantly larger than 1 (Table 5). This seems to support the World Bank's finding that a major factor explaining the fall in world trade in general (including in Asia) is the falling international demand or the "income effect" (Auboin, 2009).

Finally, test results for all 3 countries confirm the claim that the deeper the crisis, the more significant the adverse consequence of trade credit collapse ($\Delta(DGDP * TCR)$) on the export sector. Even more interesting to note here is that the results suggest that the effect of a financial crisis is deeper in countries with a more developed financial system. The sum of the coefficient estimates for variable ($\Delta(DGDP * TCR)$) is the largest for the case of Korea. This general finding is consistent with Kroszner et al. (2007). However, most importantly, this result substantiates the importance of the stage of financial development in linking the financial sector to the real sector, particularly the trade sector.

Suffice to say that our results have confirmed the role of terms of trade in influencing export activities in these major Asian economies. Looking at the sum of the coefficient estimates for the variable (TOT) for each country, it is apparent that the price factor is particularly important for Indonesia. The coefficient estimate for this country is not only significant and relatively large, but it also suggests that the impacts of global price change on exports are immediately felt within the same quarter. This appears to be consistent with the nature of Indonesian exports, which have predominantly been primary commodities.

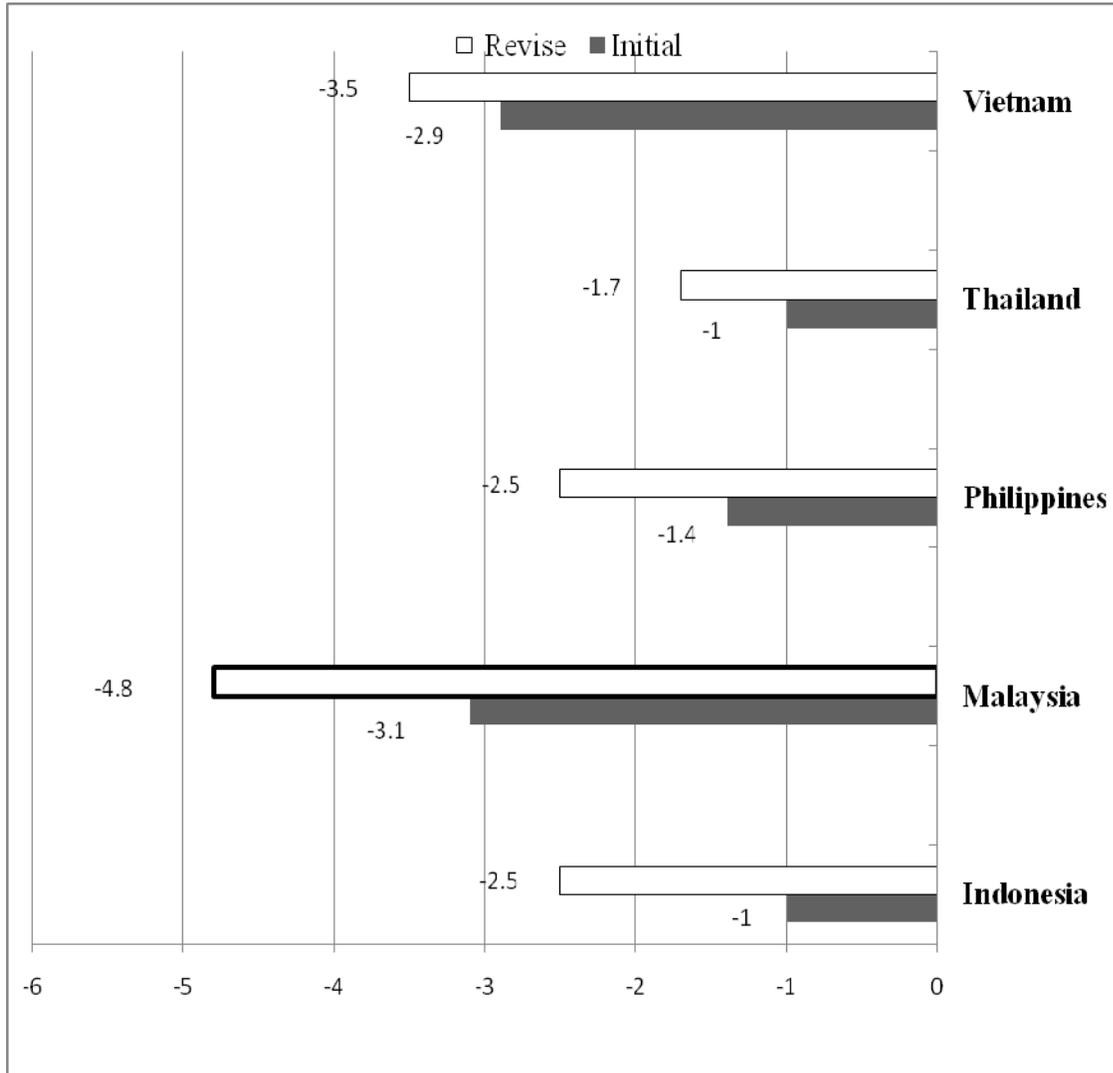
5. Financial Crisis and Trade Sector Linkages: Have the Stimulus Policy Responses Been Appropriate?

The recent global financial meltdown presented the emerging market economies (EMEs) with 2 shocks: a 'sudden stop' of capital flows driven by the deleveraging, and a collapse in export demand associated with the global slump. The past episodes of sudden stops have demonstrated that countries with tighter fiscal policy experienced sharper contractions than those with a looser

stance (Ortiz et al., 2009). In particular, given the limitation of monetary policy discussed earlier, the role of fiscal stimulus is critical, not only in terms of minimizing the impacts of the crisis, but more importantly in stimulating economic recovery. Therefore, it is not a surprise that a similar measure would be pursued during the recent GFC. However, one of the hallmarks of the GFC is the unprecedented size of fiscal and monetary policies carried out by countries, and in some cases done in a coordinated fashion, around the world.

Among the 3 economies included in this study, Korea has been the most aggressive. The country's overall fiscal balance was still positive at 1.2 percent of GDP in 2008 but by the end of the first half of 2009 it reported an overall deficit balance of around 5 percent of GDP. On the other hand, the governments of Indonesia and Thailand both expanded their stimulus measures in 2009. The Ministry of Finance of Indonesia initially aimed at a very modest budget deficit of around 1.0 percent of GDP in 2008, but eventually decided to double the stimulus package in early 2009 to a deficit of around 2.5 percent of GDP. Similarly, Thailand stepped up its fiscal expansion target to -1.7 percent of GDP in 2009 from a mere -1.0 percent in 2008. In fact, a number of Southeast Asian economies pursued these expansionary efforts in a consistent manner regionally (Figure 5). In general, the fiscal stimulus of the Asian economies involved both expansion on the expenditure side and reduction of a number of key tax rates. To support the activities of firms, especially small and medium firms, the governments of these 3 economies extended tax cuts and other forms of investment funds. A significant number of these small and medium enterprises are export-oriented firms.

Figure 5. Budget Deficit as Percent of GDP for Selected Southeast Asian Economies



Source: Bloomberg, CEIC Asia Database.

In addition, a number of monetary policy expansionary measures have accompanied fiscal expansion in most emerging markets in Asia. As in advanced economies, the basic thrust of the monetary policy in our 3 major Asian economies is to ease the impacts of the deleveraging process in the global economy on domestic liquidity, and to help mitigate the full implications of the sub-prime crisis on the real sectors of the economy. To start, most Southeast and East Asian economies lowered their policy rates considerably. Indonesia, for instance, reduced its policy rate from 9.5 percent in December 2008 to 6.5 percent in August 2009. Similar policy measures were reported in other major SEACEN economies, including Thailand, Malaysia and Korea. For

some of these economies, the rates by end of the 3rd quarter of 2009 hovered around the lowest ranges reported for a long time, between 1 and 2 percent.

Beyond the standard interest rate policy and reserve requirement adjustments, to further stimulate their credit markets, the Asian central banks have also adopted a number of 'quantitative measures', including various 'credit easing' (CE) and 'quantitative easing' (QE) policies. Korea has been among the most active in employing various CE and QE measures. To instill market confidence and financial sector stability, the Korean government, together with the Bank of Korea, guaranteed repayment of banks' external borrowings; extended foreign currency liquidity through foreign exchange swaps; provided liquidity to domestic banks, including those of the Korean branches of foreign banks; and instituted tax exemptions for foreign investment in Korean treasury bonds and monetary stabilization bonds.

Have these stimulus policies been appropriate to mediate the impacts of the global financial crisis on the exports of these 3 economies? To address this important policy question, one needs to first review and understand various possible channels of transmission of a financial crisis to trade contraction. Borrowing the analyses of Bayoumi and Melander (2008), one common feature of a financial crisis is the presence of much tighter banking credit. Often this tightened credit can be explained by 2 sequential factors. The first is due to adverse shocks to the bank's capital position. To avoid further deterioration of their balance sheets, banks often tighten their lending standards, which results in further tightening credit availability. The drying up of bank lending has been linked to the tightening up of trade credit (Borensztein and Panizza, 2006; Braun and Larrain, 2005; Dell'Ariccia et al., 2008).

The analyses above suggest that the stimulus packages have been appropriate policy responses. With the clear objectives of ensuring continuous flows of bank credit and adequate foreign exchange supply in the local market during the difficult period of the GFC, the stimulus policies have probably contributed to less severe declines in trade financing, especially for Indonesia and Korea (Table 2). However, further in-depth studies are required to examine more closely the components of export credits/trade financing to better understand the role of stimulus policies in mediating the adverse consequences of the recent global financial meltdown on trade financing in our Asian economies.

6. Concluding Remarks

Trade finance has long been an important component of international financial flows, but has often been overlooked. However, during the 1997 financial crisis the important contribution of trade credit to export performance was finally fully appreciated when the major trade-dependent economies of East and Southeast Asia saw their trade sectors shrink and further worsen the balance-of-payment crisis. My study covers the period from the pre-1997 financial crisis to the recent sub-prime crisis. Extending early works, I focus on the experiences of Indonesia, Thailand and Korea, individually. By adopting time series data for each country case, and not the panel data of the early works, a number of cross-country experiences can be compared and contrasted.

In general, my findings confirm the critical role of trade credit in explaining export performance of the 3 economies. However, the impacts of trade financing on export demand differ from one country to another. The experiences of the 3 countries included in this study seem to suggest that the more developed is a country's financial sector, the more significant the role of trade financing is likely to be. As expected, the adverse consequences of a fall in trade credit on export performance amplify during a financial crisis. This last finding confirms the importance of a crisis contagion channel from the financial sector to the real sector of the economy.

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