

# What Makes Resilient Developing Asia in a Financially Globalized World?

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## Abstract

The recent global financial crisis in 2008 has brought renewed attention to the role and benefits of financial globalization. Our empirical analysis examining the link between capital account openness and output volatility reveals that a developing country with a more open capital market can mitigate output volatility depending on other conditions. We found that countries can mitigate or reverse the potentially destabilizing effect of financial liberalization, if they were equipped with highly developed financial markets, particularly of banking and stock markets. Countries with underdeveloped financial markets, on the other hand, will have to experience greater output volatility if they implement financial liberalization. Pursuing greater exchange rate stability while having a medium level of financial development can be destabilizing output movement, but its destabilizing effect can be alleviated by holding a sufficiently high level of foreign reserves. Asian emerging market countries, our group in focus, appear to be successful in preventing international macro policies from becoming destabilizing factors with their relatively highly developed financial markets and a massive amount of international reserves holding.

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## 1. Introduction

The issue of financial globalization has received much attention since the 1997 Asian financial crisis. Economists have argued that, while it may lead to more efficient allocation and increased accessibility of capital, financial liberalization could expose economies to volatile cross-border capital flows, including sudden stops or reversals of capital flows, thus making economies face boom-bust cycles (Kaminsky and Schmukler 2008).<sup>1</sup> Henry (2006) argues that financial integration could have a long-term effect on investment and output growth only when it fundamentally changes productivity growth through financial market development. Otherwise, the effect of financial liberalization would be short-lived at best. Reflecting the ambiguity of the potential impact of financial globalization, empirical evidence has been mixed at best (Kose et al. 2006, Obstfeld 2008). Nonetheless, cross-border financial flows continue to surge, strengthening the inter-linkages of economies and markets in both advanced and developing worlds. Developing Asia is no exception; the region experienced a surge in capital inflows from 2002 through 2007, eightfold from \$45 billion to \$363 billion.

The current global financial crisis, however, has only helped further kindle the debate about the role of financial globalization. Although Asia is not the epicenter of the crisis this time, it has received much attention because the region has been perceived as the main contributor to the “global imbalances”; Asian countries have financed the profligacy of advanced countries, especially the United States, with their current account surpluses, i.e., excess savings, through holding a sizeable amount of international reserves. These countries’ financial systems have been also under critical scrutiny because, allegedly, they are not developed or open enough to direct domestic saving into investment needs within the country or the region while exporting liquidity abroad.

In the current global crisis, Asia has also received spotlight for another reason. Although many of the economies in the region were significantly affected by the waves of the global crisis through plummeted demand for their exports from the industrial world, most of the economies in the region recovered quickly showing strong signs of growth while some other parts of the world are still trying to walk out of the shadow of the crisis. In fact, the V-shaped recovery in Asia, if there is, will not be unprecedented; despite a severe output contraction in 1998, many economies in the region recovered quickly and robustly in the immediate aftermath of the Asian crisis of

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<sup>1</sup> For a summary on the cost and benefits of financial liberalization, refer to Henry (2006) and Kose et al. (2006).

1997-98. Figure 1 shows that, interestingly, Asian emerging market economies have maintained relatively stable economic growth (in terms of the standard deviations of per capita output growth rates), at low levels comparable to those of the industrialized economies. The Asian experience of relatively stable economic growth and its robustness in the midst of the global crisis may present some lessons for other countries, especially developing ones, about how to navigate through the world that has been increasingly becoming more interlinked through more integrated financial markets.

In this paper, we pay close attention to the role of domestic financial development as one of the keys to achieving stable economic growth in a financially globalized world. We examine this issue in the context of the famous hypothesis in international finance, the “impossible trinity” or just “trilemma.” The hypothesis states that a country may simultaneously choose any two, but not all, of the following three goals: monetary independence, exchange rate stability, and financial integration. This concept, if valid, is supposed to constrain policy makers by forcing them to choose only two out of the three policy objectives. Given that Asian emerging market economies have collectively outperformed other developing economies in terms of output growth stability, it is possible that their international macro-policy management, determined within the constraint of the trilemma, has contributed to preparing these economies for higher output vulnerability, possibly exacerbated by recent globalization. Financial development in these economies may also have contributed to the well-functioning of their international macro-policy management.

In this paper we examine these issues following the estimation model of Aizenman et al. (2008). That is, to add cross-country and time dimension to the analysis, we conduct panel data analysis, and also, use the “trilemma indexes” developed by Aizenman et al. (2008) that measure the extent of achievement in each of the three trilemma policy objectives. In our estimation efforts, we will investigate how domestic development and global liberalization of financial markets interact with international macro-policy configurations while examining how the trilemma policy configurations affect output volatility.

Section 2 reviews how financial integration has progressed in the developing world, especially Asia, and looks into how the process of financial integration interacted with the cross-border flows of capital and output performance. Section 3 presents empirical estimations to examine the impacts of financial integration on output volatility. Section 4 extends the empirical

model to look closely into the role of financial development in helping the Asian region benefit from financial globalization. The final section provides conclusion and policy inferences.

## **2. Financial Globalization and Economic Instability**

### **2.1 Some Snapshots of Financial Globalization**

There is no question that financial globalization is proceeding across countries, including developing ones. In the literature, many authors have created metrics to measure the degree of financial openness. Roughly speaking, the measures of financial openness can be categorized into two groups: “de facto” and “de jure” measures. De facto measures show the actual flows of capital, such as the sum of external assets and liabilities, and normalize them with a numeraire, often GDP. De jure measures are usually constructed using the information on regulatory restrictions on cross-border capital transactions found in the *Annual Report on Exchange Arrangements and Exchange Restrictions* published by the International Monetary Fund. Although both types of measures have their own merits and demerits, regardless of the type, the measures of financial openness usually show many countries have been moving toward more financially open and integrated world (see Chinn and Ito (2008) as an example for the extent of financial globalization based on a de jure measure of financial openness and Lane and Milesi-Ferretti (2006) for the one based on a de facto measure of financial openness).<sup>2</sup>

Figure 2 shows the averages of the Chinn-Ito index (2006) of financial openness for different country groups. This figure confirms that not only industrialized countries but also developing ones are moving toward higher degrees of financial openness. Among developing countries, emerging market economies in Asia (“EMG Asia”) maintained relatively high levels of financial openness before the 1990s, but retrenched their openness after the late 1990s and started coming back after 2000. Latin American economies seem to have the opposite experience; after retrenchment in the 1980s, mostly as a backlash from the debt crisis in the beginning of the decade, they liberalized their financial markets in the early 1990s and have achieved relatively high levels of financial openness among developing countries.

As countries become more intertwined with each other through financial markets, there is a concern that cross-border capital flows also become more volatile. In fact, Figure 3 shows

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<sup>2</sup> De facto measure is subject to fluctuations in prices and output, while the de jure measure is affected by the degree of enforcement of the controls. For discussions on different measures of financial openness, refer to Chinn and Ito (2008) and Henry (2006).

that for all types of cross-border capital flows, FDI, portfolio investment, and “other” capital flows (which usually captures bank lending in the IMF’s statistics), the above statement seems to hold. In the figure, the standard deviations of cross-border capital flows, FDI, portfolio investment, and “other” capital flows (all extracted from the IMF’s *International Financial Statistics* and normalized by nominal GDP) over moving seven-year windows are displayed as the measure of volatility in each type of cross-border capital flows for different country groups. For most of the country groups and the different types of cross-border capital flows, the level of volatility appears to be rising since the late 1990s, which corresponds to the time period of faster financial liberalization shown in Figure 2.<sup>3</sup> Also, another interesting characteristic of the figure is that for the last decade or so, there is no discernable difference in the level of volatility among the developing country groups in each type of cross-border capital flows. As has been believed widely, the level of volatility is the lowest for FDI flows among the three types while it is the highest for bank lending flows. The volatility level of portfolio investment flows is not as high as that of bank lending flows though portfolio investment flows are often viewed as part of the presumably volatile “hot money” along with bank lending.

Is the increased volatility in cross-border capital flows caused by regulatory changes toward financial globalization across countries? Figure 4 provides some ideas to answer this question. The change in the level of volatility of all types of net capital inflows combined over the 10-year period of 1996-2006 is plotted against the change in the level of de jure financial openness measured by the Chinn-Ito index (*KAOPEN*) over the same period for only developing countries. The correlation appears to be weakly positive for the entire group of developing countries.<sup>4</sup> However, the extent of positive correlation seems to be more pronounced among non-emerging market economies. Figure 5 shows that the level of output volatility and the level of volatility of cross-border capital flows are weakly correlated for both EMG and non-EMG countries. These findings suggest that there can be some factors that may prevent financial liberalization, in terms of regulatory relaxation on cross-border capital flows, from exerting a potentially volatility-increasing effect onto macroeconomic performances.

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<sup>3</sup> The rapid rise and fall of the volatility of net “other” inflows for the “Other” country group in the 1990s is mainly driven by countries in the middle-east and northern African region.

<sup>4</sup> However, it must be noted that the fitted lines in the figure is merely equivalent to unconditional correlation given the lack of other control variables.

As we examine more formally, we suspect that development of domestic financial markets may be the factor that helps mitigate the volatility that may arise from financial liberalization, or other international macro-policy arrangements. There are several channels through which financial development may help mitigate increased volatility that can arise due to liberalization of financial markets. More developed financial markets can help restoring the pricing of financial assets, so that disturbed financial markets, possibly due to regulatory changes in financial markets or other external shocks, can restore normalcy more quickly if assets can be rightly priced. Also, more developed financial markets usually provide more liquidity. High levels of liquidity should help financial markets restore normalcy even if cross-border capital flows become more volatile. Hence, more developed financial markets may help alleviate the volatility that may arise from more open financial markets. The volatility-mitigating effect can be expected in conjunction with other macro-policy arrangements as well.

### 3. Empirical Analysis

#### 3.1 The Estimation Model

We now examine the impact of financial openness, external financial flows, and financial development on output volatility. For this purpose, we base our estimation model on that of Aizenman et al. (2008), because we are interested in the interactions of the variables of our interest in a globalized context where institutions or policies cannot be determined independently from other macroeconomic policy objectives. According to the trilemma hypothesis, policy makers must face a trade-off of choosing two out of the three policies: monetary independence, exchange rate stability, and financial openness. Hence, we need to control properly constraints to the trilemma policy choices.

Our benchmark estimation model is given by:

$$y_{it} = \alpha_0 + \alpha_1 TLM_{it} + \alpha_2 IR_{it} + \alpha_3 (TLM_{it} \times IR_{it}) + ExtFin_{it}'\Theta + X_{it}'B + Z_t'\Gamma + D_i'\Phi + \varepsilon_{it} \quad (1)$$

$y_{it}$  is the measure for macro policy performance for country  $i$  in year  $t$ , i.e., output volatility, that is measured as five-year standard deviations of the growth rate of per capita output.  $TLM_{it}$  is a vector of any two of the three trilemma indexes that measure the extent of achievement in the three policy goals: monetary independence (MI), exchange rate stability (ERS), and financial

openness (KAOPEN).<sup>5</sup>  $IR_{it}$  is the level of international reserves (excluding gold) as a ratio to GDP, and  $(TLM_{it} \times IR_{it})$  is an interaction term between the trilemma indexes and the threshold variables that may allow one to observe whether they complement or substitute for other policy stances.

$X_{it}$  is a vector of macroeconomic control variables that includes the variables most used in the literature. It includes relative income (to the U.S.—based on the Penn World Tables per capita real income), its quadratic term, trade openness, the terms-of-trade shock (defined as the 5-year standard deviation of trade openness times terms-of-trade growth), fiscal procyclicality (defined as the correlations between Hondrick-Prescott [HP]-detrended government spending series and HP-detrended real GDP series), M2 growth, the inflation rate, and inflation volatility. We measure the level of financial development primarily by private credit creation (as a ratio to GDP, or  $PCGDP$ ) and include it in the vector  $X$ .  $Z_t$  is a vector of global shocks that includes changes in U.S. real interest rate, world output gap, and relative oil price shocks (measured as the log of the ratio of the oil price index to the world's consumer price index).  $D_i$  is a set of characteristic dummies for oil-exporting countries and regions.  $\varepsilon_{it}$  is an independently identically distributed error term.

The estimation model includes a vector,  $ExtFin_{it}$ , of external finances, that includes net foreign direct investment (FDI) inflows, net portfolio inflows, net “other” inflows (which mostly include bank lending), short-term debt, and total debt service. For net capital flows, we use the *International Financial Statistics* (IFS) data and define them as external liabilities (= capital inflows with a positive sign) minus assets (= capital inflows with a negative sign) for each type of flows.<sup>6</sup> Short-term debt is included as the ratio of total external debt and total debt service as is that of gross national income (GNI), both retrieved from the World Development Indicators (WDI) dataset.

The sample period is 1972 – 2006 and the dataset is organized into 5-year panels of 1972–1976, 1977–1981, 1982–1986, 1987–1991, 1992–1996, 1997–2001, and 2002–2006. All time-varying variables are included as 5-year averages.<sup>7</sup> The regression is conducted for the

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<sup>5</sup> Aizenman et al. (2008) have shown that these three measures of the trilemma are linearly related. Therefore, it is most appropriate to include two of the indexes simultaneously, rather than individually, or all three jointly. That means that for each sample, three types of regressions, i.e., those with three different combinations of two trilemma variables, are estimated.

<sup>6</sup> Negative values mean that a country experiences a net outflow capital of the type of concern.

<sup>7</sup> The variable for relative income and its quadratic terms are sampled from the initial year of each five-year panel.

group of developing countries (LDC). Given that a group of developing countries recently emerged as major players in the world economy, and that these countries share some commonality among them (in terms of high levels of institutional development and/or high degrees of economic openness, etc.), we also focus on a subgroup of developing countries with emerging markets, or just emerging market economies (EMG).<sup>8</sup> Robust estimation is conducted to downweigh outliers that can arise in both the dependent variables and explanatory variables.<sup>9</sup>

### 3.2 Estimation Results for the Basic Model

The estimation results for our benchmark model are shown in Table 1 (columns (1) through (3) for developing countries and columns (4) through (6) for emerging market countries). Overall, macroeconomic variables retain the characteristics consistent with what has been found in the literature. In the regression for output volatility, the higher the level of income is (relative to the U.S.), the more reduced output volatility becomes, though the effect is nonlinear. Output volatility could also increase with a change in U.S. real interest rate, indicating that the U.S. real interest rate may represent the debt payment burden on these economies. The higher the terms of trade (TOT) shock, the higher the output volatility that economies experience (consistent with Rodrik, 1998 and Easterly, et al., 2001). Economies with procyclical fiscal policy tend to experience more output volatility. The results on the macro variables hold qualitatively for the subsample of emerging market economies though the statistical significance tends to appear weaker.

Financial development *per se*, as one of the variables of our focus, does not seem to contribute to output volatility; the effect is not only statistically insignificant but also quite small. However, it may help the functioning of other variables. We will focus on the interactive effect of it with other policy arrangements in a later section.

Among the trilemma indexes, financial openness is negatively associated with output volatility in developing countries though it is not found to be significant among emerging market countries. The result is independent of whether it is paired with monetary independence or exchange rate stability. Interestingly, exchange rate stability is found to destabilize output

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<sup>8</sup> The "emerging market" economies are defined as the countries classified as either emerging or frontier during 1980–1997 by the International Financial Corporation. For those in Asia, emerging market economies are "Emerging East Asia-14" defined by Asian Development Bank plus India.

<sup>9</sup> Explanatory variables that persistently appear to be statistically insignificant are dropped from the estimation.



movement in both samples.<sup>10</sup> At the same time, the interaction term between this variable and the one for foreign exchange reserves is found to have a statistically negative effect, suggesting that countries can cancel or reverse the destabilizing effect of pursuing greater exchange rate stability if they hold higher levels of foreign reserves than a threshold. Based on the estimation result, the threshold to reverse the destabilizing effect of exchange rate stability is about 20% of GDP.

This finding has a significant relevance to Asian economies. Figure 6 shows ERS and foreign reserves as a percent of GDP (IR) in Asia and other countries. In the period 1990-2008 the average level of exchange rate stability for emerging market and developing Asia is higher than that for emerging market Latin America and European countries, but lower than the group average for developing countries and other subgroups. At the same time, the ratio of international reserves holding for emerging market Asian economies is much higher than in all other regions except the Middle East, and much greater than the threshold level of about 20%. These panels of figures reflect that developing Asian economies have pursued international macroeconomic policies that allow their massive IR holding to reduce the level of output volatility.<sup>11</sup>

Among the disaggregated capital flow variables, bank lending (i.e., “other” capital flows in the IFS dataset) and net portfolio investment tend to have a statistically positive impact on output volatility. In other words, the more bank loans or net portfolio inflows a country receives, the more likely it is to experience higher output volatility—consistent with the “hot money” argument regarding cross-border, short-term capital flows such as bank lending and portfolio investment. FDI flows do not appear to have any significant impact on output volatility. At the very least, this type of capital flows does not necessarily destabilize the economy.

### **3.3 Further Analyses: Interactions Between Financial Development and Cross-border Capital Flows**

In the previous exercise, financial development, measured in terms of private credit creation (as % of GDP: *PCGDP*), turns out to be statistically insignificant. The statistical

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<sup>10</sup> This result is consistent with Edwards and Levy-Yeyati (2005) and Haruka (2007), both of which find conversely that more flexible exchange rate regimes are associated with smaller output volatility.

<sup>11</sup> Based on the estimation result, for example, Singapore—a country with a middle level of exchange rate stability (0.5 in 2002–2006) and a very high level of international reserve holding (100% of GDP)—is able to reduce output volatility by 2.7–2.9 percentage points while China, whose exchange rate stability index is as high as 0.97 and whose ratio of reserves holding is 40% of GDP, is able to reduce volatility by 1.4–1.7 percentage points.

insignificance of financial development could illustrate that financial development can be a double-edged sword. That is, although further financial development may enhance output growth and stability by ameliorating information asymmetry, enabling more efficient capital allocation, and allowing for further risk sharing, it can also expose economies to high-risk, high-return financial instruments, thereby involving the possibility of amplifying real shocks and/or falling into the boom-bust cycles. Thus, ambivalence continues to hold for the effect of financial development on macroeconomic performance.<sup>12</sup>

Although we do not find any impact of financial development alone, we still suspect that financial development can interact with other international macroeconomic policies and affect output volatility indirectly. This attempt is based on our anecdotal observation that policy makers seem to incorporate the level of financial development as one of the important factors in their decision-making process. For example, China has been alleged to pursue closed financial markets with exchange rate stability as precautionary measures to protect its underdeveloped financial system, suggesting that the degree of financial development could affect the macroeconomic performance of the economy.<sup>13</sup> In addition, some argue that a newly liberalized and still underdeveloped financial system tends to be vulnerable to external shocks and experience financial fragility (Demirguc-Kunt and Detragiache 1998). The economy will suffer more especially when the financial fragility is coupled with a currency crisis (Hutchison and Noy, 2005). Hence, we need to be informed of how these variables could collectively affect the economy.

### ***3.3.1 Interactions between Trilemma Policies and Financial Development***

Let us first examine how trilemma configurations can interact with the level of financial development. There is no question that monetary policy with high levels of authorities' independence, which we found to be volatility-reducing, should work better with more developed financial markets. Exchange rate stability, which can lead to higher output volatility, may be less disturbing if financial markets handle capital allocation more efficiently. Financial

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<sup>12</sup> Levine (2005) summarizes theoretical predictions and empirical literature on the link between financial development and economic growth.

<sup>13</sup> See Prasad (2008) for the argument that China's policy of exchange rate stability and closed financial markets is impairing the country's macroeconomic management.

liberalization can easily be expected to work hand in hand with financial development to reduce economic volatility.

With these theoretical predictions, we test to see if there is any interaction between the trilemma indexes and financial development, which we measure using private credit creation as a ratio to GDP (*PCGDP*). The results turn out to be simply futile; when the previous output volatility regressions from Table 1 are repeated, including interaction terms between the trilemma indexes and *PCGDP*, none of the interaction terms turn out to be significant (not reported). These results are not surprising or discouraging, because, as we already mentioned, we suspect that the effect of financial development can be ambiguous.

The weakness of using interaction terms is that we must assume that the effect of *PCGDP* on the link between the trilemma indexes and output volatility is monotonic; a higher level of *PCGDP* must either enhance, have no impact on, or lessen the link. Given the insignificance of the interaction terms from the initial investigation, we suspect the nonlinearity of *PCGDP*.<sup>14</sup> Hence, we decide to use the dummy variables for different level groups of financial development. That is, *X-HI* is assigned a value of one for a country that has a measure of financial development (*X*) above the 75<sup>th</sup> percentile in the distribution of 5-year averages of *X* within a 5-year window, and zero, otherwise. *X-LO* takes a value of one if a country has a level of financial development below 25<sup>th</sup> percentile, and zero, otherwise. *X-MD* takes a value of one if a country's financial development level lies between 25<sup>th</sup> and 75<sup>th</sup> percentiles in a five-year period. We interact these level category dummies with the trilemma indexes and include the interaction terms in the output volatility regressions, hoping to capture the nonlinear effect of financial development on the link between the trilemma configurations and output volatility.

Table 2 reports the estimation results when private credit creation (*PCGDP*) is used as the measure of financial development (i.e.,  $X = PCGDP$ ), and it presents some interesting findings among emerging market economies. The estimated coefficient on the term “ERS x Medium *PCGDP*” is significant in columns 4 and 6. In column 6, the coefficient on “ERS x High *PCGDP*” is also significant, and both “ERS x Medium *PCGDP*” and “ERS x High *FD*” are

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<sup>14</sup> Hnatkovska and Loayza (2005) and Kose, et al. (2009) find the nonlinear effect of financial development especially in interaction with financial liberalization.

statistically greater than “ERS x Low *PCGDP*” in the estimates’ magnitude.<sup>15</sup> With these results, we can surmise that for countries with underdeveloped financial markets, higher levels of exchange rate stability do not lead to higher output volatility. Those with medium levels of financial development do seem to experience higher output volatility when they pursue a more stable exchange rate, suggesting that countries with newly developed financial markets can be volatile when they pursue greater exchange rate stability. Furthermore, interestingly, both columns 4 and 6 show that the estimated coefficients on the interaction term between ERS and IR are significantly negative. These estimates suggest that emerging market economies equipped with medium (or higher) levels of financial development could cancel or lessen the volatility-enhancing effect of ERS if they hold at least 21-26% of GDP of international reserves. However, this rule is not applicable to those with underdeveloped financial markets. This finding is consistent with the recent pile-up of international reserves by emerging market economies.

Deepening credit market and financial openness seem to have interesting interactive effects on output volatility, especially again among emerging market economies. Emerging market economies with medium or high levels of financial development tend to experience less output volatility when they decide to pursue greater financial openness. Shallow credit markets, on the other hand, are expected to experience greater output volatility. When the coefficient on “KAOPEN x Medium *PCGDP*” and “KAOPEN x High *PCGDP*” is compared to that of “KAOPEN x Low *PCGDP*,” the difference is found to be statistically significant. These results indicate that emerging market economies need to be equipped with deeper credit markets if they want to reap the benefit of financial liberalization on their output volatility. Having a higher level of financial openness and deep credit market can yield a synergistic impact to dampen output volatility, presumably by facilitating allocation of capital and ameliorating information asymmetry, thereby reducing the cost of capital. The worst and more significant case is that a country with shallow credit markets can exacerbate output volatility caused by financial liberalization. For developing countries, financial openness may be the volatility reducer when coupled with a high level of financial development—however, the relationship is weak.

Now, where do Asian economies stand? Figure 7 displays scatter diagrams for the average levels of financial openness and financial development since 1990 among different

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<sup>15</sup> The results are shown in the bottom part of Table 2 that reports the Wald test statistics for the tests on the differences in the estimated coefficients of the interaction terms between the trilemma indexes and different *PCGDP* level dummies.

group of economies. The vertical lines correspond to the 75<sup>th</sup> and 25<sup>th</sup> percentiles for the 2002-06 period. In the diagrams, we can see that the levels of financial development for the Asian economies are mostly above the 75<sup>th</sup> percentile for this time period. That means that Asian economies could lead financial liberalization to help reduce output volatility. For these economies, pursuing greater exchange rate stability could lead to greater output volatility especially when they are equipped with high levels of financial development as we found previously. However, this group of economies could lessen the link by holding a large amount of IR. In other words, their IR holding behavior can be interpreted as the facilitator for the synergetic relationship between financial development and financial openness while pursuing exchange rate stability. Other geographical groups of economies do not share these characteristics. The Latin American, Middle-East/North African, and East and Central European groups appear to have more economies whose levels of financial development fall in the medium-range that can be susceptible to greater output volatility with a policy of pursuing greater exchange rate stability. For the group of Sub-Saharan African economies, financial liberalization can increase output volatility, because the level of financial development is often found to be below the 25<sup>th</sup> percentile. Thus, financial development in the Asian economies seems to have provided favorable environment for reaping the benefit of financial liberalization.

So far, private credit creation has been used as the measure of financial development. However, as Beck, et al. (2001) and Levine (2005) discuss, private credit creation represents only one aspect of financial development. Moreover, it is likely that capital flows are influenced not only by the level of banking system development, but also by that of securities markets. Hence, we construct composite indexes as alternative measures of financial development that incorporate other types of financial development and re-estimate the regressions using the indexes instead of *PCGDP*.

Three composite indexes of financial development are tested. The first one (*FD1*) is the first principle component of private credit creation (*PCGDP*) and stock market capitalization (*SMKC*); the second one (*FD2*) of *PCGDP*, *SMKC* and stock market total value (*SMTV*); and the third one (*FD3*) of *SMKC* and *SMTV* which is supposed to measure the general level of stock market development. We will also test *SMKC* and *SMTV* individually to examine which variable is driving the performance of the composite indexes. Furthermore, we are also interested in analyzing the impact of bond market development. Therefore, we will test private bond market

capitalization (*PVBM*) and public bond market capitalization (*PBBM*) as well.<sup>16</sup> Using each one of the three composite indexes in place of *PCGDP*, the previous exercise will be repeated.

Table 3 summarizes the estimation results. In the table, each column reports the signs of the estimated coefficients of our focus for each different measure of financial development. When *FD1*, the composite index of *PCGDP* and *SMKC*, is used as the measure of financial development, we see that economies with high levels of financial development are able to reduce output volatility by retaining greater monetary autonomy. When financial markets are developed at the level of medium or higher, exchange rate stability could be volatility-enhancing, though the significant negative interactive effect between ERS and IR is detected again (not reported), indicating countries could mitigate the volatility-increasing effect by holding international reserves.

The estimations with *FD2* yield similar results. For emerging market economies, however, financial liberalization coupled with the low level of financial development can raise output volatility as was found in the estimation with *PCGDP*. The estimation results with the measure of stock market development (*FD3*) yield somewhat similar results although the volatility increasing effect of pursuing exchange rate stability with the medium-level of financial development is not found. Among the estimation results with different composite indexes, it is commonly found that if an economy with highly developed financial markets pursues *weaker* monetary independence and greater exchange rate stability, the economy is more prone to volatile output. Given that the trilemma variables are linearly related, a policy of weaker monetary autonomy and greater exchange rate stability also means a policy of greater exchange rate stability and financial openness such as currency union and currency board. Hence, this result implies that a developing country with a currency union or alike regime, if equipped with highly developed stock markets, can be more exposed to greater output volatility. Given the above estimation results, we can suspect that increased output volatility is potentially due to highly volatile capital flows that can be driven by the performance of stock markets, and also because of the lack of monetary independence to retain control over the economy.

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<sup>16</sup> All of these variables are normalized by GDP. Because stock market development-related variables are available after 1976 (and later years for many of developing countries), the sample size is affected. *PVBM* and *PBBM* are more restricted and available only after 1990 for a much smaller number of countries (especially for developing countries). Naturally, the changes in the sample size affect the magnitude and statistical significance of the estimated coefficients. For more descriptions on the dataset, refer to Beck et al. (2000). Ito and Chinn (2009) provide summary statistics with focus on East Asian economies.

The estimations with *SMKC* or *SMTV* yield similar results to those with the composite indexes. However, one interesting finding from the estimation with stock market capitalization (*SMKC*) is that a combination of financial liberalization and highly developed stock markets can allow a country to lessen output volatility, a result consistent with the previous estimation with *PCGDP*. This is another indication that financial liberalization needs to be hand-in-hand with financial development in both banking and equity sectors; financial development does not merely mean conventional financial intermediation through the banking system, but also includes more efficient resource allocation and portfolio diversification through stock markets.

The estimations with *PVBM* or *PBBM* do not yield any insightful results, primarily due to data limitations. However, this does not mean bond market development is not important. Figure 8 compares the level of financial development, measured by different aspects of the financial markets, across different groups of economies. In the figure, one can see that if the level of financial development is measured in terms of development in the banking sector or stock markets, the level of financial development of Asian emerging market economies is quite comparable to that of industrialized countries. However, (emerging) Asian economies lag behind the industrial countries in terms of bond market development. Clearly, in terms of both private and public bond markets, there is still room for Asian economies to catch up with the industrial countries. Eichengreen and Luengnaruemitchai (2004) argue that one of the reasons why bond markets are underdeveloped in Asia is ironically due to stable macroeconomic environment in the region. Since the Asian crisis of 1997-98, however, academia and policy makers argued the need for a fund of reserves that can provide liquidity support in the region, and consequently, debated actively the need for developing bond markets in Asia. The main motivations for advocating bond market development in the region can be twofold. First, more developed bond markets in the Asian region should promote more regional risk sharing, which has been advocated especially among policy makers as a lesson from the Asian crisis. Second, bond market development should contribute to alleviate the global imbalances by allowing Asian capital to be “recycled” within the Asian region. However, for now, the impact of bond market development and implications for Asia need to be discussed in a future research.

### ***3.3.2 Interactions between Financial Development and Different Types of Cross-border Capital Flows***

Previously, we have seen that net inflows of portfolio investment and bank lending can raise output volatility. We have also observed that *de jure* financial openness interacts with different levels of financial development differently. We now examine the interactions between financial development and external financing by extending the previous approach. The basic motivation for this exercise is that the conditions or the level of development in the recipient country of actual capital flows may matter for the way capital inflows affect the performance of the economy. Especially for developing countries, the conditions of recipient countries should matter.

Columns (1) through (3) in Table 4 show the estimated coefficients for the interaction terms between different types of net capital inflows and the dummies for different levels of financial development measured by private credit creation (*PCGDP*). The models shown in columns (1) through (3) contain different pairs of the trilemma variables (shown at the bottom row of the table). Columns (4) through (6) present the same type of exercise, but the level of financial development is measured by stock market capitalization (*SMKC*) instead of *PCGDP*.<sup>17</sup>

When *PCGDP* is used as the measure of financial development, the coefficients for the interactions between net FDI inflows or net “other” inflows and the low level of financial development is significantly different from the other estimates. This implies that net inflows of FDI and bank lending can increase volatility only when the economy’s financial markets are underdeveloped. Thus, to prevent net FDI inflows or net bank lending inflows from increasing output volatility, an economy needs to be equipped with financial markets with medium or higher levels of development.

Columns (4) through (6) present a different picture. When the level of financial development is measured by stock market capitalization, generally, the effect of FDI is found to be negative. The degree of negativity is higher especially when stock markets of the economy are underdeveloped. The result reported here needs to be interpreted with caution since the number of observations shrinks by 40% by using *SMKC* instead of *PCGDP*. However, even with this in mind, the negative coefficients of the interactions between net FDI inflows and the low financial development dummy (with greater magnitude) can be interpreted as suggesting FDI may play a role of supplementing equity finance, thereby helping reduce output volatility through

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<sup>17</sup> The estimation models do include the benchmark macroeconomic variables and other characteristic dummies, though their estimation results are not reported in the table.



smoothing allocation of capital. In fact, for the interactions with high-level stock market development, the magnitude of the coefficient becomes smaller.

Net bank lending inflows can help reduce output volatility for economies with highly developed stock markets. This finding may suggest that bank loans from overseas and domestic stock market complement each other. When the variable for net bank lending inflows is interacted with *SMKC* instead of the level dummies, the estimated coefficient for the interaction term is found to be significantly negative. That means the effect of net bank lending inflows monotonically negative as the level of stock market development rises, which supports the complementarity between net bank lending and *SMKC*. This kind of complementarity is also weakly observed between net portfolio inflows and *SMKC*.

#### **4. Concluding Remarks and Policy Implications**

In late 2008, the global crisis, the most severe one since the 1930s, led investors to frantically deleverage assets and convert them into US dollar assets to recover or minimize losses in the global financial markets. This has surely led to drastic changes in the direction and volume of capital flows, leaving damaging effects on some economies. Unsurprisingly, the global crisis has brought the debate on the merits and demerits of financial globalization and the role of financial development under fierce scrutiny. This paper reexamined the role of financial globalization in the context of how it could affect emerging market countries' macroeconomic performance. We especially focused on Asian emerging market countries and investigated how the region succeeded in benefiting from financial globalization.

In our exploration, we placed the main focus on the interactions between financial liberalization and financial development in terms of how these economic environments can affect the stability of output movement. Our motivation comes from a set of casual observations. That is, developing countries have implemented a series of regulatory reforms toward financial liberalization in the last two decades while the level of volatility of cross-border capital flows seems to have increased during the same period. The positive correlation between financial liberalization and cross-border financial volatility, however, appears to be somewhat weaker for emerging market countries. Additionally, higher volatility in cross-border capital flows seems to be positively correlated with output volatility in the last decade. All these casual observations may indicate that countries may overcome the volatility-increasing effect of regulatory financial

liberalization with some additional conditions. We thus focused on the interactions between financial liberalization and domestic financial development, with a prior that the latter may help mitigate the volatility-increase effect of the former.

To formally investigate the role of financial liberalization and financial development, we estimated the determinants of output volatility and found some interesting results.

A developing country with more open financial market tends to experience lower output volatility. Further, it is found that countries can mitigate the volatility-increasing effect of pursuing greater exchange rate stability if they hold a sufficiently high level of foreign reserves. Additionally, the more bank lending or more net portfolio inflows a country receives, the more likely it is to experience volatile output, reflecting the “hot money” argument regarding cross-border bank lending and portfolio investment. Meanwhile, FDI flows do not necessarily destabilize the economy, though stabilizing effects do not seem to be significant either.

The role of domestic financial sector development is investigated in detail. The regression analyses indicate that emerging market economies need to be equipped with highly developed financial markets, particularly of banking and stock markets, if they want to reap the benefit of financial liberalization to reduce output volatility. The findings also suggest that a macroeconomic policy regime leaning more toward exchange rate stability is most likely to exacerbate output volatility when the economy is equipped with only medium levels of financial development.

Additionally, the analysis reveals that net bank lending inflows can help reduce output volatility for economies with highly developed stock markets. This can be explained by the complementarities between overseas bank loans and domestic stock market. This complementarities argument can be also weakly observed between net portfolio inflows and stock market development.

In the sample examined in this paper, the levels of private credit creation (percent of GDP) in emerging market developing Asia are high and are categorized under the more developed financial market group. That means that for these economies, financial liberalization, by itself, can be volatility-reducing. Financial development, particularly in the banking sector in these economies, seems to have provided a favorable environment for reducing the level of output volatility. Having highly developed stock markets were also found useful in stabilizing the economy by complementing external financing. Meanwhile, there is a significant room for a

non-emerging market developing countries in Asia to catch up with the emerging market developing Asia in the financial development.

Having access to external financing by opening up the capital markets can be beneficial if advanced in a cautious manner, and if moved hand in hand with the development of domestic financial markets. However, bond market development, in particular, has been playing a limited role so far.

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**Table 1: The Impact of the Trilemma Configurations and External Financing on Output Volatility**

	Less Developed Countries (LDC)			Emerging Market Countries		
	(1)	(2)	(3)	(4)	(5)	(6)
Relative Income	-0.03 [0.035]	-0.13 [0.036]***	-0.143 [0.036]***	-0.033 [0.073]	-0.018 [0.072]	-0.033 [0.075]
Relative Income, sq.	0.007 [0.066]	0.278 [0.067]***	0.311 [0.067]***	0.041 [0.160]	0.009 [0.161]	0.043 [0.165]
Change in US real interest rate	0.122 [0.049]**	0.11 [0.050]**	0.119 [0.050]**	0.143 [0.060]**	0.119 [0.060]**	0.142 [0.060]**
Volatility of TOT*OPN	0.026 [0.009]***	0.03 [0.009]***	0.027 [0.009]***	-0.001 [0.016]	0.015 [0.016]	-0.002 [0.016]
Inflation volatility	0.023 [0.006]***	0.02 [0.006]***	0.023 [0.006]***	0.066 [0.008]***	0.036 [0.008]***	0.065 [0.008]***
Fiscal Procyclicality	0.002 [0.002]	0.004 [0.002]*	0.004 [0.002]*	0.004 [0.003]	0.003 [0.003]	0.004 [0.003]
Oil exporters	0.011 [0.006]*	0.006 [0.006]	0.007 [0.006]	0.003 [0.008]	0.004 [0.008]	0.002 [0.008]
Currency Crisis	0.005 [0.003]*	0.005 [0.003]*	0.005 [0.003]*	0.004 [0.003]	0.007 [0.003]**	0.004 [0.004]
Private credit creation	-0.003 [0.006]	-0.008 [0.006]	-0.005 [0.007]	0 [0.007]	-0.005 [0.007]	0.001 [0.007]
Total Reserve (as % of GDP)	0.072 [0.052]	-0.055 [0.052]	0.065 [0.034]*	0.087 [0.055]	-0.043 [0.056]	0.096 [0.035]***
Monetary Independence (MI)	-0.019 [0.014]	-0.035 [0.014]**		-0.018 [0.017]	-0.038 [0.018]**	
MI x reserves	0.005 [0.085]	0.112 [0.089]		0.008 [0.088]	0.096 [0.094]	
Exchange Rate Stability (ERS)	0.008 [0.007]		0.012 [0.006]*	0.023 [0.009]**		0.028 [0.009]***
ERS x reserves	-0.086 [0.044]*		-0.095 [0.044]**	-0.125 [0.052]**		-0.15 [0.051]***
KA Openness		-0.02 [0.008]**	-0.014 [0.008]*		-0.01 [0.009]	-0.002 [0.009]
KAOPEN x reserves		0.086 [0.045]*	0.048 [0.042]		0.062 [0.047]	0.016 [0.042]
Net FDI inflows/GDP	0.047 [0.068]	0.092 [0.071]	0.109 [0.070]	-0.121 [0.107]	-0.105 [0.112]	-0.155 [0.113]
Net portfolio inflows/GDP	0.241 [0.122]**	0.289 [0.129]**	0.286 [0.127]**	-0.113 [0.140]	-0.048 [0.145]	-0.081 [0.147]
Net 'other' inflows/GDP	0.069 [0.029]**	0.063 [0.029]**	0.071 [0.029]**	0.025 [0.037]	0.017 [0.037]	0.022 [0.037]
Short-term Debt (as % of total external debt)	-0.009 [0.016]	-0.008 [0.016]	-0.007 [0.016]	-0.013 [0.019]	-0.008 [0.019]	-0.011 [0.019]
Total debt service (as % of GNI)	0.063 [0.035]*	0.081 [0.035]**	0.078 [0.035]**	0.008 [0.044]	0.037 [0.044]	0.011 [0.044]
Observations	311	311	311	154	154	154
Adjusted R-squared	0.37	0.39	0.4	0.45	0.29	0.46

Robust regressions are implemented. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. The dummy for Sub-Saharan economies is included in the regressions, but it is not reported in the table.

**Table 2: Output Volatility: the Trilemma Indexes Interacted w/ different levels of PCGDP**

	Developing Countries (LDC)			Emerging Market Countries (EMG)		
	(1)	(2)	(3)	(4)	(5)	(6)
Private credit creation (% of GDP)	-0.008 [0.008]	-0.005 [0.008]	-0.008 [0.007]	0.001 [0.008]	0 [0.007]	0 [0.006]
MI x Int'l reserves	-0.028 [0.067]	-0.006 [0.064]		-0.05 [0.067]	-0.024 [0.063]	
MI x High PCGDP	-0.018 [0.017]	-0.013 [0.016]		-0.013 [0.019]	-0.016 [0.017]	
MI x Medium PCGDP	-0.015 [0.012]	-0.019 [0.012]		-0.008 [0.014]	-0.017 [0.014]	
MI x Low PCGDP	-0.005 [0.015]	-0.019 [0.013]		0.004 [0.023]	-0.034 [0.018]*	
ERS x Int'l reserves	-0.048 [0.033]		-0.051 [0.031]	-0.084 [0.037]**		-0.058 [0.030]*
ERS x High PCGDP	0.008 [0.010]		0.015 [0.009]	0.017 [0.012]		0.015 [0.009]*
ERS x Medium PCGDP	0.005 [0.006]		0.005 [0.005]	0.018 [0.007]**		0.014 [0.007]**
ERS x Low PCGDP	-0.007 [0.007]		-0.002 [0.006]	0.011 [0.016]		-0.012 [0.010]
KAOPEN x Int'l reserves		0.009 [0.027]	-0.005 [0.027]		0.032 [0.027]	0.025 [0.026]
KAOPEN x High PCGDP		-0.016 [0.010] <sup>11%</sup>	-0.015 [0.011]		-0.018 [0.010]*	-0.014 [0.010]
KAOPEN x Medium PCGDP		-0.003 [0.006]	-0.001 [0.006]		-0.008 [0.006]	-0.006 [0.006]
KAOPEN x Low PCGDP		-0.008 [0.010]	-0.003 [0.009]		0.04 [0.017]**	0.045 [0.015]***
Adjusted R2	0.23	0.22	0.23	0.46	0.36	0.4

*Significance of the estimated coefficients of the interaction terms b/w the trilemma indexes and different PCGDP groups is tested using a Wald test.*

MI: High vs. Med.	0.07	0.32		0.10	0.01
MI: Med. vs. Low	0.82	0.00		0.35	1.83
MI: High vs. Low	0.69	0.22		0.55	1.25
ERS: High vs. Med.	0.11		1.56	0.01	0.02
ERS: Med. vs. Low	3.27*		2.34 <sup>12%</sup>	0.21	7.84**
ERS: High vs. Low	2.27 <sup>13%</sup>		3.78**	0.15	5.53**
KAO: High vs. Med.		1.92 <sup>16%</sup>	1.80		1.25
KAO: Med. vs. Low		0.24	0.05		7.84**
KAO: High vs. Low		0.40	0.85		10.25***



**Table 3: Output Volatility: the Trilemma Indexes Interacted w/ different levels of *PCGDP***

	<b>x FD</b>	<b>FD1</b>	<b>FD2</b>	<b>FD3</b>	<b>SMKC</b>	<b>SMTV</b>	<b>PVBM</b>	<b>PBBM</b>
		PCGDP, SMKC	PCGDP, SMKC, SMTV	SMKC, SMTV	Stock market Capitalization	Stock Market Total Value	Private Bond Market Cap.	Public Bond Market Cap.
<i>Monetary Independence</i>	High	– L	– L	– L	– L, E	– L, E		
	Medium							
	Low							
<i>Exchange Rate Stability</i>	High	+ L, E	+ L, E	+ L, E	+ L, E	+ L, E		
	Medium	+ L	+ L, E		+ L			
	Low							
<i>Financial Openness</i>	High				– L, E			
	Medium						–	
	Low		+ E					

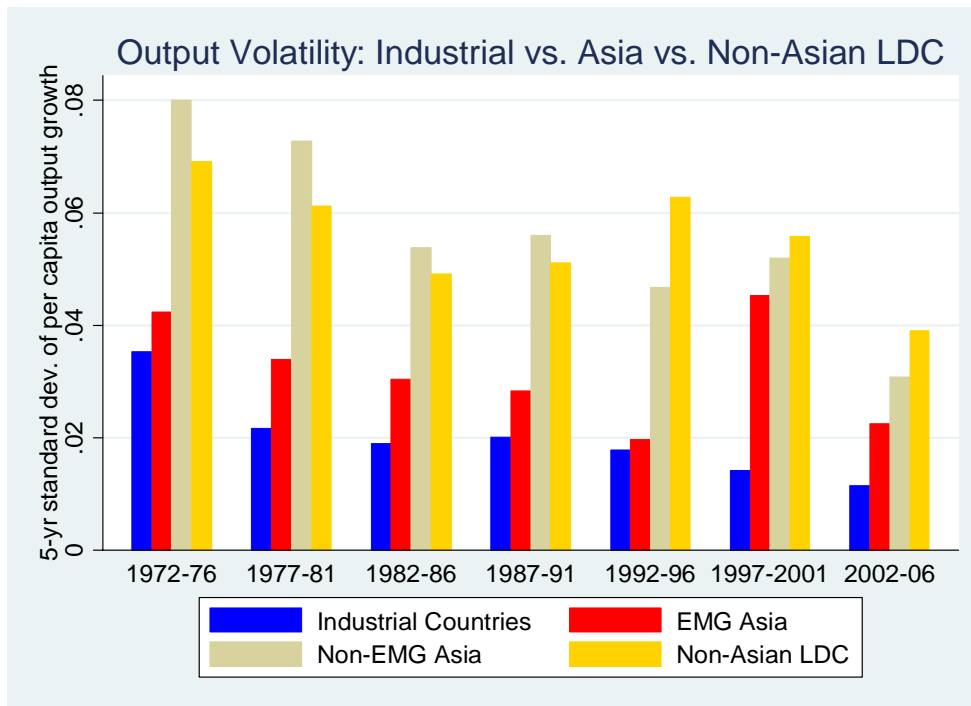
Notes: *FD1* is the first principle component of private credit creation (*PCGDP*) and stock market capitalization (*SMKC*). *FD2* is that of *PCGDP*, *SMKC* and stock market total value (*SMTV*). *FD3* is that of *SMKC* and *SMTV*, which can be considered to measure the general level of stock market development. The plus/minus signs indicate the sign of a significant coefficient. “L” means that the coefficient of concern is significant in the LDC sample; “E” means that the coefficient of concern is significant in the EMG sample. For the estimations with *PVBM* and *PBBM*, there is no EMG subsample. Due to data availability of *PVBM* and *PBBM*, there is no or little difference between LDC and EMG subsamples. The estimation models do include the benchmark macroeconomic variables and other characteristic dummies though their estimation results are omitted to conserve space.

**Table 4: Output Volatility: External Finances Interacted w/ different levels of *PCGDP* or *SMKC***

	FD =	<i>PCGDP</i>			<i>SMKC</i>		
	x FD	(1)	(2)	(3)	(4)	(5)	(6)
<i>Net FDI Inflow</i>	High	0.055 [0.096]	0.063 [0.102]	0.055 [0.103]	-0.077 [0.094]	-0.115 [0.108]	-0.186 [0.107]*
	Medium	0.03 [0.081]	0.068 [0.083]	0.057 [0.084]	-0.145 [0.096]	-0.159 [0.099]	-0.171 [0.102]*
	Low	0.502 [0.051]***	0.506 [0.051]***	0.521 [0.051]***	-0.209 [0.097]**	-0.238 [0.101]**	-0.249 [0.103]**
<i>Net Portfolio Inflow</i>	High	0.096 [0.098]	0.1 [0.104]	0.069 [0.101]	-0.079 [0.067]	-0.095 [0.067]	-0.124 [0.067]*
	Medium	0.017 [0.075]	0 [0.075]	0.022 [0.075]	-0.086 [0.131]	-0.067 [0.134]	-0.069 [0.136]
	Low	0.09 [1.041]	0.163 [1.047]	0.135 [1.047]	0.129 [0.087]	0.133 [0.088]	0.144 [0.089]
<i>Net 'Other' Inflow</i>	High	0.032 [0.062]	0.042 [0.063]	0.047 [0.063]	-0.155 [0.051]***	-0.136 [0.052]***	-0.108 [0.053]**
	Medium	0.002 [0.039]	0.009 [0.039]	0.008 [0.039]	-0.062 [0.047]	-0.065 [0.048]	-0.064 [0.049]
	Low	0.184 [0.044]***	0.179 [0.043]***	0.194 [0.044]***	0.022 [0.068]	0.021 [0.069]	0.004 [0.071]
Included trilemma variables		<i>MI</i> <i>ERS</i>	<i>MI</i> <i>KAOPEN</i>	<i>ERS</i> <i>KAOPEN</i>	<i>MI</i> <i>ERS</i>	<i>MI</i> <i>KAOPEN</i>	<i>ERS</i> <i>KAOPEN</i>

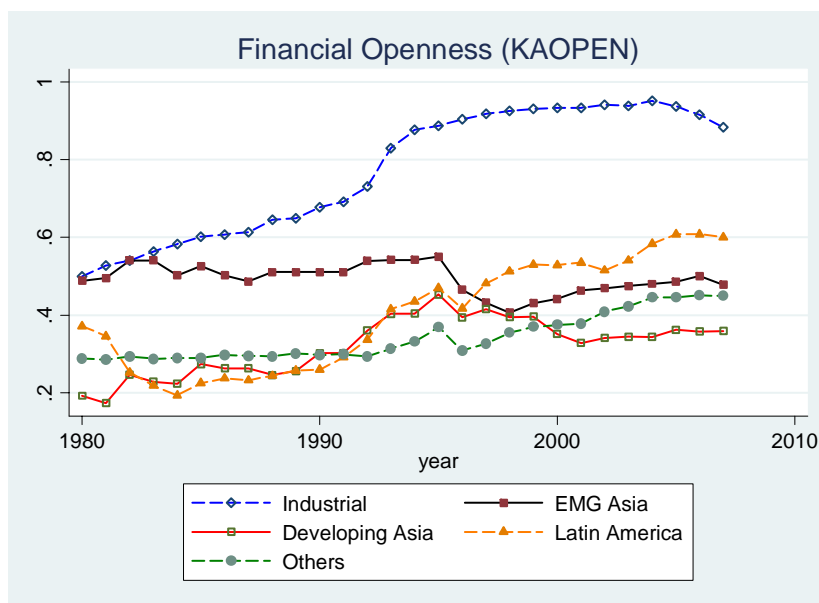
Notes: Columns (1) through (3) show the estimated coefficients for the interaction terms between different types of net capital inflows and the dummies for different levels of financial development measured by private credit creation (as % of GDP: *PCGDP*). For columns (1) through (3), different pairs of the trilemma variables are included (see the bottom row). For Columns (4) through (6), the level of financial development is measured by stock market capitalization (as % of GDP: *SMKC*) instead of *PCGDP*. The estimation models do include the benchmark macroeconomic variables and other characteristic dummies though their estimation results are omitted.

**Figure 1: Output Volatility, 1972 – 2006**



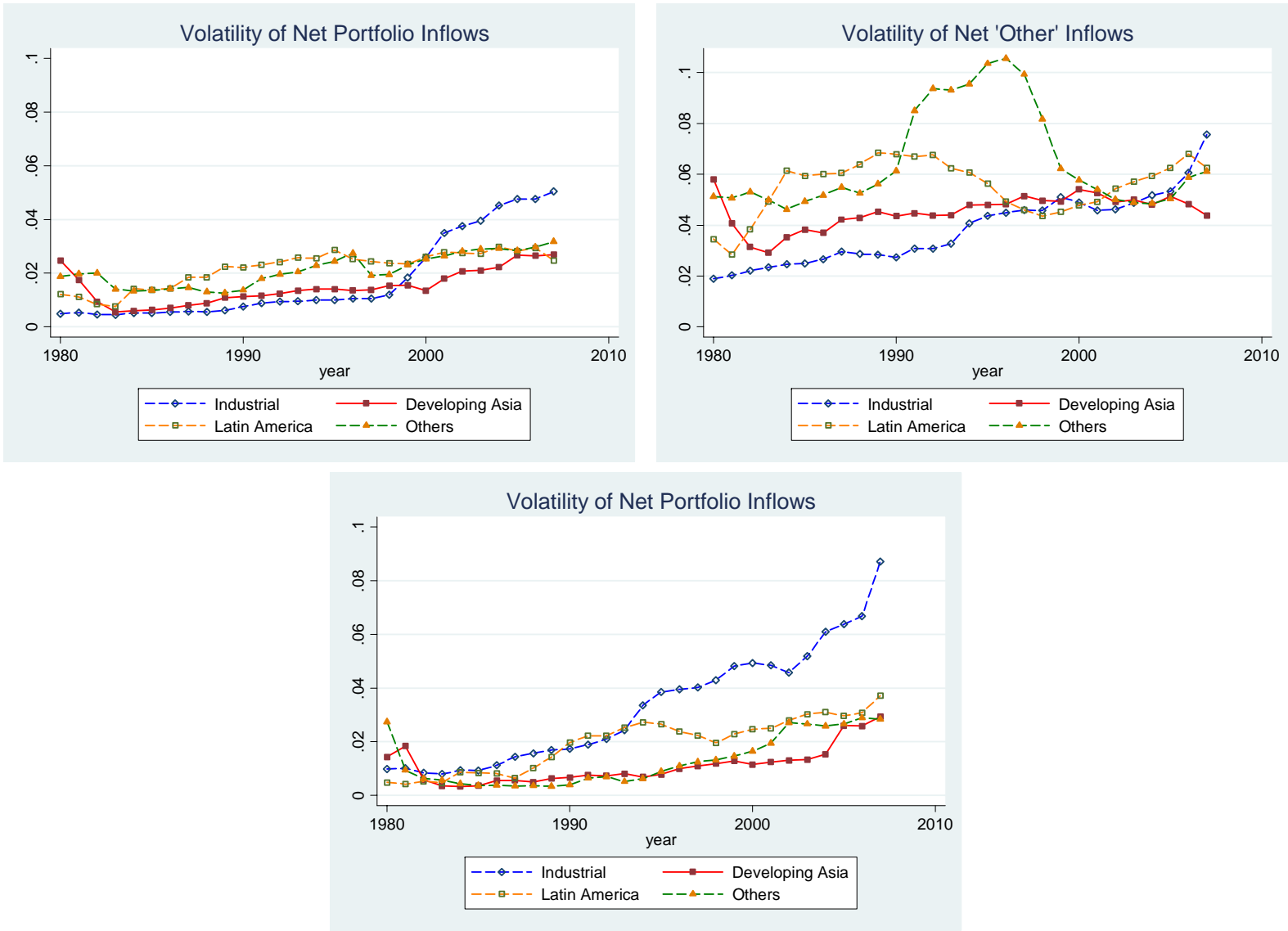
Notes: Output volatility is measured by five-year standard deviations of the growth rate of per capita output. The data for per capita output are extracted from the Penn World Trade database. The group of “EMG Asia” or emerging market economies in Asia include Brunei, Cambodia, China, Hong Kong, India, Indonesia, Korea, Rep., Malaysia, Philippines, Singapore, Taiwan, Thailand, and Vietnam.

**Figure 2: Financial Openness (KAOPEN) across Different Country Groups**



Note: Based on the Chinn-Ito (2006) index of financial openness

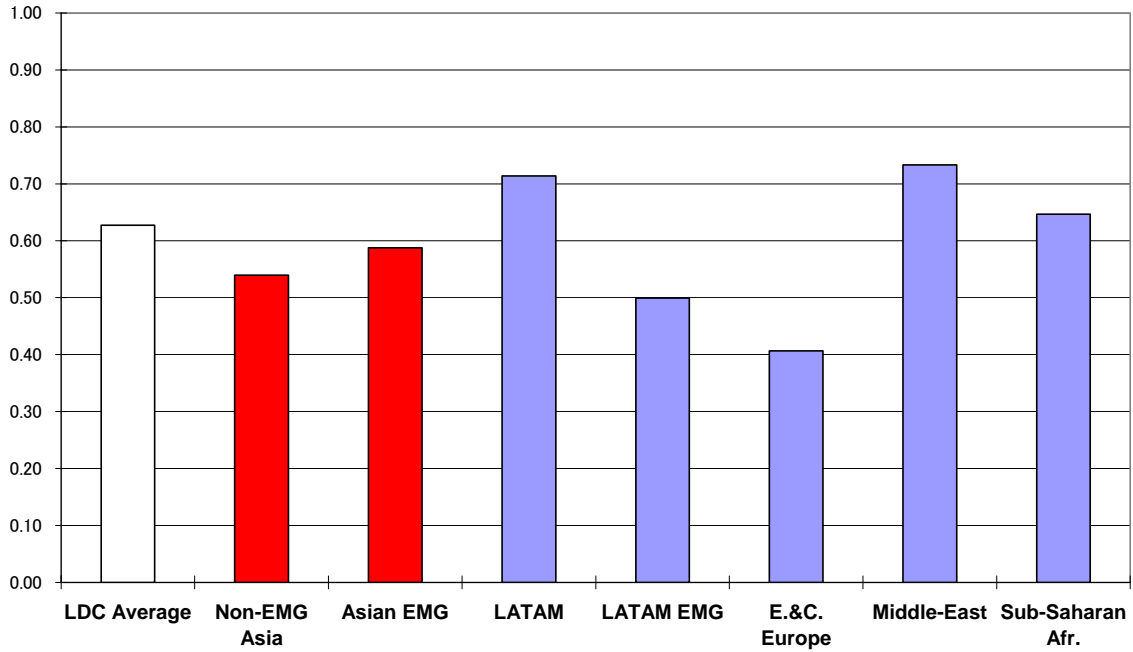
**Figure 3: Volatility of Cross-Border Capital Flows**



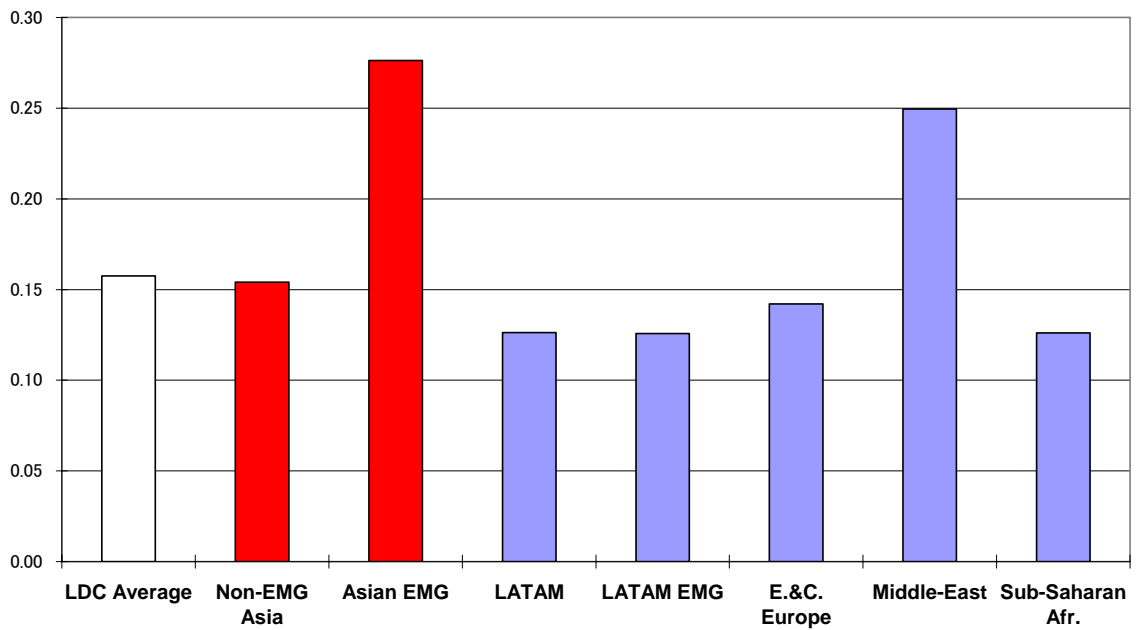


**Figure 6: Regional Comparison of Exchange Rate Stability and Foreign Reserves**

**(a) Exchange Rate Stability (ERS)  
1990 - 2006**

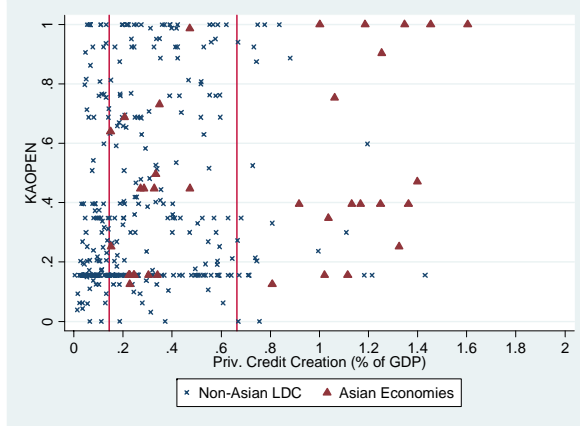


**(b) Int'l Reserves as % of GDP  
1990 - 2006**

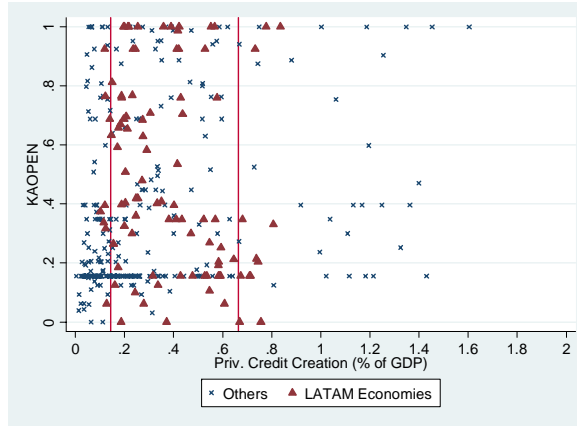


**Figure 7: Capital Account Openness (KAOPEN) and Financial Development (PCGDP) by Regions**

(a) Asia



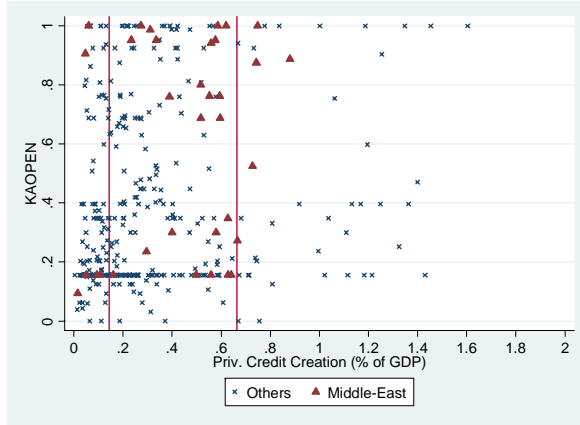
(b) Latin America



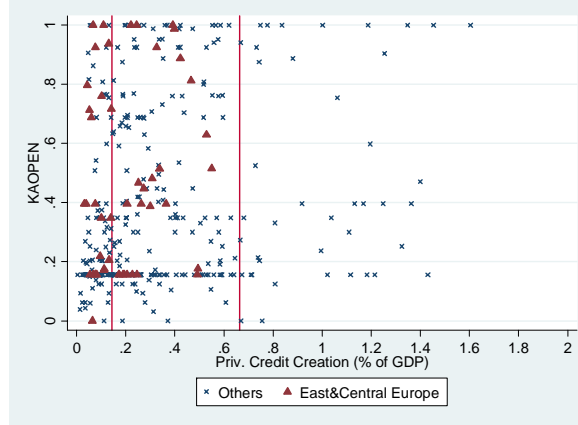
(c) Sub-Saharan Africa



(d) Middle-East and N. Africa



(e) East and Central Europe



**Figure 8: Measuring Financial Development**

