"The More Divergent, the Better?: Lessons on Trilemma Policies and Crises for Asia"

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Abstract

This paper investigates the potential impacts of the degree of divergence in open macroeconomic policies in the context of the trilemma hypothesis. Using an index that measures the extent of policy divergence among the three trilemma policy choices, namely monetary independence, exchange rate stability, and financial openness, we find that emerging market countries have adopted trilemma policy combinations with the smallest degree of policy divergence in the last fifteen years. We then investigate whether and to what extent the degree of open macro policy convergence affects the probability of a crisis and find that a developing or emerging market country with a higher degree of policy divergence is more likely to experience a currency or debt crisis. We also compare the development of trilemma policies around the crisis period for the groups of Latin American crisis countries in the 1980s and the Asian crisis countries in the 1990s. We find that Latin American crisis countries tended to close their capital accounts in the aftermath of a crisis while that is not the case for the Asian crisis countries. The Asian crisis countries tended to reduce the degree of policy divergence in the aftermath of the crisis, which possibly mean that they decided to adopt open macro policies that are less prone for a crisis.

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1. Introduction

Managing policies in an economic turbulence is never an easy task, especially when the world economy is highly integrated and markets are intertwined with each other. History is full of episodes where a certain international monetary system or regime ends with an abrupt end as we have witnessed in the collapse of the Bretton Woods system in the early 1970s or in the financial crises many emerging market economies experienced in the 1980s and 1990s. These abrupt ends of regimes often involve crises or some sort of financial turbulence. No matter what forms of international monetary systems or regimes they decide to replace the old ones with, however, countries always end up adopting a combination of three policy goals: monetary independence, exchange rate stability, and financial openness, with different degrees of attainment in each. That is, a powerful hypothesis called the "impossible trinity," or the "trilemma" dictates open macro policy management. Countries may simultaneously either choose any two, but not all, of the three policy goals to the full extent, or adopt a combination of intermediate degrees of all or two of the three policy goals.

Theory and empirical evidence also tell us that each one of the three trilemma policy choices can be a double-edged sword as recognized by a significant amount of recent literature.[1] To make the matter more complicated, the effect of each policy choice can differ depending on what the other policy choice it is paired with. For example, exchange rate stability can be more destabilizing when it is paired with financial openness while it can be stabilizing if paired with greater monetary autonomy.

Furthermore, countries rarely face the stark polarized binary choices as often envisioned by policy makers and researchers. In the famous trilemma triangle well-used in textbooks as we have in Figure 1, each of the three sides represents the full implementation of each of the three policy goals. We can locate the Euro system or the gold standard at the corner that represents the full attainment of financial openness and exchange rate stability while the Bretton Woods system can be placed at the corner of full exchange rate stability and full monetary independence. When a country adopts a policy combination of intermediate levels for all the three policy choices, such a policy combination would be located somewhere inside the trilemma triangle. The bottom line

[1] As for monetary independence, refer to Obstfeld, et al. (2005), Shambaugh (2004), and Frankel et al. (2004). On the impact of the exchange rate regime, refer to Ghosh et al. (1997), Levy-Yeyati and Sturzenegger (2003), and Eichengreen and Leblang (2003). The empirical literature on the effect of financial liberalization is surveyed by Henry (2006), Kose et al. (2006), Prasad et al. (2003), and Prasad and Rajan (2008).

is, as Mundell (1963) argued, that that the extent of achievement in the three choices must be linearly related to each other.[2]

Obviously, different combinations of the three policies must have different macroeconomic effects. Now the question is, how can the location of a country's policy combination in the trilemma triangle affect its macroeconomic performance, especially in terms of avoiding traumatic economic turbulence such as financial crises?

Against this backdrop, we first construct a metric that measures the degree of divergence among the three trilemma policies while incorporating its relative position to the global trend. With this index, we then evaluate the patterns of divergence of trilemma policy combinations in the last four decades. In Section 3, we implement a series of empirical exercises to examine the impact of the degree of trilemma policy divergence on macroeconomic performance, namely the probability of the onset of a currency, banking, and debt crisis. In the end of this section, we also compare the degree of policy divergence and trilemma policy arrangements between the Latin American crisis countries in the 1980s and the Asian crisis countries in the 1990s and identify commonalties and differences between these crisis periods. In Section 4, we conclude the main findings of the paper.

2. Divergence of the Trilemma Policy Choices

2.1 Why Does the Extent of Policy Divergence Matter?

While there are only three kinds of polarized policy combinations among the three trilemma policies, i.e., the three vertexes in the triangle in Figure 1, once intermediate levels for each policy are allowed, there can exist an infinite number of open macro policy combinations. Until recently, researchers have tended to focus on debating the merits and demerits of polarized monetary regimes. Fischer (2001) argued the unstable nature of intermediate exchange rate regimes, pointing out that such regimes are more prone to experience a crisis in a financially globalized world. Frankel (1999), while admitting that regimes with "corner solutions" can be simple and transparent in showing government commitment to maintaining a regime, argued that avoiding intermediate regimes is not always the best solution for countries, especially developing

[2] In other words, if there are measures representing the levels of attainment in the three policy choices, such measures must add up to a constant, which has been empirically proved by Aizenman, et al. (2012) and Ito and Kawai (2012).

ones. Willett (2003) argued that the issue is not so much about whether polarized or intermediate regimes are more or less stable. Rather, he argues that the issue of whether macroeconomic conditions of an economy are consistent with its monetary regime is more important. The crises that occurred among emerging market countries in the 1980s and 1990s, and the Global Financial Crisis of 2008-09 to a similar extent, have raised questions about the global trend of financial liberalization, leading researchers to debate the merits and demerits of greater financial openness.

Despite the debate, regimes with corner solutions are more of a rarity. In other words, most countries often operate "somewhere inside the triangle." For example, some countries implement partial financial integration while trying to retain control over exchange rate movement as well as monetary policy autonomy. This sort of clustering of the three policies inside the trilemma triangle, or the "middle-ground convergence," has been a characteristic of emerging market countries (EMG) in recent decades as Aizenman, Chinn, and Ito (2012) have shown. Aizenman, et al. have also found such middle-ground convergence has been more evident among Asian EMGs in recent years.

By adopting such converged policy combinations, these countries may have been trying to dampen the negative effects that may arise from adopting polarized policy regimes. Interestingly, the period when EMG's middle convergence started becoming more evident coincides with the time when some of these economies began accumulating sizable international reserves (IR) as if they have been trying to buffer the trade-off arising from the trilemma, again a more evident trend among Asian EMGs.[3]

A natural question that arises is how the location within the trilemma triangle can affect macroeconomic performances, especially when we focus on the risk of experiencing a financial crisis, which this paper focuses on. Before exploring this question, however, we want to raise one more important issue. That is, even if certain open macro policy combinations were found to affect the likelihood of a country experiencing a crisis, such correlations may not be merely a function of the country's own macroeconomic policies.

A country's open macro policies need to be evaluated in a greater context, compared with policies adopted by other countries. For example, a fixed exchange rate regime must have

[3] Aizenman, et al. (2010) empirically show that pursuing greater exchange stability can be increasing output volatility for developing economies, but that that can be mitigated by holding a greater amount of international reserves than the threshold of about 20% of GDP.

different effects on the economy depending on whether or not most of other countries also adopt fixed exchange rate regimes as they did during the Bretton Woods period. As another example, the consequence of liberalizing financial markets should also differ between the 1960s when most of the countries also had closed financial markets and recent years when many countries have been moving toward the direction of full financial liberalization.

When we think about the history of international monetary systems, anecdotally, countries seem to have tended to adopt monetary regimes prevalent in other countries, making the types of monetary regimes across countries correlated with each other. Such correlated behavior can be sometimes global as was in the case of the Gold Standard in the pre-WWII era or the Bretton Woods system, other times regional such as the Euro system, or clustered around similar income levels such as the middle-ground convergence observed among emerging market economies in recent years. When many countries tend to adopt similar monetary regimes, such a herding behavior would create externality, lowering the cost of a country following such a global or regional trend, or the "mean behavior." Conversely, herding behavior in arranging monetary regimes could also raise the opportunity cost of deviating from it, unless the country that deviates from the "mean behavior" is well-equipped with healthy fundamentals or solid institutions including well-functioning financial markets. In this sense, the pursuit of forming a monetary union by some European countries, we could argue, can be sustainable only if they are equipped with appropriate levels of institutional development and good fundamentals.[4] Hence, again, it is important to evaluate the combinations of open macro policies in a global context or in comparison to other countries.

In this paper, we will particularly focus on the impact of a triad policy combination on the likelihood of financial crisis. By financial crisis, we mean three kinds of financial crises, namely currency, banking, and debt crisis. While it may not be difficult to consider the relationship between the degrees of policy divergence and their impact on currency crisis, the link between them and their impact on banking or debt crisis may not sound too straightforward. However, the macroeconomic performance of banking or debt crisis, or the probability of its occurrence can be direct functions of the triad policy coordination.

[4] Furthermore, it means the current crisis situation faced by some of the Euro countries can be explained by their weak fundamentals and institutional development.

As for the banking crisis, the recent European experience makes it clear that a choice of a monetary regime can affect the likelihood of experiencing a banking crisis. In the case of the Euro crisis, participating in the monetary union had made it easier for certain countries such as Ireland, Spain, and Cyprus to experience a surge in capital flows in an unsustainable fashion. Such capital influx ended up sowing seeds of the ongoing banking and debt crisis in these countries. The situation could have been different if these countries had not participated in the fixed exchange rate arrangement because it rids countries with highly open financial markets of monetary independence.

The debt crisis in emerging market economies in the 1980s and 1990s and that in Southern Europe such as Greece can also be explained similarly in the context of the trilemma. For emerging market economies, particularly, the predominant global trend for financial liberalization had made the trilemma into the dilemma between pursuing greater monetary autonomy (with more flexible exchange rates) and greater exchange rate stability (with less monetary autonomy). Facing the "original sin" (Eichengreen and Hausman, 1999), many emerging market economies had chosen the path of greater exchange rate stability while the inevitably weaker monetary independence made these economies more vulnerable to external shocks.

Thus, not just for currency crisis, but also for banking and debt crisis, how the three trilemma policies are coordinated by individual countries and where they stand in the global context can be an important factor.

2.2 Measure of Policy Divergence and Its Patterns

To see how much convergence or divergence is taking place among the three trilemma policy choices and evaluate it in a global context, we construct the "measure of divergence" in the triad policies. For that, we use the "trilemma indexes" introduced by Aizenman, Chinn, and Ito (2010, 2012).

The trilemma indexes measure the degree of achievement in each of the three policy choices for more than 170 economies for 1970 through 2010.[5] The monetary independence index (MI) is based on the correlation of a country's interest rates with the base country's interest rate. The index for exchange rate stability (ERS) is an invert of exchange rate volatility, i.e., standard

[5] The indexes are available at http://web.pdx.edu/~ito/trilemma_indexes.htm.

deviations of the monthly rate of depreciation, using the exchange rate between the home and base economies. The degree of financial integration is measured with the Chinn-Ito (2006, 2008) capital controls index (KAOPEN). [6]

Using these indexes, we define the "measure of policy divergence" as below:

$$d_{it} = \sqrt{(MI\_r - 1)^2 + (ERS\_r_{it} - 1)^2 + (KAOPEN\_r_{it} - 1)^2} \qquad (1)$$

where $X\_r_{it} = \frac{X_{it}}{\bar{X}_t}$ for *X* = *MI*, *ERS*, and *KAOPEN*, and $\bar{X}_t$ is cross-country average of *X* in year *t*.[7,8] Appendix 1 list all the countries for which *d* is available.

Long-run Trends

Figure 2 illustrates the average of d_{it} for different subgroups of countries based on income levels.[9] We can make several interesting observations based on this figure. For the last two decades, advanced economies tend to have combinations of distinctive policies. Not surprisingly, the Euro country group has the highest degree of policy divergence among the country groups, followed by the group of non-Euro advanced economies. Higher income countries may be able to afford to have divergent policy combinations.

The group of emerging market economies has had the lowest degree of policy convergence in the last two decades. Since the beginning of the 1980s, developing economies, whether or not with emerging markets, have had relatively stable movement in the degree of policy convergence except for the mid-1990s when both subgroups of developing economies experienced a drop in the degree of policy divergence. In the crisis years of 1982, 1997-98, and

[6] Refer to Aizenman, et al. (2012) or the index's website for the details of construction of the indexes.

[7] The cross country average ($\bar{X}_t$) is the sample average of X including both industrialized and developing countries for year *t*.

[8] One could argue that if the extents of the three trilemma policy choices are linearly related as theoretically predicted, the above formula for *d* does not have to contain all the three indexes – it would need only any two of the three trilemma indexes. However, we do not assume the linearity too strictly, i.e., the linearity does not have to hold every single year. In other words, we assume that there is some room for policy choices to deviate from the trilemma constraint. In fact, policy makers sometimes intentionally or unintentionally challenge the constraint of the trilemma by implementing a policy combination that is not consistent with the trilemma hypothesis. Before aborting the fixed exchange rate arrangement for the Thai baht, Thai policy makers attempted to challenge the trilemma by pursuing both greater monetary independence and exchange rate stability without imposing capital controls. Also, holding a massive amount of IR may allow countries from deviating from the constraint of the trilemma in the short run.

[9] Country grouping is shown in Appendix 1.

2008-09 – the Mexican debt crisis, the Asian financial crisis, and the global financial crisis, interestingly, the policy convergence measure tends to rise around the times of the crises.[10]

We are also curious to see if there are any regional characteristics in the formation of triad open macro policies. As we have discussed, externality can play a role in concerting policy decision makings among neighboring countries in a region while possibly increasing the cost of shying away from regional policy coordination. Furthermore, there can be a regional economic integration such as in the case of East Asian supply chain network or a monetary policy arrangement as in the case of Gulf Cooperation Council (GCC). Hence, comparison among geographical groups of countries should shed another ray of light on the differences in the characteristics of triad open macro policies among countries. Figure 3 illustrates the averages of the policy dispersion measure (d_{it}) for different regional country groups, but focusing on Latin American and Asian economies.

We can make an interesting observation that since the last few years of the 1990s, which coincides with the Asian Crisis period, the degrees of policy divergence have been persistently small among all regional groups.[11] This policy convergence among developing economies may reflect the great moderation, but the convergence seems to be still in place in the last few years of the sample that corresponds to the years of the global financial crisis. Additionally, despite its high levels of policy divergence in the 1980s, emerging market economies in Asia have been experiencing lowest levels of policy divergence in the last decade.[12]

Behavior of d around the Time of a Crisis

Let us observe the behavior of the measure of policy dispersion around the time of a financial crisis. Figures 4-6 show the development of the cross-country average of the degree of policy divergence (*d*) for different subsamples of countries over the period for currency, banking, and debt crises, respectively, over the period from three years before the first year of the crisis

[10] To see what is driving the trajectories in Figure 2, looking at the group mean of the ratios of each of the three indexes to its cross-country mean (i.e., $X_{it} \big/ \overline{X}_t$ with X for monetary policy independence (*MI*), exchange rate stability (*ERS*), and financial openness (*KAOPEN*)) is helpful. For that, refer to Aizenman and Ito (2012).

[11] This is also true for the group of middle-eastern or North African countries (not reported).

[12] Asian emerging market economies (and countries in the middle-east, though not reported) experienced high levels of policy divergence from the beginning of the 1980s through the early 1990s. This is partly because Latin American countries, many of which went through debt crises, retrenched financial openness around the same period, dragging down the average and making the financial liberalization efforts by Asian emerging market countries especially distinctive.

through three years after it (i.e., $[t_0 - 3, t_0 + 3]$).[13] In each figure, Panel (a) shows the development of the subsample averages of *d* for IDC, LDC, and EMG.[14] Panel (b) shows the development of the averages of *d* for the crisis countries that experienced positive output losses as a result of a crisis (top) and those which experienced *output gains* (i.e., output losses < 0) (bottom).[15] Panel (c) compares the development of the *d* for the crisis countries with "high" IR holding with those with "low" IR holding while "high" IR holding means that the level of IR holding (as a share of GDP) is higher than the annual cross-country median (of all the countries in the entire sample, including crisis and non-crisis economies) as of the year before the crisis occurrence ($t_0 - 1$).

We can make several interesting observations. In all three kinds of crises, there is a hump shape of development for *d* around the first year of the crisis while the peak occurs at the first year for currency crisis (t_0); a year after the onset of a banking crisis (t_0+1); and a year before the onset of a debt crisis (t_0-1). In the cases of currency and banking crises, if the crisis involves output losses, the measure of policy divergence tends to stay at high levels at the first and second years of the crisis. In the case of the crisis countries that did not experience output losses, the countries experience a peak in *d* in the year before the onset of the crisis. This may imply that these countries could avoid output losses by preemptively implementing stabilization measures that end up raising the degree of policy divergence. [16]

For the currency or banking crisis countries with low IR holding, there is a distinct rise in *d* at the onset of the crisis and a distinct fall afterwards. If these countries are high IR holders, the peak occurs in the second year of the crisis. This generalization is more apparent for the high IR holding countries with output losses (not reported). These findings may suggest that if a country experiences a currency or banking crisis without holding high levels of IR, the country needs to implement policies that raise *d* whereas *d* peaks more slowly for high IR holders.

[13] The methods for identifying the three types of crises are explained in Appendix 2.
[14] The emerging market countries (EMGs) are defined as the countries classified as either emerging or frontier during the period of 1980-1997 by the International Financial Corporation plus Hong Kong and Singapore.
[15] Output losses are defined as the cumulative sum of the differences between actual and trend real GDP over the four-year period (i.e., $[t_0, t_0+3]$. The trend real GDP is based on HP-filtered real GDP series over the twenty-year-long pre-crisis period $[t_0 - 20, t_0 - 1]$. Based on whether the cumulative sum is positive or negative, a crisis is defined to involve output losses or gains. In a sense, the existence of output losses is based on "output losses in ex post," not strictly as of the first year of the crisis.
[16] We do not treat *d* as an exogenous variable. *d* can respond endogenously to a crisis.

It is harder to generalize the movement of *d* for debt crisis countries. Panel (c) shows that holding higher levels of IR seems to allow a crisis country to raise *d* prior to the onset of a crisis. However, those debt crisis countries that experience a peak in *d* prior to the onset of a crisis tend to be the ones that experience output losses, which tend to be contrary to the cases of currency or banking crisis countries. Those with high IR holding tend to lower the level of *d* around the time of the crisis, which again we do not observe among currency or banking crisis countries.

There is a limit to what we can infer from observing unconditional means of the measure of policy divergence around the time of the crisis.

We now move on to more formal analysis on the degree of policy divergence and examine how *d* can affect the probability of crisis onsets.

3. Empirical Analysis

3.1 Probability of Crisis Occurrence

We now estimate the probability of different types of crises to examine whether and to what extent the degree of relative policy divergence affects the likelihood of a currency, banking, or debt crisis. The identification methods for each of the crises are explained in Appendix 2.

For each type of the crisis, we assign the value of one to a binary variable y_t when country *i* experiences the onset of a crisis in year *t*, and zero, otherwise.[17] We hypothesize the probability that a crisis will occur, $\Pr(y_t = 1)$, is a function of a vector of characteristics associated with observations in year *t*, or X_t, and the parameter vector β, with the control variables in X lagged one year to avoid endogeneity issues. Using the panel data composed of more than 100 countries for the period 1970 – 2010, the log of the following function is maximized with respect to the unknown parameters through non-linear maximum likelihood.[18]

$$\ln L(\beta) = \sum_{i=1}^{m} \left[y_t \ln F(\beta' X_t) + (1 - y_t) \ln(1 - F(\beta' X_t)) \right] \qquad (2)$$

where *m* indicates the number of countries times the number of observations for each country and the function F(.) is the standardized normal distribution.

[17] We only focus on the *onset* of a crisis, that is, the first year of the crisis. This means that we do not investigate the persistence of a crisis situation if it lasts longer than one year.

[18] The countries included in the estimation are shown as those with an asterisk in Appendix 1.

The following variables are included in the characteristics vector X_t. The choice of the variables is based on the past literature, except for the ones related to the degree of trilemma policy convergence.

Variables included in the estimation:[19]

Relative income to the U.S. – Countries' per capita income levels from the Penn World Table (PWT) are normalized as a ratio to the U.S. per capita income level.

International reserves (IR) holding – IR excluding gold as a ratio to GDP .

Per capita Output growth – The growth rate of GDP per capita (in local currency).

Private credit growth – The change (first-difference) in the ratio of private credit creation to GDP.

Net Debt inflows – The ratio of (external debt liabilities– external debt assets) to GDP. The original data are from Lane and Milesi-Ferretti (2007 and updates).

Gross external financial exposure – The ratio of (total external assets + total external liabilities) to GDP (from the Lane and Milesi-Ferretti dataset), included as deviations from the five-year average of the ratios. After the global financial crisis, in addition to net capital flows or investment positions, gross capital flows have been pointed as potential destabilizing factors.[20]

Real exchange rate overvaluation – It is defined as deviations from a fitted trend in the real exchange rate. The real exchange rate is calculated using the exchange rate between country *i* and its base country (in the sense of Aizenman, et al., 2011), and the CPI of the two countries. Higher values of this variable indicate the real exchange rate value is lower, i.e., *appreciated*, than its time trend.

Exchange rate stability (*ERS*) and *Financial openness* (*KAOPEN*) – Both are from the trilemma indexes of Aizenman, Chinn, and Ito (2012).

[19] Unless mentioned otherwise, the data for these variables are extracted mostly from publicly available datasets such as the *World Development Indicators*, *International Financial Statistics*, and *World Economic Outlook.*

[20] See Borio and Disyatat (2011), Obstfeld (2012a, b), Bruno and Shin (2012) for the argument on how gross external financial exposure matters for financial and economic stability. However, it must be noted that gross external financial exposure may also mean a higher level of ability to diversify risk, which may work as a stabilizing fact.

Triad Policy Divergence Measure – The aforementioned measure of triad policy divergence d_{it} is included.

Standard deviations of the Triad Policy Divergence Measure – The standard deviations of the above d_{it} over five years from t–5 through *t*–1 are included to examine the impact of the stability level of the trilemma policy combinations.

Other crises – The dummies for the other types of crises that occur either concurrently (t) or in the previous year (*t*–1) are also included.

Contagion – To see the impact of other crises in the same geographical region, we also include a variable that represents the effect of regional contagion. The variable to be included is defined as:

$$Contagion^{n}_{i,t} = \sum_{\substack{j=1 \\ j \neq i}}^{P_K} \omega_{j_K} \cdot CD^{n}_{i,t} \qquad (3).$$

$CD^{n}_{i,t}$ is a crisis dummy for type *n* crisis (i.e., currency, banking, or debt). ω_{j_k} is the weight based on GDP in PPP for country j ($j \neq i$) in region *K*. Hence, the variable $Contagion^{n}$ is the weighted sum of the dummy variables for the countries in the region country *i* belongs to, excluding the weighted dummy of country *i* itself.[21] The basic assumptions are that the more countries in the same geographical region experience crises, the more likely it is for country *i* to experience a crisis, and that the contagious effect is larger for bigger economies.

We apply the above probit estimation model to the full sample that includes both industrialized and developing countries, the sample of industrialized countries (IDC), the sample of developing countries (LDC), and a subsample of emerging market countries (EMG). The baseline estimation results are reported in Table 1, which reports the marginal effects of the explanatory variables assuming that variables take mean values (except for the dummy variables).[22,23]

[21] The regions we consider are: West hemisphere (i.e., North and South Americans), East and Southeast Asia and the Pacific, South Asia, Europe (including both Western, Eastern, and Central Europe), and Sub-Saharan Africa, Middle East and North Africa.

[22] The variables that are persistently insignificant and therefore dropped from the estimation include: trade openness measured by the sum of export and import values as a ratio to GDP; the dummy for countries' engagement in both internal and external armed conflicts; the dummies for commodity exporters and manufacturing exporters; the degree of fiscal procyclicality, which is measured by the correlation between HP-detrended output and government expenditure; the dummy for the existence of the deposit insurance; volatility of the TOT income shocks; and the dummy for hyperinflation (with the annual rate of inflation exceeding 40%).

3.2 Estimation Results – The Determinants of Crisis Occurrences

We make observations of the estimations mainly for the samples of developing and emerging market economies.

Currency crisis:

Most of the explanatory variables turn out to be qualitatively consistent with the findings in the literature (such as Kaminsky and Reinhart, 1999; Kaminsky et al., 1998; Glick and Hutchison, 2001; and Kaminsky, 2003) though statistical significance varies by the sample group. Countries with real appreciation (compared to its time trend) tend to experience a currency crisis, though significantly only for the group of industrialized countries. Rapid growth in private credit creation (as a ratio to GDP) leads to a currency crisis especially for emerging market countries. Not surprisingly, externally indebted countries tend to experience a currency crisis. However, despite the prevalent strong belief, IR holding does not affect the probability of the onset of a currency crisis.

Among developing countries, a country experiencing a banking crisis concurrently or in the previous year tends to experience a twin crisis with currency crisis; banking crisis increases the probability of a currency crisis by 10-12 percentage points. Debt crisis, however, does not seem to lead to a twin crisis with currency crisis.

Regional contagion is also found to affect the probability of a currency crisis. The more countries experience either a currency or banking crisis in the same region, the more likely it is for a country to experience a currency crisis, although debt crisis does not have such a contagion effect.

Among the variables of our focus, interestingly, developing or emerging market countries that pursue more divergent triad policies from the global trend (as of a year prior to the crisis) are more likely to experience a currency crisis although the opposite impact is found for industrialized countries while the degree of triad policy stability does not matter for any of the subsamples. The positive impact of a greater policy divergence on the likelihood of a currency crisis occurring among developing countries may mean that it involves some opportunity cost for

[23] In the estimation for debt crisis, the estimation results for the full or IDC sample are not reported because there is no debt crisis data for industrialized countries in our sample period (that ends in 2010).

these economies to adopt a combination of open macro policies that deviates from the global trend, which may explain why many developing economies have tended in recent years to either adopt triad policies with middle-ground convergence, or hold a massive amount of international reserves, or both. Contrarily, for industrialized countries, a combination of diverse policies might help countries avoid experiencing a currency crisis, though its effect is only marginally significant. This may suggest that industrialized countries can afford to pursue a higher degree of policy divergence with their established policy credibility.

Banking crisis:

Generally, the banking crisis estimations also yield results qualitatively consistent with other studies on the same subject (such as Aizenman and Noy, 2012; Demirgüç-Kunt and Detragiache, 1998); von Hagen and Ho, 2007; Joyce, 2011; and Duttagupta and Cashin, 2011), though with varying levels of statistical significance.

Unlike in the currency crisis estimation, IR holding now matters for the onset of a banking crisis and lowers the probability of a banking crisis occurrence among developing and emerging market countries. Developing or emerging market countries with faster credit growth tend to experience banking crisis, though that is not the case for industrialized countries. While the extent of real exchange rate overvaluation does not matter, the degree of exchange rate stability marginally increases the probability of the onset of a banking crisis for emerging market economies. Greater external financial exposure does increase the probability of a banking crisis for developing countries.

Banking crisis is also found to be contagious. For the groups of developing or emerging market economies, if other economies in the same region experience a banking crisis, that could cause a banking crisis in the home country. Also, we again have evidence for the twin crisis of currency and banking.

Neither the degree of triad policy divergence nor the degree of *in*stability of the triad policies affects the probability of bank crisis occurrence for any of the subsamples. Among the three types of financial crises, banking crisis seems to be the most weakly linked with the extent of triad policy divergence. One possibility for the weak link is that a certain choice of a monetary regime affects other macroeconomic conditions in a way that these conditions would have more direct impacts on the financial system. In the estimation result for the LDC group (column (7)) in

Table 1, credit growth and financial exposure are positive contributors to the likelihood of an occurrence of a banking crisis. We can suspect that triad policy divergence may possibly affect the probability of a banking crisis occurrence but only through these two variables. Capital can flow to markets that are distinctively different from other markets. In the literature, it has been argued that a policy regime with high degrees of exchange rate stability and financial openness would often make an economy more conducive to influx of capital flows, eventually experiencing a boom and bust cycle. That tendency can be stronger if a certain market or economy adopts a monetary regime that is more distinct from the global trend – which can be captured by *d* – compared to when many others adopt a similar monetary regime (e.g., the Bretton Woods system). In sum, the effect of triad policy divergence could be masked by changes in macroeconomic conditions that might have a bigger impact on the likelihood of a banking crisis.

Debt crisis:

Not surprisingly, the more indebted externally a country is, the more likely it is to experience a debt crisis. While greater external financial exposure does not contribute to the probability of a debt crisis, a country pursuing greater exchange rate stability tends to experience a debt crisis. This result may suggest that countries with fixed exchange rate regimes experience moral hazard in their debt financing; a fixed exchange rate policy may induce over-borrowing in hard currency. It may also be possible that a country with a fixed exchange rate tends to procrastinate its policy adjustments even when macroeconomic conditions require an adjustment (usually devaluation) of its currency, letting the peg duration increase the political cost of devaluation. These findings are consistent with the negative impact of IR holding on the probability of a debt crisis occurrence.

Currency crisis in the same region could also lead to an occurrence of a debt crisis. The significantly negative sign on the debt crisis contagion variable is somewhat puzzling. However, that may mean that once a country in the same geographical proximity, especially an economically larger one, experiences a debt crisis and goes through some form of rescheduling, that may calm down the sovereignty bond market for other countries with similar income levels in the region.

Again, a higher degree of triad policy divergence tends to lead to debt crisis. If a country pursues a distinctly more divergent triad policy compared to the global trend, that may cause stress on the economy. Possibly, investors would start suspecting the sustainability of the country's policy management and therefore question the future ability of repaying the debt. Such stress may become self-fulfilling and eventually force the country to experience a debt crisis. The *in*stability of the triad policy combination also matters though only with marginal significance. That also implies that unstable open macro policy management may weaken the credibility of the country in terms of its policy management and debt sustainability, and lead investors to attack speculatively the country's sovereign bond markets.

Impact of IR holding

Can the impact of the degree of triad policy convergence, *d*, on the probability of crisis occurrence be conditional on another factor, such as IR holding? One may expect a greater amount of IR holding might help lessen the positive effect of *d* on the probability of experiencing a crisis. If that is the case, countries with lower amounts of IR holding may be likely to experience a crisis once they increase the levels of *d,* while those with higher amounts of IR holding may not. To examine this, we re-estimate the probit model while dividing the sample into two groups: one composed of country-year's with IR holding higher than the annual median (as of *t-1*) and the other of IR holding lower than the median.

We report the estimation results of IR holding, *d*, its volatility, and private credit growth for both high and low IR regimes in Table 2.[24] In the table, the coefficient on *d* is significant among the low IR holders for the debt crisis estimation while it is no longer significant for the high IR holders that experience debt crisis. These findings are consistent with our prior. However, for the currency crisis estimation, the estimate on *d* is significant for the high IR holding regime for both developing and emerging market groups. This result is somewhat counterintuitive. To interpret this ostensibly counterintuitive result, we could expect that countries with high IR holdings may experience other macroeconomic symptoms that may create an environment where higher policy dispersion can lead to an occurrence of a crisis. Interestingly, private credit growth is a positive contributor to the likelihood of a crisis occurrence among high IR-holding

[24] The estimates of the other variables than those reported in Table 2 are omitted from presentation to conserve space. They are available from the authors upon request.

developing or emerging market countries in either the currency or banking crisis estimation, while it is not the case for any type of crisis among the low IR holders, or for debt crisis irrespective of the IR regime type. These results suggest that in the high IR regime, IR holdings may tend to induce higher credit growth, which would in return likely lead to a currency or banking crisis. In such an environment, pursuing a higher degree of policy divergence is riskier and tends to lead to a currency crisis. The distinct roles of private credit growth in currency and debt crisis may explain the twists in the results for the currency and debt crisis estimations.

Furthermore, the finding that, for the low IR regime, the estimate on the IR holding variable is persistently negative among all the samples and significant among most of them, suggests that the effect of IR holding can be nonlinear. In other words, the effect of an incremental change in the level of IR holding may be larger for lower IR holders than for higher IR holders.

3.3 Discussions – What Do the Estimation Results Tell Us about the Experiences in Latin America and Asia?

Now, we examine what we can learn from the estimation results as well as the actual crisis experiences. For that, we take a look at the two big crisis episodes in the 1980s and 1990s, namely the Latin American debt crisis in the early 1980s and the Asian crisis of 1997-1998.

Figure 7 shows the averages of *d* around the crisis period for the groups of Latin American and Asian countries.[25] The year of a crisis onset (year 0 in the graph) differs between the sample groups, and also among the countries within the Latin American group. For each of the Latin American countries, "Year 0" indicates the year when the crisis is the most severe among the years: 1981, 1982, or 1983.[26] For the Asian countries, "Year 0" is always 1997. The figure illustrates the sample average of *d* over the period from five years before ($t_0 - 5$) through five years after the crisis year ($t_0 + 5$).

From the figure, we can see that Latin American countries tend to have higher *d* in the period prior to the crisis compared to the Asian counterpart. Second, for this group of crisis countries, the policy divergence variable increases over the post-crisis period. Third, for the

[25] The "Latin America" crisis countries include: Argentina, Bolivia, Brazil, Chile, Columbia, Costa Rica, Ecuador, El Salvador, Honduras, Mexico, Peru, Uruguay, and Venezuela. The "Asian" crisis countries include: Indonesia, Korea, Malaysia, the Philippines, and Thailand.

[26] The year with the "most severe crisis" is identified when one of the years 1981, 1982, and 1983 is the starting year for different types of crises that occur in consecutive years, or the year when a twin or triple crisis occurs.

Asian group, *d* rises rapidly when the crisis breaks out, making it look more like countries are increasing the level of policy divergence in response to the occurrence of a crisis. Fourth, unlike the Latin American counterparts, *d* drops in the second year after the crisis and remains at relatively low levels afterwards.

The fact that *d* remains at relatively lower levels in the post-crisis period may suggest that Asian countries have possibly adopted policy combinations that would help reduce the likelihood of repeating a crisis. As far as the post-crisis period is concerned, Asian crisis countries appear more crisis-proof than Latin American countries in the 1980s.

Considering the previous finding that the positive correlation between the degree of policy dispersion and the likelihood of a currency crisis survives even if a country holds a large amount of IR (Table 2), Asian crisis countries' efforts to maintain lower levels of policy dispersion from the global trend do matter, and may have helped these economies to stay less crisis-prone in the post-Asian crisis years.

In Figure 8, we can observe the development of the measure of policy divergence for individual crisis countries: Argentina, Brazil, Chile, Columbia, and Mexico in panel (a) and Indonesia Korea, Malaysia, Philippines, and Thailand in panel (b). The individual countries' experiences provide interesting information that may be masked by the average behaviors illustrated in Figure 7. First, the movement of *d* is more diverse among Latin American crisis countries than Asian counterparts. Second, the degree of diversity is especially greater before the crisis-breakout year for Latin American countries, and it diminishes as years go by in the post-crisis period. Among Asian countries, except Indonesia, the level and the movement of *d* tends to be more homogenous, which may suggest the extent of policy coordination is greater in the Asian region. Third, among the economies in this region, the peak of *d* tends to be clustered around the first year of a crisis occurrence, preceded by lower levels of *d* and followed again by lower *d*, but moderately higher than in the pre-crisis years. Such a generalization is not applicable to Latin American economies. Last, as we observed in Figure 7, Asian crisis economies tend to implement policy combinations in a way that homogenously leads to declining *d* over post-crisis years, which is not observable among Latin American crisis economies.

Figure 9 takes a closer look at the policy combinations of the economies from the two regions. It illustrates the development of the sample averages of mean deviations for each of the

three trilemma policy indexes, i.e., : $\text{MI\_r} = {}^{\text{MI}}/_{\overline{\text{MI}}}$, $\text{ERS\_r} = {}^{\text{ERS}}/_{\overline{\text{ERS}}}$, and $KAO\_r = {}^{KAO}/_{\overline{KAO}}$ for both groups. This figure allows us to see how the movement in the three trilemma indexes is driving the results we saw in Figures 7 and 8.

According to this figure, while both Latin American and Asian countries experienced the crisis with relatively high levels of financial openness, Latin American countries significantly reduced the level of financial openness in the post-crisis period. The mean deviations of the financial openness index show (not reported) that countries such as Bolivia, Chile, Mexico, and Argentina reduced the degree of financial openness (with respect to the global trend) significantly. Asian crisis countries also did reduce the level of financial openness (such as Malaysia and Indonesia), but only by a lesser degree than Latin American counterparts. Considering that Latin American economies did not have high domestic savings in the pre-debt crisis years while Asian economies did have by the 1990s, the Latin American economies could have been more vulnerable to external shocks than Asian counterparts. That may explain the difference in the response to financial openness in the post-crisis years.

Both groups experienced a fall in the level of exchange rate stability, but the extent of the fall is greater for Asian countries on average. Part of the smaller decline in the extent of exchange rate stability for Latin American crisis countries is due to relatively dispersed timings of aborting fixed exchange regimes. While Asian crisis countries aborted their fixed exchange rate arrangements as soon as they experienced a currency crisis, the Latin American reactions to a crisis occurrence in terms of exchange rate stability differ widely across the countries. Some countries allowed exchange rate flexibility immediately after experiencing a crisis while others tried to maintain exchange rate stability. Furthermore, all the Asian countries, except for Malaysia, maintained exchange rate flexibility in the post-crisis five year period while such a homogeneity is not observed among Latin American counterparts.

Asian crisis countries have maintained stable levels of monetary independence throughout the pre- and post-crisis period though it did lose some degree of monetary independence at the time of crisis occurrence. As was the case with exchange rate stability, the movement of the monetary independence indexes for the Asian countries is much more homogenous than for the Latin American countries, again suggesting more policy coordination among these economies. On average, Latin American countries moderately increased the level of

monetary independence a year before the crisis year through three years after the occurrence of a crisis.

Due to the way the variable *d* is constructed, if any of the three indexes is far from the value of one, that would tend to raise the value of *d*. Given that, we can observe that Asian crisis countries have maintained relatively low levels of *d* because they tend to be "conformists" to the world trend in terms of monetary independence and financial openness. Despite the oft-discussed anecdote, Asian crisis countries have maintained relatively low levels of exchange rate stability, that allowed these countries to have more conformist trilemma policy combinations.

Latin American countries in the post-crisis period in the 1980s tended to have combinations of three distinct policies. They retained high (i.e., more-than-average) levels of monetary independence with lower exchange rate stability. Most importantly, these countries decided to seclude themselves from international financial markets. Such policy response, ironically, may have left the economies exposed to a crisis-prone state – though there are surely other factors that contributed to keeping the economies prone for crisis.

Given these findings, what makes Asia different the most is that, despite the turbulent experience of the Asian crisis, Asian countries have decided not to move away from the global trend of financial liberalization. As Aizenman, et al. (2011) show, these economies seem to have decided to learn how to surf on the waves of financial globalization rather than run away from them.

4. Conclusion

We have examined the impact of open macro policies on the economies from the perspective of the powerful hypothesis of the "trilemma" – a country may not simultaneously pursue the full extent of achievement in all of the three policy goals of monetary independence, exchange rate stability, and financial openness. In this paper, we shed light on a new aspect of the trilemma by focusing on the degree of policy divergence, i.e., how far a country's trilemma policy combination differs from the world trend.

We find a wider variation in the degree of policy divergence across countries among different income levels and also geographical groups. Industrialized countries, most notably the Euro countries, tend to adopt more diverse trilemma policy combinations since the early 1990s.

In the last 15 years or so, emerging market countries have adopted trilemma policy combinations with the smallest degree of policy divergence. Given that this group of countries has achieved relatively stable output performance, lower levels of policy divergence may have been one of the keys to it.

To investigate that, we formally tested the effect of the degree of policy divergence on the probability of crisis occurrences.

We have found that a developing or emerging market country with a higher degree of policy divergence is more likely to experience currency or debt crisis. For industrialized countries, a higher degree of policy divergence tends to *reduce* the probability of currency or banking crisis, however. We also found that by holding large volumes of IR, developing countries could avoid facing the correlation between wider policy divergence and a higher level of likelihood of experiencing a debt crisis, though high IR holders, interestingly, would also face a *positive* correlation between wider policy divergence and the likelihood of experiencing a currency crisis. Our results also suggest a non-linearity in the effect of IR holding; i.e., the effect of an incremental change in the level of IR holding may be larger for lower IR holders

When we examined the development of trilemma policies around the crisis period for the groups of Latin American crisis countries in the 1980s and the Asian crisis countries in the 1990s, we found that these two groups of countries have gone through distinctly different policy development around the time of the crisis. The biggest difference between the two groups of crisis countries is that Latin American crisis countries tended to close their capital accounts in the aftermath of a crisis while that is not the case among the Asian crisis countries. Furthermore, the Asian crisis countries tend to reduce the degree of policy divergence in the aftermath of the crisis, which possibly means that they decided to adopt open macro policies that are less prone for a crisis. That decision has been paired with a strong incentive to hold a great amount of international reserves. By observing how crisis-prone conditions can be perennial for emerging market economies as it happened to Latin American countries, Asian economies, including those which did not experience a crisis like China, seem to have decided to become a cautious implementer of open macro policies. In the highly integrated world economy, this decision is no surprise to anyone.

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Appendix 1: Country List

Industrialized Countries

1	193	Australia*
2	122	Austria*
3	124	Belgium*
4	156	Canada*
5	128	Denmark*
6	172	Finland*
7	132	France*
8	134	Germany*
9	174	Greece*
10	176	Iceland*
11	178	Ireland*
12	136	Italy*
13	158	Japan*
14	181	Malta
15	138	Netherlands*
16	196	New Zealand*
17	142	Norway*
18	182	Portugal*
19	184	Spain*
20	144	Sweden*
21	146	Switzerland*
22	112	United Kingdom*

Developing Countries: (E) denotes emerging market countries

23	914	Albania*
24	612	Algeria*
25	614	Angola*
26	311	Antigua and Barbuda
27	213	Argentina*, (E)
28	911	Armenia*
29	314	Aruba
30	912	Azerbaijan
31	313	Bahamas, The
32	419	Bahrain
33	513	Bangladesh*
34	316	Barbados
35	913	Belarus
36	339	Belize
37	638	Benin*
38	514	Bhutan
39	218	Bolivia*
40	616	Botswana, (E)
41	223	Brazil*, (E)
42	918	Bulgaria*, (E)
43	748	Burkina Faso*
44	618	Burundi*
45	662	Cote d'Ivoire*, (E)
46	522	Cambodia, (E)
47	622	Cameroon*
48	624	Cape Verde*
49	626	Central African Republic*
50	628	Chad*
51	228	Chile*, (E)
52	924	China*, (E)
53	233	Colombia*, (E)
54	632	Comoros
55	636	Congo, Dem. Rep.
56	634	Congo, Rep.
57	238	Costa Rica*
58	960	Croatia*
59	423	Cyprus
60	935	Czech Republic*, (E)
61	611	Djibouti
62	321	Dominica
63	243	Dominican Republic*
64	248	Ecuador, (E)
65	469	Egypt, Arab Rep.*, (E)
66	253	El Salvador*
67	642	Eq. Guinea*
68	939	Estonia*
69	644	Ethiopia
70	819	Fiji
71	646	Gabon
72	648	Gambia, The
73	915	Georgia*
74	652	Ghana*, (E)
75	328	Grenada
76	258	Guatemala*
77	656	Guinea
78	654	Guinea-Bissau*
79	336	Guyana*
80	263	Haiti
81	268	Honduras*
82	532	Hong Kong, China*, (E)
83	944	Hungary*, (E)
84	534	India*, (E)
85	536	Indonesia*, (E)
86	429	Iran, Islamic Rep.
87	436	Israel*, (E)
88	343	Jamaica*, (E)
89	439	Jordan*, (E)
90	916	Kazakhstan*
91	664	Kenya*, (E)
92	542	Korea, Rep.*, (E)
93	443	Kuwait*
94	917	Kyrgyz Republic*
95	544	Lao PDR
96	941	Latvia*
97	446	Lebanon
98	666	Lesotho
99	668	Liberia
100	672	Libya
101	946	Lithuania*, (E)
102	674	Madagascar*
103	676	Malawi
104	548	Malaysia*, (E)
105	556	Maldives

106	678	Mali*
107	682	Mauritania*
108	684	Mauritius*, (E)
109	273	Mexico*, (E)
110	868	Micronesia, Fed. Sts.
111	921	Moldova
112	948	Mongolia*
113	686	Morocco*, (E)
114	688	Mozambique*
115	518	Myanmar
116	728	Namibia
117	558	Nepal*
118	353	Netherlands Antilles
119	278	Nicaragua
120	692	Niger*
121	694	Nigeria*, (E)
122	449	Oman
123	564	Pakistan
124	283	Panama*
125	853	Papua New Guinea
126	288	Paraguay*
127	293	Peru*, (E)
128	566	Philippines*, (E)
129	964	Poland*, (E)
130	453	Qatar
131	968	Romania*
132	922	Russian Federation*, (E)
133	714	Rwanda
134	716	Sao Tome and Principe
135	862	Samoa
136	456	Saudi Arabia
137	722	Senegal*
138	718	Seychelles
139	724	Sierra Leone*
140	576	Singapore*, (E)
141	936	Slovak Republic*, (E)
142	961	Slovenia*, (E)
143	813	Solomon Islands
144	199	South Africa*, (E)
145	524	Sri Lanka*
146	361	St. Kitts and Nevis
147	362	St. Lucia
148	364	St. Vincent & the Grenadines
149	732	Sudan
150	366	Suriname
151	734	Swaziland*
152	463	Syrian Arab Republic
153	923	Tajikistan
154	738	Tanzania*
155	578	Thailand*, (E)
156	742	Togo*
157	866	Tonga
158	369	Trinidad and Tobago, (E)
159	744	Tunisia*, (E)
160	186	Turkey*, (E)
161	746	Uganda*
162	926	Ukraine
163	298	Uruguay*
164	846	Vanuatu
165	299	Venezuela, RB*, (E)
166	582	Vietnam*, (E)
167	474	Yemen, Rep.*
168	754	Zambia*
169	698	Zimbabwe*, (E)

Note: Countries with "*" are the ones included in the regression estimations. (E) denotes "emerging market economies."

Appendix 2: Crisis Identification

Currency crisis – We identify the currency crisis based on the conventional exchange rate market pressure (EMP) index pioneered by Eichengreen et al. (1995, 1996). The EMP index is defined as a weighted average of monthly changes in the nominal exchange rate, the international reserve loss in percentage, and the nominal interest rate. The nominal exchange rate is calculated against the base country that we use to construct the trilemma indexes (see Aizenman, et al., 2008).[27] The weights are inversely related to the pooled variance of changes in each component over the sample countries. As many others do, we use two standard deviations of the EMP as the threshold to identify a currency crisis. For the countries whose data for the EMP are not available, we supplement the crisis dummy with the currency crisis identification by Reinhart and Rogoff (2009). The crisis dummy is available for 1970 – 2010.

Banking crisis – It is based on the data developed by Laeven and Valencia (2008, 2010) and its update (Laeven and Valencia, 2012). Laeven and Valencia define a systematic banking crisis if an economy is showing "significant signs of financial distress in the banking system" (e.g., significant bank runs, losses in the banking system, and/or bank liquidations) *and* if the government has taken "significant banking policy intervention measures in response to significant losses in the banking system." They consider "significant banking policy intervention measures" have been taken if at least three out of the following six measures have been used: 1) extensive liquidity support (5 percent of deposits and liabilities to nonresidents); 2) bank restructuring gross costs (at least 3 percent of GDP); 3) significant bank nationalizations; 4) significant guarantees put in place; 5) significant asset purchases (at least 5 percent of GDP); and 6) deposit freezes and/or bank holidays. See Laeven and Valencia (2008) for more details. We also supplement the data with the Reinhart and Rogoff data. The data are available for 1970 – 2010.

[27] The "base country" is defined as the country that a home country's monetary policy is most closely linked with as in Shambaugh (2004). The base countries are Australia, Belgium, France, Germany, India, Malaysia, South Africa, the U.K., and the U.S. The base country can change as it has happened to Ireland, for example. Its base country was the U.K. until the mid-1970s, and changed to Germany since Ireland joined the EMS.

Debt crisis – It is identified using the dataset by Reinhart and Rogoff (2009). They identify a sovereignty default when a country fails to meet a principle or interest payment on the due date. Or, a debt crisis is identified when "rescheduled debt is ultimately extinguished in terms less favorable than the original obligation." We also augment the Reinhart and Rogoff data using the information from Babbel (1995), Beim, D. and C. Calomiris. (2001), Reinhart and Rogoff (2008), and World Bank's *Global Development Finance* (2012). The data are available for 1970 – 2010.

Twin crises – A twin crisis is identified when one type of crisis occurs while another type occurs in the immediate previous year (t_0–1), the same year (t_0), or the immediate following year (t_0+1).

Table 1: Probit Estimations on the Probabilities of Different Types of Crisis Occurrences

	(1) Currency Full	(2) Currency IDC	(3) Currency LDC	(4) Currency EMG	(5) Banking FULL	(6) Banking IDC	(7) Banking LDC	(8) Banking EMG	(9) Debt LDC	(10) Debt EMG
Relative income	0.041	0.051	0.064	0.026	-0.017	0.001	0.012	0.026	-0.108	-0.023
(*t*-1)	(0.015)***	(0.035)	(0.027)**	(0.040)	(0.014)	(0.004)	(0.026)	(0.037)	(0.049)**	(0.026)
IR holding (*t*-1)	-0.004	-0.156	0.001	0.008	-0.093	0.003	-0.131	-0.122	-0.124	-0.079
	(0.041)	(0.135)	(0.044)	(0.075)	(0.041)**	(0.016)	(0.047)***	(0.064)*	(0.050)**	(0.031)**
Per Capita	-0.071	-0.243	-0.032	0.016	-0.124	-0.063	-0.063	-0.032	-0.134	-0.214
Output growth (*t*-1)	(0.078)	(0.206)	(0.077)	(0.161)	(0.067)*	(0.053)	(0.069)	(0.115)	(0.113)	(0.088)**
Private credit growth	0.015	0.056	0.035	0.190	0.097	0.002	0.209	0.150	-0.104	-0.070
(*t-1*)	(0.067)	(0.079)	(0.088)	(0.096)**	(0.045)**	(0.012)	(0.070)***	(0.076)**	(0.128)	(0.065)
Net Debt (*t-1*)	0.006	-0.004	0.021	0.052	0.008	0.005	0.007	-0.002	0.046	0.006
	(0.006)	(0.015)	(0.007)***	(0.023)**	(0.006)	(0.004)	(0.008)	(0.016)	(0.015)***	(0.012)
Real Exchange	0.019	0.105	0.007	-0.004	0.005	0.010	0.003	0.011	-0.002	-0.001
Overvaluation (*t-1*)	(0.010)*	(0.041)**	(0.009)	(0.020)	(0.013)	(0.008)	(0.015)	(0.020)	(0.014)	(0.011)
Financial Exposure	-0.017	-0.023	-0.002	-0.025	0.013	0.004	0.015	0.010	-0.007	-0.012
(*t-1*)	(0.006)***	(0.011)**	(0.009)	(0.019)	(0.004)***	(0.004)	(0.006)***	(0.007)	(0.016)	(0.014)
ERS (*t-1*)	-0.012	-0.025	0.006	0.001	0.009	-0.002	0.009	0.020	0.035	0.016
	(0.011)	(0.019)	(0.012)	(0.018)	(0.009)	(0.004)	(0.011)	(0.017)	(0.016)**	(0.012)
KAOPEN (*t-1*)	-0.042	-0.027	-0.024	-0.023	-0.009	-0.003	-0.011	-0.015	-0.001	-0.016
	(0.015)***	(0.024)	(0.015)	(0.021)	(0.012)	(0.007)	(0.013)	(0.018)	(0.016)	(0.011)
Tri. Pol. Conv (*t-1*)	0.001	-0.022	0.036	0.043	0.005	0.002	-0.000	0.011	0.051	0.024
	(0.011)	(0.014)	(0.014)***	(0.019)**	(0.010)	(0.003)	(0.013)	(0.017)	(0.017)***	(0.010)**
Tri-Pol. Conv., SD	0.035	-0.001	0.039	0.052	0.045	0.012	0.027	0.024	0.081	0.038
(*t-5*|*t-1*)	(0.036)	(0.053)	(0.041)	(0.057)	(0.033)	(0.012)	(0.042)	(0.056)	(0.053)[13%]	(0.025)[11%]
Contagion: Currency	0.143	0.078	0.135	0.117	-0.050	-0.024	-0.042	0.025	0.076	-0.019
(*t* or *t-1*)	(0.030)***	(0.047)*	(0.031)***	(0.066)*	(0.035)	(0.021)	(0.036)	(0.049)	(0.040)*	(0.045)
Contagion: Banking	0.035	-0.034	0.055	0.093	0.124	0.027	0.073	0.089	-0.022	0.007
(*t* or *t-1*)	(0.025)	(0.036)	(0.024)**	(0.034)***	(0.018)***	(0.026)	(0.019)***	(0.027)***	(0.038)	(0.025)
Contagion: Debt	-0.015	-0.075	-0.003	0.046	0.005	0.046	-0.023	0.005	-0.234	-0.129
(*t* or *t-1*)	(0.032)	(0.127)	(0.034)	(0.061)	(0.043)	(0.044)	(0.034)	(0.056)	(0.053)***	(0.034)***
Banking Crisis	0.102		0.107	0.124					0.030	0.027
(t or t-1)	(0.029)***		(0.032)***	(0.044)***					(0.024)	(0.019)
Debt Crisis	0.007		0.001	0.009	-0.004		-0.006	0.011		
(t or t-1)	(0.014)		(0.012)	(0.024)	(0.009)		(0.010)	(0.020)		
Currency Crisis					0.056		0.092	0.091	0.030	0.019
(t or t-1)					(0.020)***		(0.028)***	(0.033)***	(0.023)	(0.016)
N	2,407	662	1,745	932	2,372	627	1,745	906	1,562	847

Notes: The table reports the change in the probability of a crisis in response to a 1 unit change in the variable evaluated at the mean of all variables (x 100, to convert into percentages) with associated z-statistic (for hypothesis of no effect) in parentheses below. * $p<0.1$; ** $p<0.05$; *** $p<0.01$. Robust standard errors in brackets.

Table 2: Interactive Effects of IR on the Probabilities of Different Types of Crisis Occurrences

	(1) Currency Full	(2) Currency IDC	(3) Currency LDC	(4) Currency EMG	(5) Banking FULL	(6) Banking IDC	(7) Banking LDC	(8) Banking EMG	(9) Debt LDC	(10) Debt EMG
High IR Holders										
Private credit growth (t-1)	0.172 (0.076)**	0.059 (0.071)	0.173 (0.071)**	0.188 (0.074)**	0.208 (0.058)***	--	0.239 (0.068)***	0.126 (0.060)**	0.005 (0.087)	0.001 (0.013)
IR holding (*t*-1)	0.015 (0.037)	-0.072 (0.141)	0.050 (0.035)	0.054 (0.048)	-0.040 (0.030)	--	-0.041 (0.036)	-0.009 (0.032)	-0.086 (0.044)*	-0.015 (0.015)
Tri. Pol. Conv (*t-1*)	0.013 (0.014)	0.003 (0.018)	0.033 (0.015)**	0.032 (0.014)**	-0.002 (0.009)	--	-0.003 (0.011)	0.004 (0.008)	0.025 (0.016)	0.004 (0.004)
Tri-Pol. Conv., SD (*t-5*|*t-1*)	-0.029 (0.042)	-0.012 (0.041)	-0.029 (0.042)	-0.011 (0.035)	0.065 (0.030)**	--	0.060 (0.036)*	0.057 (0.029)*	-0.011 (0.049)	0.006 (0.007)
N	1,102	178	924	517	1,103	--	933	504	860	497
Low IR Holders										
Private credit growth (t-1)	-0.130 (0.103)	-0.251 (0.175)	-0.082 (0.111)	-0.009 (0.319)	-0.171 (0.108)	-0.155 (0.095)	-0.067 (0.125)	-0.054 (0.203)	-0.193 (0.201)	-0.461 (0.205)**
IR holding (*t*-1)	-0.402 (0.144)***	-0.345 (0.203)*	-0.305 (0.171)*	-0.308 (0.404)	-0.336 (0.125)***	-0.056 (0.062)	-0.470 (0.184)**	-0.600 (0.288)**	-0.405 (0.246)*	-0.279 (0.309)
Tri. Pol. Conv (*t-1*)	-0.018 (0.014)	-0.020 (0.012)*	0.013 (0.022)	0.011 (0.039)	0.002 (0.012)	-0.000 (0.005)	-0.000 (0.022)	0.014 (0.027)	0.064 (0.028)**	0.051 (0.030)*
Tri-Pol. Conv., SD (*t-5*|*t-1*)	0.071 (0.047)	-0.003 (0.048)	0.080 (0.063)	0.152 (0.120)	-0.045 (0.044)	0.012 (0.012)	-0.092 (0.068)	-0.217 (0.091)**	0.173 (0.093)*	0.087 (0.076)
N	1,293	480	813	411	1,257	453	804	398	695	347

Notes: The table reports the change in the probability of a crisis in response to a 1 unit change in the variable evaluated at the mean of all variables (x 100, to convert into percentages) with associated z-statistic (for hypothesis of no effect) in parentheses below. The estimates of the other variables than those reported in Table 2 are omitted from presentation to conserve space. The results of the estimation for the developed country group's (IDC) high IR regime are not reported because a small sample size (in comparison to the set of the right-hand side variables) makes the estimates inappropriate. They are available from the authors upon request. * $p<0.1$; ** $p<0.05$; *** $p<0.01$. Robust standard errors in brackets.

Figure 1: The Trilemma Triangle

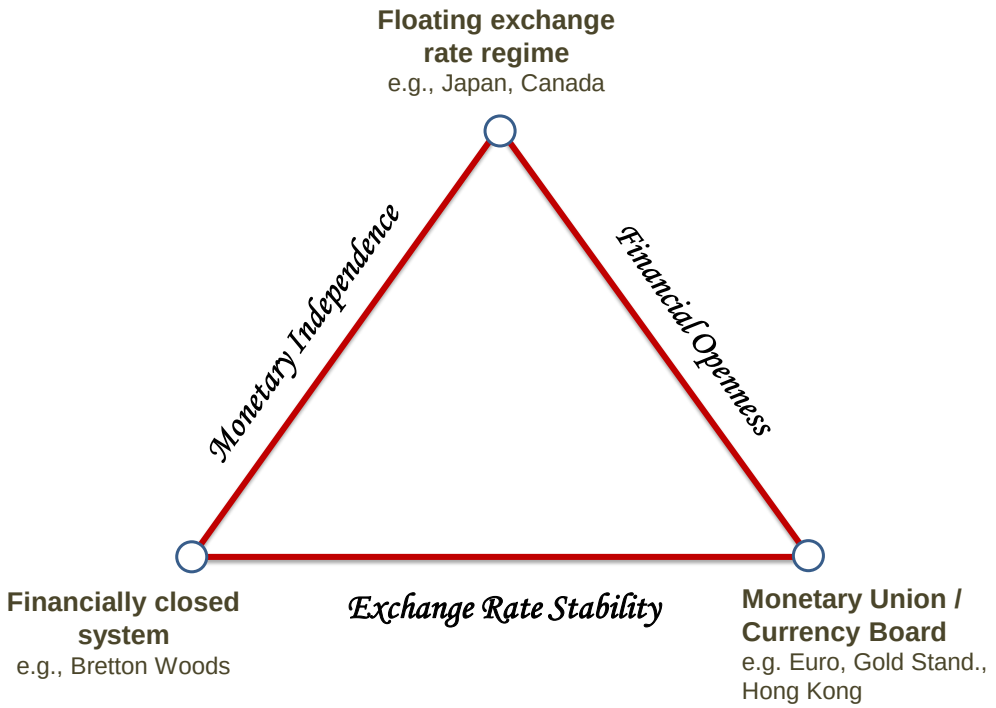


Figure 2: Degree of Policy Dispersions among Different Income Groups of Countries

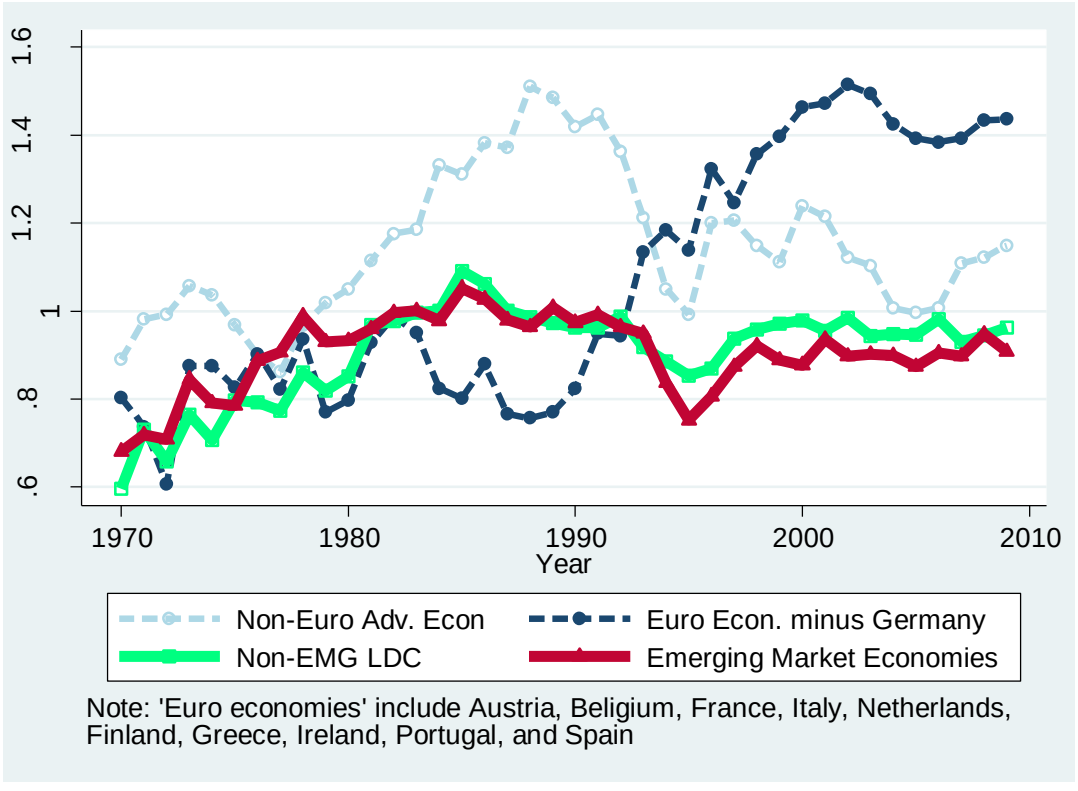


Figure 3: Degree of Policy Dispersions among Different Regional Country Groups

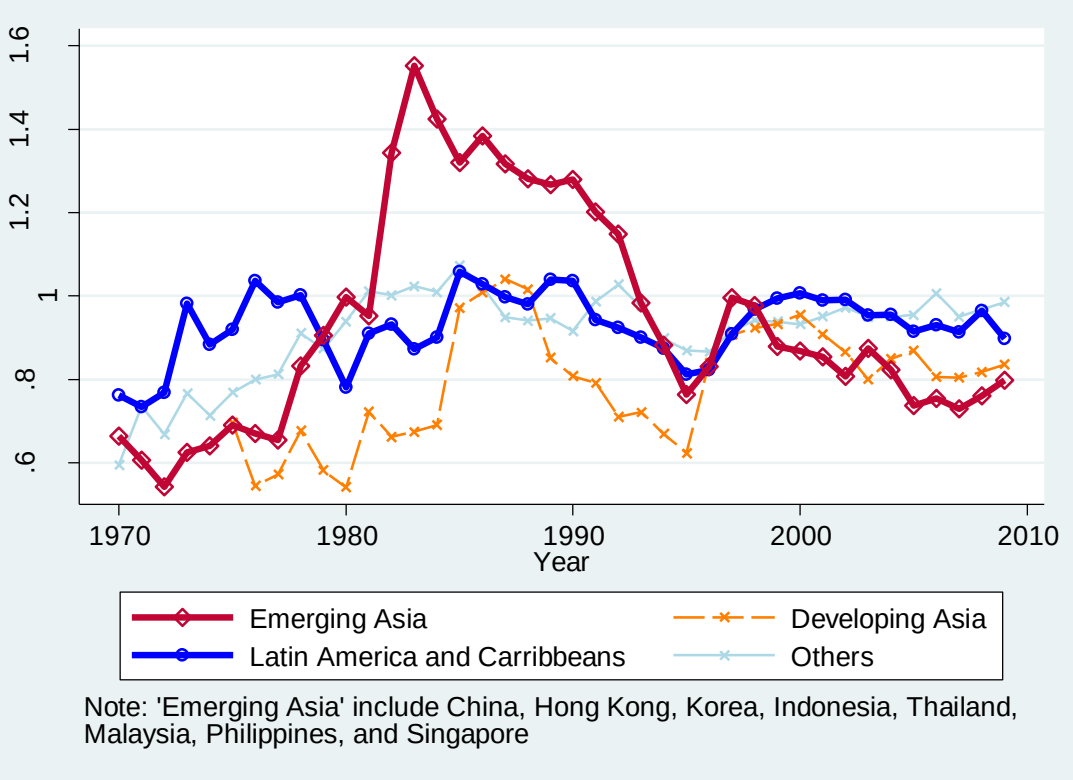
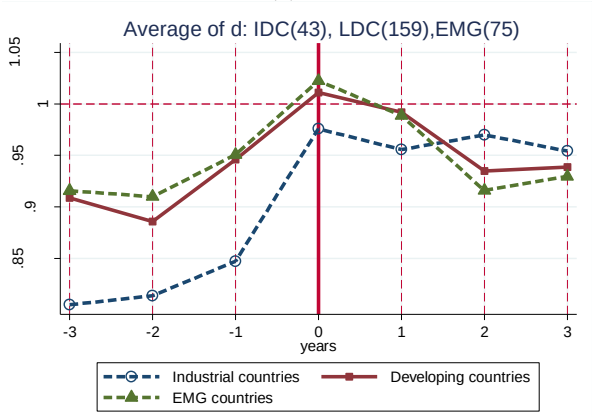
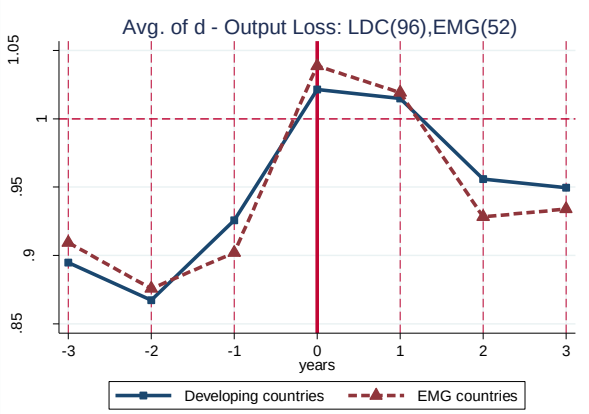


Figure 4: Average of the Measure of Policy Divergence over <u>Currency</u> Crisis

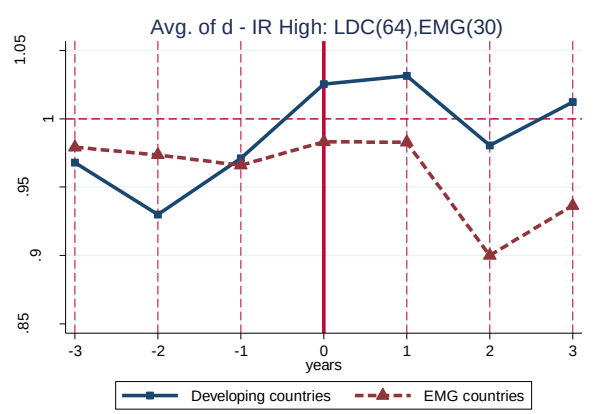
(a) Total

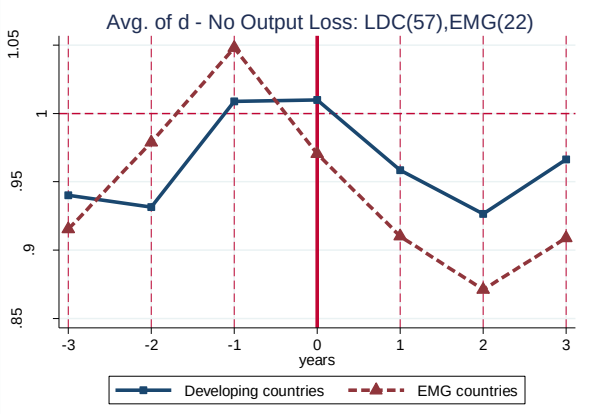


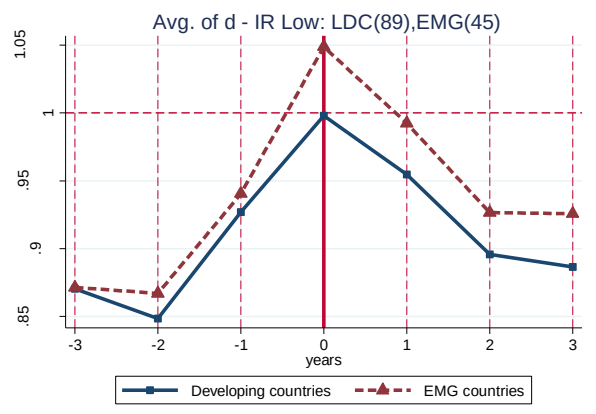
(b) Output Loss vs. No Output Loss



(c) High or Low IR Holding



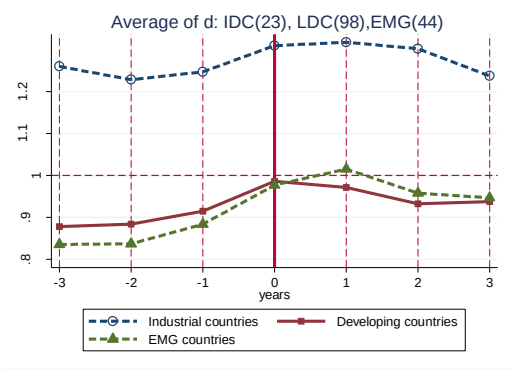




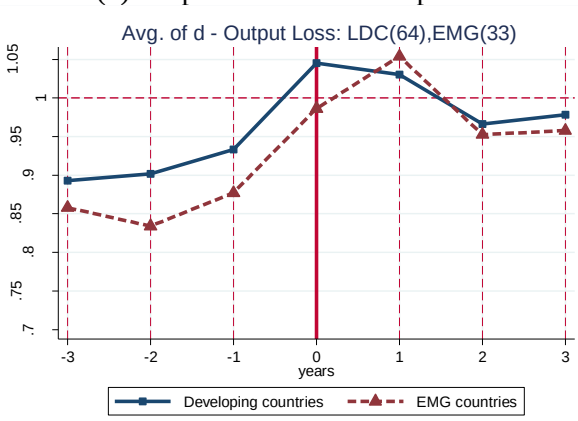
Note: The figures in parentheses indicate the number of countries included in the averaging.

Figure 5: Average of the Measure of Policy Divergence over Banking Crisis

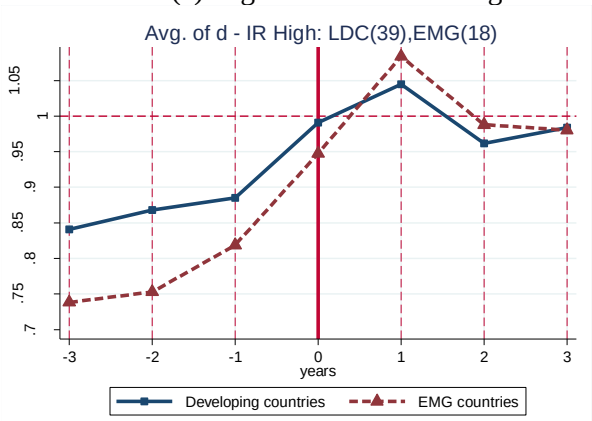
(a) Total

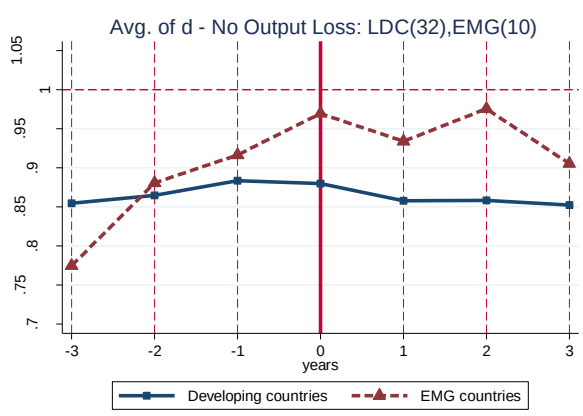


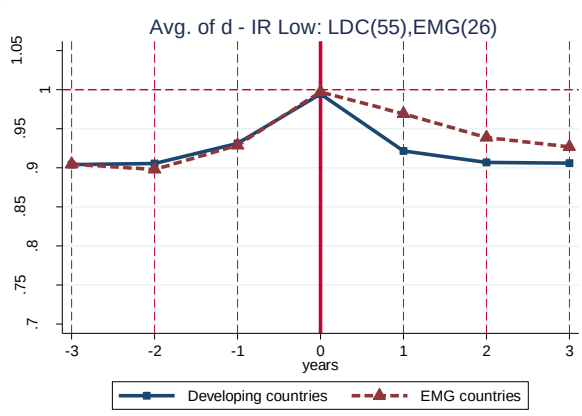
(b) Output Loss vs. No Output Loss



(c) High or Low IR Holding



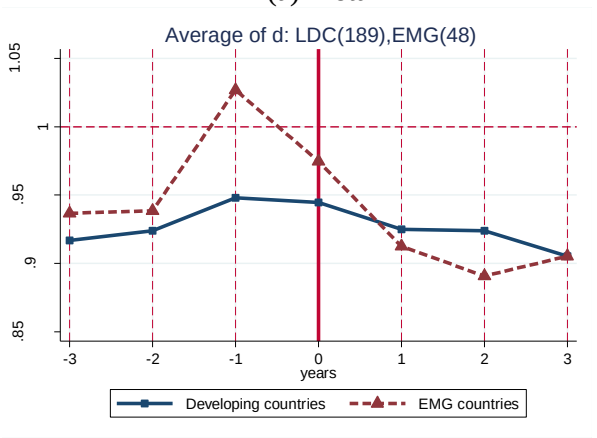




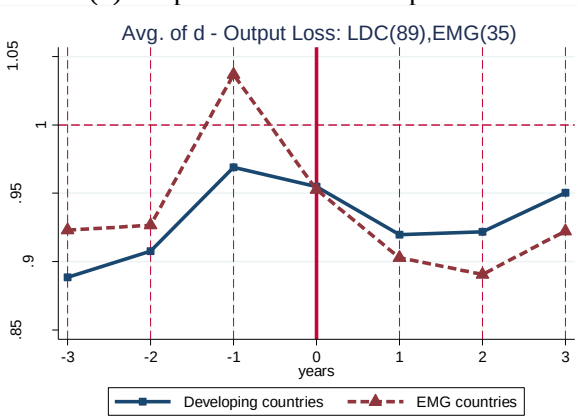
Note: The figures in parentheses indicate the number of countries included in the averaging.

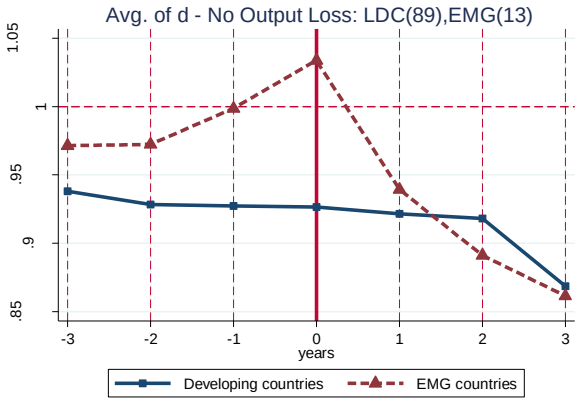
Figure 6: Average of the Measure of Policy Divergence over Debt Crisis

(a) Total

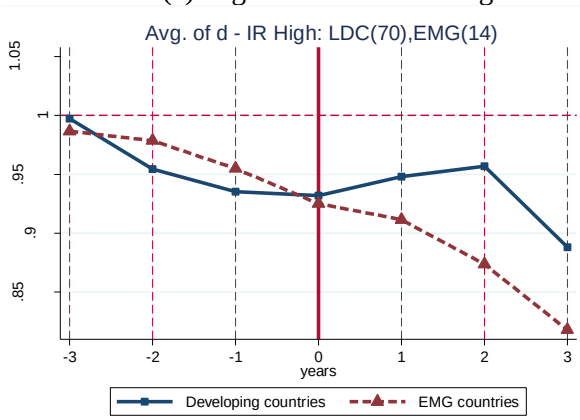


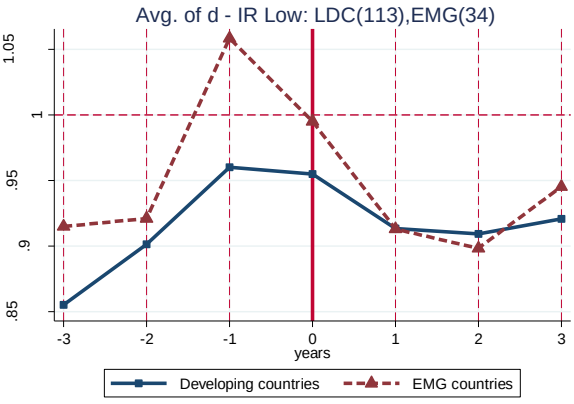
(b) Output Loss vs. No Output Loss





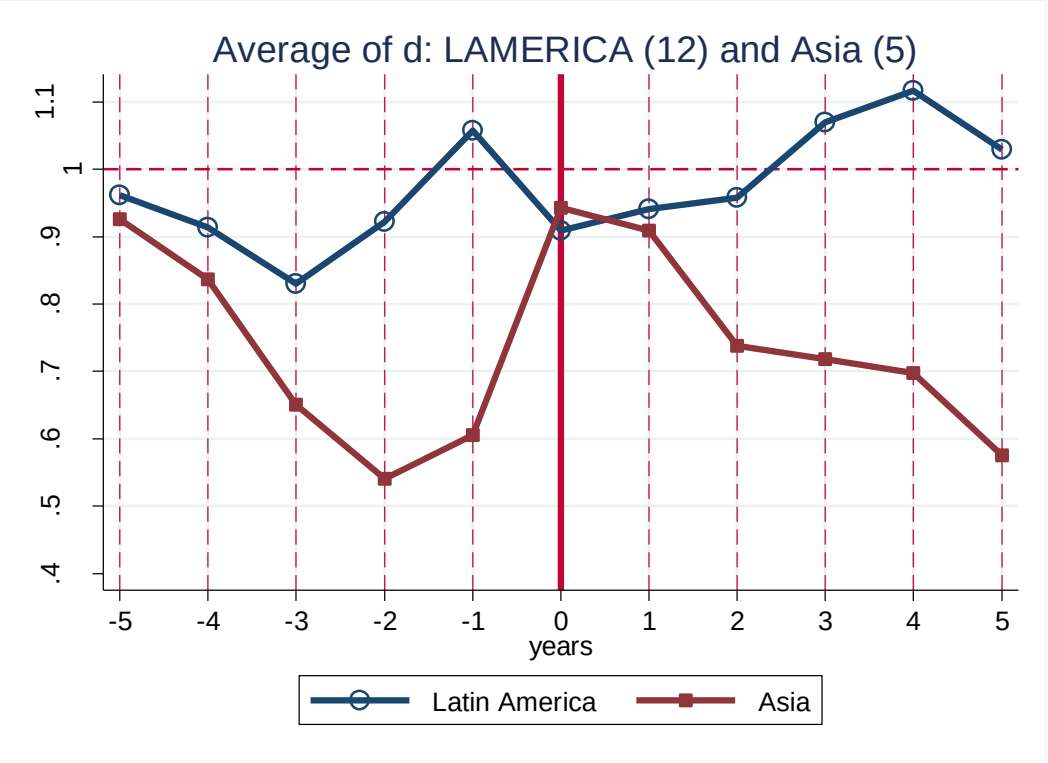
(c) High or Low IR Holding





Note: The figures in parentheses indicate the number of countries included in the averaging.

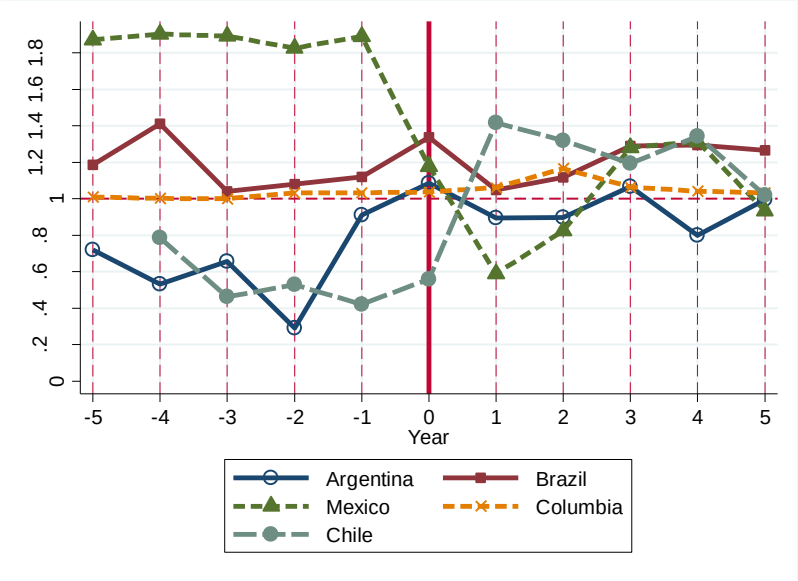
Figure 7: Average of the Measure of Policy Divergence for Latin America and Asia



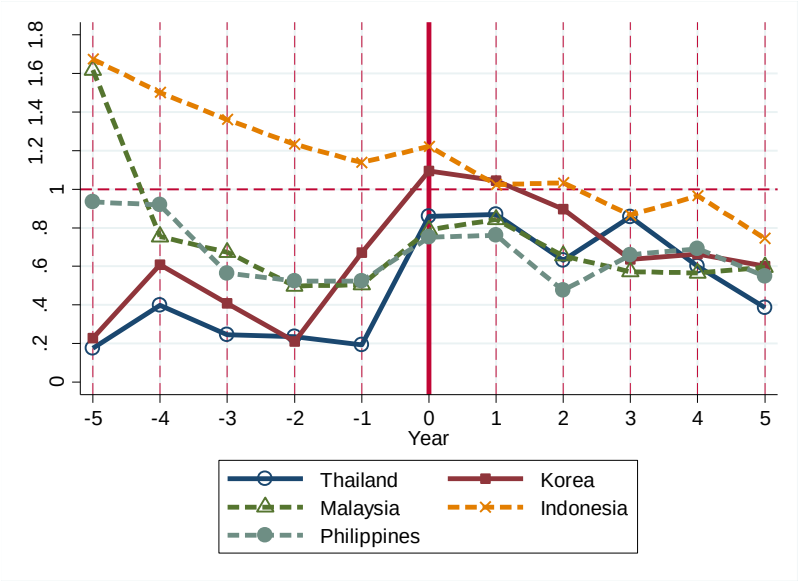
Notes: "Latin America" includes: Argentina, Bolivia, Brazil, Chile, Columbia, Costa Rica, Ecuador, El Salvador, Honduras, Mexico, Peru, Uruguay, and Venezuela. "Asia" includes: Indonesia, Korea, Malaysia, the Philippines, and Thailand. For each of the Latin American countries, "Year 0" indicates the year when the crisis is the most severe among the years: 1981. 1982, and 1983, i.e., it varies among the countries. For the Asian countries, "Year 0" is 1997.

Figure 8: Measures of Policy Divergence for Latin American and Asian Crisis Countries

(a) Latin America

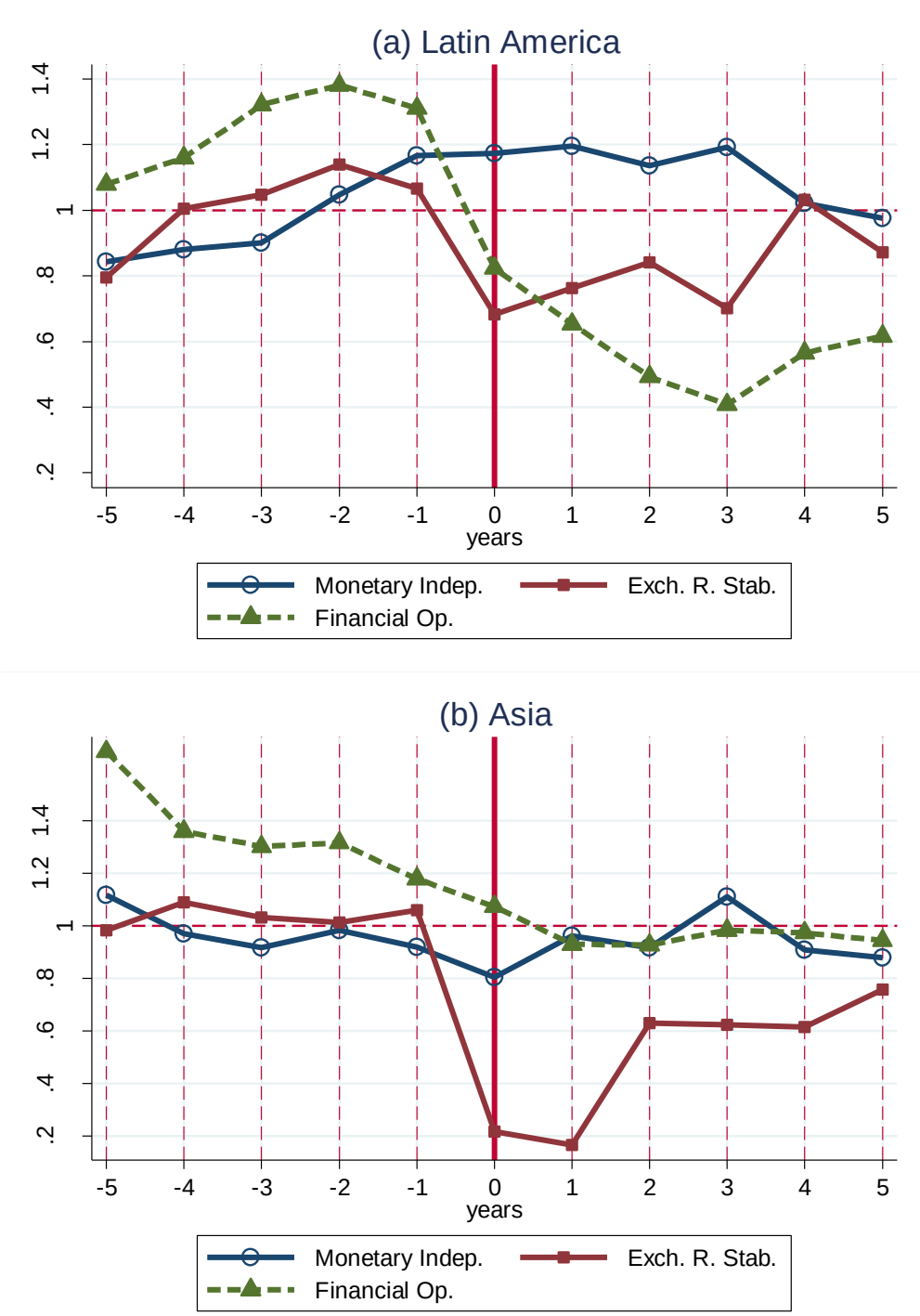


(b) Asia



Notes: "Latin America" includes: Argentina, Bolivia, Brazil, Chile, Columbia, Costa Rica, Ecuador, El Salvador, Honduras, Mexico, Peru, Uruguay, and Venezuela. "Asia" includes: Indonesia, Korea, Malaysia, the Philippines, and Thailand. For each of the Latin American countries, "Year 0" indicates the year when the crisis is the most severe among the years: 1981. 1982, and 1983, i.e., it varies among the countries. For the Asian countries, "Year 0" is 1997.

Figure 9: Average Deviations from the Means for Each Trilemma Index over a Crisis for Latin America (a) and Asia (b)



Notes: "Latin America" includes: Argentina, Bolivia, Brazil, Chile, Columbia, Costa Rica, Ecuador, El Salvador, Honduras, Mexico, Peru, Uruguay, and Venezuela. "Asia" includes: Indonesia, Korea, Malaysia, the Philippines, and Thailand. For each of the Latin American countries, "Year 0" indicates the year when the crisis is the most severe among the years: 1981. 1982, and 1983, i.e., it varies among the countries. For the Asian countries, "Year 0" is 1997.