Monetary Policy in an Era of High Financial Market Volatility:
on the Challenges Facing Emerging Markets

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This paper analyzes the impact of financial volatility on the role and design of monetary policy, and in particular studies critically the lessons of the global crisis regarding the conduct of monetary policy. We overview and explain the way emerging markets dealt with the spiking Exchange Market Pressures during the crisis of 2008-9, adjusting by drawing down international reserves and depreciating their currencies. We document and explain the changing configuration of the generalized economic trilemma -- the choices and tradeoffs among monetary independence, financial integration, exchange rate stability. Emerging markets reacted by moving towards the middle ground of the trilemma, buffered by sizable hoarding of international reserves. The growing exposure to volatile financial inflows associated with the Quantitative Easing (QE) of the US has posed new challenges to emerging markets. Yield chasing by OECD investors induced exchange rate appreciations, increasing countries' susceptibility to destabilizing capital flight. Affected countries reacted by the use of varying combinations of prudential regulations, capital controls, and by hoarding large stocks of reserves aiming at mitigating possible adverse effects of large and volatile inflows of funds. Several countries also reacted by initiating their version of QE. These adjustments illustrate that conventional inflation targeting does not suffice to deal with the challenges facing central banks in an era of financial instability. New prudential policies are called for: experimenting with varying leverage policies and prudential levies associated with balance sheet exposures, etc. While none of these steps alone provides a panacea, their agile application accounts for the greater resilience of emerging markets at times of peril.

In the years before the global crisis of 2008-9, inflation targeting gained prominence as the recommended policy framework, first for the OECD, and more recently as the preferred regime for a growing number of emerging markets. Rose (2007) summarized lucidly this state of affair:

"A stable international monetary system has emerged since the early 1990s. A large number of industrial and a growing number of developing countries now have domestic inflation targets administered by independent and transparent central banks. These countries place few restrictions on capital mobility and allow their exchange rates to float. The domestic focus of monetary policy in these countries does not have any obvious international cost. Inflation targeters have lower exchange rate volatility and less frequent "sudden stops" of capital flows than similar countries that do not target inflation. Inflation targeting countries also do not have current accounts or international reserves that look different from other countries. This system was not planned and does not rely on international coordination. There is no role for a center country, the IMF, or gold. It is durable; in contrast to other monetary regimes, no country has been forced to abandon an inflation-targeting regime. Succinctly, it is the diametric opposite of the post-war system; Bretton Woods, reversed."

The crisis of 2008-9 shattered the growing consensus regarding the role of the central bank, the implementation of monetary policy in general, and inflation targeting in particular. The great recession put to the fore the challenges of designing a monetary policy at times where the nominal interest rate in OECD countries approached the zero-boundary associated with liquidity traps. Furthermore, the fiscal fatigue associated with the growing public debt overhang in the OECD countries imposed new and mostly unprecedented challenges on central banks in the rich countries. Prime examples of these trends are the US and the UK, where the diminishing support towards fiscal policy and the deflationary pressure led to aggressive quantitive easing (QE) by the US FED, and to an expansionary monetary policy in the UK. The euro zone crisis, starting in 2009-10 in Ireland and Greece, morphed into an accelerated run on the euro banking system and a massive deleveraging of PIIGS sovereign debt. Down the road, the growing threat to the euro block induced the ECB to adopt its own version of QE needed to prevent the melt down of the euro project. More recently, Japan joined these trends, initiating its own version of aggressive QE. These developments showed the limitations of a narrow view of monetary policy, where inflation targeting was viewed as the holy grail of Central Banking. Beyond the

challenges associated with approaching the liquidity trap, it put to the fore the need to integrate monetary policy with prudential supervision, and more recently the substitutability of fiscal and monetary stimuli during times of peril.

While debate continues regarding the proper institutional design of prudential regulation and its ability to reach the shadow banking, the crisis made clear the limitations of targeting inflation while ignoring the tail risks propagated by lax prudential regulations. Focusing on the OECD countries' experience with inflation targeting during the crisis, Reichlin and Baldwin (2013) edited eVox volume provides a mixed assessment of inflation targeting at times of peril. While inflation targeting helps in anchoring the expected inflation, it is ill designed to deal by itself with the challenges associated with deflationary times. This volume illustrates the growing debate regarding inflation targeting, attempting not to throw out the baby with the bath water. The range of views includes Franekel's recommendation to adopt nominal GDP targeting, a position that is opposed by Posen. Banerjee, Cecchetti and Hofmann (BIS economists), advocate that price stability should remain monetary policy's primary objective of an inflation-targeting system that is more flexible and more complex. They recommend adding the wide array of monetary policy and prudential instruments in use since 2007 to the central bankers' tool kit in the new post-crisis landscape. In contrast, Whelan concludes that "*The Crisis has ruined inflation targeting's 'wonder drug' reputation. …central banks should have a broad mandate that incorporates financial stability, good macroeconomic performance, and a target for price stability that is consistent – as far as possible – with their other goals.*" Woodford argues for modified tactics in fortifying central-bank credibility by explicit 'forward guidance,' where "*Central banks should buttress inflation targeting with a much more detailed, much more transparent monetary policymaking procedure. Central banks should use forecast-targeting procedures as the basis of their monetary policy deliberations. And they should regularly explain how their decisions are consistent with these procedures. This should help convince economic actors that the economy will get through the Crises without runaway inflation.*"

Turning to the experience of emerging markets with inflation targeting, the record is mixed. While inflation targeting gained popularity among emerging markets prior to the global crisis of 2008-9, *de-facto* it morphed there into a hybrid system. Aizenman, Hutcison and Noy (2011), focusing on the pre-crisis experience of emerging markets with inflation targeting (IT), found that emerging markets appear to follow a 'mixed strategy,' whereby both inflation and real exchange rates are important determinants of policy interest rates. The response to real exchange rates, however, is more constrained than in non-IT regimes. They also find that the response to real exchange rates is strongest in those countries following IT policies that are relatively intensive in exporting basic commodities.

The crisis validated the need for emerging markets (EMs) to adapt flexibly in dealing with the varying challenges facing them. A low target of inflation for EMs is problematic even in good times, and mimicking the policies of the OECD may be the wrong headed policy for EMs. The volatility of the real shocks facing EMs (their terms of trade, funding costs, GDP real growth rates, etc.), is substantially above the volatility facing the OECD countries. This in turn implies that a low target for inflation, say 2%, increases the spells of approaching a low interest rate, exposing the economy to the zero-interest rate problem. A low interest rate runs the risk of reducing the potency of monetary policy, as short term bonds become a more perfect substitutes to money. A low interest rate also increases the odds of magnifying unsustainable real estate booms, and other yield chasing patterns.

A related concern facing EMs follows the positive association between relative national price levels and relative income per capita, dubbed *the Penn effect* by Samuelson (1994), and referred to frequently as the Harrod–Balassa–Samuelson effect.[1] This effect implies that a fast growing emerging market converging to the GDP/Capita of the OECD countries will undergo real exchange rate appreciation. Thus, the attempt to target a low inflation rate for EMs while

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[1] While the Penn effect is not as strong among advanced economies, it is among the more robust findings in countries at varying stages of development during the last forty years (see Rogoff (1996) for further discussion and references).

maintaining exchange rate stability may induce deflationary forces impacting the non-traded sector.

Minimizing the emerging markets' exposure to the downside risk of deflationary forces calls for adjusting inflation targeting to the volatility of shocks, economic growth, and other macro conditions, a suggestion consistent with Blanchard et al. (2010). Considering the challenges facing EMs, one needs to approach the desirable inflation rate as part of the determination of a wider spectrum of macro instruments, including the desirable choice of a country's position in the Trilemma. While inflation targeting helps in anchoring the expectation of inflation, a too low and a too solid anchor comes with the costs of stifling the adjustment to unanticipated shocks, with the risk of approaching the liquidity trap. Though an inflation target of 2% gained popularity among OECD countries before the crisis of 2008-9, targeting inflation at 5% for EMs fits better their challenges. This is consistent with the absence of clear empirical evidence indicating that a target of 2% is superior to 5%, or to any other single digit target. Indeed, the well-known study by Bruno and Easterly (1998) concluded that "*The case for a negative association of inflation and growth is firmly established when we look at the temporal association of growth with discrete high inflation crises. This study does not show similarly robust associations of growth with variations in low to moderate rates of inflation... In contrast, the data on discrete high inflation episodes speak clearly - there is a strong and robust relationship between high inflation and growth.*" It's noteworthy that the high inflation episodes in their study refer to rates above 40%, well above single digit inflation rates.

The global Trilemma trends in recent decades are summarized in Figure 1, vividly showing that EMs converged during the 1990-2000s towards the middle ground of Mundell's Trilemma: controlled financial openness, managed exchange rate flexibility, and active monetary policy. Following the sudden stop crises of the 1990s, most EMs buffered their Trilemma configuration with higher international reserves/GDP, reflecting the wish to self-insure against sudden stop and capital flight crises, and for some as a way to delay real exchange rate appreciations. The good news has been that these trilemma choices facilitated smoother

adjustment to the global crisis. Aizenman and Ito (2012) report that "*the three dimensions of the trilemma configurations are converging towards a 'middle ground' among emerging market economies -- managed exchange rate flexibility underpinned by sizable holdings of international reserves, intermediate levels of monetary independence, and controlled financial integration. Emerging market economies with more converged policy choices tend to experience smaller output volatility in the last two decades. Emerging markets with relatively low international reserves/GDP could experience higher levels of output volatility when they choose a policy combination with a greater degree of policy divergence. Yet this heightened output volatility effect does not apply to economies with relatively high international reserves/GDP holding.*"

The adjustments made by EMs were helped by an active use of international reserves to accommodate for the changing exchange market pressures during the worst stages of the global crisis. Aizenman and Hutchison (2012) reported evidence that countries with large balance sheet exposure – high external portfolio liabilities exceeding international reserves—absorbed the global shock by allowing greater exchange rate depreciation and comparatively less reserve loss. Despite the remarkable buildup of international reserves by EMs during the period prior to the financial crisis, countries relied primarily on exchange rate deprecation rather than on reserve loss to absorb most of the exchange market pressure shock. This may reflect a deliberate choice ("fear of reserve loss") or market actions that caused a very rapid exchange rate adjustment, especially in EMs with open capital markets, overwhelming policy actions.[2]

Aizenman and Sun (2012) validated the key importance of balance sheet exposure in accounting for the use of reserves in the first phase of the crisis, when reserves funded the delivering of short term debt deleveraging by foreign creditors. Figure 2 traces the average quarterly international reserves (IR) position and short term external borrowing of the two

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[2] Another possible factor is that at times of global crisis, exchange rate depreciation has limited inflationary consequences, while it mitigates the collapse in the demand for exportable goods.

groups of EMs, those experiencing sizable versus non-sizable IR losses during the crisis.[3] EMs that experienced sizable IR losses during the worst part of the crisis, were exposed to a much larger deleveraging of short term external debt than to other EMs. During Q4, 2008, the average IR losses were 28 billion US$ for EMs in the sizable IR losses group, half of it funded the deleveraging of short-term external debt. In contrast, IR losses and the deleveraging of short term debt were close to zero for countries experiencing non-sizable IR losses during Q4 2008 (IR increased on average by 1 billion $, short term external debt declined by 2 billion). Thus, high external debt exposure implied deeper use of reserves in the first phase of the crisis used to fund deleveraging, relative to the case of low external debt exposure.

The experience of the EMs that were exposed to sizable deleveraging at the peak of the crisis, 2008, Q4, suggests that counties with higher external debt exposure depleted more international reserves during the first phase of the crisis, yet they became quite conservative in using their reserves in the later stages of the crisis. One interpretation is that during a deep crisis with uncertain duration, countries will cover first the deleveraging of external short term debt, and then they would slow down the depletion rate. In such circumstances, the authorities will no longer be willing to use reserves, and thus will have to rely more on the currency depreciation in order to meet the exchange market pressures. Figure 3 illustrates these patterns by focusing on the Exchange Market Pressure (EMP) and the depletion of reserves during the crisis for Russia, Korea, Poland and Malaysia. EMP is measured by the bars, using the left scales. EMP exceeding 0.05 is reported by the lighter bars. Note that these countries faced EMP exceeding 0.05 after August 2008, the on-set of the worst phase of the crisis. The top broken line measures the IR/MaxIR ratio (MaxIR is the MaxIR level during 2008.1–2009), using the right scale. The solid volatile line, IRER, measures the relative share of IR depletion in the exchange market pressure,

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[3] Sizable IR loss group includes: BRA, IDN, IND, KOR, MYS, PER, POL, RUS, and TUR. Small (or no) IR loss group are: ARG, CHL, COL, CZE, EGY, ISR, MEX, THA, and ZAF. Figures 2 and 3, and the discussion, draw on Aizenman and Sun (2012).

using the right scale. The high IRER value during the peak of the crisis (Aug to Oct 2008) versus the low IRER value afterwards indicates the authorities' policy changes: relying more on the currency depreciation than on the reserve depletion as the response to the high market pressure after the peak of the global crisis.

Focusing on the experience of Russia and Korea, their EMP increased rapidly from about 0.1 in August 2008, to about 0.4 in Russia within half a year, and 0.2 in Korea within four months. During that period, Russia and Korea experienced rapid depletion of international reserves, at rates that decelerated towards the end of 2008, increasing the use of exchange rate depreciation in dealing with exchange market pressure. Similar patterns are exhibited by the other EMs experiencing sizable IR losses. The hoarding of reserves in boom times, and the use of reserves during the crises followed frequently a similar narrative, impacted by the political economy circumstances of the EMs. Russia and other oil and commodities exporting countries were slow to spend their growing trade surpluses in years of high oil and commodities prices, either because they were unsure of the permanence of the price rise, or because their demand for foreign products did not rise fast enough to catch up with the windfall gains of strong terms of trade in boom years. The huge price rise of oil 2008 led to a large reserve hoarding in Russia and in other commodity countries. During the collapse of oil prices, these countries were willing to buffer the adjustment with reserves.[4] Their corporations frequently expanded rapidly on foreign debt during the boom associated with strong terms of trade, and needed to cover their position during the crisis. The large initial reserve outlays were used to cover the corporate sector; after that, there was less need for intervention. In a similar vein, relatively open countries with a large short term foreign debt, or a banking system that had dollar liabilities funding dollar assets offshore, opted to follow similar adjustments. In these circumstances, central banks tended to hoard reserves in boom years, used these reserves to mitigate exchange rate depreciations in the

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[4] This active reserve management not only lowers significantly the short run impact of commodity terms of trade shocks, but also lowers the long run real exchange rate volatility of commodities exporters [see Aizenman, Edwards and Riera-Crichton (2012)].

first phase of the crisis, and lent funds to their banks so that they could pay off their foreign creditors with reserves purchased cheaply from the central bank. This had been the case in Korea, Russia and other countries during the 2008–9 crisis, reflecting the use of reserves to meet the balance sheet exposure of systemic banks, or of politically powerful agents in the first phase of the 2008–9 crisis. The resultant reduced balance sheet exposure of key players, and the declining stock of reserves led to the sharp reduction in reserves depletion, shifting the adjustment from reserves depletion in the first phase of the crisis to exchange rate deprecations in the second phase of the crisis.

To the surprise of most observers, EMs showed remarkable resilience during and after the global financial and economic crisis of 2008-9. Their resilience is all the more remarkable in light of the revealed structural weaknesses of most of the OECD countries, which together account for a hefty share of global output and remain key exports markets for EMs. Indeed, the global crisis and the subsequent Eurozone sovereign debt crisis dampened their demand for imports. EMs were not entirely immune to the effects of the global crisis, as evident in the collapse of their growth and exports during the 4th quarter of 2008 and 1st quarter of 2009. However, by and large, their financial systems did not suffer the paralysis inflicted upon their US and European counterparts, largely due to the marginal exposure of emerging-market banks to US subprime assets. Just as significantly, emerging country governments unleashed massive fiscal and monetary stimulus programs to support aggregate demand. As a result, EMs weathered the storm of the global crisis far better than expected.

In striking contrast to the advanced economies, which still remain mired in stagnation and uncertainty, EMs are growing once again at a healthy pace, although they remain exposed to a possible growth deceleration due to the persistent weaknesses of the former. The much talked about two-speed world economy (and lately the three-speed global economy) refers to the visibly faster and stronger momentum of recovery and growth in the EMs compared to the advanced economies since the global crisis. The healthy growth of the EMs provides welcome relief to a world economy weighed down by the post-crisis sluggishness of the advanced economies. The two-speed world economy prompted debate about the possible decoupling of EMs from

advanced economies. While decoupling is at first sight a plausible interpretation, more rigorous analysis highlights the need for caution in interpreting the two-speed world economy as definitive evidence of the decoupling hypothesis. Indeed, the IMF (2012) warns that it may be premature to jump to hasty conclusions regarding the resilience of EMs in the post-global crisis period. For one, it is not at all clear whether even the most dynamic EMs had decoupled themselves from the business cycle of the advanced economies.[5]

The growing financial integration exposed EMs to growing inflows of funds from the OECD countries, probably reflecting yield chasing at times of low yields and deepening QE policies. While seeking higher expected yield from a given risk exposure is possibly an efficient strategy, yield chasing may reduce welfare when the investor overlooks exposure to tail risks. This concern has been vividly illustrated by the global crisis [see Rajan's seminal 2006 paper on the growing risks of hidden exposure to adverse tail events, written well before the crisis, and the interesting interpretation provided by Gennaioli, Shleifer and Vishny (2012)]. In EMs, yield chasing has been manifested in spells of inflows of 'hot money,' frequently increasing the short term external debt of a country. This in turn increases the emerging market's exposure to costly capital flights and sudden stop crises, requiring costly hoarding of international reserves to be used as a financial buffer at times of crisis. The expectation of the future bailouts of the domestic banking system in EMs may magnify the resultant moral hazard distortions, where the

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[5] While emerging markets exhibited remarkable resilience during the global crisis, they were impacted directly via the trade and financial channels. Didier et al. (2012) concluded that "*Contrary to popular perceptions, emerging economies suffered growth collapses relative to the pre-crisis levels comparable to those experienced by developed economies, even when they continued growing. Afterwards, most economies returned to their pre-crisis growth rates. Although emerging economies were not able to avoid the collapse originated in the US and then transmitted across countries, they were more resilient during the global crisis than during past crises. Moreover, breaking with the past, emerging economies did not fall more than developed economies during the global crisis and were able to conduct countercyclical policies, thus becoming more similar to developed economies.*"

yield chasing of OECD agents leads down the road to a costly exposure of the emerging market's taxpayer.

A more efficient policy stance for emerging market includes prudential policies, where a proper risk premium is charged for a greater exposure of the tax payer. The logic behind this policy is akin to the operation of deposit insurance, where the insurance agency [FDIC in the US] imposes a risk premium on the balance sheet of the bank, inducing the bank (and thereby the depositors) to internalize the cost of an expected bailout. Applying the Pigovian tax-cum-subsidy scheme to short term debt flows rests on the concerns that fire sale and congestion externalities are associated with hard currency debt, leading frequently to over-borrowing. The history of Korea in 2008-9 is a vivid example of this situation, where the large hoarding of international reserves was useful, but was not the most efficient way to deal with the resultant moral hazard exposure [see Aizenman (2011) for an overview of the Korean experience]. The public finance approach to external borrowing is reflected in Hyun Song Shin's statement, advising South Korea's government, *"…it should tax the wholesale liabilities of the country's banks. Whenever a South Korean bank wants to expand its loan book faster than its retail deposits, it relies on foreign borrowing to fill the gap. So a levy on these extra liabilities would serve to limit banks' borrowing abroad."*[6]

To put these concerns in their proper context, note that in contrast to some OECD countries, which had access to elastic swap lines that facilitated their adjustment during the crisis of 2008-9, most EMs and developing countries were left to their own devices, deleveraging their exposure by drawing down reserves, or to even more painful adjustments. The relative resilience of EMs and developing countries during that crisis and its aftermath validated the logic of self-insurance as part of the overall design of macroeconomic and prudential policies. A desirable

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[6] See *The Economist*, Nov 11th 2010, and Shin (2010) for an overview of the recommend policy and the shortcomings of the Basel III in dealing with balance sheet exposure of large banks and the shadow banking system. For further discussion of related issues see Bianchi (2010) and Korinek (2010).

configuration of macro policies that allowed countries to reduce their exposure to the 2008-09 crisis and its aftermath include: (i) sound management of the public finances in order to place public debt on a sustainable trajectory; (ii) building up international reserves; (iii) prudential policies to reduce contingent liabilities from private sector balance sheets; and (iv) moving to the trilemma middle ground with its emphasis on controlled exchange rate flexibility. None of these policies would have probably sufficed on their own to insulate EMs from global turbulence; but agile combinations of these policies provided policy makers with the needed tools to limit both debilitating growth and confidence crises in EMs in the wake of the global crisis. By virtue of their limited internal safety nets and their relative poverty, emerging markets do not have the luxury of waiting for the collective resolution of the challenges associated with the adjustment of the OECD to the post 2008-9 world. Hence, self-insurance combined with the public finance approach to financial integration may be an optimal response of emerging markets in a second best global structure.

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Rogoff Kenneth (1996)."The Purchasing Power Parity Puzzle" *Journal of Economic Literature*, Vol. 34, No. 2, pp. 647-668.

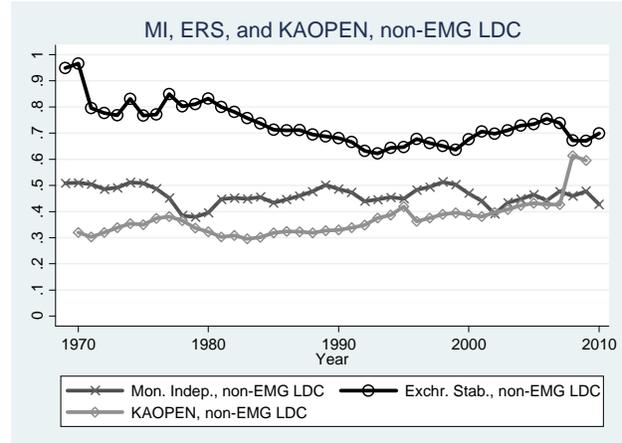# Figure 1: Development of the Trilemma Configurations Over Time: 1970–2008

(a) Industrialized Countries

MI, ERS, and KAOPEN, IDC
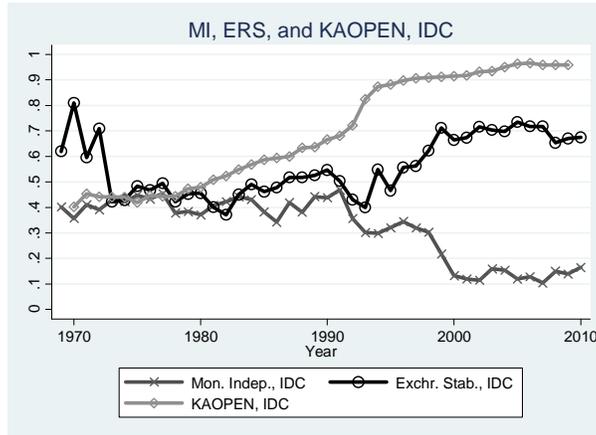
(b) Emerging market economies

MI, ERS, and KAOPEN, EMG
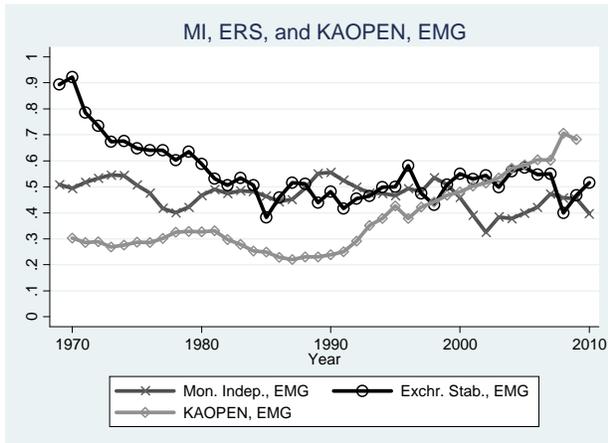
(c) Non-Emerging Market Developing Countries


MI, ERS, and KAOPEN, non-EMG LDC

For data, definitions and methodology see:

I. The Trilemma Indexes by Joshua Aizenman, Menzie D. Chinna, and Hiro Ito, summarized in http://web.pdx.edu/~ito/trilemma_indexes.htm

II. "The Financial Crisis, Rethinking of the Global Financial Architecture, and the Trilemma," by Joshua Aizenman, Menzie D. Chinna, and Hiro Ito, ADBI Working Paper 213, 2010.

Figure 2

Changes of international reserves (IR) and short terms external debt,

quarterly data, 2008–Q1 to 2009-Q1
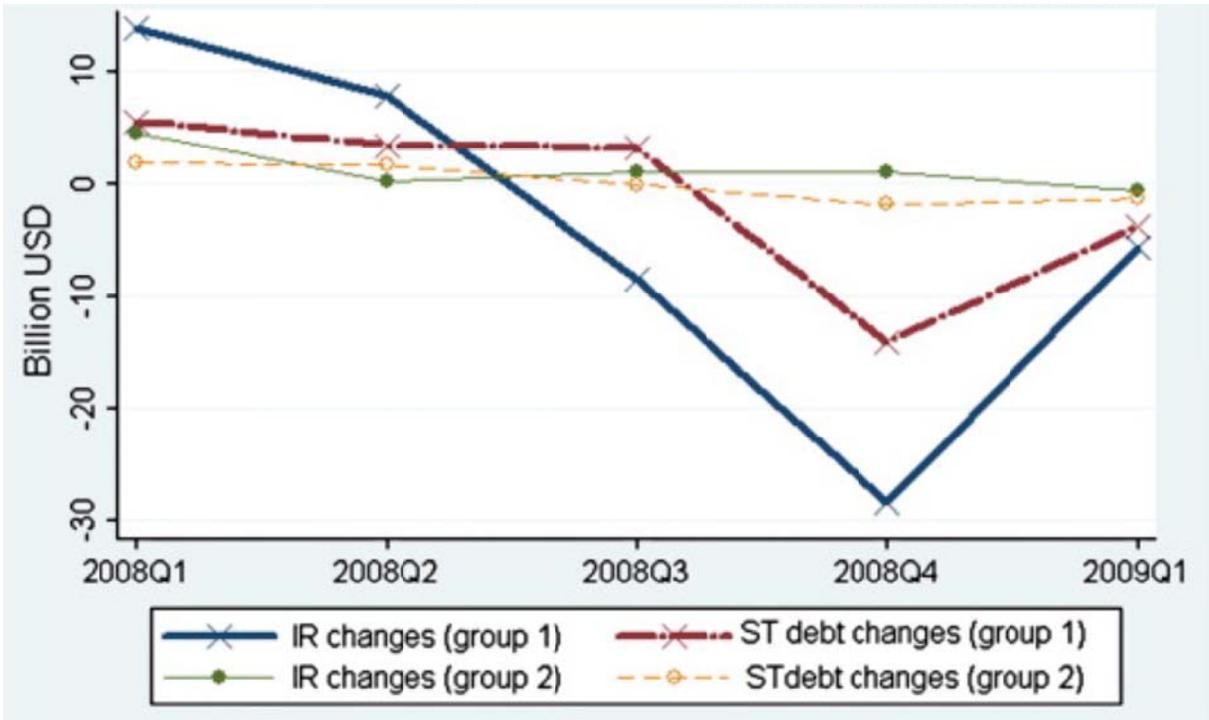
Source: Aizenman and Sun (2012)

Sizable IR loss group includes: BRA, IDN, IND, KOR, MYS, PER, POL, RUS, and TUR.
Small (or no) IR loss group are: ARG, CHL, COL, CZE, EGY, ISR, MEX, THA, and ZAF.

Figure 3: Exchange market pressure, IR/Max IR and the Share of IR in Exchange market pressure during the crisis, Russia, Korea, Poland and Malaysia.
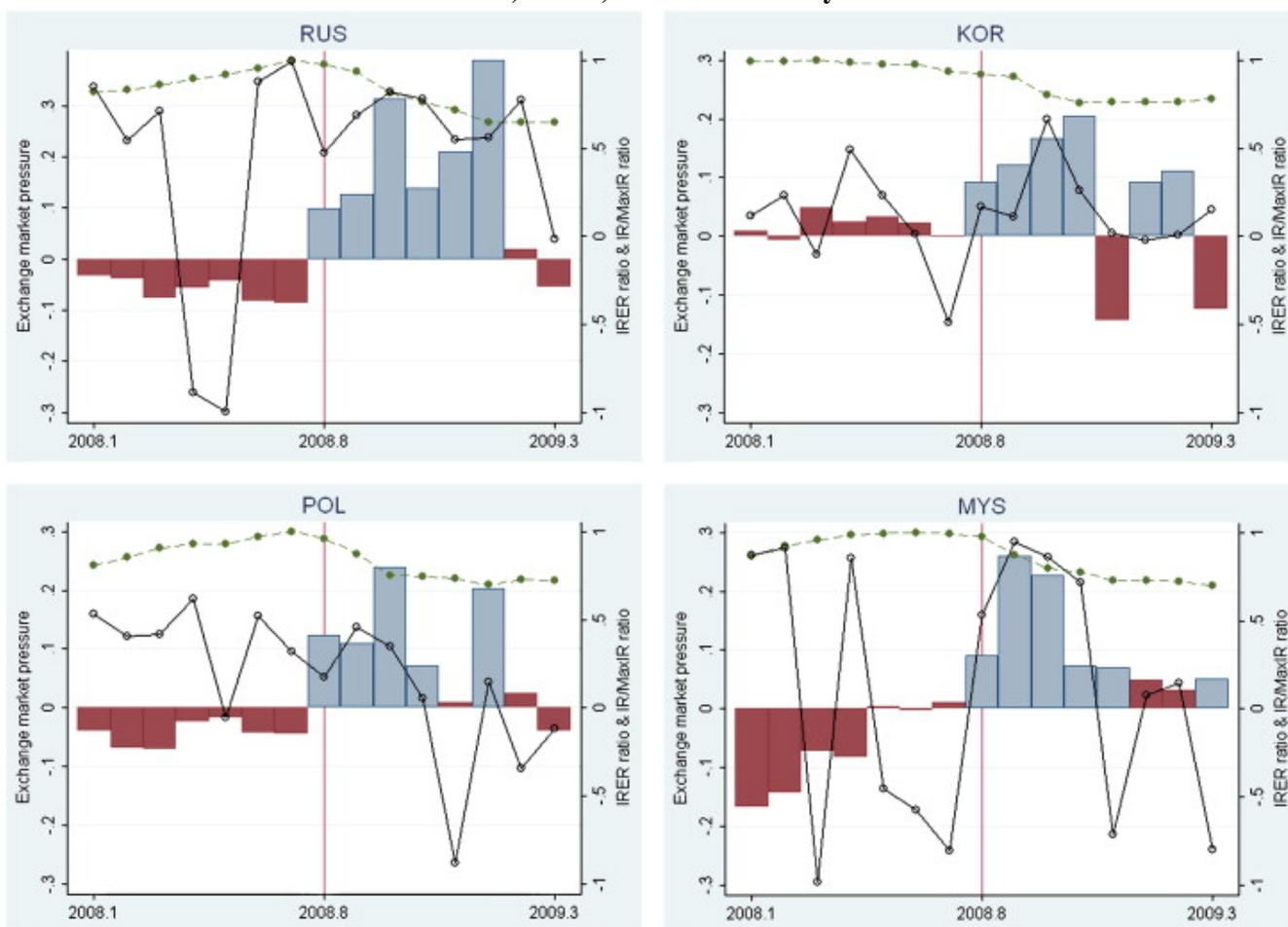
Notes: EMP is measured by the bars, using the left scales. EMP exceeding 0.05 is reported by the lighter bars. Note that these countries faced EMS exceeding 0.05 after August 2008, the on-set of the worst phase of the crisis. The top line (broken line) measures the IR/MaxIR ratio, where MaxIR is the MaxIR level during 2008.1–2009, using the right scale. The solid volatile line, IRER, measures the relative share of IR in the exchange market pressure, using the right scale. The formal definition of IRER =

$sign(- \Delta IR / M1 * \Delta Ei/usd / Ei/usd) * abs((- \Delta IR / M1) / [abs(- \Delta IR / M1) + abs(\Delta Ei/usd / Ei/usd)])$. Source: Aizenman and Sun (2012).