Global Shocks and International Policy Coordination

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Abstract

We argue emerging markets (EMs) have become large enough to make it in advanced economies (AEs) own interest to reduce negative spillovers to EMs. It follows the potential for international cooperation in macroeconomic and prudential policy increases. But entrenched perceptions and historical advantages are obstacles. These blocks are explored as well as possibilities in macroeconomic policies and in prudential regulation. Export of capital is a major way AEs earn a share in EM income. AE macroeconomic policy and volatile capital outflows from AEs are a source of negative spillovers for EMs, but preventive prudential regulation is not adequate in AEs. More regulation is likely to reduce short-term returns to capital flows but not long-term, since with fewer crises both AE and EM income streams would rise. Moreover, there is some evidence excess capital flow volatility has adverse effects on AEs themselves. It follows universal macro-prudential polices would benefit both country groups. International conventions should be refocused on reducing the probability of crises, instead of protecting creditors by ensuring they do not suffer a loss in case a crisis occurs. Major source countries should develop prudential regulation of their non-bank financial sectors, including commodity futures markets. The IMF should remove restrictions on pre-emptive implementation of capital flow management and its use before other measures.

Keywords: International policy coordination; Covid-19; Quantitative easing; Capital flows; Advanced economies; Emerging markets

JEL Code: F42; F59; F36

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1. The chances of coordination

We argue emerging market (EMs) have become large enough to give advanced economies (AE) stronger incentives to limit negative cross-border spillovers than was the case in the past. It follows the potential for international cooperation in macroeconomic and prudential policy increases. But perception has to improve. The paper contributes to this as an initial step to addressing the more structural blocks. A brief outline of the historical evolution of international policy shows these blocks and asymmetries. Policy implications are drawn.

There is a debate in the literature on whether international macroeconomic policy coordination is welfare improving (Gupta, 2016, Rajan 2015, Rey 2013) or not (Bernanke 2015, Blanchard 2017, Eichengreen 2013). But even those who do not find a case for macroeconomic policy coordination agree that prudential policy is required to restrain capital flow surges, although their view largely is that EMs should implement it. We add to this literature by showing that as EM size crosses a threshold, AEs benefit by acting to limit spillovers.

When nations own interests pull in different directions, the Nash equilibria (NE) resulting from maximization of individual country welfare lowers aggregate welfare. Coordination can be highly productive if it can bring outcomes closer to the global optimum. Since the latter involves joint maximization of individual country social welfare functions, it internalises spillovers. But it is more feasible when interests are aligned.

After the global financial crisis (GFC) the G20 was widely regarded as successful in coordinating a macro-fiscal stimulus. But Eichengreen (2013) argued the first best unilateral response for most nations was anyway to apply a stimulus making coordination on it feasible. It follows the G20 contribution itself was not large. G20 resolutions may only have strengthened and hastened domestic resolve for some nations.

It is under heterogeneous quantitative easing (QE) that coordination can make a major contribution. Although EMs had weathered the GFC itself well because of a shift from foreign short term debt financing towards risk-sharing equity, their growth fell in the 2010-20

decade[1] of AE QE partly due to repeated surges and stops in foreign portfolio flows. Goyal et. al. (2021) show after the GFC, as regulation focused on banks, external debt securities dominated cross border flows. Their contribution to domestic macroeconomic risk rose when global risk crossed a threshold and was also higher for EMs with relatively more such flows.

The Covid-19 shock intensified asymmetries. Developing economies were unable to borrow and spend as much as AEs did to rescue and revive their economies and were left behind in the vaccination drive, although it was clear no one could safe until all were safe. Weaker countries needed debt forgiveness and multilateral support. In addition, the excessive AE stimulus risked a sharp reversal raising capital flow volatility and borrowing costs, with risks for global financial stability.

Even so, we argue that some reduction in inequality across nations makes interests more aligned, so that the feasibility of coordination improves. That AEs share of global income is lower (it had fallen[2] to 42.18% in April 2021 from 54% in 2004, in purchasing power parity exchange rates) makes it in their own interest to protect EM growth since it can pull global growth. Of course, there is much more heterogeneity across nations in EMs, and special measures are required for more backward nations and regions within nations.

A simple 2 period exercise shows when a representative AE has a share in the income of a representative EM and EM growth depends on its share of own income, beyond a threshold, period 2 EM income going to the AE must decrease with a rise in EM income level and its growth rate, for the AE to maximise its own period 2 returns with respect to income share as EM income rises. Even if there is a spillover from the AE to the EM, the spillover has to rise with the relative rise in EM income, for the AE to maximise its period 2 income with respect to income share. Symmetrically, any negative spillover must fall. This result holds even for bi-directional spillovers, that is, when there is a spillover from the EM to the AE also.

Despite these changes coordination is still difficult, however, because it has to replace a bargaining outcome, in which more powerful nations are used to taking a larger share. Since

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[1] For example, ten major EMEs had a mean IIP growth rate of 4.3 before the GFC (2000-08). Growth was just 1.3 after the GFC (2009-17) (Goyal et. al. 2021).

[2] Source: https://www.imf.org/external/datamapper/PPPSH@WEO/OEMDC/ADVEC/WEOWORLD. Global volatility hurts EMs. Their share fell slightly in 2014 after the taper tantrum. The gap between EM and AE growth is expected to rise over time. The IMF forecasts for their respective growth in 2021 were 6.7 and 5.1; by 2025 EMDEs are expected to grow at 4.5 compared to 1.5 for AEs.

denial of negative spillovers and asymmetric treatment of spillovers affecting emerging and advanced economies has become entrenched, changes in perception are also required for coordination to become possible. Even if interests are aligned own actions can continue to be driven by past group think (IEO, 2017). It may be necessary to improve perception, remove psychological blocks, as well as reform power structures that ring-fence AE shares. Gains can be large, however, as coordination has the potential to prevent risky behaviour, crises and financial instability.

Export of capital is a major way AEs earn a share in EM income. Therefore, after the theoretical derivations, we illustrate these issues through analysis of the international rules governing macroeconomic policy and prudential regulation through the years. AE macroeconomic policy and excess volatility of capital outflows from AEs are a source of negative spillovers for EMs, but there is resistance to adequate preventive prudential regulation. Prudential regulation may reduce short-term returns to capital flows but not long-term returns. Both AE and EM income streams would rise if crises are aborted. Moreover, there is some evidence that excess volatility in capital flows has adverse effects on AEs themselves.

Goyal (2002) tried to understand why AEs did not undertake some of the many financial reforms proposed after the East Asian crisis, since implementing them could have weakened or aborted the GFC. If rational creditor nations gain from prudential policies, they should be willing to adopt them. Potential reasons for their reluctance could be first, discounting the probability of future crises in AEs. The GFC has reduced this defence, however. Second, cognitive dissonance such that creditor nations are more concerned about a small current loss rather than a reduction in future losses. Or their discount rates may be high. Third, higher bargaining power of investing nations, entrenched in contracts and international institutions, protects creditors by ensuring they do not suffer a loss in case a crisis occurs, rather than by reducing the probability of crisis. EM policy makers also follow creditors' preferences to preserve access to capital and to lower its costs. Creditors get a higher share of a lower total, preserving current income but reducing future earnings. It follows a loss in bargaining power and change in perceptions could actually turn out to benefit AEs. Finally, because problems emanated from AE banks, post-GFC financial reforms were excessively banks focused—potential market arbitrage was overlooked. Major source countries still do not have prudential regulation of their non-bank financial sectors.

The analysis provides clues to the puzzle of why regulation of portfolio flows was not improved before the GFC and changes have been slow even in the QE era. Higher risk and volatility, to which AEs QE contributes, reduces EM growth. In the attempt to preserve own share, these spillovers are neglected.

If EM size is large enough so that spillovers from EMs to AEs become important—EM aggregate demand matters for AE growth, then it becomes in AEs interest to adopt risk mitigation even if it decreases their share. Then universal macro-prudential polices that protect EM income growth would be better for AEs than investor warranties that reduce EM income share but increase the probability of crises and reduce income growth for all countries. This is what we show.

The remainder of the paper is structured as follows: Section 2 shows the impact of higher EM growth on AE returns in a two period exercise. Section 3 reviews some literature on and experience of international coordination in macroeconomic policy, Section 4 does the same for financial and macroprudential regulation. Section 5 reviews some episodes of capital flow volatility, before Section 6 concludes with policy implications. Formal derivations are in the appendix.

2. The impact of higher EM growth on AE strategies

The common view, held by EMs also, is whatever is good for AE growth will raise EM growth also since AEs are large. But since EMs now have a larger share of global GDP and growth, slower EM growth in turn can reduce growth in AEs.

Risky behaviour gives AEs a large share of a poor outcome. The large share more than compensates for risk-taking investing in EMs, but outcomes are below potential. The large share is ensured using international pressures and treaties but reduces the total. We saw as the total rises, a lower share maximizes returns. A literature on political economy points out a dictator in a country is not concerned to increase the total as long as his share is large. But if a

rising total, conditional on a lower share, gives him higher returns he may be willing to accept the lower share[3]. Perceptions will also have to change, however, for doing so.

In a simple 2 period model, we show that reducing AE share (or EM loss from risky AE behavior) beyond a threshold, as EM incomes and growth rise, would increase what both get. The intuitive results listed below are formally derived in the Appendix.

Result 1: *When AE's share in EM's income is above a threshold level ($\overline{x_2}$), the optimal share of AE is decreasing in EM's income.*

Result 2: *When AE's share in EM's income is above the critical level $\widehat{x_2}$, the optimal share of AE is decreasing in the growth rate of EM's income.*

As EM incomes rise, spillovers become important. Next we consider a spillover from AE income to EM income.

Result 3: *The spillover from an AE to an EM has to rise with the relative rise in EM income, for the AE to maximise its period 2 income with respect to income shares.*

Result 4: *Result 3 holds even for bi-directional spillovers, that is, when there is a spillover from the EM to the AE also.*

Result 5: *Even in the presence of spillovers from the AE, the share of the AE in second period EM income must fall for EM income to reach optimum levels.*

Result 1 was that the part of second period EM income that the AE gets cannot be optimized with a rise in AE share when EM income growth depends on its own share. Result 5 complements and is consistent with Result 1 because it says EM second period income cannot be at its maximum with a rise in the share going to AEs even when there are positive spillovers from AEs.

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[3] Olson (2000) argued under anarchy a government is like a roving bandit. Uncertainty makes it worthwhile to extract the maximum as long as possible. But higher growth can make it worthwhile to reduce extraction and further raise growth. The government has an incentive to become a stationary bandit, who gains from economic growth in her region.

Therefore as EM incomes rise relative to AE incomes it is in AEs own interest to limit their share of EM income. One way this can happen is if they reduce risky strategies that reduce expected income.

3. International monetary rules and cross border flows
A country's external balance adjustments impinge on other countries. The international financial system was designed to mitigate such spillovers and ensure stable trade, payments and cross border flows. There were changes over time in the arrangements. As closed post World-War II economies became more integrated AEs moved towards fuller capital account convertibility and more flexible exchange rates in the 1970s and EMs in the 1990s.

After the US ended the gold exchange standard, there was more freedom in international exchange rate agreements. In 1976 IMF article IV was amended to allow countries to follow any exchange rate regime as long as it promoted stability and growth and there was no manipulation of exchange rates. The IMF could monitor but had little clout, especially against countries that did not need its loans.

Most AEs had floating exchange rate by the 1970s. Inflation targeting (IT) and flexible exchange rates became the norm for most EMs also by the 2000s. Inflation targeting served as the nominal anchor. The exchange rate was largely market determined since large capital flows made sustained manipulation of levels difficult, but there were freedoms on the extent and types of intervention. In their relatively thin markets, EMs need interventions to smooth excess volatility due to capital flow surges. A full float was adopted in mature economies after crossing a threshold of development, not before.

After the GFC many AEs had large depreciations driven by policy rates approaching zero. In addressing the question of whether post GFC low AE interest rates hurt EMs, Blanchard (2017) showed even if the global optimum, that has a higher interest rate, differs from the Nash equilibrium where AEs maximise own welfare, gains from coordinating policy interest rates were not large. Optimal AE interest rates should be higher only if the effect of the interest rate on the exchange rate and on trade exceeds its effect on aggregate demand. That is, the expenditure switching channel dominates the absorption channel. Expenditure switching is beggar-thy-neighbour since depreciation for one country implies appreciation for the other, while a rise in demand is positive for both.

Rajan (2015) emphasized the dominance of the switching channel while arguing for more coordination in monetary policy. Bernanke (2015)[4], however, believed the absorption channel was larger so that US monetary easing benefitted EMs. Rajan argued, at a zero bound, the main effects of monetary policy come through capital flows and the exchange rate. He said many AE central bankers had told him this privately. QE was an expenditure switching policy.

However, the definition of currency manipulation is narrow covering only direct action. Therefore, low interest rates do not come under it[5]. QE or interest rate reductions are not regarded as currency manipulation even though QE affects a central bank's balance sheet much as exchange rate intervention does. QE also encourages cross border capital flows in a global search for higher yield. QE and procyclical markets, therefore, create negative spillovers as they raise risks that reduce aggregate demand overtime. These are the original source of spillovers, responses such as capital controls are required in self-defence. It follows that first best policy would be to moderate at source.

G20 communiques illustrate this asymmetry that advantages AEs. For example finance ministers and central bank governors (Ankara, Turkey Sept 2015) decided:
'*We reiterate our commitment to move toward more market-determined exchange rate systems and exchange rate flexibility to reflect underlying fundamentals, and avoid persistent exchange rate misalignments. We will refrain from competitive devaluations, and resist all forms of protectionism.*'
But there was nothing on QE and capital flows at a time of major outflows from EMs.

In the 2012 G-20 meeting, finance ministers agreed not to manipulate exchange rates for competitive advantage, but interest rate or liquidity boosting policy in response to domestic needs, which AEs typically use, was not to be regarded as manipulation.

After the GFC, the IMF in addition to its traditional focus on the exchange rate, did for the first time bring in considerations of domestic stability and spillovers to other countries as it

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[4] Bernanke also responded from the floor to Rajan's speech at Brookings. For a media coverage of this see http://archive.indianexpress.com/news/how-raghuram-rajan-got-ben-bernanke-goat/1240182/
[5] Banerjee and Goyal (2020) find robust evidence of over-valuation of EM real exchange rates due to monetary spillovers in the QE period, especially through the portfolio rebalancing channel.

expanded to multilateral from bilateral surveillance and from BOP stabilization to domestic stabilization in the 2012 Integrated Surveillance Decision (ISD). But there was still no obligation on a member to respond to global spillovers, as long as the member's policies were promoting its own stability. The 2011 IEO evaluation of the IMF had noted that greater focus on exchange rate levels and currency misalignments resulted in less attention to the external sector more broadly and in some cases triggered tensions between the IMF and country authorities.

Despite these additions, however, the 2020 IEO report found ISD had not resulted in any action from source countries. It noted that EMs appreciated the IMF's new support for capital flow management (CFM)[6] but restrictions on implementation of CFM before other measures or on its pre-emptive use limited its usefulness. Suggested macroeconomic adjustments such as reducing government expenditure to lower excess demand capital inflows create, would lead to misallocation of investment in EMs from public goods to real estate.

Backing from the IMF was missing on measures used in the heat of a crisis. There was wrangling over classification—prudential measures used for financial stability were labelled as CFM. It was not surprising that despite large surges in flows during Covid-19 CFM was largely not used.

Under Trump the US sought to impose bilateral pressure on EMs. It had an even narrower definition of manipulation, based on bilateral current account deficits. The US Treasury brings out a bi-annual Report on FX Policies of Major Trading Partners. In 2015 it threatened to identify a 'currency manipulator' based on a bilateral trade surplus larger than US$20 billion, a current account surplus larger than 3 per cent of that economy's GDP, and repeated net one-sided purchases of foreign currency of 2 per cent or more of its GDP over a year. But bilateral surpluses are inadequate measures of trade distortion since they could arise from supply chains with limited value added. Moreover, intervention allowed must be conditional on excess volatility of capital flows. Major trading partners that met two out of the three assessment criteria were kept on the list, but the April 2017 Report decided to retain any

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[6] The institutional view (IV) to which Ostry et. al. (2012) had contributed.

major trading partner accounting for a large and disproportionate share of the overall US trade deficit on the list. One criterion became sufficient[7].

It had especially hawkish language on FX intervention policies aimed at EM Asian central banks[8], while emphasizing the need for greater transparency of exchange rate and reserve management policies. It noted while there has been reduced FX intervention by major trading partners in the last two years, "it is critical that this not represent merely an opportunistic response to shifting global macroeconomic conditions – in particular capital outflows that have created depreciation pressures… but a durable policy shift away from foreign exchange policies that facilitate unfair competitive advantage."

Blanchard (2017) goes on to argue, that because of the limited impact of interest rate coordination on welfare, EMs should unilaterally impose capital controls in response to lower AE interest rates. This would regain the optimal equilibrium by removing effects on exchange rates. Even if QE gives rise to excessive capital flows, exchange rate flexibility does better than FX market intervention and reserve accumulation. Bernanke also argues that flexible exchange rates would be sufficient for monetary policy independence. Rey (2013), however, had pointed out that exchange rate flexibility is an inadequate defence against volatile capital flows. Other types of intervention are also required.

Market over-reactions also make it difficult to reverse freedoms given and to impose sudden restrictions in crisis times. Transparent, pre-emptive and pre-announced countercyclical measures are better. These could be macroprudential measures (MPM), or CFM as part of a path towards more liberalization in step with domestic market development. Crisis time CFM would be rarely used if at all.

EMs do use MPMs and CFM much more than AEs do (Claessens, 2015), thus bearing most of the costs. It is not clear why these interventions should all be one-sided, imposed and borne only by recipient countries. After the GFC there is rethinking on mechanisms to protect

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[7] Six countries regularly appear on the US monitoring list: China, Japan, Korea, Taiwan, Germany, and Switzerland and are subjected to pressure to appreciate their currency. India, despite having a current account deficit and having to contend with capital flow surges, was mentioned in the 2018 report, then dropped and appeared again in the 2020 and April 2021 report.

[8] For example: "Treasury is determined to watch very closely for any unfair currency practice that creates a burden for US workers and US companies." See https://www.ft.com/content/fad8c576-214a-11e7-a454-ab04428977f9

from market excesses, but even the IMF's new emphasis on CFM puts the onus on the recipient. It is to be the last resort, after macroeconomic policies and other adjustments have been tried. Even handedness requires that source countries should also adopt MPM to reduce excess spillovers from QE. Protecting EM growth will help AEs as global growth is sustained. The expenditure channel works in reverse also. Moreover, repeated global risk-ons and -offs are major blocks to more liberalization.

4. Adoption of prudential measures

Bernanke (2015) argued strongly that while cost-benefit analysis supported focusing monetary policy on own inflation and employment, there should be coordination in MPM.

But there is little discussion of policies to internalize spillovers, moderate QE, distinguish between excess-correcting or market-distorting CFM interventions, with regulation to damp liquidity multiplication that would put the onus on the AEs. Global and regional safety nets are required. After the GFC US Fed swaps were given only to an inner circle. Funds for EM infrastructure could play a useful stabilization role.

Figure 1: Crude oil price volatility following regulatory changes

Source: Data from https://www.eia.gov
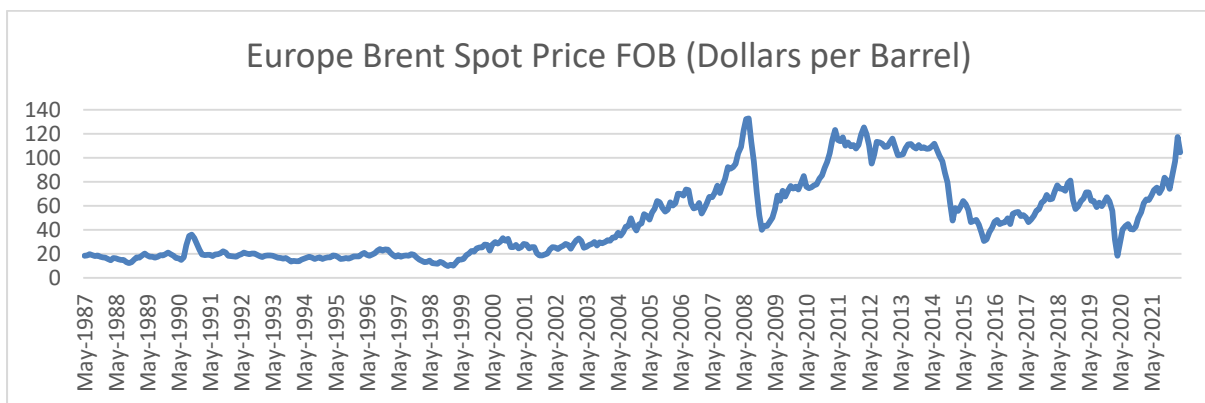
Excess volatility in crude oil prices demonstrates the consequences of inadequate regulations in the absence of coordination on MPM. Prices have been excessively volatile since the mid-2000s—Brent ranged from $132 in mid-2008 to $30 in Jan 2016, with sharp swings between. There was a lower peak at 81in Oct 2018. A crash to 18 with covid-19 (Figure 1) did not last long. Prices crossed $132 again after the Ukraine war in 2022. The monthly coefficient of

variation was 25 before the pre 2000s and 42 after. This volatility is a major reason for continued slow global growth after the GFC. Gainers and losers create spillovers for each other, dampening growth. For example, while commodity exporting nations were in dire straits, India's gains from the 2014 oil price crash were less than expected, since the slowdown in global export growth moderated gains.

That both average price levels and their volatility rose sharply after 2000, suggests prices were deviating from fundamentals. Even crude oil producers consider oil futures to be too volatile. They prefer a price band of $60-80, which would sustain steady production. As a physical commodity, the price of crude oil depends on the supply-demand balance, inventories, oil production capacity and costs. If inventories are low supply or demand shocks can lead to large short-term price fluctuations. But as administrative price mechanisms were given up in the physical market, price discovery also began to take place in deep and liquid futures markets, which aggregated diverse views. These were expected to aid discovery and make it more forward-looking. As a financial asset, the price of crude oil depends on the structure of markets, expectations of oil fundamentals and of news impacting them.

Prior to 2000, the expected long-run price of crude oil was stable. A price shock was expected over time to reduce demand and to raise supply. But these feedback mechanisms did not work well to reduce fluctuations in the subsequent period because of regulatory relaxations. In the 1990s investors had begun taking positions in commodity futures as part of a diversified portfolio. The US Commodity Futures Modernization Act passed in 2000, lightened position limits, among other deregulations. 'Swap dealers', who facilitate over-the-counter investment in exchange-traded funds tracking commodity indexes, were granted exemptions from position limits. Following this, open interest in oil derivatives more than tripled and the number of traders doubled over 2004-08. Large-scale index-based investment took place as pension funds diversified their portfolios after the dot com crash.

This financialisation of crude oil markets has coincided with high price volatility[9]. It heightened the tendency of financial markets to waves of optimism or pessimism, which makes them pro-cyclical and more volatile. Post GFC the QE led excess liquidity sustained

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[9] Goyal and Tripathi (2012) evidence of short-term (or collapsing bubbles) for oil futures in mature market commodity futures exchanges but not in an Indian exchange. Indian regulations such as position limits may have mitigated such bubbles.

the process despite some regulatory tightening[10]. The amplitude of cycles reduced briefly because of easier shale oil supply response, before rising again as green restrictions curtailed supply.

Unfortunately, financial reforms after the GFC have focused too much on banks neglecting markets and other financial institutions. This led to arbitrage to non-banks, such as shadow banks, hedge funds and commodity trades whose share in assets under management rose to 40% of global financial assets—from $50 trillion in 2004 to $76 trillion in 2014. Fixed income debt flows are a major source of volatility for EMs.

Simple lender-based prudential measures such as position limits and leverage caps are easier to apply universally to non-banks also, therefore arbitrage or leakages are less. Even for banks, IMF (2013) empirical assessment finds that prudential measures are more effective in reducing the growth in banks' leverage, asset and noncore to core liabilities ratio, compared to countercyclical buffers although the latter also do reduce leverage and assets. To reduce distortions and efficiency costs, tools that affect lender behaviour, such as a bank's incentives to lend, should be introduced before quantitative constraints on borrowers.

But AE use of such measures is still limited. Macro-prudential regulation has emphasized capital buffers, whose primary purpose is shock absorption, and borrower based restrictions such as loan-to-value (LTV) and debt-to-income ratios, not measures that apply on creditors or on instruments. For example, leverage caps/limits/haircuts could be imposed on lenders or instruments, along with LTV or loan-to-income ratios on borrowers.

Claessens (2015) finds EMs used macro-prudential tools four times more intensively compared to AEs before the GFC. The ratio fell to 3.3 after the GFC, as the value of such tools in reducing systematic spillovers became apparent. The UK also imposes no position limits, although major EMs like India and China do so. UK and the US are major source countries but until 2020 had no prudential regulation on the non-bank financial sector.

Since capital is scarce in EMs and they have more direct measures that restrain leverage they should not have to lock up so much capital in buffers.

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[10] Slowing Chinese demand was blamed for the 2014 fall in oil prices. But Chinese growth had slowed to 7.7% in 2012 from 9.3% in the previous year without reducing oil prices.

It follows better prudential regulation in commodity markets could have reduced crude oil price bubbles and their fallout. If G20 works towards regulatory coordination with use of margin requirements and position limits across countries, this could mitigate distortions in price discovery by making sentiment driven position taking more costly, and limit some of the negative spillovers of QE. It would reduce risks from shadow banks. While some supervision is essential, prudential regulations that improve participant-incentives can reduce regulatory discretion that itself imposes delays and costs.

In many areas involving global standard setting, a country cannot impose tougher standards by itself since it would lose out compared to its lax neighbours. These are not distorting if all countries adopt them. Principle-based global standards are required, with countercyclical features and variation on objective criteria. Coordination is required for this and is easier when the proposed action can be shown to benefit most countries. Post GFC it is clear moderating fluctuations in commodity prices and reducing excess volatility in capital flows would benefit most countries.

G20 has been able to cement global coordination in a number of areas. One of its major successes has been in tax harmonization to reduce base erosion and profit shifting (BEPS). BEPS had to act against the same type of lobbies that resist stronger regulations on financial firms. It showed action is possible against strong corporate lobbies. Uniform creditor-country based counter-cyclical prudential measures can reduce volatility at source[11]. There is EM experience on this. G20, with its greater diversity of membership has an opportunity to convince the world that types of financial governance that have worked well in EMs will work well elsewhere also.

5. Impact of volatile capital flows

The experience of excess currency volatility in the period after the GFC illustrates how volatility can sometimes hurt AEs themselves.

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[11] There is s fear that prudential regulations may distort resource allocation or raise the cost of capital. Goyal and Verma (2020) explore the impact of regulation on cross border bank liabilities and find they complement macroeconomic policies and raise welfare over the cycle.

A new fear in the post GFC period was that countries would try to depreciate their currencies in order to boost exports and create jobs. The Brazilian finance minister Guido Mantega, coined the term 'currency wars' in 2012 as QE in the US and other AEs generated sharp inflows that appreciated the Brazilian Real by 24%. Following the Japanese April QE the Yen depreciated by 33% by 2015; the Euro also fell. The Brazilian response was to impose market based capital controls to discourage inflows. There was a reversal of capital account convertibility in many EMs.

Figure 2: Reversal of trend in Chinese currency
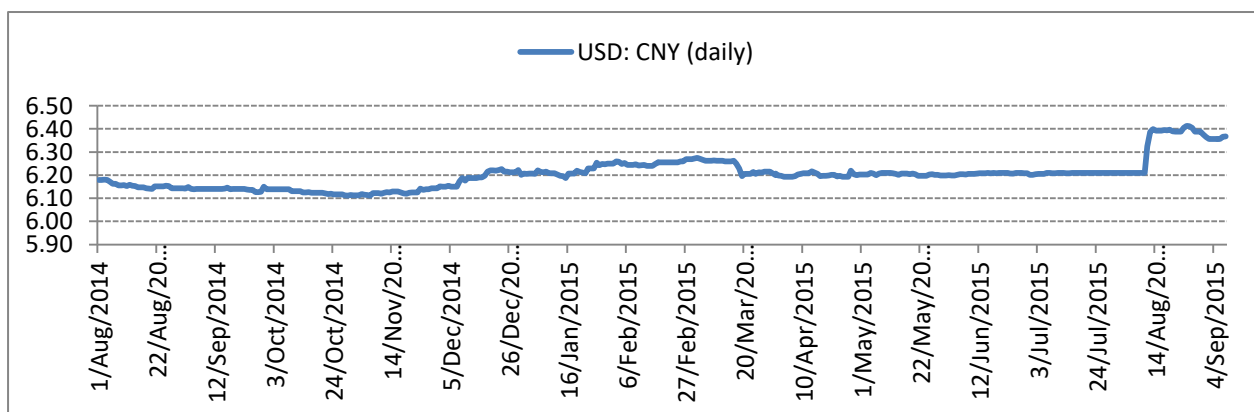
But were the changes due to currency wars or were they due to capital flow and market volatility? It is easy to blame others as fear distorts perceptions. Over 2014-15 there was USD appreciation and EM depreciation (the Real rose 40%)—why would the US want to reverse a hard won currency war? Global risk-off and the return of capital to safe havens appreciated the USD just as risk-on contributed to depreciation.

There were extreme capital flows and market swings. The 19 largest EMs saw outflows of $0.5tn over 2008/09 and $1tn in 14/15; but inflows over July 2009-June 2014 were $2tn.

The Chinese move to more market determination caused large volatility and confusion in 2015. Markets themselves do not like large unexpected movement even if they are market-caused.

In 2005 the dollar peg was relaxed to allow narrow daily movement around the People's Bank of China reference rate, in very slow moves to more market determination. In August 2015 the reference rate was based on the last day's trading giving more say to the markets. But the renminbi depreciated from 6.21 to 6.34. The 25% rise was the biggest one day movement since the mid-1990s (Figure 2). This was interpreted as war. The US threatened a 45% import tax.

But the Chinese were using reserves to reduce the outflow-induced depreciation that could have helped their exports. They did not buy dollars to keep the renminbi weak, but sold large amounts of dollars to prevent it from sliding further. Their reserves fell by about a trillion dollars.

Figure 3: Capital flows in the US and in India
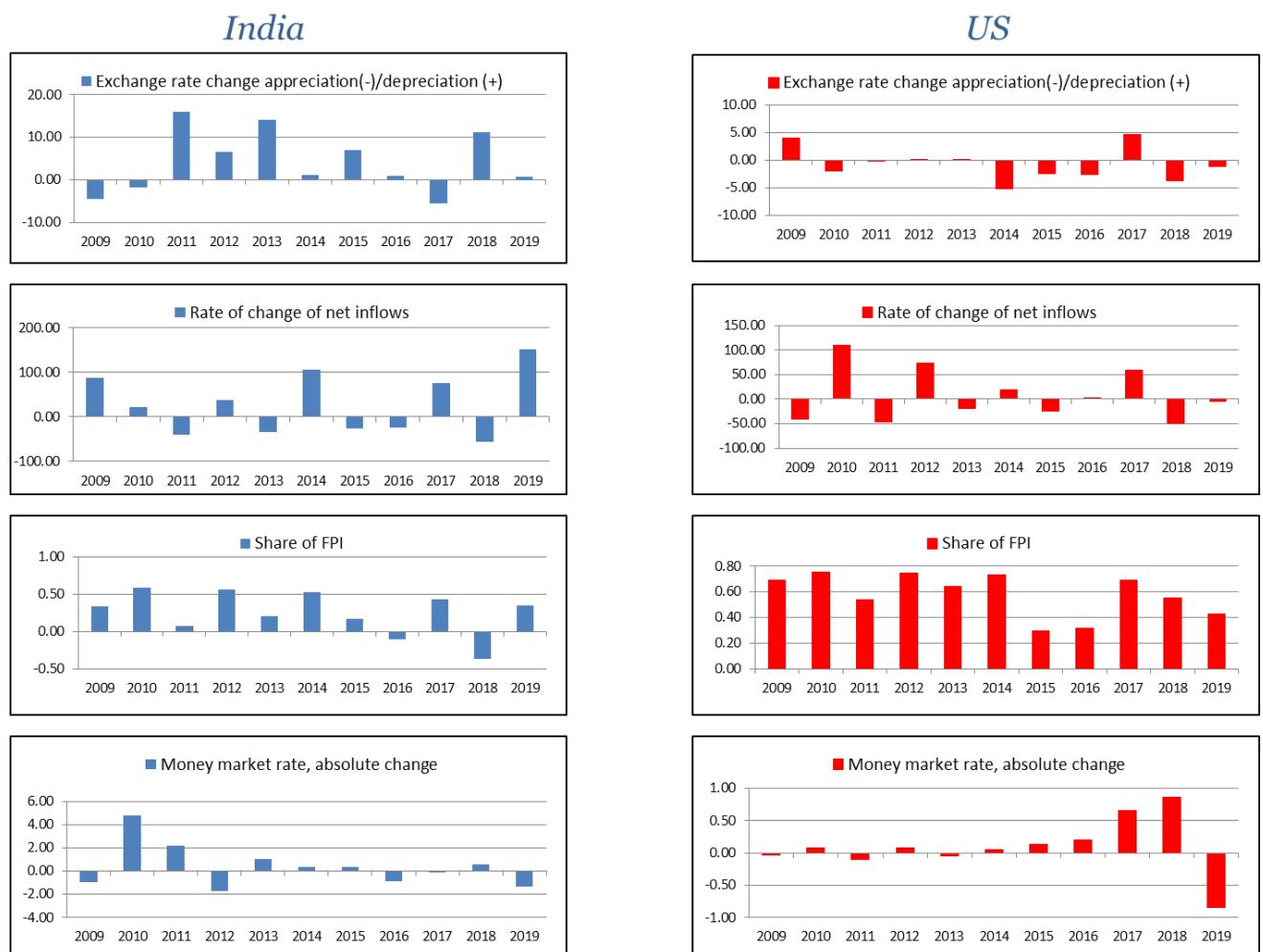
Source: Graphed with data from the IMF International Financial Statistics, https://data.imf.org/?sk=4c514d48-b6ba-49ed-8ab9-52b0c1a0179b

Table 1 gives the changes in net inflows, interest and exchange rates for the US and some EMs in select years when EMs faced surges in capital flows. Figure 3 graphs this data for the US and India over 2009-19. There are more two-way movements in gross flows that moderate volatility in net inflows in AEs—for example, resident outflows counter outflows from institutions. But in crisis times there are sharp changes in net flows in the US also, suggesting it is also at the receiving end of capital flow volatility.

Table 1: Periods of capital flow surges

	Brazil	China, P.R.	Euro	India	Indonesia	Korea	Malaysia	US
2009: EM inflows								
Exchange rate change appreciation(-)/depreciation(+)	-24.27	-0.15	-9.31	-4.51	-15.39	-13.92	-4.33	4.06
Rate of change of net inflows	55.44	0.12	57.34	88.58	24.08	488.00	-145.62	-40.32
Share of FPI	0.59	0.15	0.55	0.34	0.68	0.84	0.98	0.70
Money market rate, absolute change	-4.67	0.00	-1.06	-1.00	-2.62	-0.43	-1.05	-0.03
2011: EM outflows								
Exchange rate change appreciation(-)/depreciation(+)	9.43	-4.16	1.37	16.02	0.29	2.58	3.32	-0.04
Rate of change of net inflows	-25.71	13.23	26.33	-40.03	-17.56	-49.08	-9.83	-47.30
Share of FPI	0.21	0.04	0.33	0.07	0.20	0.64	0.49	0.55
Money market rate, absolute change	0.05	0.00	-0.44	2.15	-1.23	0.60	0.26	-0.10
2013: EM outflows								
Exchange rate change appreciation(-)/depreciation(+)	15.42	-2.57	-3.04	13.98	24.57	-0.98	6.92	0.19
Rate of change of net inflows	24.68	18.28	14.55	-34.98	-1.25	-26.9	-41.08	-19.39
Share of FPI	0.30	0.16	0.52	0.20	0.34	0.59	0.45	0.64
Money market rate, absolute change	2.79	0.00	0.13	1.00	1.75	-0.26	-0.01	-0.05

Inferences from Table 1 include a close association for EMs between net capital flows and currency values. The dollar strengthens during periods of EM capital outflows, while EM currencies weaken. During EM capital outflows the FPI share falls, indicating this is the most volatile component. There is monetary tightening during period of outflows in EMs. That it is unable to stop outflows suggest interest differentials are not the most important driver of capital flows in EMs. Multiple empirical tests in the literature have found little support for uncovered interest parity. Moreover, in 2011 and 2013 there were net outflows from the US

as well as EMs, suggesting some components of capital flows contract in the aggregate during global risk-offs.

Statistical analysis for the decade supports the above episode-based picture. Over a period of large capital flow volatility, the correlation between change in net flows and monetary tightening is -025 for India but 0.51 for the US—rising policy rates were associated with outflows for India, but inflows for the US. Consistently, INR depreciated with rising repo rates (correlation -0.08). Inflows appreciated the INR (correlation -0.71) but depreciated the USD (0.08) over the period. All currencies had a strong negative correlation with the USD in the 2010s (average across the countries in our sample -0.54).

While low policy rates and QE can be one source of capital flows, pro-cyclical balance sheets are another. Counter-cyclical macroprudential regulations are required to reduce excess volatility that affects AEs also. US dollar appreciation hurt US recovery in some periods. EMs slowdown decreased demand for AE imports and AE firms' profits. This effect is enhanced as the relative size of EMs increases.

5. Conclusion and implications for policy

International adjustment to shocks continues to be asymmetric. Not enough is done to moderate or compensate spillovers on EMs. During 2011, 2013 and 2015, the period of QE, shocks for EMs were larger than they were in 2008. EMs cooperated to raise global demand after the GFC. Indian stimulus, for example, was excessive and led to over-heating. But they were left to handle spillovers from AE GFC and Covid-19 policy responses by themselves.

The underlying assumption was that AE recovery benefits EMs. But it is becoming clear that EM slowdown also hurts AEs. This decrease in demand for AEs themselves due to negative spillovers originating from their policies has to be factored in and their excessive risk-taking moderated.

An example of how power affects the functioning of institutions is the direction set at the Post WWII Breton Woods Conference.

The initial negotiated draft vision statement was: To facilitate the expansion and balanced growth of international trade, and to contribute thereby to the promotion and maintenance of

high levels of employment and real income and to the development of the sources of productive power in the territories of all members whatever the stages of their economic development as primary objectives of economic policy (US State Department 1945:697).

But the final draft became: To facilitate the expansion and balanced growth of international trade, and to contribute thereby to the promotion and maintenance of high levels of employment and real income and to the development of the productive resources of all member countries as primary objectives of economic policy (Schuler and Rosenberg 2012: 130, 190-91).

This loss of 'development stages' gave the license to assume the same macroeconomic framework for all countries, and follow uniform policies that suit AEs but impose excessive adjustment costs on EMs. While a couple of rule-breaking EMs may be exploiting the system, the majority are at the receiving end. A global system that is not equitable itself encourages rule-breaking. The asymmetric power of creditor countries made the IMF more concerned about protecting capital flows and earnings from flows than about protecting employment, productivity and growth. In AEs themselves the wealthy have gained more and there is a revulsion against the consequent inequalities. The suffering and loss due to Covid-19 is an opportunity to put the focus back where it should have been—on lives and livelihoods.

Excess currency volatility is a symptom of excess capital flows, not an indication of currency wars. Coordinated prudential regulation can reduce market over-reactions. Markets and AEs would also benefit from lower volatility. Less protection of capital incomes and rise in labour incomes would reduce political pressures because of rising inequalities in AEs themselves. Group think (IMF 2011) is hurting AEs also. A genuine diversity of ideas is required. Coordination failures continue due to misperceptions that AEs are the major drivers of global growth. But a larger share of global income now comes from EMs. Greater equality makes cooperation more feasible if perception blocks are overcome and inequities in international institutions' procedures and processes removed.

Specific policy implications follow. More measures are required to reduce risks for emerging markets since they are now drivers of global growth. International conventions should be

refocused on reducing the probability of crises, instead of protecting creditors by ensuring they do not suffer a loss in case a crisis occurs.

Major source countries should develop prudential regulation of their non-bank financial sectors, including commodity futures markets. Simple lender-based prudential measures such as position limits and leverage caps are easier to apply universally to non-banks also, therefore reducing arbitrage within the financial sector and across countries.
The IMF should remove restrictions on pre-emptive implementation of capital flow management and its use before other measures. Transparent, pre-announced countercyclical measures as part of a path towards more liberalization in step with domestic market development create better incentives compared to crisis time restrictions.

Quantitative easing affects central bank balance sheets and exchange rates. So do some measures for capital flow management such as accumulating reserves. Both should be treated symmetrically.

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Appendix

Result 1: *When AE's share in EM's income is above a threshold level ($\overline{x_2}$), the optimal AE share is decreasing in EM's income.*

Let

y_{1t}: EM's income in period t

y_{1t+1}: EM's income in period $t + 1$

$x_2 \in [0, 1]$: AE's share in EM's income

$s_2 = x_2 y_{1t+1}$: The part of EM's income going to AE in period $t + 1$

Let $y_{1t+1} = f(x_2, y_{1t}; g)$, where g is the growth parameter and $f(.)$ is continuous and twice differentiable in its arguments.

(a) Higher value of g indicates higher rate of growth of y_1, given x_2 and y_{1t}: $\frac{\partial f}{\partial g} > 0$

(b) $\frac{\partial f}{\partial x_2} < 0$, i.e., higher share of AE in EM's income in period t leads to lower income of EM in period t+1, for any given y_{1t} and g.

(c) $\frac{\partial f}{\partial y_{1t}} > 0$, i.e., higher income in a period leads to higher income in the next period, for any given x and g.

(d) $\frac{\partial}{\partial x_2}\left(\frac{\partial f}{\partial y_{1t}}\right) = \frac{\partial}{\partial y_{1t}}\left(\frac{\partial f}{\partial x_2}\right) < 0$, i.e., higher the x_2, lower is the positive marginal effect of y_{1t} on y_{1t+1}.

(e) $\frac{\partial}{\partial x_2}\left(\frac{\partial f}{\partial g}\right) < 0$, i.e., an increase in x_2 dampens the positive effect of g on EM's income.

Now, the problem of the AE is to maximize its income in period $t + 1$ by choosing its share x_2: $\max_{x_2 \in [0,1]} s_2 = x_2 f(x_2, y_{1t}; g)$.

The F.O.C of the above problem can be written as follows.

$$\frac{\partial s_2}{\partial x_2} = f(x_2, y_{1t}; g) + x_2 \frac{\partial f(x_2, y_{1t}; g)}{\partial x_2} = 0 \qquad\qquad (1)$$

Assumption 1: $\frac{\partial^2 s_2}{\partial x_2{}^2} = 2\frac{\partial f(x_2, y_{1t}; g)}{\partial x_2} + x_2 \frac{\partial^2 f(x_2, y_{1t}; g)}{\partial x_2{}^2} < 0$

Note: Assumption 1 always holds true if $\frac{\partial^2 f(x_2, y_{1t}; g)}{\partial x_2{}^2} \le 0$ or $2\left|\frac{\partial f(x_2, y_{1t}; g)}{\partial x_2}\right| > \left|\frac{\partial^2 f(x_2, y_{1t}; g)}{\partial x_2{}^2}\right|$, which seems to be plausible in a sufficiently wide range of parametric configurations. Assumption 1 ensures that the SOC of the AE's maximization problem is satisfied.

From (1), we get the optimal share of AE $x_2^* = x_2^*(y_{1t}, g)$

The questions are, how does the optimal share of AE x_2^* depend on y_{1t} and g?

From (1), by implicit function theorem, we get the following.

$$\frac{dx_2^*}{dy_{1t}} = -\frac{\frac{\partial}{\partial y_{1t}}\left(\frac{\partial s_2}{\partial x_2}\right)}{\frac{\partial^2 s_2}{\partial x_2{}^2}}, \text{ where } \frac{\partial^2 s_2}{\partial x_2{}^2} < 0 \text{ by the SOC. Thus,}$$

$$Sign\left(\frac{dx_2^*}{dy_{1t}}\right) = Sign\left(\frac{\partial}{\partial y_{1t}}\left(\frac{\partial s_2}{\partial x_2}\right)\right) = Sign\left(\frac{\partial f}{\partial y_{1t}} + x_2 \frac{\partial}{\partial y_{1t}}\left(\frac{\partial f}{\partial x_2}\right)\right).$$

Now,

$$\frac{\partial f}{\partial y_{1t}} + x_2 \frac{\partial}{\partial y_{1t}}\left(\frac{\partial f}{\partial x_2}\right) < 0$$

$$\Leftrightarrow x_2 > -\frac{\frac{\partial f}{\partial y_{1t}}}{\frac{\partial}{\partial y_{1t}}\left(\frac{\partial f}{\partial x_2}\right)} = \overline{x_2} > 0, \text{ since } \frac{\partial f}{\partial y_{1t}} > 0 \text{ and } \frac{\partial}{\partial y_{1t}}\left(\frac{\partial f}{\partial x_2}\right) < 0.$$

Therefore, $\frac{dx_2^*}{dy_{1t}} < 0$, if $x_2 > \overline{x_2}$.

Result 2: *When AE's share in EM's income is above the critical level $\widehat{x_2}$, the optimal share of AE is decreasing in the growth rate of EM's income.*

From (1), by implicit function theorem, we get the following.

$$\frac{dx_2^*}{dg} = -\frac{\frac{\partial}{\partial g}\left(\frac{\partial s_2}{\partial x_2}\right)}{\frac{\partial^2 s_2}{\partial x_2{}^2}}, \text{ where } \frac{\partial^2 s_2}{\partial x_2{}^2} < 0 \text{ by the SOC. Thus,}$$

$$Sign\left(\frac{dx_2^*}{dg}\right) = Sign\left(\frac{\partial}{\partial g}\left(\frac{\partial s_2}{\partial x_2}\right)\right) = Sign\left(\frac{\partial f}{\partial g} + x_2 \frac{\partial}{\partial g}\left(\frac{\partial f}{\partial x_2}\right)\right).$$

Now,

$$\frac{\partial f}{\partial g} + x_2 \frac{\partial}{\partial g}\left(\frac{\partial f}{\partial x_2}\right) < 0$$

$$\Leftrightarrow x_2 > -\frac{\frac{\partial f}{\partial g}}{\frac{\partial}{\partial g}\left(\frac{\partial f}{\partial x_2}\right)} = \widehat{x_2} > 0, \text{ since } \frac{\partial f}{\partial g} > 0 \text{ and } \frac{\partial}{\partial g}\left(\frac{\partial f}{\partial x_2}\right) < 0.$$

Therefore, $\frac{dx_2^*}{dg} < 0$, if $x_2 > \widehat{x_2}$.

Result 3: *The spillover from an AE to an EM has to rise with the relative rise in EM income, for the AE to maximise its period 2 income with respect to income shares.*

As EM incomes rise spillovers become important. Consider a spillover from AE income to EM income. Now period 2 EM income is y_{e2}. It equals the EM share of its period 1 income y_{e1} plus a spillover term $a_a y_{a1}$. Since this is a spillover, not a share, it does not reduce AE period 1 income, y_{a1}, so that AE period 2 income y_{a2} is y_{a1} plus the AE's share of EM period 1 income $x_2 y_{e1}$ or $(1 - x_1)y_{e1}$.

$$y_{e2} = x_1 y_{e1} + a_a y_{a1}$$
$$y_{a2} = y_{a1} + (1 - x_1)y_{e1}$$

The first equation implies:

$$y_{e1} = \frac{y_{e2} - a_a y_{a1}}{x_1}$$

Substituting in the second equation and taking its derivative with respect to x_1, to see how AE second period income varies with EM share of EM income, gives:

$$\frac{\delta y_{a2}}{\delta x_1} = \frac{a_a y_{a1} - y_{e2}}{x_1^2}$$

To maximise the AE's second period income, y_{a2}, given first period income shares requires:

$$a_a = \frac{y_{e2}}{y_{a1}}$$

Therefore, if y_{e2} rises relative to y_{a1}, the spillover a_a will have to rise as the ratio y_{e2}/y_{a1} rises to optimize AE second period income as the share of EM in its own income rises.

Result 4: *Result 3 holds even for bi-directional spillovers, that is, when there is a spillover from the EM to the AE also.*

If instead of a one directional spillover; a two directional spillover is introduced so that y_{e1} raises y_{a2}:

$$y_{e2} = x_1 y_{e1} + a_a y_{a1}$$

$$y_{a2} = y_{a1} + (1 - x_1)y_{e1} + a_e y_{e1}$$

Solving for y_{e1} gives the same equation as above:

$$y_{e1} = \frac{y_{e2} - a_a y_{a1}}{x_1}$$

Next, consider one sided spillovers when EM income grows with x_1.

$$y_{e2} = x_1(1 + g(x_1))y_{e1} + a_a y_{a1}$$

$$y_{a2} = y_{a1} + (1 + g(x_1))y_{e1}(1 - x_1)$$

$$\frac{\delta y_{a2}}{\delta x_1} = \frac{a_a y_{a1} - y_{e2}}{x_1^2} = 0$$

$$\Rightarrow a_a = \frac{y_{e2}}{y_{a1}}$$

Again, the result is the same, since the $g(x_1)$ terms cancel out in the derivation.

Result 5: *Even in the presence of spillovers from the AE, the share of the AE in second period EM income must fall for EM income to reach optimum levels.*

To examine the effect of AE share x_2 on second period EM income, y_{e2}:

$$y_{e2} = (1 - x_2)y_{e1} + a_a y_{a1}$$

$$y_{a2} = y_{a1} + x_2 y_{e1}$$

Derive:

$$y_{a1} = y_{a2} - x_2 y_{e1}$$

From the second equation, substitute in the first, and take its derivative with respect to x_2 to get the FOC:

$$\frac{\delta y_{e2}}{\delta x_2} = (-1 - a_a)y_{e1} = 0$$

$$a_a = -1$$

So a_a must be less than one, or spillovers from the AE to the EM must be negative for EM income to be maximized with a rise in AE share in its income. Since normally $a_a > 0$, this

implies even in the presence of spillovers from the AE second period EM income cannot be optimum if x_2 rises.