

## **A Case for an Integrated Policy Framework**

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We have had two days of excellent discussions on the challenges for monetary policy. It is quite clear that the challenge for central bankers is not just how to attain full employment and price stability when the main frictions are nominal rigidities like price and wage stickiness, but how to do so when financial markets are imperfect, capital is globally but imperfectly mobile, and the international monetary and financial system is dominated by the dollar.

As we learnt, financial imperfections can amplify the impact of shocks and call for a more aggressive monetary policy response. Silvana demonstrated this for the case of commodity price shocks in commodity exporting countries. Secondly, financial imperfections imply that it is no longer the case that interest rate differentials sufficiently capture the different stance of monetary policy across countries. Sebnem focused on the risk premia channel of monetary spillovers and Arvind and Hanno on the convenience yield channel in a world of dollar dominance. Alan and Oscar provided evidence of the significant influence of global factors on the neutral rate of interest  $r^*$ . Lastly, Athanasios highlighted the importance of having a systematic monetary policy framework for effective policy making.

Today I would like to focus my remarks on work that we are doing in the research department at the IMF that precisely takes on the challenge of developing an integrated policy framework (IPF) for a world where imperfections include not just the inflexibility of prices, but also financial imperfections.<sup>2</sup> The IPF considers jointly the role of monetary policy, exchange rate flexibility, macroprudential measures, and capital flow measures (capital controls) in small open economies, while accounting explicitly for imperfections in trade and financial markets. The Mundell-Fleming model remains the workhorse framework for the analysis of small open economies in the policy space. In that model, flexible exchange rates are optimal, and can deliver full employment together with low inflation after domestic and external shocks. This

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<sup>2</sup> The modeling work at the Research department is part of a cross-departmental work program on the IPF at the IMF.

is partly because of a powerful expenditure-switching channel that operates on both the import side and the export side.

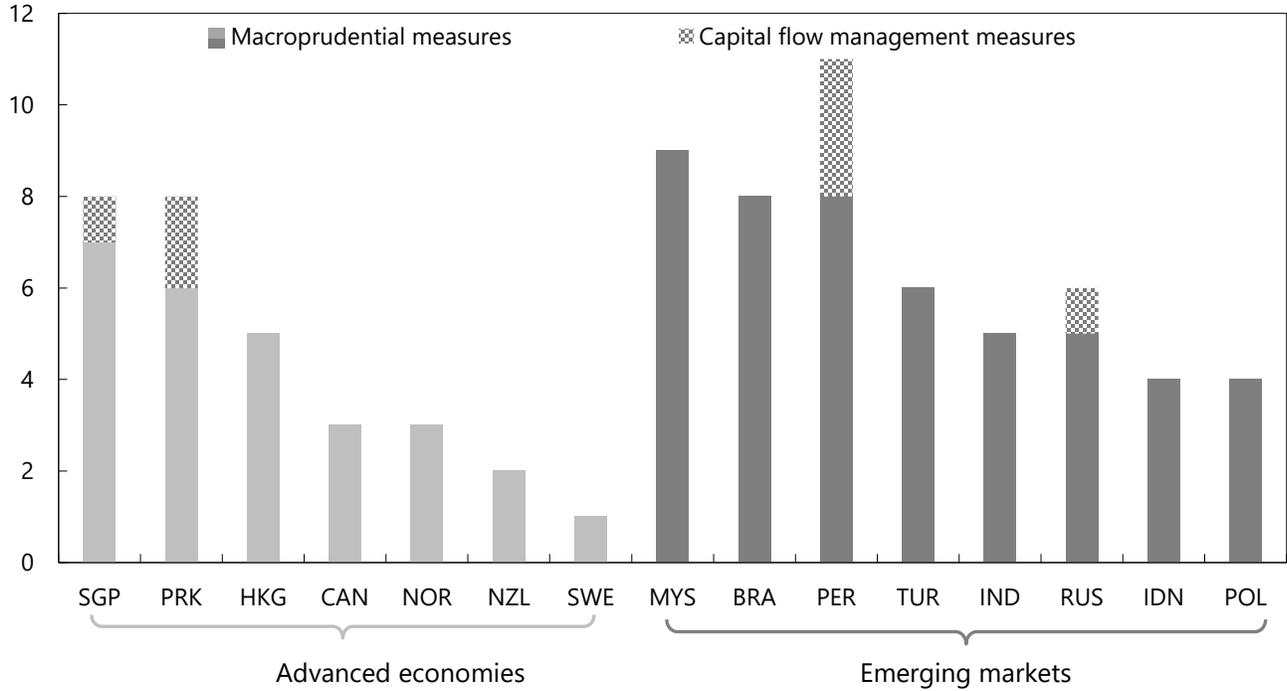
## **I. MOTIVATION**

Our motivation for the IPF is twofold. First, we have witnessed many countries adopting more eclectic approaches other than plain-vanilla monetary policy and floating exchange rates to cope with shocks. Second, the empirical evidence is inconsistent with some of the assumptions underlying the Mundell-Fleming framework.

First, many countries have used unorthodox policy instruments. A number of countries have used macroprudential policies, capital controls, an interest rate defense of the exchange rate, and foreign exchange intervention in response to shocks, or they have used a combination of these tools. Macroprudential measures, for example, have been widely used during capital inflow episodes, such as in 2010-11. Both advanced and emerging small open economies introduced a number of measures, mainly to limit credit growth and housing price appreciation (Figure 1). When faced with capital outflow pressures, many emerging markets used multiple tools to achieve macroeconomic stabilization. There has been significant heterogeneity across countries in their use of these tools. One recent example was during the emerging market stress episodes induced by the dollar appreciation in 2018 (Figure 2). Policy rates were raised in some countries to stem outflows, but in other countries, they were lowered. While some countries allowed the exchange rate to depreciate, other central banks intervened in the FX market to lean against the depreciation.

**Figure 1. Inflow Episode**

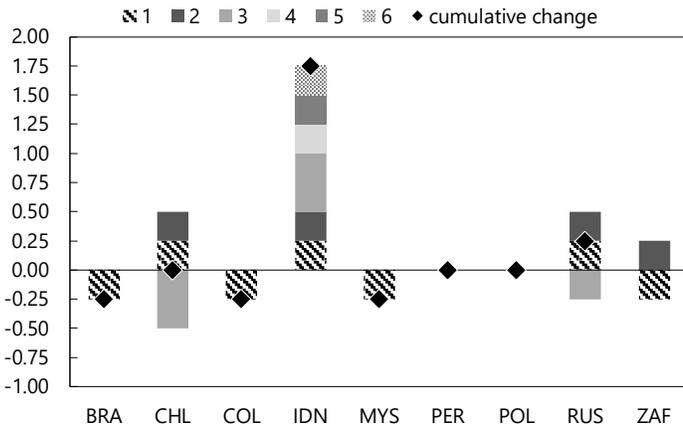
Number of macroprudential and capital flow management measures, 2010-11  
(number of measures)



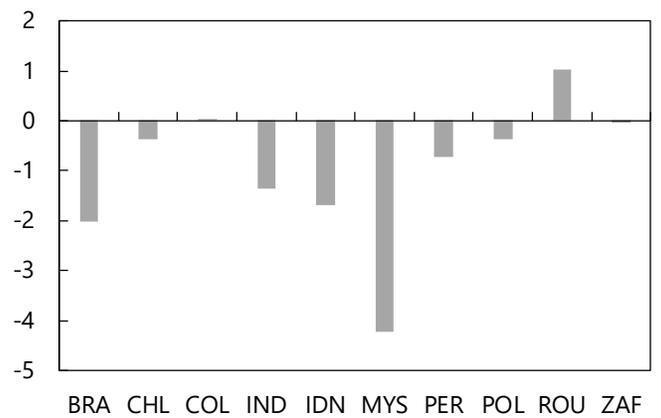
Source: Alam and Others (2019).

**Figure 2. Outflow Episode**

Policy rates changes since March 2018 – July 2019  
(percentage points)



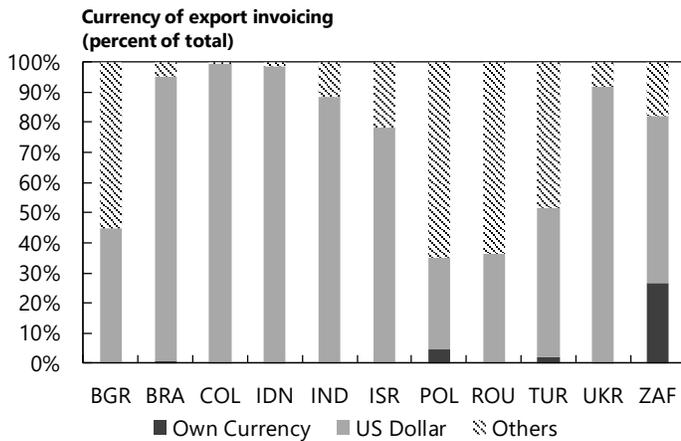
Foreign exchange intervention, March-October 2018  
(cumulative; percent of GDP)



Sources: Haver Analytics; Bloomberg, L.P.; IMF, Balance of Payments; and IMF staff estimates.

Given their frequent use, we need to better understand these alternative tools: what they do, how they interact, and the trade-offs involved. We ultimately need to be able to characterize policy counterfactuals. In other words, we need to establish under what conditions the Mundell-Fleming prescription still holds and when it may instead be optimal to limit exchange rate flexibility and rely on other tools. Clearly, we need to go beyond the Mundell-Fleming framework to answer this question.

The second motivation for the IPF is that the empirical evidence is inconsistent with some of the assumptions underlying the Mundell-Fleming framework. We can see in Figure 3 that most emerging markets, except those in the European Union, seem to have dollar invoicing shares above 80 percent. Those in the European Union rely heavily on the euro. This empirical finding implies that we need to go beyond the standard assumption of producer currency pricing, where prices are sticky in exporter's currency, and instead, we need to consider a dominant currency pricing paradigm where export prices are sticky in a dominant currency, which is most often the dollar and in some cases the euro. On the financial side, we need to take imperfect capital markets into account. For example, the economy's foreign currency borrowing generates a link between the exchange rate and the macroeconomy through currency mismatch. Indeed, currency mismatches have been cited as a reason for using alternative tools to limit exchange rate movements in Brazil, Indonesia and Peru. Figure 4 shows the extent of foreign currency borrowing across several emerging markets.

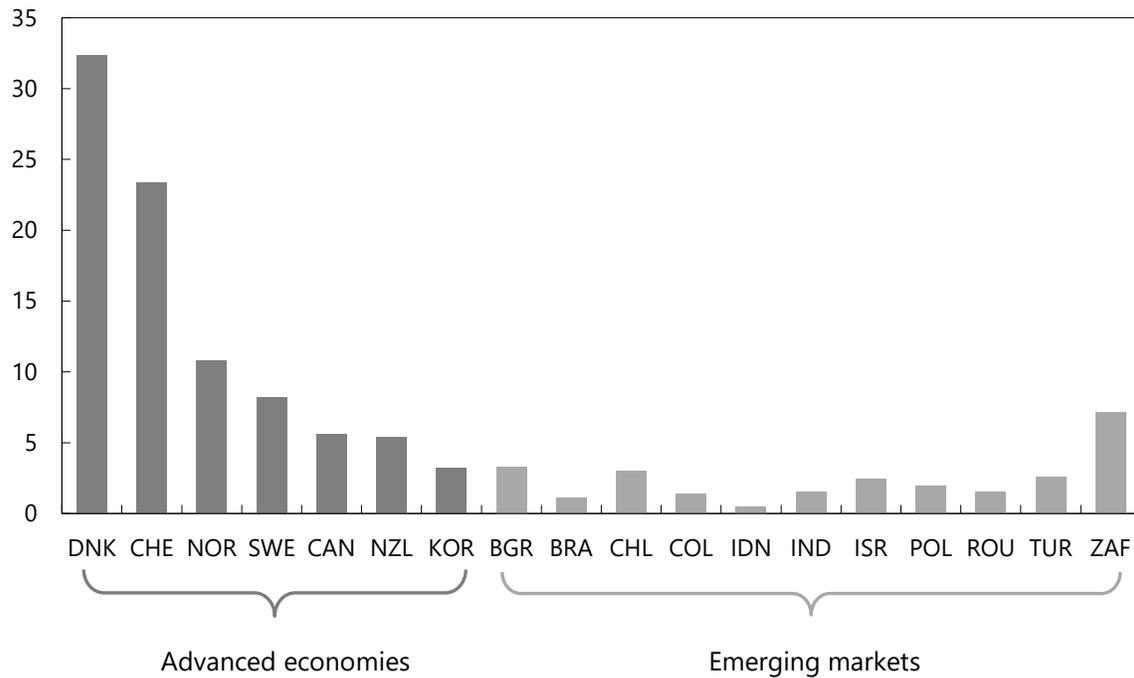
**Figure 3. Dominant currency pricing****Figure 4. Non-financial corporate fx debt**

Sources: Gopinath (2016); IMF staff calculations.

Another imperfection on the financial side relates to the foreign exchange markets. International financial intermediaries generally have a limited appetite for taking on emerging markets' currency exposure. They thus demand a premium to hold assets in emerging market currencies. In such cases, gross capital inflows do not fully respond to the interest rate differentials. The empirical counterpart to this imperfection is the varying depth of the foreign exchange market (Figure 5). Most advanced economies and some emerging market countries such as South Africa and Chile have deep markets, but other countries such as Brazil and Indonesia do not.

Those countries which intervened heavily during the depreciation episodes tend to be countries where balance sheet concerns prevailed, and where financial markets were not deep enough to provide hedging opportunities.

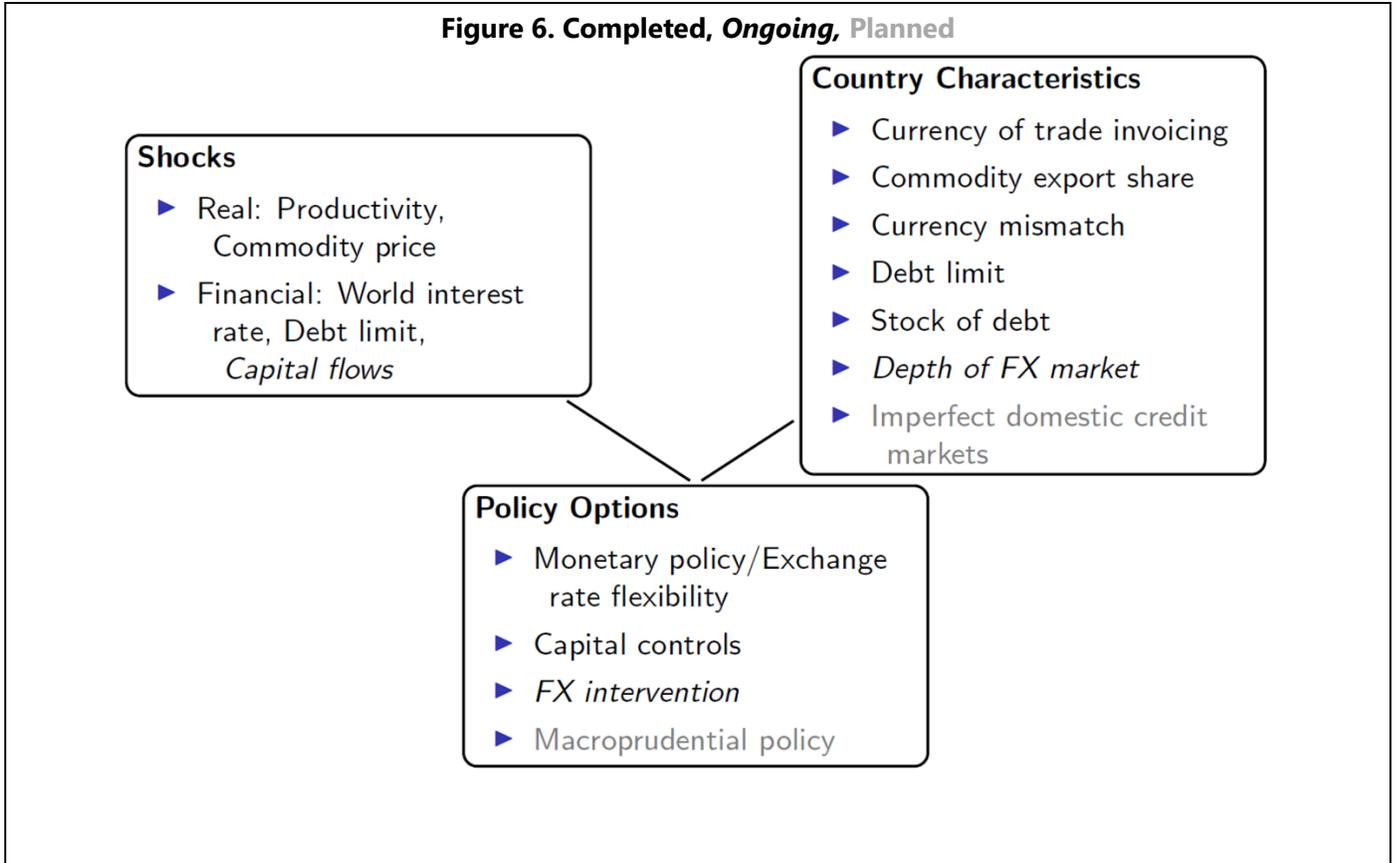
**Figure 5. FX market turnover**  
(in percent of GDP; 2016)



Sources: BIS.

## II. OUR AGENDA

The novelty of our analysis at the Research Department of the IMF is that we are characterizing the joint use of multiple policy instruments as a function of shocks and both real and nominal frictions. Before going further into the specifics, let me begin by outlining our broad ongoing agenda on the IPF. Figure 6 is a visual representation of the work that is completed (in black), ongoing (in Italic) and planned (in gray). The top left box captures a range of real and financial shocks. In the top right box, you can see the list of country characteristics that our model is going to capture. Ultimately, our goal is to complete this picture fully, to study combinations of shocks and country characteristics and map them to the optimal policy mix, listed in the box at the bottom.

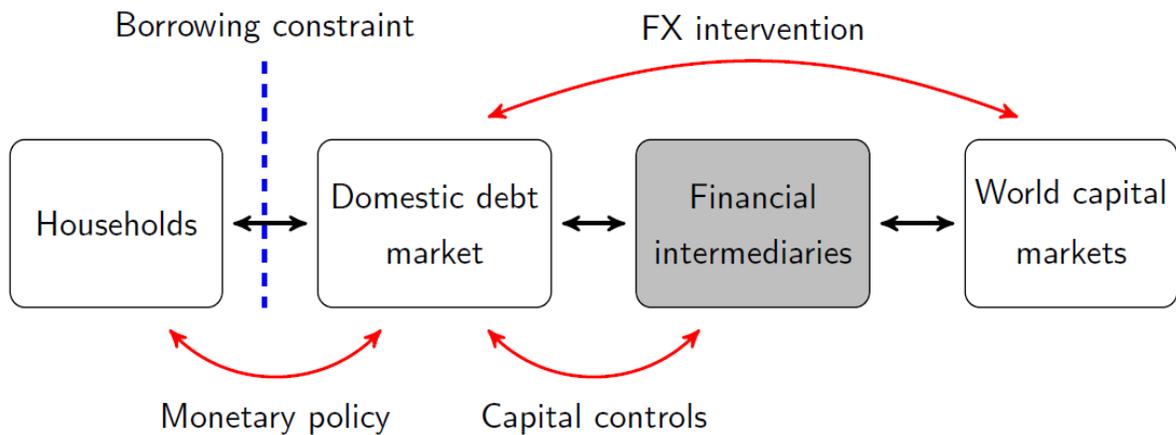


Today I will present some preliminary insights from this modeling work.

### III. THE MODEL

We build a model of a small open economy (Figure 7). There are three sectors: the tradable goods sector, the commodity sector and the non-tradable goods sector. The price of the non-commodity traded goods is sticky. The price may be sticky in the producer's currency or in the dominant currency. The country is a price taker in commodity markets.

**Figure 7. Model Ingredients**



On the financial side, households go to the domestic bond market to satisfy their borrowing needs. Financial intermediaries borrow in foreign currency on world markets and meet the households' supply of local currency bonds. Who are these financial intermediaries? At one extreme, they could be part of the domestic economy, in which case all of the domestic currency bond positions would net out and the economy would only have foreign currency debt. At the other extreme, they could be entirely foreign, implying no currency mismatch for the emerging market. We will focus on cases in-between.

The first inefficiency in financial markets is a borrowing constraint that limits the household's debt to a fraction of pledgable income in local currency. This constraint is not binding in normal times, but it might become binding after a sufficiently bad shock, leading to financial distress. Importantly, households do not internalize the effects of their individual actions on the exchange rate and on the tightness of the constraint ex-post, which may lead to overborrowing. The second inefficiency is that financial intermediaries have a limited capacity for bearing emerging market's currency exposure, so they request a premium. In other words, there are deviations from the uncovered interest parity condition.

Within this framework, we jointly consider the role for monetary policy, capital controls, and foreign exchange (FX) intervention.

- Monetary policy, working through changes in interest rates, has its traditional New-Keynesian impact. It affects the interest rate faced by domestic households when they make borrowing and lending decisions.
- Capital controls are in the form of taxes on capital inflows. They can be prudential, as they are effective in curbing overborrowing before the shock strikes. They can also be used after the shock strikes.
- Sterilized FX intervention is the central bank's exchange of domestic currency bonds for foreign currency bonds. By changing how much of the households' debt needs to be absorbed by financial intermediaries, FXI changes the external premium and hence affects the exchange rate.

#### **IV. POLICY TRADE-OFFS**

Our model captures the following trade-offs associated with monetary policy/exchange rate flexibility, capital controls, and FX intervention (Table 1).

*Flexible exchange rates* have some expenditure-switching benefits but can generate costs if they exacerbate financial imperfections. When the exchange rate depreciates, imports become more expensive relative to home-produced goods. Households therefore switch away from imports towards home goods. Under producer currency pricing, expenditure switching is also operational through exports: an exchange rate depreciation boosts demand by making exports more competitive. Under dominant currency pricing, exchange rate adjustment becomes a weaker tool because while it continues to affect import consumption, it no longer affects the competitiveness of exports on world markets, as the dollar price remains unchanged. However, if there is currency mismatch on the financial side, a depreciation can make the borrowing constraint bind by worsening the country's balance sheet. This cost is more important for high-debt countries with large FX mismatches, and it is asymmetric: it only occurs after depreciations but not after appreciations.

**Table 1. Policy Trade-offs**

Monetary policy/flexible exchange rates	Benefits	Expenditure switching but weaker under DCP
	Costs	Negative balance sheet effect and risk of binding borrowing constraint in case of depreciation
Capital controls	Benefits	Prevent overborrowing and alter debt/consumption profiles
	Costs	Distort capital flows
FX intervention	Benefits	Can free up monetary policy by affecting the exchange rate separately
	Costs	Carry cost

*Capital controls* impact aggregate demand by changing the “effective interest rate” faced by the households, thus changing consumption and debt dynamics. Prudential controls work to prevent overborrowing. They can be used to curb debt, which alters the consumption profile when FX markets are deep, and which additionally avoids inefficient intermediation of the debt by international intermediaries when FX markets are shallow. However, capital controls can distort capital flows relative to the efficient benchmark, which may generate welfare costs since those flows can be beneficial for the recipient countries.

*Foreign exchange intervention* can be used in shallow FX markets to manage the exchange rate while freeing up the policy rate to stabilize households’ borrowing and lending. However, reserve accumulation involves buying low-return foreign currency bonds and selling high-return domestic currency bonds. Therefore, it involves carry costs.

## V. PRELIMINARY RESULTS

Our work is preliminary, but some interesting results have started to emerge.

(1) The first important result is that policymakers should understand that ***not all instruments affect all imperfections***. Instruments are not created equal; they operate through different margins. If an imperfection remains unaddressed, and an

additional policy tool becomes available, that does not necessarily mean that the additional tool should actually be used. It just may not be the right tool.

**Figure 8. Result 1: Not all instruments affect all imperfections**

**Shock: Real (productivity) shock**

**Country characteristics: Dominant currency pricing, deep FX markets**



Despite output gap, there is no case for capital controls or FX intervention:

- Imperfect stabilization arises from stickiness of price in dominant currency, not from overborrowing

For example, consider *an increase in productivity* in Figure 8, which generates an expansion of aggregate supply, which then exceeds aggregate demand. In an economy without financial imperfections, monetary policy should stimulate the economy and generate a depreciation. Under producer currency pricing, the depreciation makes exports more competitive, so the economy can stabilize its use of labor and export the additional output that it now produces. Under dominant currency pricing, the depreciation does not affect the competitiveness of exports, so a negative output gap remains. Even given the negative output gap under dominant currency pricing, there is no case for capital controls, because unfortunately, capital controls do not affect the unaddressed imperfection. Capital controls are effective in addressing overborrowing by the private sector, but the only inefficiency we have highlighted arises from price stickiness rather than from overborrowing. Overall, for the country characteristics in Figure 8, our model agrees with the Mundell-Fleming recommendation that traditional monetary policy and exchange rate flexibility should be used to deal with shocks to domestic productivity.

(2) The second important result is that ***instruments generally affect multiple imperfections***, so the use of an existing policy may be reduced or increased after a new tool becomes available, that is tools may be substitutes or complements.

Our model's recommendation may diverge from the Mundell-Fleming prescription after *shocks to financial conditions*, such as a shock to the country's external debt limit (Figure 9). Such a shock may occur in a country-specific manner if there is a loss of credibility of the domestic financial institutions which intermediate loans between foreign lenders and domestic borrowers. The shock may also occur at a global level if it is triggered by a "risk-off" episode in the global financial cycle, i.e., foreign financial institutions face financing difficulties of their own and as a result decide to downgrade, or limit their exposure to, the domestic collateral of all borrower countries. We allow for an occasionally-binding borrowing constraint by specifying that the shock binds in some, but not all, states. This debt limit is a non-New-Keynesian element which interacts with the price stickiness of the New Keynesian approach.

Our model's recommendation for the desirable use of policy instruments now diverges from the Mundell-Fleming prescription both in normal times, when the constraint is not binding, and in stressed times, when the constraint is binding.



gaps. This behavior may be justified if we think that constraints are indeed binding, but not if policymakers are just smoothing the exchange rate in the absence of constraints.

Let me now consider the additional instrument of *capital controls on inflows*. Inflow controls do not get around the debt limit when it binds, so they are not useful in stressed times. But in normal times ( $t=0$ ), there is overborrowing because, as I mentioned earlier, households do not internalize the effects of their actions today on the severity of the constraints when the debt limit shock strikes in the future. Capital controls are the appropriate instrument to tackle this overborrowing problem, and they should be imposed as prudential policy in normal times before debt limit shocks strike.

Our model provides a role for the countercyclical use of capital controls as has been observed in practice in countries such as Brazil, Indonesia, and Peru. When foreign financing conditions are loose and the risk of overborrowing is greater, capital controls should be increased; while when the foreign financing conditions are tighter and the risk of overborrowing is lower, capital controls should be loosened. Our model also suggests that optimal capital controls may be higher for countries with dominant currency pricing, because for those countries, the exchange rate may be more volatile with respect to financial shocks.

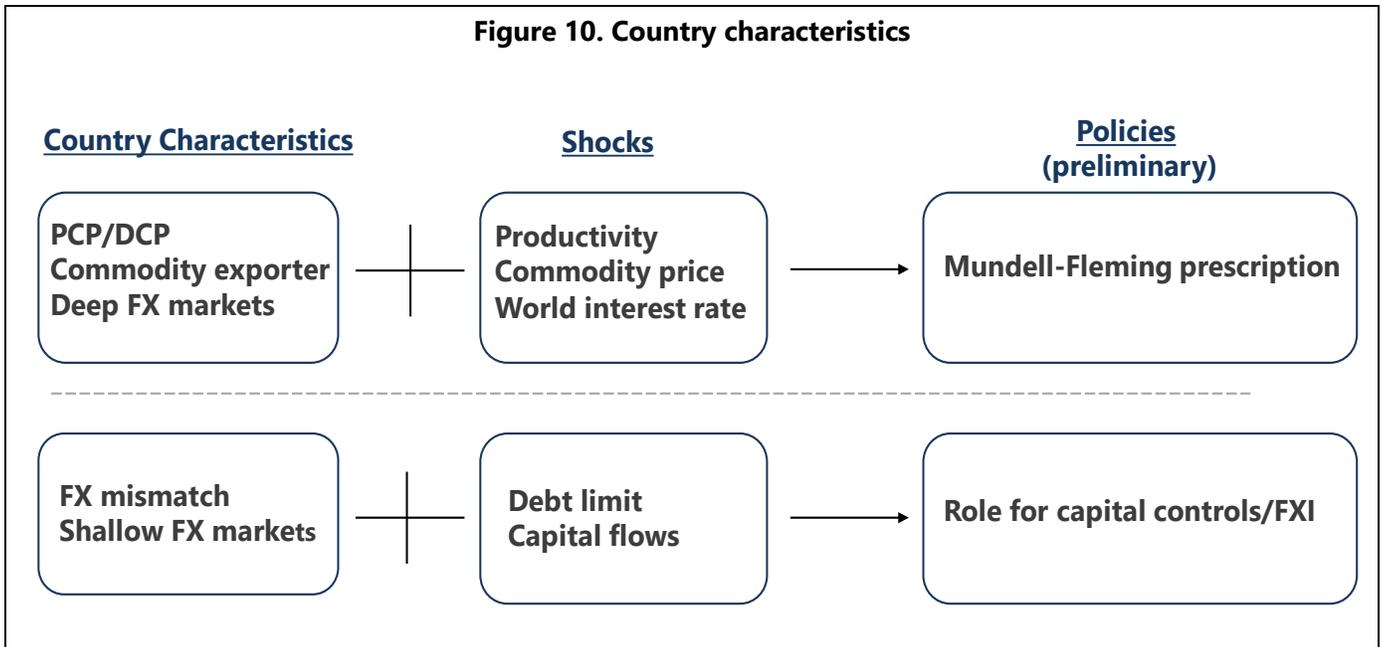
If FX intervention is possible and the domestic monetary policy transmission mechanism is not broken completely at the time of the shock, FX intervention may become a desirable part of the policy mix in stressed times, because sales of FX can support the exchange rate to relax the financial constraint in countries with shallow FX markets, while the policy rate can be freed up to be lowered, so as to boost domestic borrowing and stabilize aggregate demand.

How does the introduction of capital controls in normal times ( $t=0$ ) affect the use of the policy rate in stressed times ( $t=1$ )? The introduction of capital controls redistributes aggregate demand from normal times to stressed times, which means that the debt limit shock causes a smaller reduction in aggregate demand when it strikes. Therefore, in stressed times, there is less need to stimulate demand by reducing the policy rate, while there is also less need to relax the debt limit on the financial side of the economy by raising the policy rate. As such, the impact of capital

controls on the policy rate becomes ambiguous. The ambiguity reflects the insight that since additional instruments generally affect multiple imperfections, the use of an existing policy (such as the policy rate in  $t=1$ ) may be reduced or increased after a new tool (such as the capital controls at  $t=0$ ) becomes available. Our qualitative simulation results so far suggest that once capital controls are imposed, the interest rate in stressed times is higher.

Our modeling framework underlines that country characteristics matter. To illustrate this insight, we show some preliminary examples of policies as a function of combinations of shocks and country characteristics in Figure 10.

*After shocks to commodity prices*, and in the absence of additional financial imperfections, our model's recommended policy response again agrees with Mundell-Fleming. The value of exchange rate flexibility for commodity-exporting countries is that it stabilizes output in the non-commodity sector (with better stabilization under producer currency pricing than dominant currency pricing). For countries like Chile and Australia, which have large commodity and non-commodity sectors, traditional monetary policy with exchange rate flexibility is the correct response to de-link domestic employment from foreign commodity prices. Our model does not see a case for smoothing the exchange rate following commodity price shocks in countries with deep FX markets and no financial imperfections. And there is again no case for capital controls, because there is no overborrowing.



After *shocks to the world interest rate*, the Mundell-Fleming prescription still holds. This result highlights that it's not the direct effect of the U.S. interest rate which is most worrying for emerging markets, but rather, any impact of such U.S. monetary policy changes on the risk appetite of international banks (which we model using the separate debt limit shock described above). For countries with deep FX markets, such as Chile and South Africa, our model confirms that FX intervention does not affect the exchange rate, so there is no rationale for using FX intervention to attempt to smooth the exchange rate. For countries with shallow FX markets, however, such as Brazil, Malaysia, and Peru, capital mobility is limited, and the uncovered interest parity condition is broken. There is a possibility that the policymaker may be able to affect the exchange rate to stabilize the external balance and any external borrowing constraints, while freeing up the policy rate to stabilize households' borrowing and lending decisions.

As I discussed earlier, for countries with FX mismatch under financial stress, there is also a role for capital controls ex-ante. But suppose that capital controls are ineffective or face substantial stigma in normal times, and thus they cannot be used. Can FX intervention substitute in some measure for the absence of capital controls? Our informed guess is yes: to the extent that FX intervention can be used to stabilize macro outcomes after a financial shock, the accumulation of FX assets in normal

times can be a partial substitute for the reduction of debt via capital controls; a partial substitute because the accumulation of FX reserves incurs a carry cost which capital controls do not suffer from.

Figure 10 captures only some of the possible combinations of shocks and country characteristics that we can use our model to analyze. Many other configurations are already possible: for example, a commodity price shock in a country with pre-existing FX mismatches and an occasionally-binding debt limit, or a productivity shock in a country with shallow FX markets. Generally, financial shocks and financial imperfections can sometimes, but not always, generate a role for additional policy instruments beyond monetary policy and exchange rate flexibility.

## **VI. FIVE BROAD PRINCIPLES**

Our work is not yet complete. Inevitably, optimal policies are going to be model-specific. But we have come up with a list of broad principles which we believe are not specific to our model. We will be refining them as we build our model further.

1. Not just the number but the workings of instruments matter. Not all instruments affect all imperfections, and each instrument typically affects multiple imperfections.
2. The currency of invoicing matters for macro stabilization. Countries whose exports are mainly services like tourism or education, which are priced in the exporter's currency, receive greater benefits from flexible exchange rates. Countries whose traded-good prices are set in a dominant currency receive lower benefits from exchange rate flexibility. The smaller expenditure-switching benefit from exchange rate changes may lead to larger exchange rate movements under dominant currency pricing.
3. Dominant currency pricing, on its own, does not lead to a departure from the Mundell-Fleming prescription. Flexible exchange rates (and therefore independent monetary policy) remain optimal for countries with deep FX markets and no constraints on external financing.
4. Prudential capital controls become optimal when there is a possibility of not being able to borrow. Occasionally-binding borrowing constraints, which may

arise as a result of currency mismatches in external borrowing, generate a role for prudential (ex-ante) capital controls in order to prevent overborrowing in periods before debt limit shocks strike. Even though capital controls distort capital flows, they operate exactly at the margin that is required to deal with the overborrowing problem. So far, we have found optimal capital controls to be larger in DCP countries because of the larger exchange rate movements desired in those countries based on trade considerations.

5. FX intervention can be effective in increasing monetary autonomy, provided that domestic FX market is shallow and that the domestic monetary transmission mechanism remains at least partially functional.

## **VII. CONCLUSION**

In applying the results of our model in practice, we would emphasize that while each policy tool could have its own merit in certain circumstances as outlined earlier, in practice central banks that embrace an IPF framework will have to consider how to carefully incorporate multiple objectives and tools into their policy strategy, operational framework, and communication strategy.

Central banks affect the economy both through immediate policy actions and by affecting the public's expectations about future policy actions. The stabilization of expectations requires sustained clear communication of how policy tools will be used in different states of nature in the future, and how to verify that the central bank is sticking to its previous promises. With multiple instruments, this communication problem becomes more complex, and transitional arrangements (such as building credibility with some instruments before adding others into the toolkit) may be necessary.

Central banks also need to be careful to monitor any side-effects from the use of unorthodox policy instruments on risk-taking by domestic and foreign financial institutions, and on long-term market development. FXI can for instance lead to excessive borrowing in foreign currency and therefore exacerbate the balance sheet mismatch problem.

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