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Agradecimientos

La XI Conferencia Internacional de Estudios Económicos fue posible gracias al apoyo incondicional de Ana María Carrasquilla, Presidenta del Directorio y Presidenta Ejecutiva del FLAR, a quien también se agradece el respaldo a la publicación del presente trabajo.

También se agradece de manera especial a Enrique García y a CAF —Banco de Desarrollo de América Latina— por el copatrocinio de la Conferencia, por décimo año consecutivo.

A los expositores, en su orden de intervención, Kenneth Rogoff, Donald Kohn, Athanasios Orphanides, Leonardo Leiderman, Enrique Mendoza, Klaus Schmidt-Hebbel, Eswar S. Prasad, Lutz Kilian, Alejandro Werner, Sebastian Edwards, Adriana Arreaza y Barry Eichengreen por compartir sus conocimientos sobre el tema y quienes con su exposición hicieron una interesante conferencia.

Finalmente, pero no menos importante, se agradece a las autoridades económicas de los países miembros del FLAR y a los demás participantes de la conferencia.
Acknowledgments

The 11th International Conference on Economic Studies was possible thanks to the unconditional support of Ana María Carrasquilla, Chairwoman of the Board and Executive President of FLAR, whom we also thank for supporting the publication of this work.

Likewise, we convey our special thanks to Enrique García and CAF—Development Bank of Latin America—for cosponsoring the Conference for the tenth year in a row.

We also thank the speakers, in order of appearance, Kenneth Rogoff, Donald Kohn, Athanasios Orphanides, Leonardo Leiderman, Enrique Mendoza, Klaus Schmidt-Hebbel, Eswar S. Prasad, Lutz Kilian, Alejandro Werner, Sebastian Edwards, Adriana Arreaza and Barry Eichengreen, for sharing their knowledge on the subject and thus ensuring a very interesting conference with their lectures.

Last but not least, we thank the economic authorities of FLAR member countries and all other participants in the conference.
Para el momento de la XI Conferencia Internacional de Estudios Económicos, había un contexto de recuperación de la economía global, en línea con los pronósticos de crecimiento, en el cual el mundo continuaba enfrentando retos en materia de estabilidad económica y financiera, en un escenario de aumento de tasas de los fondos federales de la Reserva Federal de los Estados Unidos, y una política monetaria expansiva del Banco Central Europeo.

Por su parte, el mundo emergente y en desarrollo experimentaba dos importantes desafíos: i) Un choque de los términos de intercambio, en especial para los países exportadores de petróleo y, ii) Un estrechamiento de las condiciones financieras.

Al respecto, se generaron importantes interrogantes, hoy vigentes, sobre los efectos que, para la región, traerían temas como el comportamiento de la inflación global, el ajuste económico de China, las perspectivas de los precios de las materias primas y la importancia de una Arquitectura Financiera Global sólida.

Para abordar los anteriores interrogantes, el tema general de la XI Conferencia Internacional de Estudios Económicos FLAR-CAF fue “Economía de China, política monetaria global y América Latina: retos para los bancos centrales de la región”.

La conferencia reunió a un destacado grupo de autoridades económicas, académicos y representantes de organismos internacionales que dialogaron en torno a los desafíos que plantea este tema para los hacedores de política económica en la región.

Gran parte de los resultados de esta discusión fueron recogidos en la presente publicación, que se espera el lector disfrute.
The 11th International Conference on Economic Studies was held amid a context of a global economic recovery, in line with the latest growth forecasts, during which the world continued to face economic and financial challenges, in a scenario featuring increasing federal fund rates adopted by the US Federal Reserve, and an expansionary monetary policy by the European Central Bank.

In turn, the emerging and developing world was experiencing two major challenges: i) a terms of trade shock, particularly for oil-exporting countries, and ii) a tightening of the financial conditions.

This juncture gave rise to important questions, still prevailing, regarding the effects that could be brought upon the region by topics such as the behavior of global inflation, China’s economic adjustments, commodity price outlooks and the importance of a sound Global Financial Architecture.

To address the above questions, the general topic of the 11th FLAR-CAF International Conference on Economic Studies was “China’s economy, global monetary policy and Latin America: challenges for the region’s central banks”.

The conference brought together a prominent group of economic authorities, scholars and representatives from international organizations, who discussed the challenges posed by this matter for the region’s economic policymakers.

A large part of the results of these discussions are collected in this publication, which we hope the readers will enjoy.
Central Banks at the Zero Bound

KENNETH ROGOFF

This talk looks at why advanced country central banks have struggled some much in recent years with the zero bound on nominal policy interest rates, what options central banks have to deal with it, and how the problem has affected emerging markets.

In advanced economies today, interest rates are low across the spectrum from overnight to long term rates. Interest rates for German public debt have actually gone below zero for ten year bonds, and rates are almost as low in Japan. Although ten year rates are higher in the United States, they have still dropped to as low as 1.5% at times, far below the 5% level which would be consistent with 2% expected inflation and a 3% real interest rate. One major factor has simply been the fall in inflation over the past forty years. During the 1970s, US inflation reached 13% while it exceeded 20% in the UK and Japan. Today, many advanced economies struggle to get inflation rates up to their 2% targets. Indeed, over the past few years, investors have even started to lose confidence in central banks’ ability to average 2% inflation over the long term, with ECB long term inflation surveys showing declines for the first time, and US long-term inflation-indexed bonds also showing a dip in inflation expectations.

A second factor has been a generalized decline in long-term real interest rates. The Ten-year real interest rates had been trending down for many years, but following the global financial crisis they took a sharp further drop, falling to roughly -0.5% in the US in 2013, today they are closer to zero. There are many reasons for this decline, including slow expected growth, adverse demographics, a slowing rate of innovation, and a surfeit of excess savings from fast-growing emerging markets that do not have sufficiently developed institutions

and financial markets to absorb the high local savings rates. Another factor which is likely very important is heightened fear of another financial crisis or tail event, which models such as Barro (2007) predicts can dramatically lower the “safe” real interest rate.

Traditional monetary policy stabilization approaches for example the famous Taylor rule, assume that an equilibrium short term policy interest rate (the Fed Fund rate in the United States) is likely something in the neighborhood of four percent. Today, most formulations find a much lower value of 2-3%, or even lower. This makes it very hard to see how the monetary authorities will deal with another deep recession, much less a systemic financial crisis, given that the Federal Reserve has averaged interest rates cuts of 5.5% in post war recessions.

Central banks have tried to mitigate the costs of the zero bound (what to do once interest rates have been cut to zero), but using other methods such as “quantitative easing” and “forward guidance,” but there is general agreement among economists that such measures are weak and quite a poor substitute for normal interest rate policy. Other ideas such as helicopter money, are basically smoke and mirrors, as is shown by Rogoff (2016) who discusses the challenges considered in this talk in much greater detail. Some economists have even suggested trying to raise prices through “negative structural reform”. While clever, these ideas are ultimately dubious and dangerous. Somewhat better is the idea of having central banks raise their inflation targets to 4%, but this too is replete with problems as Rogoff (2016) shows. Foremost among the problems is that a major change in inflation target amounts to an abrogation of a firm commitment central banks have made to targeting 2% inflation, and walking away from this commitment would deal a massive blow to credibility that could take decades to recover from. In addition, there is a concern that over time, a higher inflation target would lead to more frequent price adjustment and greater indexing. This would make monetary policy less effective in normal times; during deep recessions, it might mean that the monetary authorities would need to make much deeper interest rate cuts to achieve the same monetary stimulus, potentially using up the extra “bullets” supposedly gained by having a higher inflation target.

By far the most elegant solution to the zero bound problem would be to make the preparations necessary for effective negative interest rate policy. This requires not only dealing with the problem of paper currency (which pays zero interest), but also making the necessary tax, legal and market changes so that the transmission of monetary policy can be as effective in negative rate territory as positive territory. As Rogoff (2016) shows, there are a variety of
relatively straightforward approaches to achieve this goal and while it helps to eliminate large bills (now mainly used by criminals and tax evaders), it is not at all necessary to have a cashless society. In fact, it is not necessary to affect the use of cash at all. Most of the pushback on effective negative rate policy comes from arguments that are quite superficial and rather easily dismissed. It is important to point out that the early experimentation in Europe and Japan gives little indication how effective negative rate policy would work, for starters because these central banks have not addressed the problem of cash, severely constraining the policy.

The zero bound is problematic for emerging markets first and foremost because it makes advanced country policy significantly less predictable. If the Fed itself does not quite know what to do at the zero bound, or how its instruments work, its reaction function is going to be acutely difficult to predict. Moreover, if advanced economy governments choose negative structural reform to raise prices, then emerging markets may have to content with problems such as increased protectionism.

Unfortunately, the zero bound is not likely to go away anytime soon. It is not possible to institute effective negative rate policy overnight and it may not be possible to do it before the next deep recession, but there are still large long-run potential benefits to trying to address the problem sooner rather than later.
In my talk, I will illustrate points that can be made about what we do not know as well as what we do know about inflation dynamics. There has been a lot of discussion in the last few years about alternative objectives for monetary policy: for example, the US Federal Reserve has a dual mandate that encompasses full employment as well as price stability, and much controversy has swirled around whether monetary policy should also target financial stability. But in my view, price stability is still the predominant, most important goal for Central Banks over the intermediate and longer terms so it is critical to examine the inflation process and how it might have changed after the Global Financial Crisis of 2008.

Price stability—low and stable inflation—is a unique objective for monetary policy and central for good economic performance. However, the actions that Central Banks take, the monetary policy actions, to deliver price stability take a long time to feed through to inflation. So central banks need to understand the process by which their policy actions affect inflation in the long run. It is a complex chain that starts with policy actions leading to changes in financial conditions—changes in exchange rates, stock prices, and interest rates. Those changes in financial conditions in turn feed through to the domestic economy, to economic slack, to the gap between actual output and potential GDP or actual employment and full employment. That slack in turn, along with some global influences, like import prices, and inflation expectations determine inflation. So we absolutely need to understand this process by which Central Bank actions lead to inflation in order for Central Banks to achieve their price stability goals.

1. Senior Fellow, Brookings Institution, and former Vice - Chairman, Federal Reserve.
If you don’t understand or try to short-circuit this process, you can be badly misled. In the spring of 2009 right after the Federal Reserve had begun its large scale asset purchases—QE—at a number of academic conferences, well known economists would put the Fed’s balance sheet, actual and projected up on a slide and say “inflation is coming.” They would assert that there has never been an expansion in a Central Bank balance sheet of this magnitude that has not led to inflation. They were wrong, obviously, because they were not thinking about the channels through which monetary policy works to raise prices, but rather were drawing a mechanical linkage from balance sheet size to inflation.

In my discussion, I will concentrate on issues related to the determinants of inflation through slack, global conditions, and expectations. I will focus on the US economy, because that is my expertise, looking for effects on dynamics of the zero lower bound and the long period of low inflation. I will highlight uncertainties, that is, what we do not know and then think about the policy implications of the changes of inflation dynamics over the last few years.

The Figure 1 is an illustration of what we do not know. These are errors by the participants in Federal Reserve monetary policy meetings in projecting inflation. The top of Figure 1 shows projections of inflation for 2012, where the horizontal axis indicates the date on which the projection was made; for example, January 2010 is the first projection. And the dotted line across the top is actual inflation. At that time and for a year or two thereafter, we participants in Fed monetary policy meetings thought that the large amount of slack in the economy at the depth of the recession would cause much more disinflation that it actually did. So we made persistent errors under-predicting the actual inflation rate; we didn’t see as much disinflation as expected. The bottom of figure shows more recent projections—inflation in 2015—and there, maybe learning too well the lessons of the earlier period, the Fed has been over-predicting inflation on a persistent basis, expecting it to return to its 2% target much more quickly than it has done. The Federal Reserve and a lot of other forecasters were surprised by the drop in inflation between 2012 and 2015, and this just illustrates that inflation dynamics are complex, and not that well understood.

Despite these persistent errors, however, my hypothesis is that while there a lot of the things we do not understand, in the end, there is a core model that works pretty well if you take into account these other things that may be affecting inflation. The elements of that core model are slack, inflation expectations and global dynamics.

I’ll start my discussion of this core model with the amount of slack in the economy and its effects on inflation. The first thing we need to keep in mind is there are no direct measures of slack. That key variable is never observed
in real life. People publish many slack estimates, but it is not something that you can directly verify. For example, you know what the GDP is, more or less, but potential GDP is something you have to estimate. Often those estimates, the amount of slack, are inferred from the behavior of wages and prices. This becomes kind of an endogenous and self-referencing reasoning cycle where if inflation is low or has fallen therefore there must be a lot of slack, then if inflation is coming up slack must be diminishing.

In the first period, between 2010 and 2012, where inflation came in higher than people thought it would, it is a fair presumption that slack was less than thought despite the depth of the recession. That’s because some influences such as the slowdown in productivity growth meant that potential GDP was
not growing as rapidly as anticipated. In addition, people were leaving the labor force more rapidly than expected. So one of the reasons that inflation did not fall as much as we thought it would is because potential GDP and potential labor supply were lower than we thought at the time; there was not as much slack.

An error in the estimation of slack seems less important as a cause of the prediction errors for the second period, between 2013 and 2015 in which the puzzle is why did inflation stay so low. However, under estimation of slack may have played some role. People did make the argument that the regular unemployment rate was not a good measure of slack because broader measures of unemployment that include discouraged workers and some part time workers remained relatively high and wages were very sluggish in picking up. This suggested to some that inflation stayed so low because slack was really larger than it might look like on the surface. However, I am a little skeptical about how large a role this played in this period.

Not only is it important to know what the output or employment gap is, but also how inflation responds to that output or employment gap. In the first period, in particular we saw some non-linearities. When unemployment is high relative to potential, you would expect wages to be very weak. Starting from a period of low inflation and prices not going up very quickly, that might imply a need for nominal wages to fall. We didn’t see that. There is evidence in the US, and I am sure this is true elsewhere as well, that is very hard for employers to actually reduce nominal wages. So wage gains end up piling up at zero; they do not fall as much as they otherwise would. As a consequence, unit labor costs did not decline as much as they otherwise would. Non-linearities of this sort are one way of explaining the under predictions of inflation in the first period and something we need to think about going forward.

The other more general point about the slope of the Phillips curve is that in general, inflation does not seem to be responding to deviations of unemployment from full employment or GDP from potential as much as it used to. Two reasons are given for that. One is that inflation expectations have been exceptionally well anchored. When expectations are not anchored then low inflation can feed into declines in inflation or high inflation can feed increases in inflation much more quickly as those expectations are revised. In the direction of actual inflation.

With regard to expectations, there are some very profound uncertainties, almost profound ignorance, about how they are formed and measured. We know inflation expectations are critical. Certainly in the experience in the United States in the 1970’s high and rising inflation expectations fed an upward infla-
tion spiral that could only be broken by very sharp increases in interest rates. In Japan more recently, deeply embedded very low inflation expectations has made it quite difficult for the Bank of Japan to reach its 2% target.

Inflation expectations are extremely important but I think we do need to acknowledge there is a lot we do not know. The first issue that we must acknowledge is that the most important expectations for us should be the expectations of households and businesses—they are the ones making decisions in the economy about what to do with wages and prices. However, many of our measures are of the expectations of economists for future movements in price indexes. They are not as interesting; economists do not control many resources, they do not make many decisions that count, and they are probably echoing what they hear from the Central Bank. We also have measures of inflation compensation derived from market yield curves, but these conflate expectations with liquidity and term premia. What we really need are the expectations of households and businesses. There are a number of surveys for households, at least in the US, but essentially no surveys of business inflation expectations. We need to do a better job of determining what the expectations of important agents in the economy actually are.

The second issue that we as research economists need to do a better job on is trying to figure out how these expectations are formed: How much weight is put on experience, looking backward on what has happened to inflation and then projecting that into the future? How much weight is put on other factors other than history? For example how does what you think the Central Bank is doing affect your expectations? How about your assessment of where you think the economy is evolving? How forward looking households and businesses are in forming their expectations remains a very open question.

With respect to the effect on expectations of Central Bank actions and words, some evidence suggests that announcements of very aggressive Central Bank actions in the last few years, in the United States, in Europe and Japan, have indeed boosted inflation expectations a little. However, if inflation itself begins to deviate substantially from what the Central Bank says it is going to do, those expectations come back down again. In addition, our understanding of how agents take those expectations and translate them into price and wage decisions is still pretty limited.

Figures 2 and 3 show two measures of inflation expectations. Figure 2 shows 5-Year forward inflation compensation derived from the difference between indexed and nominal bond yields published by Federal Reserve Bank of St. Louis. In Figure 3 we have the University of Michigan long-term inflation expectations from a survey of households. It is remarkable how well both measures...
were anchored in the extremely deep recession and in the initial expansion from the recession in which unemployment came down very slowly and we were constantly disappointed about how the economy was doing. Also notable, however, is the drop-off of measured expectations recently in both of these measures. Some of this can be explained away—especially for the yield curve measure—by a reduction in inflation risk rather than expectations themselves. But it must be of some concern for the Federal Reserve to see these measures of expectations that have looked so anchored begin to tail off recently. I am sure this is something that the Fed will be looking at carefully because keeping expectations anchored has been so important.

![FIGURE 2. 5-YEAR FORWARD INFLATION COMPENSATION](source: Federal Reserve Bank of St. Louis)

![FIGURE 3. UNIVERSITY OF MICHIGAN: EXPECTED INFLATION RATE, NEXT FIVE](source: University of Michigan / Haver)

As I noted at the outset, in addition to expectations and slack in the US, global influences appear to have played a role in the evolution of inflation in
recent years. Longer term global disinflationary forces have been at work over the past fifteen years. Much Chinese and other emerging market labor has been added to the global labor force as these countries more actively participate in trade, greatly increasing the effective global supplies of labor. In some cases, and China is the best example, countries have not allowed the exchange rate to adjust upward as their productivity increased, with the effect that the extra supply of labor has translated into an extra supply of goods and services. These countries have run persistent trade and current account surpluses, supplying more goods and services into the global market than they are demanding from the global market and of course that is helping to put some downward pressure on inflation over time. I think the refusal to allow the exchange rate to adjust and therefore the tendency to run a persistent current account surplus is a more important disinflationary force than the greater labor supply, but both of them are working.

In the intermediate term, since the global financial crisis, we have a couple of additional global forces working on inflation. One is the commodities cycle. In the initial period after the GFC, one reason inflation stayed higher than the Fed and others expected - even core inflation - was because commodities prices were rising rapidly under the influence of Chinese demand. More recently of course those prices have fallen substantially. Although energy prices, food prices are excluded from core measures of inflation, they feed through in various indirect ways. So the ups and downs of the commodities cycle help to explain some of those misses that we saw in the projections of core inflation.

Another important influence has been weak global growth. There has been some research effort to show that slack in the global economy has had an appreciable effect on inflation in local national economies. Most of the research done since this hypothesis was first put forward - about ten years ago - has shown that if there is an effect, it is pretty weak and that the most important thing is slack in your domestic economy; slack in other economies might play a marginal role but not the main role. Still, when the whole world seems to be experiencing disinflation, it is likely to be harder to raise inflation in any particular country or currency area.

The last intermediate term global influence on the US is exchange rate pass-through. This can be really important in the short run, even in the United States where trade is not that large in GDP but where there was a major increase of around 20% on a trade-weighted basis in the dollar from mid 2014 through to late 2015. Even for an economy like the US that is not very open, a movement of this size is an important influence on import prices and on core inflation through imports. Economists have attributed about 0.4 of the recent...
short fall of inflation from the Fed’s 2% target to the effects of import prices and the feed through of energy prices. The key point on both the commodity cycle and the exchange rate pass-through is that these are level adjustments, not lasting changes in inflation rates when expectations are anchored; commodity prices will not go up forever and they will not go down forever; the exchange rate is not going to go up forever, and it is not going to go down forever. These are changes in price levels. Obviously, the change itself has a short run effect on inflation but if it does not feed through to inflation expectations, it should not have an effect on inflation over the intermediate term.

To test the relative importance of global and local influence on inflation, Mark Carney in his presentation at Jackson Hole in 2015, looked at rolling fifteen-year pairwise regressions of headline and core inflation for OECD countries but also including some emerging market economies. That is shown in figure 4. In the last five or seven years, core inflation correlations are pretty low. To extend that analysis I did pairwise regressions just for the OECD and on a five-year moving average to 2016; and the results are shown in the Figure 5. The correlations of headline inflation across countries have been very high through this commodity cycle. However, this correlation of headline inflation really has not fed through to core inflation very much. You can see a tendency in the past when headline correlations rise, core inflation correlation tends to rise and when headline correlations fall, core inflation correlation tends to fall, but the rise in headline inflation with the commodity cycle in the past few years has not been reflected in a rise in core inflation correlations of late.

**FIGURE 4. INTERNATIONAL SYNCHRONIZATION OF INFLATION**

![Graph showing international synchronization of inflation](image)

Source: OECD, Global Financial Data, DataStream, national sources and Bank Staff calculation. Notes: Average pairwise rolling (15 years) correlation of seasonally adjusted quarterly headline and core inflation. The country specific average pairwise correlation of a time series $x_i$ in a country $i$ ($\rho_{ij}$) is the average of the contemporaneous correlation between $x_i$ and $x_j$ for all $i \neq j$. The average pairwise correlation is computed ($\rho$) as the average $\rho_{ij}$ across all countries and, as such, provides a measure of international synchronization of $x$. 
Correlation

What I take from this is that countries can control their inflation fate. Each country, each currency area can ultimately determine its own inflation—provided it allows its currency to adjust or is willing to put substantial controls on capital flows, with all the cost that entails. You cannot have all three of a fixed exchange rate, free flow of capital and control over your own inflation, but you can control your own inflation if you are willing to allow exchange rates to fluctuate.

Let us think about the implications of our discussion so far for monetary policy. Perhaps the first and most important implication is humility. We need to admit what we do not understand; even in the stable great moderation times of the 80’s and 90’s and early 2000’s, our Phillips curve models at the Board could explain only about 25% of the change in inflation. So even in the most stable times, we could not explain 75% of the change in inflation, and of course the last few years have been far from stable times. We have examined questions about how much slack there is, how expectations are formed, what expectations are, and how they feed through to inflation. We have discussed the potential impact of global disinflation on national outcomes. We are at an uncharted waters economically, for our understanding of both economic growth and inflation.

This degree of uncertainty only heightens the challenge for policy makers of taking incoming information and sorting the signal from the noise—estimating to what extent data surprises suggest a new read on underlying fundamentals and to what extent they are just noise. When it looks like you are overreacting, taking every piece of incoming information as a huge signal, you are at risk of overreacting and confusing people. There is a sorting process that needs to happen. Still, for all the uncertainties, I think the basic model of inflation
causation relying mostly on slack and expectations as well as one-time level influences still works pretty well and I take some signal in that regard from the recent experience of the US.

Figure 6 shows the unemployment rate in the US, which has come down substantially. Figure 7 plots core inflation relative to the Fed’s 2% target. There is the surprise disinflation in 2015, reflecting in large part the drop in energy prices and the rise in the dollar. Now in 2016 as energy prices have stabilized, and the dollar is no longer rising so rapidly, and there is much less slack, core inflation is going up. In sum, the unemployment rate is down close to where the Fed thinks the full employment rate is and core inflation is going up—just as the basic model would predict.

There are many things that happen that we do not understand but I think we still have enough of an understanding to make broad policy calls off this model, even if we need to adapt to surprises that come along.

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**FIGURE 6. U.S. UNEMPLOYMENT RATE**

Source: BEA via St. Louis FED. Note: Seasonally adjusted.

**FIGURE 7. U.S. CORE PCE INFLATION RATE**

Source: BEA via St. Louis FED. Note: Seasonally adjusted.
What about the implications for monetary policy? One of the implications people have taken from the flattening of the Phillips curve, the fact that inflation has been less responsive to changes in unemployment, is that the cost of overshooting on the unemployment side is not going to be that large in terms of higher inflation.

So Why not go for it? It is true that when inflation is below the target, there is very little cost of overshooting a bit on the slack side. That will just get inflation back on target more quickly. But, the implication of the flat Phillips curve also is that if you overshoot on inflation, it is going to take a big increase in the unemployment rate to get inflation back down. Unless there are some non-linearities that can be identified, policymakers need to think carefully about overshooting inflation targets significantly to facilitate a large drop in unemployment. To get inflation back down to target could well take a wrenching adjustment in the economy and a large increase in slack. Policymakers need to think about both sides of this equation.

The other implication from the recent period is to underline the critical role of expectations. Anchored inflation expectations allow countries, monetary authorities and treasuries to allow their exchange rates to be flexible and their monetary policies to vigorously pursue bringing inflation up to target and activity to potential. Keeping expectations anchored at the Central Bank’s target and bringing actual inflation up to target will eventually allow nominal rates to be somewhat higher than they have been recently and give Central Banks room to maneuver.

At the same time, the importance of keeping expectations near the target reinforces the idea of an asymmetrical loss function when inflation is low—working extra hard to bring it up. That is, if expectations come down to below target, it will be difficult to reverse that decline when there is limited room for maneuver at the zero lower bound for interest rates. If inflation rises and exceeds target, even if expectations exceed target, a central bank can always bring that back down with higher interest rates. So anchoring expectations is a very good reason for being quite adverse towards missing inflation on the downside, being very aggressive and trying to get inflation back up to target as quickly as possible consistent with macroeconomic stability.

Is there a role for policy rules in reaching inflation targets? I think that the changes we have seen in the economic environment, the decline in the real funds rate, the drop real policy rates to very low levels, the unexpected global developments and their effects on inflation, suggest that it would be very difficult to run good, effective, policy by rule. A central bank can be systematic in its response to new developments without necessarily following a rule; and it
would be very hard to find a rule with predetermined parameters that would be robust to all these changes in the economic environment. So I am somewhat skeptical that using specific rules would improve economic outcomes. We just don’t know enough about economic relationships to tie the central bank’s hands in this way.
The Fed-ECB Policy Divergence: 
Causes and Consequences

ATHANASIOS ORPHANIDES¹

I appreciate the opportunity to contribute to the discussion on the de-synchro-
nization of global monetary policy at the FLAR/CAF conference and would 
like to thank the organizers for the invitation. Within the broader theme, I will 
focus on the Fed-ECB policy divergence, its causes and consequences. My plan 
is to highlight the apparent role of the continuing mismanagement of the euro 
area crisis for this divergence which appears intimately related to fundamental 
political problems in Europe that are likely to persist for some time. In my view, 
these difficulties represent one of the key global risks today.

The unusual policy divergence in Fed and ECB policy has been clearly evi-
dent in the interest rate policy of the two central banks since December of last 
year. In the past, the interest rate policy of the two institutions was broadly syn-
chronized, as can be seen in Figure 1 which offers a comparison since January 
1999—when the euro was introduced and the ECB started formulating policy 
for the euro area as a whole.

In decisions taken within two weeks of each other in December 2015, the 
Federal Reserve raised the federal funds rate for the first time since the Global 
Financial Crisis while the ECB moved in the opposite direction. The two cen-
tral banks announced, respectively:

*European Central Bank (3 December 2015). “[A]s regards the key ECB interest 
rates, we decided to lower the interest rate on the deposit facility by 10 basis 
points to -0.30%.”*

*Federal Reserve (16 December 2015). “[T]he Committee decided to raise the 
target range for the federal funds rate to ¼ to ½ percent.”*

¹. Professor of the Practice of Global Economics and Management at the MIT Sloan School of Management, former Se-
nior Adviser at the Federal Reserve Board and former member of the ECB Governing Council.
This marked the start of a divergence in interest rates that is likely to persist for some time.

These policy decisions have broader implication for global financial markets. Figure 2 shows a comparison of the 10-year bond yield for the United States and for Germany, which serves the role of a benchmark for the euro area. As can be seen, while these two yields were not very different from each other during the first decade after the creation of the Euro in 1999, there has been a notable divergence in the last few years. This divergence in long-term yields relates to the causes of the current ECB-Fed divergence and I believe will stay with us for some time as well.

When did the actual policy divergence begin and what is its underlying cause? Although the divergence has been noted and discussed widely since December 2015, in reality it started long before then but was not visible in
policy interest rates because short-term rates have been constrained by the zero lower bound.\(^2\)

Because currency notes earn a nominal return of zero, interest rates on deposits and other financial instruments cannot have a return that is systematically considerably below zero. Consequently, as long as zero-interest-rate bearing currency is widely available, central banks cannot guide short-term nominal interest rates much below zero. (Somewhat negative interest rates are possible and the ECB has pushed interest rates somewhat below zero, as can be seen in Figure 1. By contrast the Fed has kept interest rates slightly above zero.)

Following the Great Financial Crisis of 2008, the Federal Reserve and the ECB reduced interest rates considerably but the zero lower bound posed a constraint on the degree of monetary accommodation that could be achieved just with reductions in short-term interest rates. Additional policy accommodation was needed. This could be achieved by other means that reduce longer-term interest rates and the cost of financing for firms and households in the economy. At the zero lower bound, one way this additional monetary policy accommodation can be achieved is by quantitative easing—that is by expanding the balance sheet of the central bank. This can be done through direct purchases of assets such as long-term private-sector and government bonds or through the provision of multi-year liquidity to the banking system at favorable terms, which can be used for asset purchases and/or lending at favorable terms.

The specifics of how balance sheet expansion provides additional policy accommodation at the zero lower bound may differ from one central bank to another due to differences in the legal framework of the central bank and the structure of the financial sector. For example, the Federal Reserve is only permitted to engage in purchases of government or government-guaranteed securities and cannot purchase private-sector assets. In contrast, the ECB can include corporate debt and other private-sector assets in its purchases but is hampered by the lack of homogeneity in the financial sector across member states and political sensitivity related to the purchases of government debt.

Regardless of the specifics, the size of the balance sheet of the central bank becomes a useful a summary indicator of the degree of additional policy accommodation provided at the zero lower bound. Other things equal, the more assets purchased (and the more liquidity provided) the more accommodative policy becomes, while short-term interest rates may stay unchanged at zero (or slightly above or below zero). To be sure, the size of the balance sheet is not a sufficient indicator of policy accommodation at the zero lower bound, much like the over-

\(^2\) See Orphanides (2014, 2016) for earlier discussions of policy options at the zero lower bound in the context of the Fed and ECB policies of the past few years.
night interest rate is not a sufficient indicator for monetary policy conditions under normal circumstances. But it remains a very useful summary indicator, much like the overnight interest rate is when we are away from the zero lower bound.

Figure 3 presents a comparison of the balance sheet of the Federal Reserve and the ECB from 1999 until the latest month available. As can be seen, before the crisis the size of the balance sheets were fairly stable. The balance sheet of the Federal Reserve was kept nearly constant while that of the ECB exhibited a slight upward trend. After September 2008, a substantial increase in the size of the balance sheets can be seen for both institutions. This reflects decisions regarding both crisis management and monetary policy. But the increases were not uniform. From 2012 on, a peculiar divergence is observed, a divergence that warrants discussion in greater detail.

![Figure 3. Size of Balance Sheet, in Dollars/Euro, Respectively](image)

It is useful to organize the discussion of the balance sheet policies of the ECB and the Fed since the crisis started in 2008 into three phases.

The first phase from 2008 to mid-2012 was a period in which both central banks increased their balance sheets by comparable amounts (measured in dollars for the Fed and in euro for the ECB). In terms of the monetary policy implications of their balance sheet policies, policy was expansionary at both institutions.

The second phase, from mid-2012 to the end of 2014, was a period of dramatic divergence in the balance sheet policies of the Fed and the ECB. Indeed, this is the difference to which the current divergence that has been observed in interest rates can be attributed to. In this period the Fed engaged in an open-ended expansion of its balance sheet, which earned the moniker “QE-infinity” by some critics. The expansion was open-ended in the sense that the Fed had announced it would continue expanding its balance sheet until accommodation was judged
sufficient to raise inflation and restore growth, in line with the Fed’s objective.
The program, which ended at the end of 2014, represented a massive expansion
of the Fed’s balance sheet from about three trillion dollars to about four and
half trillion dollars. At the same time, the ECB was effectively tightening policy
by bringing down its balance sheet from about three trillion euro to about two
trillion euro—a dramatic reduction. The ECB tightening in this period proved
to be a major policy mistake and is ultimately behind the policy divergence that
has been observed more recently, as will be detailed below.

The third phase is the period we observe since early 2015. In this phase, the
Fed has been preparing and implementing a tightening of monetary condi-
tions, a normalization of monetary policy. The Fed announced it would keep
its balance sheet roughly unchanged while tightening policy conditions by rais-
ing interest rates and started raising rates in December 2015. By contrast, since
early 2015, the ECB has been engaged in a partial correction of the tight policy
it had adopted in the 2012-2014 period. The ECB announced it would start
quantitative easing in January 2014 and ECB QE has been in effect ever since.
Unfortunately the ECB’s program has been quite timid and insufficient to cor-
correct its earlier policy mistake. As can be seen in Figure 3, despite the ECB’s
policy reversal, the size of the ECB balance sheet has remained below its mid-
2012 peak until very recently.

Over the next few quarters, as the Federal Reserve normalizes policy further,
we are likely to observe that the ECB will try to continue to catch up in a partial
way. The dynamic that has been responsible for that divergence is likely to stay
with us in the meantime.

To understand how miscalibrated ECB policy has been in recent years, rela-
tive to Fed policy, one needs to examine the evolution of inflation and indica-
tors of real economic activity. Figure 4 compares Headline Inflation for the
two economies: the United States in black, the Euro area in blue. The figure
shows the PCE index that the Federal Reserve has adopted during the crisis as
its benchmark for its inflation target of 2% and the HICP index which the ECB
uses for its definition of price stability in the euro area. The ECB announced
in 2003 that it aims to maintain inflation in the euro area, as measured by the
HICP, “close to but below 2%”. This is virtually the same as the Fed’s although
not exactly identical. A more precise comparison would use 1.9% as the infla-
tion objective for the ECB and indeed modeling exercises, including by ECB
economists, sometimes describe the ECB in terms similar to an inflation tar-
geting central bank with a 1.9% inflation target, rather than the 2.0% inflation
target that is more suitable for describing the Federal Reserve.
In short, the Fed and the ECB have very similar price stability objectives and indeed from 1999 and until the last few years the inflation outcomes for the two economies have been roughly similar with average inflation around 2% in both economies. However, since 2013 or so, a divergence in inflation outcomes is observed. Inflation in the euro area has been systematically below inflation in the US, while both have been below the goals corresponding to the price stability targets of the two central banks.

The divergence in inflation performance is not very clearly visible in Figure 4 due to the influence of energy prices in the headline indexes. Large fluctuations in energy markets, e.g. the price of oil, shown in Figure 5, introduce noise and complicate the reading of the underlying rate of inflation that is more directly relevant for evaluating the stance of monetary policy. In the last two years, in particular, low oil prices have depressed headline readings of the rate of inflation.
To account for the volatility in energy prices and allow for greater clarity, Figure 6 shows a comparison of core inflation measures in to the Euro Area and the United States. As can be seen, while the Fed has struggled somewhat longer than had been anticipated to raise inflation close to its objective, it has managed to bring core inflation relatively close to 2%. By contrast, the ECB has been running a policy that has systematically kept core inflation below 1% for the past three years, considerably below its definition of price stability. This is the longest period the ECB has failed to meet its primary objective since it started setting policy for the euro area as a whole in 1999.

Policy that systematically delivers inflation outcomes below a central bank’s objective is by definition too tight. However, since policy operates with a lag, unanticipated shocks may be responsible for keeping inflation below a central bank’s inflation objective for a few quarters even if policy is calibrated with the intention to achieve the desired objective. In this case, even though policy may appear to have been too tight ex post, its setting may have appeared to be appropriate, with the information available when policy was set. To account for this possibility, it is useful to also examine inflation forecasts, in addition to the evolution of actual inflation.

Table 1 shows the inflation forecasts of euro area inflation, published by the ECB from September 2013 to December 2014—that is in the six quarters before the introduction of QE. Each row in the first column of the table shows the month in which the forecast was made. The last three columns show the forecast for inflation for 2014, 2015 and 2016, as available.
The table suggests that in addition to actual inflation, as shown in Figures 4 and 6, inflation forecasts were also systematically below the ECB’s definition of price stability during this period. Consider the evolution of inflation forecasts for 2016 during 2014—the four forecasts published from March 2014 to December 2014. These would be forecasts at approximately a 2-year ahead horizon, which captures the transmission lag of monetary policy. If forecasts at this horizon are close to the central bank’s objective, it could be argued that policy is consistent with the central bank’s inflation objective. During 2014 inflation was too low and the ECB was effectively tightening policy by shrinking its balance sheet at a significant pace. This could have been justified if the inflation forecasts suggested that inflation was likely to overshoot the ECB’s objective. But the table suggests exactly the opposite. In March 2014, the forecast for inflation in 2016 was merely 1.5% and as the year progressed, and while the ECB kept tightening policy, the forecast for inflation in 2016 deteriorated to 1.4% in June and September, and then to 1.3% in December 2014. Indeed, the forecast published in December 2014, with inflation forecast to be merely 0.5% for 2014, 0.7% for 2015 and only 1.3% for 2016 suggested that the ECB was nowhere close to meeting its price stability objective and confirmed that policy had become extremely tight. Remarkably despite publishing these forecasts that were further and further away from the ECB’s definition of price stability, the ECB decided not to do anything meaningful to correct its inappropriately tight policy stance.

The ECB was aware that additional easing was needed and had communicated that easing actions were under consideration throughout the year 2014. As early as Summer 2014, it was signaled that additional accommodation would be delivered if inflation forecasts stayed too low, but no meaningful easing action was taken, not even in December 2014, despite the forecasts that were published. A remarkable lack of urgency.

The question is why? What is it that could be causing an independent central bank with a single primary mandate, to behave in this way? Unfortunately,

<table>
<thead>
<tr>
<th>Forecast Date</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
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<tbody>
<tr>
<td>September 2013</td>
<td>1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 2013</td>
<td>1.1</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>March 2014</td>
<td>1.0</td>
<td>1.3</td>
<td>1.5</td>
</tr>
<tr>
<td>June 2014</td>
<td>0.7</td>
<td>1.1</td>
<td>1.4</td>
</tr>
<tr>
<td>September 2014</td>
<td>0.6</td>
<td>1.1</td>
<td>1.4</td>
</tr>
<tr>
<td>December 2014</td>
<td>0.5</td>
<td>0.7</td>
<td>1.3</td>
</tr>
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this is where euro area politics comes into play, providing a stark illustration of the causes of the overall mismanagement of the euro area crisis. Recall that the euro area is not a single sovereign state but is rather a monetary union of multiple sovereign states without a common government and without any political leadership that can take decisions in the best interest of the euro area as a whole. The ECB does not have a fiscal counterpart for the euro area as a whole but rather it faces multiple governments each with its own objectives. And during the crisis, the governments of some member states have managed to leverage their positions to guide policies in a manner that serves their own interests, rather than the interests of the euro area as a whole. As an example of some of the arguments that might have influenced policy decisions during 2014, consider two statements made by a member of the ECB Governing Council following the December 4, 2014 policy meeting, as reported by Carrel, O’Donnell and Martin (2014) in Reuters the following day:

“We have a monetary policy that is too expansive for Germany.”
“Extremely low interest rates caused countries’ willingness to implement structural reforms to tail off.”

Given that the ECB by law is supposed to be formulating monetary policy for the euro area as a whole, someone could consider that a statement like the first one may be problematic. While it is true that Germany is the largest euro area member state, and while it may have been true that policy was too expansive for Germany, this should not have been a factor under consideration since the mandate of the ECB is to maintain price stability for the euro area as a whole and policy was too tight to meet the ECB’s mandate for the euro area as a whole.

The second statement, is more frightening. This is an argument that has been frequently articulated in Europe over the past few years. It is an argument that there is moral hazard involved in what governments are doing and that perhaps independent institutions should take it upon themselves to implement policies to reduce that moral hazard. Rather that ease policy to meet the ECB’s mandate, this argument could be read as suggesting that policy should have stayed deliberately too tight so as to force some of the governments in the euro area to adopt structural reforms that the ECB (or perhaps some other governments) might have considered desirable.

To understand the force of such arguments, it is useful to recall what the state of the real economy has been in the euro area since the Global Financial Crisis in 2008 and also since that crisis morphed into the euro area crisis in
2010. Figure 7 shows a comparison of the unemployment rate in the euro area and the United States. For the euro area as a whole, the unemployment rate is still above 10%—it is still above the level it had reached after the recession that followed the Global Financial Crisis. This reflects a terrible situation, indicative of macroeconomic mismanagement. To be sure, and I want to be clear on this point, most of this damage has been caused by the inept handling of the crisis by euro area governments. Fiscal policy had been inappropriately tight, overall, and worse, government decisions impaired the functioning of the banking system, stifling growth. That said, all policies have consequences for the real economy, including monetary policy. While it may be difficult to assess how much, the ECB’s inappropriately tight monetary policy has been one of the drivers of the bad state of the overall performance of the euro area economy.

![Figure 7. U.S. Core PCE Inflation Rate](image)

Returning to the statement that the monetary policy of the ECB is too expansive for Germany, is there a way we can evaluate the rationale for these considerations, to try to understand what may have been driving decisions? Indeed, motivated by this statement, perhaps a better way to understand ECB monetary policy would be to separate the euro area into two pieces: Germany and the rest. Figure 8 compares the unemployment rate for the euro area (shown in blue) to these two components: Germany, shown in yellow, and the remainder, shown in red. The figure provides a graphical summary of how dramatic the situation has become in the euro area since the crisis started. Before the crisis, there was no major divergence in the real economy in Germany and the rest of the euro area. And the estimates of the natural rate of unemployment were fairly similar for the rest of the euro area and for Germany, roughly around 9%. However, since the crisis, the mix of fiscal, monetary and other
policies has been such that German unemployment has consistently declined, while the rest of the euro area has experienced a very deep slump. The unemployment rate in Germany is currently unprecedentedly low, even below that of the United States. Clearly, by this standard, monetary policy has been too accommodative for Germany. At the same time, the figure highlights the drama in the rest of the euro area and is indicative of the malfunction of the euro area. Excluding Germany, the unemployment rate in the remainder of the euro area is still above 12%.

What about inflation? By comparing inflation forecasts, we can get a sense of the relative degree of accommodation for the different segments of the euro area. Conveniently, the Deutsche Bundesbank, has been publishing analysis that permits comparisons of inflation forecasts for Germany and the rest of the euro area twice a year, in June and December. Figure 9 presents the pertinent forecasts, reproduced from the Bundesbank Bulletin for June 2014 and December 2014. These forecasts are comparable to those published by the ECB for the euro areas as a whole, shown in Table 1. It is quite clear from the forecasts published by the Bundesbank why in 2014 there would have been a concern that would have justified a policy tightening rather than an easing. Focusing on the left side of the figure, the June 2014 forecast, and checking the forecast for 2016, we see that inflation excluding energy for Germany was forecast to exceed 2%. Clearly policy was too accommodative for Germany. For the rest of the euro area, on the other hand, the inflation forecast excluding energy was too low, it was below 1.5%.
In December 2014, the forecast for HICP inflation excluding energy for Germany was 2%, which, strictly speaking, is above the “close to but below 2%” goal for the euro area as a whole. Even though the forecast for inflation for the rest of the euro area remained far below the level consistent with the ECB’s definition of price stability, in December 2014 again monetary policy was too accommodative for Germany.

In light of the dramatic situation in the euro area as a whole, and despite policy being too accommodative for Germany, the ECB finally decided in January 2015 to embark on a policy of quantitative easing and avoid the continuing deterioration of the outlook for inflation for the euro area. Unfortunately, the policy adopted proved too timid. Examining the evolution of inflation forecasts published by the ECB since that policy decision provides a summary evaluation.
TABLE 2. INFLATION PROJECTIONS AFTER ECB QE (%)

<table>
<thead>
<tr>
<th>Forecast Date</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 2015</td>
<td>1.5</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>June 2015</td>
<td>1.5</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>September 2015</td>
<td>1.1</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td>December 2015</td>
<td>1.0</td>
<td>1.6</td>
<td>1.4</td>
</tr>
<tr>
<td>March 2016</td>
<td>0.1</td>
<td>1.3</td>
<td>1.6</td>
</tr>
<tr>
<td>June 2016</td>
<td>0.2</td>
<td>1.3</td>
<td>1.6</td>
</tr>
</tbody>
</table>

As shown in Table 2, after the QE program started, the outlook of inflation, which reflected the additional accommodation, improved. The March 2015 and June 2015 forecasts showed inflation rising to 1.8% during 2017, suggesting satisfactory progress towards meeting the ECB’s mandate. However, subsequent outcomes on inflation during 2015 were below expectations and inflation forecasts for 2016, 2017 and 2018 were once again revised significantly downward, suggesting that policy remained too tight.

In March of this year, the ECB adopted a set of decisions that once again indicated willingness to correct its policy setting. An impressive mix of policy measures was announced. These included further interest rate cuts into negative territory and a slight further expansion of the balance sheet, which included for the first time purchases of corporate debt. They also announced an interesting new policy, unprecedented in central banking, at least in the developed world: The ECB would plan to provide long term liquidity (for four-years) to banking institutions at a subsidized and potentially negative rate. The ECB announced it would be providing this liquidity at a negative rate as long as banks in the euro area could show that they used the liquidity to expand lending. The implementation details have not yet been announced but if this policy is implemented correctly it could be incredibly powerful.

However, after the March 2016 ECB decisions, there was a remarkable response directly from Berlin attacking the central bank. Murphy, Carrel and MacSwan (2016) reported in Reuters the first part of this attack on April 8, 2016:

“What the European Central Bank is doing now is for many savers, for little people, for workers, for pensioners, an expropriation, but it is not the ECB’s fault”, Gabriel, who is also Germany’s vice chancellor, said on a visit to Vienna.

On the following day, April 9, 2016, Bentzien, Fairless and Thomas (2016) reported in the Wall Street Journal the second part of this attack, this one from the Finance Minister, blaming the ECB for the rise of the popularity of an opposition party in Germany:
Mr. Schauble also laid part of the blame for the rise of the populist Alternative for Germany at the ECB’s door. . . . “I said to Mario Draghi . . . be very proud: you can attribute 50% of the results of a party that seems to be new and successful in Germany to the design of this [monetary] policy,” Mr. Schauble said.

Despite the fact that the ECB has been implementing a monetary policy that according to the data is more ideal for Germany than for the euro area as a whole, attempts to correct the policy stance to make it somewhat more appropriate for the euro area as a whole incited accusations from Germany that the ECB is “expropriating the little people” and working against the interests of the German government. This illustrates the very difficult political environment in which the ECB needs to operate.

Based on the latest projections, published in June 2016, it is clear that additional monetary policy accommodation would be desirable for the euro area as a whole. The ECB did not take action in its latest meeting in July. I believe that we can expect a little bit more easing by the ECB in September. Unfortunately for the global economy, despite the partial correction to its policies, the ECB remains massively behind the curve. As the Fed prepares for further policy tightening, the ECB needs to consider easing policy just to catch up, and make up for the unfortunate policy tightening engineered by shrinking its balance sheet from mid-2012 to the end of 2014. In my view it would be appropriate for the ECB to at least close the gap that was allowed to open between the size of the balance sheet of the ECB and the Federal Reserve (Figure 3). By this comparison, the ECB has been a couple of trillion euro behind. The faster the ECB moves in that direction the better.

As long as the ECB appears to be politically constrained and behind the curve, the divergence in monetary policy will continue and the euro area will remain a major global risk.

REFERENCES


China’s Economy and Financial Markets: Reforms and Risks

ESWAR S. PRASAD

This note presents my views on the status of market-oriented economic reforms in China, with particular emphasis on financial market reforms and capital account liberalization, along with a discussion of the risks the economy faces.

These developments have taken place against the backdrop of a challenging domestic environment. Over the past year, China’s GDP growth has slowed significantly, producer prices continue to fall, and various other indicators of economic activity have weakened, including growth in industrial production, investment, and imports. However, the most recent data on GDP growth as well as industrial and services sector activity suggest that the economy has stabilized. Still, some further macroeconomic stimulus might be necessary to hit the government’s growth target of 6.5%.

On a more positive note, there has been some progress over the last 2-3 years on growth rebalancing, an important objective of the 12th five-year plan. The consumption to GDP ratio has gone up slightly, the service sector’s share in the economy has risen to over 50 percent, and the household saving rate has declined. China’s current account and trade surpluses have declined from their levels in 2007, although the merchandise trade surplus has climbed back to nearly 6 percent of GDP in the last half of 2015.

CAPITAL ACCOUNT LIBERALIZATION

China still has an extensive capital control regime in place, but it is selectively and cautiously dismantling these controls. In most cases, constraints on capital

1. This note is based on written testimony I provided to the U.S.-China Economic and Security Review Commission at a hearing on “China’s Thirteenth Five-Year Plan” held in Washington, DC in April 2016. It also draws on my report entitled “China’s Efforts to Expand the International Use of the Renminbi,” Brookings Institution, February 2016. Please see that report for more detailed analysis, data, and documentation of sources.
2. Tolani Senior Professor of Trade Policy, Dyson School, Cornell University Senior Fellow & New Century Chair in International Economics, Brookings Institution.
inflows and outflows have been loosened but not eliminated. Nevertheless, the country’s capital account is becoming increasingly open in de facto terms.

China’s government has created a number of schemes that allow for controlled and calibrated opening of the capital account to both inflows and outflows. These schemes have been designed to generate many of the indirect benefits of financial openness (such as domestic financial development and international portfolio diversification) while enabling freer movement of capital.

Rising foreign investments by Chinese households, corporations, and institutional investors have led to major changes in the pattern of China’s overall exports of financial capital. The composition of gross outflows has shifted markedly from reserve accumulation to official and unofficial flows due to both the private and state sectors.

The objective of “foreign exchange holdings by the people” (rather than the central bank) will have a significant impact on the composition of future capital outflows from China. While the government is providing channels for international portfolio diversification, which is a positive development, there is a risk that lack of effective oversight of domestic securities markets and institutional investors that enable such diversification could portend risks for household and corporate balance sheets.

THE EXCHANGE RATE REGIME

China has continued to move gradually—and at least in principle—towards a more flexible market-determined exchange rate. On August 11, 2015 the People’s Bank of China (PBC) changed the reference pricing mechanism for the onshore CNY-dollar exchange rate, whereby the PBC sets the opening price for trading on the Shanghai China Foreign Exchange Trading System (CFETS) each morning. The reference price is no longer delinked from the previous day’s closing price although, with RMB trading now taking place in markets such as London that are in other time zones, the two prices need not necessarily be the same. This policy change was combined with a 1.9% devaluation of the RMB relative to the dollar. On December 11, 2015, the PBC indicated another change in policy, posting on its website an article indicating that the CFETS would begin publishing a set of trade-weighted exchange rate indexes.

From August 2015 until January 2016, there was substantial downward pressure on the RMB. China’s foreign exchange reserves, which peaked at nearly USD$4 trillion in June 2014, fell to about USD$3.2 trillion by January 2016. Since then, the pressure appears to have eased and the stock of foreign exchange reserves has stabilized. However, there is still a lack of clarity about
the precise nature of China’s exchange rate policy, with PBC officials stating only that the value of the RMB is determined by supply and demand, with the PBC also striving to manage the currency’s value “with reference to” a basket of currencies.

FINANCIAL SECTOR DEVELOPMENT AND REFORMS

China’s financial system remains bank-dominated, with the state directly controlling most of the banking system. Recognizing the importance of a better financial system for an improved allocation of resources within the economy, the Chinese government has instituted a number of reforms in recent years.

Bank deposit and lending rates have now been fully liberalized. Commercial banks can now set these rates freely, although the PBC still sets reference rates to guide banks. An explicit bank deposit insurance program has been in operation since May 2015. This program is intended to expose banks to some degree of market discipline by replacing the implicit full insurance of all deposits by the government. The system also allows for early intervention by the banking regulator and has an improved resolution mechanism for failing banks. Since the system is relatively new, there have been no test cases as yet.

These reforms are important steps in the right direction. Future reforms and development of the banking system will have significant implications for the development of China’s more nascent financial markets, including the corporate bond market and also for economic development more broadly.

In particular, China’s aspirations to make the renminbi a global reserve currency rest in large part on the pace of development of its fixed-income markets. Reserve currency economies are expected to issue high-quality and creditworthy government debt or government-backed debt instruments that can serve to hedge against foreign investors’ domestic currency depreciation during a global downturn.

China’s fixed income markets, especially for corporate debt, have developed considerably in the last few years. The stock of government bonds stands at about USD$3.5 trillion. Nonfinancial corporate debt was practically non-existent a decade ago, but the outstanding stock has now risen to about USD$1.5 trillion. Turnover, a measure of trading volume, remains quite low in both markets, however. China has recently lifted restrictions on foreign investors’ participation in its bond markets, which should improve both the depth and liquidity of these markets over time.

China’s financial markets have improved in some respects during the last decade, but there are still significant gaps, especially in terms of achieving suf-
iciently large and liquid debt markets. More importantly, the structure and quality of debt markets will also need to be improved to fully prepare for a currency used widely in international financial transactions and reserve holdings. With relatively low external and government debt positions, China's debt markets can in principle expand rapidly without serious threat to inflation credibility or vulnerability to external risks. Effective regulation of corporate debt markets is an important priority, so these markets can expand without generating financial instability.

ECONOMIC AND FINANCIAL RISKS

The Chinese economy faces risks in several categories. The first is related to capital account liberalization and the possibility of a surge of capital outflows. The second is a set of concerns specifically about China's financial system. The third set of risks is related to more fundamental aspects of China's policymaking.

The Capital Account
Allowing for the free flow of financial capital has been an important element of the plan for increasing the RMB's international stature. However, many developing economies have faced crises when they opened up their capital accounts without having a market-determined exchange rate and a well-functioning financial system.

An analysis of China's external balance sheet, i.e., its international investment position, suggests that the economy faces only modest direct risks from a more open capital account. Foreign direct investment and portfolio equity together account for 70% of China's external liabilities. This structure of liabilities is safer than one dominated by foreign currency debt.

China has traditionally had a low level of foreign currency external debt, which amounted to about USD$800 billion or 7 percent of GDP in 2015, a lower ratio than virtually any other major emerging market (total external debt, including debt denominated in RMB, was USD$1.5 trillion). The stock of foreign exchange reserves, which was USD$3.2 trillion in February 2016, is sufficient to meet all of these debt obligations.

China's approach to capital account liberalization has allowed it to retain some control over capital flows. The schemes the government has put in place allow it to control the volume of flows in both directions and, to a significant extent, the composition of flows as well. However, trying to maintain a gradual approach to freeing up the exchange rate while opening up the capital account can create tensions that show up in large and volatile movements of capital.
Capital Outflows and Capital Flight

Capital flow surges in one direction or another can be exacerbated if the exchange rate is not allowed to adjust freely, and speculative pressures on the currency start building up. Illicit capital flows are a particular concern for financial stability as they bypass traditional channels that the government can control. One widely used proxy measure for such flows is net errors and omissions (NEOs), which is the residual in the balance of payments accounting and reflects unrecorded capital account or current account transactions. Negative NEOs typically reflect money leaving the country through unofficial channels. China’s NEOs have been persistently negative since 2009.

Although a full-blown capital flight crisis seems unlikely, particularly given China’s relatively strong external balance sheet characterized by a low level of external debt and a large stock of foreign exchange reserves, the government has certainly been concerned about illegitimate outflows and the fact that they may exacerbate overall capital outflows and add to financial and macroeconomic stresses the economy is already facing.

The Debt Burden

China’s overall level of debt has raised considerable concerns about a looming crisis. The level of central government debt was only 17% of GDP in 2015. The IMF computes a measure of augmented public debt, which includes various types of local government borrowing, including off-budget borrowing by such Local Government Financing Vehicles (LGFVs) via bank loans, bonds, trust loans, and other funding sources. By this measure, China’s public debt to GDP ratio is estimated to be 60% in 2015, which would still be below the public debt to GDP ratios of major advanced economies.

However, the broader picture of debt in China looks more worrisome. According to a recent McKinsey report, the level of gross debt in 2014 was 282 percent of GDP. Recent estimates suggest that corporate debt may have risen above 150% of GDP by early 2016.

The level of Chinese corporate debt is a major concern, especially since a substantial portion of outstanding bank loans has gone to large SOEs. The notion that such high debt levels heighten the risks of a financial meltdown is, however, overstated. The balance sheet of the government as a whole is healthier than an examination of just the gross debt figures would suggest. Even if a banking crisis can be avoided, it will still be necessary to cover losses from loans made to companies that become insolvent or go bankrupt.

A bigger question the Chinese economy faces is whether the financial system, especially the banks, are being freed up from government directives and
allowed to operate on a commercial basis to a greater extent. While there has been modest progress on banking reforms, at a minimum addressing the legacy problems created by state-directed lending and distorted incentives in the banking system will incur significant costs.

Shadow Banking
The shadow banking system is not large relative to that in many advanced economies, although its growth rate in China in recent years is certainly among the highest in the major economies. Based on data from Moody’s, shadow banking assets amount to 65 percent of GDP in China, compared with 150% in the United States and a world average, weighted by country size, of about 120%.

Concerns about the financial stability risks posed by the growth of shadow banking have prompted the Chinese authorities to impose stricter regulation of shadow banking activities, both by banks and nonbank financial entities. Off-balance sheet activities by the commercial banks could affect their risk profiles. While trust companies and other nonbank financial entities are not backed by the government, their liabilities pose broader risks as the failure of any such institution could undermine confidence in the overall financial system. In its present form and at current levels, it is unlikely that the shadow banking system by itself poses significant threats to overall financial stability.

Stock Market Swings
After a sharp run-up during 2014 and the first half of 2015, Chinese stock market indexes have fallen sharply. This prompted a series of measures by the government to limit the stock market turmoil. Some of these measures were heavily interventionist and, although described as emergency measures, they have hurt the credibility of the government and created doubts about its attitude toward market-oriented reforms. The measures included propping up stock prices and also limiting activity that could push down prices.

The government’s actions to stabilize the market have not inspired confidence either. On January 4, 2016, the CSRC introduced a circuit breaker mechanism in the Chinese stock market. This led to a negative reaction in markets, with the main indexes plunging by about 14 percent over the next three days. The circuit breakers were activated multiple times during that period, worsening the sell-off as many market participants tried to sell their holdings before the circuit breakers were activated. The circuit breaker was deactivated three days after its introduction.

Chinese stock markets have been prone to concerns about weak corporate governance, limited transparency, weak auditing standards, and shoddy ac-
counting practices. In the absence of broad institutional and regulatory reforms that are necessary to support effective price discovery and the overall efficient functioning of stock markets, these markets could remain unstable. The recent volatility in the stock market and the manner in which the government has addressed it has heightened many of these concerns.

Policy Instability

There are two reasons to be concerned about the path that China is taking towards market-oriented reforms. The first is the unbalanced nature of the reforms. The second is the government’s ambivalent approach towards economic liberalization and the operation of free markets.

Reforms on the real side of the economy have not kept pace with financial liberalization. The 13th five year plan echoes many items from the previous plan, including further restructuring of state enterprises, liberalization of the services sector so new firms can more easily enter this sector and operate with fewer restrictions, streamlining of the tax and public expenditure systems, and easing of restrictions on labor mobility within and across provinces. China’s economy and the RMB’s rise have also been impeded by the lack of a robust institutional framework—including transparency in the policy-making process, sound corporate governance and accounting standards, and operational independence for the central bank and regulatory authorities—that ought to supplement financial and other market-oriented reforms.

The turmoil in equity and currency markets during 2015 and 2016 appears to have shaken confidence in the economic management skills of the leadership. Such volatility, and the heavy-handed intervention it has sometimes provoked, could erode political support and economic space even for the reforms to which the technocrats are committed. A more fundamental concern is that the government seems to be caught in a deep internal conflict between its stated objective of letting markets operate freely and its desire to maintain stability and control above all else. The tension between these two perspectives could cause a number of missteps even in the implementation of reforms, especially in terms of promoting the RMB’s role in international financial markets.
The Impact of the U.S. Fracking Boom on the Price of Oil and on Arab Oil Producers

LUTZ KILIAN

There is no precise geological definition of shale oil. When people talk about shale oil, what they have in mind is oil extracted by a combination of new technologies that include horizontal drilling, hydraulic fracturing and microseismic imaging. The purpose of these new techniques is to extract crude oil that could not have been extracted by conventional techniques. It is oil that we knew was there, but that before we had no means of recovering. Like with other technological innovations, it takes a high price of the commodity in question for a new technology to become cost-competitive, so the fact that the price of crude oil was unusually high in the mid-2000s, all the way up to mid-2008, made it possible for this new technology to be introduced.

As we know, the price of oil has come down since then. Shale oil producers responded to this price pressure by increasing their productivity, so many companies managed to stay in business. Looking forward, the main problem for shale oil producers is whether they can generate enough cash to stay in business. Notably, they have to service the debt they acquired when starting production. Is entirely conceivable that in the next year or two many of these producers might disappear, but shale oil production is likely to remain an important part of total U.S. oil production for the foreseeable future.

Figure 1 shows the total volume of shale oil production, starting in 2000 when production was basically flat. We can deduce two facts from this figure. First, after 2008, the growth in shale oil production was essentially exponen-


2. Professor of Economics, University of Michigan.
tial. Later it became linear. Second, it is obvious that just two of the locations where shale oil is produced (known as shale oil plays) account for more than half of all U.S. shale oil production. These plays are Eagle Ford in Texas and the Bakken, a region on the border of North Dakota and Montana. In fact, most shale oil plays are located in the southwest, so shale oil production is really a regional phenomenon in the United States rather than a national phenomenon.

Let us put these production increases into an international perspective. The left panel of Figure 2 shows oil production by some of the most important oil producers in the world. In fact, several large oil producers in the world have managed to increase their production in recent years. For example, in the United States, abstracting from Alaska, oil production had been dropping steadily since around 1970. In late 2008, however, a very surprising reversal occurred due to increased shale oil production. The right panel of Figure 2 shows U.S. shale oil production. Although the scale is different, it can be shown that the magnitude of shale oil production after late 2008 accounts almost exactly for the increase of U.S. oil production in the left panel. As a result, the United States has become one of the largest oil producers in the world, along with Russia and Saudi Arabia, each contributing about 10% of world oil production.
How important is shale oil for the U.S. economy? Roughly speaking, if one adds net oil imports and domestic oil production, one obtains the total use of oil by the U.S. economy, which in 2014 was about 16 million barrels a day. About half of U.S. oil production is shale oil. So in total, one quarter of the crude oil used by the U.S. economy is coming from shale oil. This is a nontrivial quantity, but it is not large enough to explain the excitement surrounding the shale oil boom in recent years.

To understand why industry analysts and policymakers got so excited about shale oil, we must look at projections of future shale oil production. Figure 3 shows the different layers of U.S. oil production. It includes both historical data and EIA projections until 2040. We see that most conventional forms of oil production, including onshore production in the lower 48 states, Alaskan oil, and offshore production, are either declining or flat. The growth is coming from the area labeled tight oil. Tight oil is just another word for shale oil. The exponential increase in shale oil production is clearly evident. As of mid-2014, the EIA projection was that production would peak sometime in the late 2010s and then gradually decline. It was this projected increase that stimulated the public policy debate about shale oil.
However, it is easy to get carried away by these numbers. Let me throw a bit of cold water on that excitement. The first caveat is that these projections do not come from independent research by geologists. What the EIA did instead was to talk to shale oil companies and to ask them what their expectations and plans were. Second, the estimates of the stock of shale oil below the ground that we can recover with current technology, which are underlying these projections, are subject to considerable error. For example, in June 2014, the EIA announced that it had to revise downwards, from one day to the next, its estimate of the stock of shale oil in the United States by 64%. That is a huge revision. What had happened was quite simple. Companies thought that there was a lot of shale oil in the Monterey Basin in California, but when the shale oil companies looked more closely, they discovered that the geology of the basin was much more complicated than they had thought and they gave up. This anecdote illustrates that there is a lot of uncertainty about the stock of shale oil and, hence, about the future production levels. There are many more sources of uncertainty, of course. For example, another implicit assumption in Figure 3 is that the price of oil would stay the same, but it has not. Nor has the technology remained constant, as mentioned earlier. Thus, perhaps the only thing we can take away from the figure is that shale oil production increases are not going to be permanent.

Another concern is that Figure 3 was constructed by adding barrels of crude oil of different types. There are many ways to classify crude oil. One dimension is the density of the crude oil, with the density ranging from light, generally considered superior from the point of view of refiners, to heavy. The other key
dimension is the sulfur content of crude oil. Sulfur from the point of view of refineries is something one has to remove in refining crude oil, so crude oil that is low in sulfur content is appropriately labeled sweet crude oil, and crude oil with high sulfur content, is called sour and considered less desirable by most refineries.

Most conventional crude oil in the United States is light sweet crude oil such as West Texas Intermediate (WTI) or Louisiana Light Sweet (LLS), with a density of around 37 to 40 API units (the standard measure of density). Shale oil, in contrast, comes in three flavors: The one closest to conventional light sweet crude has 45 API. That means it is considerably lighter than conventional crude oil. Then there is a component that is ultra-light sweet crude oil, with 47 API, and, finally, there are condensates that go all the way up to 60 API. This means that from the point of view of refineries, shale oil is not the same light sweet crude oil that they would normally buy.

Figure 4 shows different oil benchmarks that are traded in the world oil market. The vertical axis runs from “sweet” to “sour” and the horizontal axis from “heavy” on the left to “light” on the right. On the upper left corner is Mexican Maya, which is very sour and very heavy. Not everybody wants to buy that type of oil. The other extreme would be Algerian Sahara Blend that is very sweet and very light – basically perfect from the point of view of many refineries. WTI and Brent are definitely on the sweet side, but in the intermediate range regarding density. Shale oil would be far to their right in this chart (if not off the chart), indicating that it is not the same type of oil as conventional crude oil.

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**Density and sulfur content of selected crude oils**

<table>
<thead>
<tr>
<th>Sulfur content (percentage)</th>
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<tbody>
<tr>
<td>API gravity (a measure of crude oil density)</td>
</tr>
<tr>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Mexico-Maya</td>
</tr>
<tr>
<td>Saudi Arabia-Arab Heavy</td>
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<tr>
<td>Kuwait-Kuwait</td>
</tr>
<tr>
<td>United States-Mars</td>
</tr>
<tr>
<td>UAE-Dubai</td>
</tr>
<tr>
<td>Iran-Iran Heavy</td>
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<tr>
<td>Saudi Arabia-Arab Light</td>
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<tr>
<td>FSU-Urals</td>
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<tr>
<td>Iran-Iran Light</td>
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<tr>
<td>Oman-Oman</td>
</tr>
<tr>
<td>Ecuador-Oriente</td>
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<tr>
<td>Nigeria-Bonny Light</td>
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<tr>
<td>Libya-Es Sider</td>
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<tr>
<td>United States-WTI</td>
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<tr>
<td>United States-LLS</td>
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<tr>
<td>FSU-Urals</td>
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<tr>
<td>Malaysia-Tapis</td>
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<tr>
<td>Algeria-Sahara Blend</td>
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Source: EIA. MARS refers to an offshore drilling site in the Gulf of Mexico. WTI = West Texas Intermediate. LLS = Louisiana Light Sweet. FSU = Former Soviet Union. UAE = United Arab Emirates.
Why does this distinction matter? It matters from the point of view of refiners. We need to keep in mind that final consumers and most industries do not buy crude oil. The only firms that buy crude oil are refiners who convert that crude oil into refined products such as gasoline, diesel, heating oil, jet fuel and others, which is what is ultimately sold at the retail level. Refiners choose a certain technology when setting up a refinery. Different refineries may have different technical configurations. Their technical configuration determines which type of crude oil refiners can process efficiently and, hence, which type of crude oil they want to buy. That is an important feature to keep in mind when thinking about the impact of the U.S. shale oil boom.

Going back a decade or so, the refining industry, which is a very forward-looking industry, recognized that the world was starting to run out of light sweet crude oil. The new crude oil discovered in the world tended to be of the heavier, sourer kind, and existing wells produced less and less light sweet crude oil, so it didn’t take much to figure out that there was going to be a shortage. Being a forward-looking industry, many refiners in Texas in particular decided to be proactive. They made the decision to replace their old technical configuration with a new one that allowed them to process heavier, sourer crudes. Of course, changing a refinery’s technical configurations is quite costly, but because nobody else in the world wanted to buy this crude oil, it was comparatively cheap, allowing refiners to still make a profit. They were in a position to buy the heavier Saudi crudes and they could import oil locally from Venezuela and Mexico that nobody else wanted.

In contrast, U.S. refiners along the East Coast, for example, reacted very differently. East Coast refiners traditionally were importing light sweet crude from Angola, Nigeria and other African producers. That oil was being moved by tanker to the East Coast, refined on the East Coast and then sent west to the interior of the country by product pipelines. East Coast refiners decided that if there was not enough light sweet crude in the world, it would be better to shut down some of the existing refineries and to make do with the light sweet crude oil that they would be able to buy. Much the same approach was taken by European refiners.

What no one anticipated was that, starting around 2010, more and more shale oil, which of course is very light, sweet crude oil, was being shipped to the U.S. oil market hub in Cushing, Oklahoma, in the center of the country. The question arose who was going to buy that light sweet crude that nobody had thought would be available. The problem was that the refiners that might have wanted to buy light sweet crude oil were mainly the East Coast refiners, but because they were set up to move product west instead of moving crude oil
east, there was no transportation capacity to move that crude oil from Cushing to the East Coast refiners.

At the same time, many of the Texas refiners had just spent a lot of money to specialize in processing heavier crudes. They didn’t need all that super-light sweet crude, and even if they had wanted it, there was no transportation capacity to ship it down to the refineries along the Gulf Coast, because traditionally all their crude arrived by tanker in ports such as Houston and then was being moved inland by pipeline. There was no pipeline running south from Cushing, so the shale oil remained stuck in Oklahoma. There were few buyers.

At this point, basic microeconomics kicked in. If nobody wants to buy the oil, its price has to fall. The local excess supply meant that WTI, the pricing benchmark for crude oil in Cushing, Oklahoma, started dropping below the global price of oil. The lack of transportation infrastructure meant that arbitrage between Cushing and the rest of the world broke down and the world oil market fragmented into regional markets. Low WTI prices persisted, even though demand for oil in the rest of the world remained high, reflecting the fact that this oil was stuck in the wrong place.

It might have seemed natural to ask, why the United States did not simply export this oil, if there were no domestic buyers. There were two reasons why this was not an option in the short run. The first reason was the U.S. oil export ban, which was put into place in 1975, when Congress decided that if there was any domestically produced crude oil, it should be reserved for Americans, and not be sold to foreigners. The second reason was that, even if the oil export ban had been lifted at that moment, there would not have been the transportation infrastructure required to ship this oil to the coast and to load it on tankers.

How did the market respond to this imbalance? Over time, the oil market learned to work around these constraints. One key response was that in 2013 a major pipeline that used to transport oil from the Gulf Coast to Cushing was reversed. Now some of the crude oil that had been stuck in Cushing could be shipped to the refineries along the Gulf Coast. By 2014, additional new pipelines were completed that allowed even more crude oil to flow from Cushing to the Gulf Coast. At the same time, the volume of shipping of crude oil by rail and by barge increased tremendously. Rail transports of crude oil from 2008 to 2013 increased by a factor of 40. Building that capacity took time. Barge traffic became important down the Mississippi, because from the Bakken it is not far to the Mississippi. In conjunction these two responses over time allowed more and more of the crude oil that used to be stuck in Cushing to reach refineries in the rest of the United States, not only along the Gulf Coast, but also along the East Coast, with the help of barges traveling in U.S. coastal waters. The latter
traffic was impeded by the Jones Act which states that tankers carrying domestic crude oil must carry a U.S. flag, but despite the shortage of U.S. flagged oil barges, shale oil starting reaching East Coast refiners.

What did refiners do with this oil? Because there was so much shale oil that could not be exported, it traded at a discount, making this oil cheaper than imported crude oil. Hence, refiners decided they would buy that crude oil and produce gasoline and diesel, not for domestic consumption but for exports. This was possible because the U.S. oil export ban did not extend to refined products. Given that refiners had access to low-cost crude oil domestically, they could compete with refiners in the rest of the world, which were forced to buy crude oil at higher international prices.

When this refined product was shipped to Latin America and to Europe in particular, those countries no longer saw a need to import as much crude oil as before, because they already had bought much of the gasoline and diesel they needed. At the same time, the United States reduced its own imports of crude oil because there was a glut of less expensive domestic crude oil. As a result, demand in global oil markets started falling, which meant that the market, in a very roundabout way, through exports of refined products that embodied crude oil, re-established arbitrage, despite the U.S. oil export ban, contributing to lower global oil prices. Thus, in the end, the market reasserted itself.

Interestingly, the surplus created by the technological innovation, known as shale oil, was almost entirely absorbed by the U.S. refiners. Whereas the refiners got rich in the process, the shale oil producers only received the very low domestic market price for shale oil. Obviously there was a tug of war in the lobbying world in Washington DC between the refiners who supported the continuation of the oil export ban, and the oil producers who wanted to rescind the ban. The Obama administration was sitting this one out for the most part, effectively siding with the refiners. When the price pressure in the domestic oil market mounted, in 2014, the administration classified lightly processed condensates as refined products, allowing them to be exported. It also introduced an exemption for exports of ultra-light crude oil, arguing that this oil was not really crude oil. Finally, the administration allowed some swaps of crude oil, where a certain quantity of heavy Mexican crude would be shipped to Texas in exchange for the same quantity of light-sweet crude oil produced in the United States. The point of this transaction was that refiners in Texas needed heavy crude. All these policy reforms were on the margin. Fundamentally, the oil export ban remained in place.

Then, in 2015, the Obama administration decided unexpectedly to rescind the oil export ban, effective in January 2016, something that it had resisted for a
long time. What changed the administration’s mind? By late 2015, the discount at which domestic crude oil sold compared with the global price of crude had evaporated. There was no longer a surplus to be absorbed by the refiners, easing the refiners’ concerns about lifting the ban.

Figure 5 illustrates the effects of these developments on the spread between different oil price benchmarks. Brent is a proxy for the global price of crude oil and LLS refers to oil produced along the Gulf Coast that therefore competes directly with Brent oil imports. Until the end of 2010, these three oil prices moved closely together and no one cared much about the difference between these oil prices.

Starting in 2011, however, the WTI price began to fall relative to the other two prices, reflecting the fragmentation of oil markets in Cushing, Oklahoma, where the WTI price is recorded, and along the coast and in the rest of the world. Interestingly, the LLS price moved more or less like the Brent price. The reason is quite intuitive. A refiner along the Gulf coast can either import crude oil and pay the Brent price or buy LLS crude oil from a local oil producer, so, by arbitrage, the refiner has to pay for Louisiana Light the same that he has to pay on the margin for imported oil.

This situation changed in late 2013, when the first pipelines were opened from Cushing to the Gulf Coast. Now, some of the shale oil could be shipped down to Texas. At this point, Texas refiners stopped importing oil at Brent prices, because there was a cheaper domestic source of oil. This also meant that LLS producers from now on had to compete with oil from Cushing,
than imported crude oil. Hence, the LLS price now had to match the WTI price, with both WTI and LLS trading at a discount relative to Brent. At this point, the market was still fragmented, but the distinction was now between the U.S. market including the coastal areas, and the rest of the world. As the market reasserted itself, and more and more of the U.S. oil reached world markets embodied in refined products, the spread between WTI and LLS, on the one hand, and Brent, on the other hand, declined. By late 2015, most of the differences were gone and we returned to the initial situation, even before the lifting of the oil export ban in early 2016.

An important question not addressed by Figure 5 is why the price of oil dropped so sharply in the second half of 2014 and in early 2015. To answer that question, one needs a structural model. For this I am going to rely on a particular structural model which incorporates data on the growth in global crude oil production, a measure of cyclical variation in the global business cycle, changes in crude oil inventories, and, of course, the real price of crude oil. The model is designed to identify flow supply shocks (defined as exogenous shifts in global oil production), flow demand shocks (defined as shocks that reflect shifts in oil consumption associated with the global business cycle), and shocks to storage (or speculative) demand for oil (that reflect shifts in oil price expectations). Figure 6 shows the cumulative effect of each of the three shocks, one at a time, on the real price of oil.

**Figure 6. What Caused the Decline in Oil Prices in 2014?**

- Cumulative Effect of Flow Supply Shock on Real Price of Crude Oil
- Cumulative Effect of Flow Demand Shock on Real Price of Crude Oil
- Cumulative Effect of Speculative Demand Shock on Real Price of Crude Oil

Source: Kilian (2016a)

Figure 6 indicates that all three shocks including flow supply shocks contributed to the decline in the real price of oil after June 2014. From our point of view, the more interesting question is how much of this decline was caused by...
the shale oil boom specifically. Answering that question requires the construction of a counterfactual. We need to answer the question of what would have happened to the Brent price of crude oil if the U.S. shale oil revolution had never happened. There are three steps involved. In step one; we need to figure out how much oil would have been produced in the world in the absence of shale oil production. This step is straightforward. All we need to do is to subtract U.S. shale oil production from global oil production, as shown in Figure 7.

Once we know the counterfactual level of oil production, in step two, we can go back to the model and solve the model iteratively for the sequence of oil supply shocks that would have been required to make world oil production reach this counterfactual level. It makes sense to treat the shale oil boom as a sequence of oil supply shocks in this model because the shale oil boom is a classical example of a technological innovation. Figure 8 shows the sequence of flow supply shocks required to reach the counterfactual level of global oil production. By construction, the shocks prior to November 2008 are the same as in the estimated model. Only the shocks to the right of the vertical line are different.
Before we go any further we must convince ourselves that this sequence of shocks is not in a fundamental sense different from the historical data. If it turned out, for example, that the counterfactual shocks were five times as big as any shock observed prior to late 2008, then one would worry that the model would become unstable because agents may change their behavior in response to such an unusual sequence of shocks. It turns out, however, that the counterfactual sequence of shocks is not very different from what we have seen historically. That means that, in the last step, we can feed the shock sequence in Figure 8 into the structural model and see what it implies for the real price of crude oil.

By construction, one would expect the real price of oil to be higher under the counterfactual because there is less oil being produced in the world. Figure 9 is consistent with that expectation and allows us to quantify the effect of the shale oil boom on the Brent price of crude oil.

![Figure 9: The impact of shale oil production on the Brent price of crude oil](image)

Note that not much happens in Figure 9 until 2011. Then the gap between the actual and the counterfactual price widens, reaching 10 dollars in early 2014. Subsequently, the gap closes. Is that magnitude of 10 dollars at most reasonable? A simple thought experiment suggests that in 1980, when the Iran-Iraq war broke out, about 4% of global oil production was removed from the market, causing an increase in the oil price of about 10%. Shale oil production represents an increase of about 4% of the global oil production, which is why we would expect the price to fall by about 10%, which translates to about ten dollars, consistent with the estimate in Figure 9.
Given this result, we can take the analysis a step further and focus on the implications for oil exporters worldwide. I will focus on Saudi Arabia for expository purposes. I am going to assume that Saudi oil production is essentially inelastic, which is not an unreasonable assumption. This allows me to multiply Saudi oil production by the difference between the actual and the counterfactual price of oil, which measures the amount of oil revenue Saudi Arabia lost as a result of the U.S. shale oil revolution. Figure 10 illustrates that the implied monthly loss in Saudi oil revenue is about two billion dollars.

To put this into perspective, consider that, according to the International Monetary Fund (IMF), between June 2014 and August 2015, the Saudis reduced their net foreign assets by about 90 billion dollars. Why this decline? Essentially, Saudi Arabia had budgeted on the assumption of oil prices being around USD$110. When the price of oil fell, they decided that the best way to deal with the revenue shortfall would be to draw down their foreign exchange reserves, so they would not have to change domestic policy right away.

How much of that loss in foreign exchange is due to shale oil? If we accumulate the losses in Figure 10 over the relevant period, we see that about one third of the 90 billion dollar cumulative loss is associated with shale oil. The remainder of the decline is associated with a combination of other oil supply shocks, shocks to price expectations affecting storage demand, and, of course, an unexpected slowdown in the global economy including China.

Extrapolating from the reduction in Saudi net foreign assets thus far, if Saudi Arabia were to continue as before, it would run out of foreign exchange by early 2020. In other words, the country is losing foreign assets at an alarming rate, raising the question of what are the Saudi policy options are. Option one would be external borrowing. Economic theory tells us that if we are dealing with a
temporary decline in the oil price we might want to borrow now, wait for the price to recover, and pay back what we owe, when the price is high again. That is the sensible thing to do if we know that the price decline is going to end sometime soon. On the other hand, if the price decline is very persistent, then fiscal retrenchment seems to be the only sensible option. One obviously cannot spend money one does not have. Thus, the question faced by Saudi Arabia is, what the right mix is between external borrowing and fiscal retrenchment. To answer this question we need to take a stand on how persistent we expect the decline in the price of oil to be. That question can be broken up into these sub-questions:

First, how resilient do we think the U.S. (and by extension the Canadian) oil producers will be to low oil prices? I mentioned earlier that many shale oil companies are increasingly in trouble because they cannot service their debt and might fold if the price does not rise soon. This does not mean that this is the end of the story, however, because if the oil price were to increase again, some of those companies are likely to resume production. Thus, from the point of view of Saudi Arabia, we want to think of that component of the price decline as being quite persistent.

What about state-controlled oil producers such as Russia, Iran or Iraq? Russia, for example, has to finance two wars, one in Syria and one in the Ukraine, in addition to its economy. It needs foreign exchange, which means it is going to pump as much oil as it can, the only constraint being its lack of oil investment, which means their oil output increases cannot be sustained forever. The same is going to be true for Iran, for very different reasons, and Iraq obviously needs all the foreign exchange it can get, which means that oil production from these countries is likely to remain high for the foreseeable future.

These developments have to be viewed against the backdrop of a long-term decline in global oil production. Many traditional oil producers such as Norway or the U.K. are literally running out of oil. Their oil production is declining. In the long run, one would expect this trend in oil production to dominate. There are other examples such as Mexico. Mexico is not running out of crude oil, but is mismanaging its oil production so badly that it might as well be. This means that there is not going to be much Mexican oil going forward. Clearly if one waits long enough, long-term declines in oil production in many countries are going to take care of the current problem of excess supply. The question is, can Saudi Arabia afford to wait that long? My view is that this would be a risky bet.

Another factor to keep in mind is the decline in oil investment. As always during cycles in the price of oil, there is a decline in oil investment, after the
price falls. This means that predictably, in a year or two, one would expect to see the oil price to recover somewhat. The question is by how much. If someone told me that the oil price ultimately will recover to 65 dollars, or maybe 80 dollars, I would not consider that unreasonable. Even in that case, however, Saudi Arabia would still have to deal with comparatively low oil revenues two years from now.

The elephant in the room is the global economy. If the global economy were to resume growing the way it did in the mid-2000’s, we would not be talking about the supply side of the oil market, because additional demand for oil would essentially absorb all the oil that is currently out there. Such a recovery, however, seems unlikely. Currently, the upside and downside risks in the global economy are balanced, which means that it would be foolish to bet on a strong global recovery anytime soon.

This leaves one more option which is coordinated supply cuts. What economic theory tells us is that such coordinated supply cuts will not work, because there are incentives for oil producers to cheat, as long as the global economy remains weak. Indeed when one looks at recent talks between Russia, Saudi Arabia and Venezuela, what they agreed on was to fix oil production at the highest possible level. They could not agree on supply cuts, and, even if they had, it is unlikely that they would be able to go through with that decision.

Thus, it is clear that policymakers in Saudi Arabia need to contemplate some serious fiscal retrenchment at this point. Indeed, there are plans in Saudi Arabia to fundamentally reform the economy. There are no easy solutions. For example, simply raising income taxes in a country, where citizens receive their income directly from the government, is equivalent to cutting income and may not be politically acceptable. Thus, reforms have to carefully balance multiple objectives. The extent, to which these plans will be executed, remains an open question at this point, of course. What is clear is that if Saudi Arabia does not manage to address the current imbalances in the next couple of years, it is likely to run out of foreign exchange, at which point the geopolitical risk in the oil market would increase substantially, which surely would drive up the price of crude oil.

The same problems affect oil producers in the Middle East, in Latin America, and elsewhere more broadly. The fact that even a country such as Saudi Arabia with a large sovereign wealth fund is severely affected by low oil prices means that other countries which either cannot borrow because they have borrowed too much in the past, or which do not have a sovereign wealth fund, will face the same problems or even bigger problems.
The Federal Reserve and monetary policy in Latin America: Is there policy “spillover”?  

SEBASTIAN EDWARDS¹

ABSTRACT

I use historical weekly data from 2000-2008 to analyze the way in which Federal Reserve policy actions have affected monetary policy in a group of Latin American countries: Chile, Colombia and Mexico. I find some evidence of policy “spillover” or “contagion” during this period, in Chile and Colombia, but not in Mexico. In addition, I analyze if changes in the slope of the yield curve in the U.S. have affected policy rates in these EMs. I also investigate the role of global financial markets volatility and capital mobility on “contagion.” I provide some comparisons between these Latin American countries and a group of East Asian nations during the same period. The results reported here call into question the notion that under flexible exchange rates countries exercise an independent monetary policy.

Key Words: Monetary independence, interest rates, Federal Reserve, capital controls, Latin America, East Asia, monetary policy contagion, flexible exchange rates.

JEL Classification Nos: E52, E58, F30, F32

This paper has been prepared for presentation at a conference on monetary policy to be held at Cartagena de Indias, July 21-22, 2016, and organized by the Fondo Latinoamericano de Reservas. A previous version was presented at a Stanford University Conference, on May 5-6, 2016. I thank John Taylor for encouragement, and Ed Leamer for very helpful discussions.

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1. INTRODUCTION

For central bankers from around the world, the years 2013-2015 were years of great apprehension, as they waited for the Federal Reserve to make up its mind and to begin raising policy rates. As time passed without the Fed taking action, central bank governors became increasingly anxious. The first sign of apprehension came in June 2013 during the so called “taper tantrum.” Soon afterward, a number of influential central bankers from the periphery called for the Fed to normalize monetary policy once and for all. They wanted the “waiting game” to be over, and for the Fed to begin hiking interest rates. On August 30 2015, the governor of the Reserve Bank of India, Ragu Rajan, told the Wall Street Journal:

“[F]rom the perspective of emerging markets... it’s preferable to have a move early on and an advertised, slow move up rather than, you know, the Fed be forced to tighten more significantly down the line.”

The wait was finally over on December 17, 2015 when the Fed raised the Federal Funds policy target range by 25 basis points, from 0-0.25 to 0.25-0.50 percent. During the next few weeks many Latin American countries – Chile, Colombia, Mexico and Peru, for example –, followed suit, and their respective central banks raised interest rates. In contrast, during that same short period most of the East Asian central banks remained “on hold.” An important question in this regard is why do some central banks “follow” the Fed, while others act with what seems to be a greater degree of independence?

During the first few weeks of 2016, and as the world economy became more volatile and questions about China mounted, anxiety returned. In particular, many EM’s central bankers became concerned about the rapid depreciation of their currencies, a phenomenon that they associated with the expectations that the Fed would continue to hike rates during 2016. For example, in an interview published in the Financial Times, Agustín Carstens, the governor of the currencies.

Bank of Mexico, publicly argued that the peso had weaken too much – it had “overshot” – and predicted that, eventually, it would go through a period of significant strengthening. During February 2016, the degree of apprehension

2. On the effects of the tapering on the EMs see, for example, Aizenman, Binici and Hutchison (2014), and Eichengreen and Gupta (2014).
3. In most of the Latin American countries the Fed action was seen as contributing to the depreciation of their currencies.
among periphery central bankers increased when the Bank of Japan moved its policy rate to negative terrain. In part as a result of this action long rates declined, and the yield curve became flatter. On February 10, 2016, the Wall Street Journal said (emphasis added):

“A little more than a month after the Federal Reserve lifted its benchmark rate from near zero, rates across the market are falling. The yield on the 10-year U.S. Treasury note, a benchmark for everything from corporate rates to corporate lending this week fell below 1.7%, its lowest level in a year.”

At a policy level, an important issue is how emerging markets’ are likely to react when advanced countries’ central banks (and, in particular, the Federal Reserve) change their monetary policy stance. According to received models of international macroeconomics (i.e. the Mundell–Fleming model, in any of its versions), the answer to this question depends on the exchange rate regime. Countries with pegged exchange rates cannot pursue independent monetary policy, and any change in the advanced countries’ central bank policy rate will be transmitted into domestic rates (with the proper risk adjustment). On the other hand, under flexible exchange rates countries are able to undertake independent monetary policies, and don’t face the “trilemma.” In principle their central bank actions would not have to follow (or even take into account) the policy position of the advanced nations, such as the U.S. More recently, however, some authors, including, in particular, Taylor (2007, 2013, 2015), and Edwards (2012, 2015a, b) have argued that even under flexible exchange rates there is significant policy interconnectedness across countries. In a highly globalization setting, even when there are no obvious domestic reasons for raising interest rates, some central banks will follow the Fed. This phenomenon may be called policy “spillover” or policy “contagion,” and could be the result of a number of factors, including the desire to protect domestic currencies from “excessive” depreciation. The late Ron McKinnon captured this idea, when in May 2014, he stated at a conference held at the Hoover Institution that “there’s only one country that’s truly independent and can set its monetary policy. That’s the United States.” Of course, not every co-movement of policy rates should be labeled as “contagion.” It is possible that two countries (the U.S. and a

5. In the recent WEO (2015) the IMF devotes a long discussion to this issue.
6. On the trilemma see, for example, Obstfeld, Shambaugh and Taylor (2003) and Rey (2013).
7. This is related to “fear of floating.” See, for example, Calvo and Reinhart (2000). On the effect of advanced central banks actions on EMs see, also, Ince, Molodstova and Papell (2015), Molodstova and Papell (2008), and Niklosko, Molodstova and Papell (2009).
8. I thank John Taylor for making the transcript of Ron McKinnon’s remarks available to me.
particular EM, say, Colombia) are reacting to a common shock—a large change in the international price of oil, for example. “Contagion” would happen if after controlling by those variables that usually enter into a central bank policy reaction function – the Taylor Rule variables, say –, there is still evidence that the EM in question has followed the Fed.

The purpose of this paper is to use data from three in Latin America countries – Chile, Colombia, and Mexico – to analyze the issue of “policy contagion” from a historical perspective. More specifically, I am interested in answering the following questions: (1) Have changes in the Fed policy rate historically affected these countries central banks’ policy stance, even after controlling for other variables? (2) If the answer is yes, how strong has the policy pass-through been? (3) What is the role played by the yield curve in the policy spillover process? Does it make a difference if the policy rate hike is accompanied by a flattening or steepening of the global yield curve? (4) What has been the role of global instability in the transmission mechanism of policy interest rates? And (5) has this process been affected by the degree of capital mobility in the specific countries? In order to put my findings in perspective, in the final section of the paper I compare the results obtained for the three countries in the sample to a group of East Asian nations. Although the analysis presented here is based on historical data (2000-2008), the answers are particularly pertinent for the current times, as an increasing number of central banks in the emerging nations are considering on whether to react to Fed policymoves.

This paper differs from previous work on the subject in several respects: (a) I concentrate on individual countries. This allows me to detect differences across nations. Most analyses related subjects have relied on either pooled (panel) data for a group of countries – often pooling countries as diverse as Argentina and India –, or have based their simulations on a “representative EM.” (b) I use short term (weekly) time series data. As a consequence, I am able to follow the granularity of the transmission from interest rates in the U.S. to interest rates in the EMs of interest. (c) As noted, I focus on the important issue of the slope of the yield curve, and I analyze how changes in the policy rate and the long rate have interacted to affect the three central banks’ policy stance. (d) I explicitly investigate how changing conditions in the global economy – including the volatility of global financial markets –, affect (if at all) the transmission process. (e) I investigate whether the degree of capital mobility affects the transmission process. And, (f) I provide an explicit comparison between a group of Latin American countries and a group of Asian nations.

2. PRELIMINARIES

Before moving forward, a note on the sample is in order: Chile, Colombia, and Mexico are the three Latin American countries with available weekly data for the variables of interest; in addition, they have three important characteristics in common: (a) they followed inflation targeting during the period under study (2000-2008); (b) they had a relatively high degree of capital mobility (more on this below): and (c) the three had independent central banks. In that sense, they constitute a somewhat homogenous group.

In Figure 1 I present weekly data for the Federal Funds target rate from 1994 through 2008, just before it was reduced to (almost) zero, and QE was enacted. Between January 2000 and September 2008 there were 40 changes in the Federal Funds policy (target) rate. Twenty were increases, and in 19 of them the rate hike was 25 basis points; on one occasion the Fed Funds rate was increased by 50 basis points (on the week of May 19th, 2000). The other 20 policy actions correspond to cuts in the Fed Funds rate. In seven cases it was cut by 25 basis points; in 11 cases it was cut by 50 basis points; and on 2 occasions it was reduced by 75 basis points (both of them in early 2008: the week of January, 25th and the week of March 21st.)

In Figure 2 I include weekly data on the policy rate for the three countries in this study: Chile, Colombia, and Mexico. As noted, the key question in this paper is the extent to which these EMs central banks took into account the Fed’s policy stance when determining their own monetary policy. In other, words, with other things given, did (some of) these countries take into account Fed action when deciding on their own policies, or did they act with complete independence?

Standard tests indicate that it isn’t possible to reject the null hypothesis that the policy interest rates have unit roots. For this reasons in the analysis that follows I rely on an error correction specification. This is standard in the literature on interest rate dynamics. Not surprisingly, it is not possible to reject the hypothesis that the Fed Fund’s rate “Granger causes” the EMs policy rates; on the other hand, the null that these rates “cause” Fed policy actions is rejected, in every case, at conventional levels. The details of these tests are not reported here due to space considerations; they are available on request.

10. See, for example, Frankel, Schmukler, and Serven (2004), and Edwards (2012) for analyses of the transmission of interest rate shocks. Those studies are different from the current paper in a number of respects, including the fact that they concentrate on market rates and don’t explore the issue of “policy contagion.” Other differences are the periodicity of the data (this paper uses weekly data) and the fact that in the current work individual countries are analyzed. Rey (2013) deals with policy interdependence, as does Edwards for the case of one country only (Chile).
A brief discussion on the use of the term “contagion” is in order – I use it interchangeably with policy “spillover.” As the reader may have noticed I have used it in quotation marks. There are two reasons for this: First, central bankers usually reject – and sometimes quite strongly – the notion that their decisions are subject to “contagion” from abroad. They argue that in making decisions they take into account all available information, including global interest rates, but they point out that they don’t follow, as a matter of policy, any other central bank, be it the Fed or the ECB. For example, this point has been made recently by Claro and Opazo (2014) with respect to Chile’s central bank. Second, and as noted, it is possible that even if there are strong co-movements in policy rates, these don’t constitute “contagion,” but are the reflection of both banks reacting to common shocks. In the analysis presented below, I do make an attempt to control by the type of variables that would constitute common shocks and, thus, to separate “contagion” or “spillover” from policy rates co-movements.

3. ON “POLICY CONTAGION”: A CONCEPTUAL FRAMEWORK

Consider a small open economy with risk neutral investors. Assume further, and in order to simplify the exposition, that there are controls on capital outflows in the form of a tax of rate $r^t$. Then, the following condition will hold in equilibrium (one may assume without loss of generality that the tax is on capital inflows, or both on inflows and outflows; see the discussion in Edwards 2015a):

$$r_t - r^*_t = E_t(\Delta e_{t+1}) - (1 + E_t(\Delta e_{t+1}))\tau$$

Where $r_t$ and $r^*_t$ are domestic and foreign interest rates for securities of the same maturity and equivalent credit risk, and $E_t(\Delta e_{t+1})$ is the expected rate of depreciation of the domestic currency. (This assumes perfect substitutability of local and foreign securities. If these are not perfect substitutes we could multiply $r^*_t$ by some parameter $\theta$). In a country with a credible fixed exchange rate, the expected rate of depreciation is always equal to zero, $E_t(\Delta e_{t+1}) = 0$. If, in addition, there is full capital mobility $\tau = 0$, and then $r_t \approx r^*_t$. That is, under these circumstances, local interest rates (in domestic currency) will not deviate from foreign interest rates. In this case, changes in world interest rates will be transmitted in a one-to-one fashion into the local economy. It is in this sense that with (credible) pegged exchange rates there cannot be an independent

11. Parts of this section draw on Edwards (2015a, b).
monetary policy; the local central bank cannot affect the domestic rate of interest. If $\tau \geq 0$, then there will be an equilibrium wedge between domestic and international interest rates, but still the domestic monetary authorities will be unable to influence local rates over the long run. Of course, how fast the domestic rates will converge to the international rate will vary from country to country. This is, indeed, the typical case of the “trilemma” or the “impossibility of the Holy Trinity.”

Under flexible rates, however, $E_t \{\Delta e_{t+1}\} \neq 0$, and local and international rates may deviate from world interest rates. Assume that there is a tightening of monetary policy in the foreign country—i.e. the Fed raises the target Fed Funds rate—that results in a higher $r^*$. Under pegged exchange rates this would be translated into a one-to-one increase in $r$; the pass-through coefficient is equal to one, even if $\tau \geq 0$. However, if there are flexible rates it is possible that $r$ remains at its initial level, and that all of the adjustment takes place through an expected appreciation of the domestic currency, $E_t \{\Delta e, r_{t+1}\} < 0$. As Dornbusch (1976) argued in his “overshooting” paper, for this to happen it is necessary for the local currency to depreciate on impact by more than in the long run. Under flexible rates, then, the exchange rate will be the “shock absorber” and will tend to exhibit some degree of volatility.\(^{12}\)

If central banks want to avoid “excessive” exchange rate variability, they may take into account other central banks’ actions when determining their own policy rates. That is, their policy rule could include a term with other central banks’ policy rates.\(^{13}\) In a world with two countries, this situation is captured by the following two policy equations, where $r_p$ is the policy rate in the domestic country, $r^*_p$ is the policy rate in the foreign country, and the $x$ and $x^*$ are vectors with the traditional determinants of policy rates (the elements in standard Taylor rules, for example), such as deviations of inflation from their targets and the deviation of the rate of unemployment from the “natural” rate:

\[
\begin{align*}
(2) \quad r_p &= \alpha + \beta r_p + \gamma x \\
(3) \quad r^*_p &= \alpha^* + \beta^* r_p + \gamma^* x^*
\end{align*}
\]

\(^{12}\) The shock absorber role of the exchange rate goes beyond monetary disturbances. Edwards and Levy-Yeyati (2005) show that countries with more flexible rates are able to accommodate better terms of trade shocks.

\(^{13}\) In Edwards (2006) I argue that many countries include the exchange rate as part of their policy (or Taylor) rule. Taylor (2007, 2013) has argued that many central banks include other central banks’ policy rates in their rules. The analysis that follows in the rest of this section owes much to Taylor’s work.
In equilibrium, the monetary policy rate in each country will depend on the other country’s rate.\textsuperscript{14} For the domestic country the equilibrium policy rate is (there is an equivalent expression for the foreign country):

\[
(4) \ r_p = \frac{\alpha + \beta \alpha^*}{1 - \beta \beta^*} + \left( \frac{\alpha + \beta \alpha^*}{1 - \beta \beta^*} \right)x + \left( \frac{\beta \gamma^*}{1 - \beta \beta^*} \right)x^*
\]

Changes in the drivers of the foreign country’s policy interest rate, such as $\alpha^*$, $\beta^*$, $\gamma^*$, or $x^*$, will have an effect on the domestic policy rate. This interdependence is illustrated in Figure 3, which includes both reaction functions (2) and (3); PP is the policy function for the domestic country, and $P^*P^*$ for the foreign nation. The initial equilibrium is at point A. As may be seen, a higher $x^*$ (say the gap between the actual and target inflation rate in the foreign country), will result in a shift to the right of $P^*P^*$ and in higher equilibrium policy rates in both countries; the new equilibrium is given by B.\textsuperscript{15} Notice that in this case the final increase in the foreign policy rate gets amplified; it is larger than what was originally planned by the foreign central bank. The extent of the effect of the foreign country’s policy move on the domestic country policy rate will depend on the slopes of the two curves; these, in turn, depend on the parameters of equations (1) and (2).

Figure 3 is for the case when both countries take into consideration the other nation’s actions. But this needs not be the case. Indeed, if one country is large (say, the U.S.) and the other one is small (say, Colombia), we would expect policy “spillover” to be a one way phenomenon. In this case, and if the foreign country is the large one, $\beta^*$ in equation (2) will be zero, and the $P^*P^*$ schedule will be vertical. A hike in the foreign country’s policy rate will impact the domestic country rate, but there will be no feedback to the large nation and, thus, no amplifying effect.\textsuperscript{16} As noted, the magnitude of the policy “spillover” will depend on the slope of the PP curve. The steeper this curve, the larger is policy “contagion”; if, on the contrary, the PP curve is very flat, policy “contagion” will be minimal. In the limit, when there is complete policy independence in both countries the PP schedule is horizontal and the $P^*P^*$ is vertical.

In traditional analyses $\beta^* = \beta^* = 0$. That is, once central banks have taken into account the direct determinants of inflation (and unemployment, if that is part of their mandate), there is no role for the foreign policy rate when determining the domestic policy stance. It is in that regard that in this paper I call a situation

\textsuperscript{14} The stability condition is $\beta \beta^* < 1$. This means that in Figure 1 the $P^*P^*$ schedule has to be steeper than the PP schedule.

\textsuperscript{15} The new equilibrium will be achieved through successive approximations, as in any model with reaction functions of this type, where the stability condition is met.

\textsuperscript{16} Of course, if neither country considers the foreign central bank actions PP will be horizontal and $P^*P^*$ will be vertical.
where \( \beta \) or \( \beta^* \) policy “contagion.” At the end of the road, the extent to which specific countries are affected by policy “contagion” is an empirical matter.

Given the discussion in the Introduction to this paper, and the concerns that have emerged in central banks from around the world in 2015-2016, it is possible to think that in some countries the actual policy rate would include other global variables, including the “long” rate in the world economy \( (r^*_{\text{L}}) \) and the extent of uncertainty in global financial markets \( (\mu) \). In this case, equation (2) would become:

\[
(5) \quad r_p = \alpha + \beta r^*_{\text{L}} + \gamma x + \delta r^*_{\text{L}} + \theta \mu
\]

In the Sections that follow I use data for the six countries mentioned above to investigate the extent to which the key coefficients in equation (5) have been different from zero, as the “contagion” analysis suggest, or whether once other variables are incorporated they are no longer relevant, as suggested by traditional analyses. To put it simply, then, the goal of this paper is to determine, using historical data, whether once the appropriate controls are introduced into the empirical analysis, \( \beta \neq 0 \).

4. AN EMPIRICAL MODEL

In this section I report the results from the estimation of a number of equations for monetary policy rates for the three countries in the sample. I assume that each central bank has a policy function of the form of equation (5), and that central banks don’t necessarily adjust their policy rates instantaneously to new information, including to changes in policy rates in the advanced nations. More specifically, I estimate the following error correction model that allows central banks to make adjustments at a gradual pace:

\[
(6) \quad \Delta r_t^p = \alpha_0 + \alpha_1 FF_t + \alpha_2 \Delta r^*_{\text{L},t-1} + \alpha_3 \Delta r^*_{\text{L},t-2} + \sum \rho_j x_{jt} + \epsilon_t
\]

\( r_t^p \) is the policy rate in each of the three countries in period \( t \), \( FF_t \) is the Federal Funds (target) interest rate, the \( x_{jt} \) are other variables that affect the central bank policy actions, including, in particular, the long rate in the foreign country (the U.S.), inflationary pressures, global perceptions of country risk, and expectations of global inflation; that is, these variables capture what we would normally expect to be included in an expanded Taylor Rule type of equation. If there is policy “contagion” the estimated \( \alpha_1 \) would be significantly positive. The extent of long term policy spillover is given by \( -\frac{\alpha_1}{\alpha_3} \). If, for example, \( -\frac{\alpha_1}{\alpha_3} = 1 \),
then, there will be full importation of Fed policies into domestic policy rates. Parameter $y$ allows for the adjustment to a new equilibrium policy rate to be cyclical; this, however, is unlikely. In equation (6) the timing of the variables is contemporaneous. However, in the estimation, and as explained below, alternative lag structures were considered.

4.1 Reduced form results

In Table 1 I report results for a basic bivariate dynamic specification of equation (6) for all three countries, using least squares. The Fed Funds variable is entered contemporaneously. If it is included with a one week lag, the results don’t change in any significant way. These preliminary estimates should be interpreted as a reduced form for a significantly more complex system. Indeed, these results are consistent with a number of models and hypotheses. For example, they are consistent with the case where vector $x$ in equation (1) includes variables that indirectly depend on the foreign country’s policy rate $r_F$. An example of this is when $x$ includes domestic inflation, or its deviations from target, which, through a pass-through equation, may depend on the rate of depreciation of the domestic currency, a variable that, in turn, depends on the interest rate differential between the home and the foreign countries. Another model that is consistent with the reduced forms presented in Table 1 is one where the monetary authorities in the EMs believe that the Fed has superior knowledge and/or information about world economic conditions, including global monetary pressures and/or the evolution of commodity prices. In this case it is possible that the EM central banks follow the Fed in a way similar to the way in which firms follow a “barometric price leader” in the industrial organization literature. In what follows I try disentangle the different effects at play, and I investigate whether the Fed Funds rate has an independent effect even when other variables are held constant (domestic inflationary pressures, U.S. expected inflation, and soon).

As may be seen from Table 1, in two of the three countries the estimated coefficients for the Fed Funds rate are positive and significant; the exception being Mexico. This provides some preliminary evidence suggesting that during the period under study there may have been some policy “contagion” from the U.S. to some of these EMs. The main insights from this table may be summarized as follows: (1) The impact effect – first week – of a Fed action on these

17. The issue of timing here is important. The three central banks under study have monthly meetings; in contrast, the FOMC meets only eight times per year. Our data refer to each week’s Friday. The FOMC never holds scheduled meetings on a Friday. This means that using contemporaneous data for the Fed Funds rate is fine, in the sense that changes to the policy precede by at least a few days the policy rate that we are considering for our EMs.
countries policy rates is small. This is not surprising, as the timing of central bank meetings don’t necessarily coincide across countries. (2) The coefficient for \( \Delta r^*_t \) is never significant. And (3) the estimated long run effect of a change in the “contagion” effect \(-\left( \alpha_3 \right) \) ranges from 0.66 to 1.0 in the countries where there is “spillover.” The individual point estimates for these (unconditional) long term coefficients are 0.66 for Chile, 1.00 for Colombia, and non-significantly different from zero for Mexico. In some regards the result that U.S. policy didn’t affect Mexico’s central bank stance during this period is surprising, given that proximity of the two countries and the traditional dependence of Mexico’s economy to U.S. economic developments.\(^\text{18}\)

4.2 Multivariate analysis
In this Sub-Section I report results from multilateral estimates using both least squares and instrumental variables for the three Latin American nations. I included the following covariates \(x_{jt}\) (in addition to the dynamic terms and the Fed Funds target rate). (a) Year over year inflation rate, lagged between four and six weeks. Its coefficient is expected to be positive, as central banks tighten policy when domestic inflation increases. (b) Quarterly growth, annualized, lagged between four and six weeks; this is the second term of traditional Taylor rules, and its coefficient is also expected to be positive. (c) A measure of expected global inflationary pressures, defined as the breakeven spread between the five year Treasuries and five year TIPS. This is entered with one period lag and its coefficient is expected to be positive.\(^\text{19}\) (d) The yield on the 10 year US Treasury note. (e) An indicator of country risk premium, defined as the lagged EMBI spread for Latin America. Its expected sign is not determined a priori, and will depend on how central banks react to changes in perceived regional risk.

The least squares estimates are reported in Table 2, and confirm the results from Table 1, in the sense that during this period there is evidence of “policy spillover” in Chile and Colombia. These results are quite satisfactory. This is especially the case considering that interest rate equations are usually very difficult to estimate. As may be seen, most coefficients are significant at conventional levels, and have the expected signs. The R-squared is quite low, as is usually the case for interest rate regressions in first differences. In addition to the individual countries regression I report pooled results. In these estimates

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\(^{18}\) Indeed, at the time of this writing (April 2016) most analysts believe that Banxico is particularly aware of the Fed’s policy when determining its own policy stance.

\(^{19}\) However, it is possible to argue that once the Fed Funds rate is included, the coefficient of the spread between Treasuries and TIPS should be zero, since the Fed Funds rate already incorporates market expectations of inflation of the US.
fixed effects were included. The most salient findings in Table 2 may be summarized as follows:

– In every regression the coefficients of the traditional Taylor Rule have the expected positive sign and in the great majority of cases they are significant at conventional levels. In Chile the long run coefficient of inflation in the monetary policy equation is not significantly different than one; in Colombia and Mexico it is greater than one, as suggested by the original Taylor model for the USA. Also, in Colombia and Mexico, the (long term) coefficient of the growth term is smaller than that of the inflation term, as in most empirical Taylor Rules.

– In six of the eight regressions the coefficient of the Federal Funds rate (FF-Policy) is significantly positive, indicating that during the period under study there was a pass-through Fed policy rates into policy interest rates in Chile and Colombia. These coefficients are positive and significant, even when other determinants of the monetary policy stance -- including the traditional Taylor Rule components -- are included in the regressions. Once other covariates are included, the coefficient for the Fed Funds for Mexico continues to be non-significant (see, however, the instrumental variables results reported below). This suggests that in Chile and Colombia there was some form of “contagion” or “spillover” during the period under study.20

– The impact coefficient for the Fed’s Federal Fund’s rate is significantly larger in Chile (.0196 and .0206) than in Colombia (.0456 and .0469). That is, during this period Chile’s central bank had a tendency to react more slowly to changes in the Fed’s policy stance than Colombia.

– The extent of long term policy contagion, measured by \(-\left(\frac{\alpha_1}{\alpha_3}\right)\), is rather large in both Chile and Colombia. The point estimates for the long run effect is greater than one for Chile – this is the case both in equations (2.1) and (2.5). For Colombia, this long term coefficient is smaller than one: point estimates are 0.707 and 0.770 in equations (2.2) and (2.6). This means that as a consequence of a Fed’s policy rate hike, Chile will react more slowly, but in the end will tend to implement a higher increase in its own policy rates.

– Consider a 100 basis point increase in the Federal Funds rate. According to the point estimates in the two first columns in Table 2, after 26 weeks, the pass-through into Chile is 41 basis points, on average, and 58 bps in Colombia. After 52 weeks, the transmission is 71 basis points in Chile and only

20. In a recent paper Claro and Opazo (2014) argue that the Central Bank of Chile has been fully independent, and has not directly responded to Fed policy moves.
69 in Colombia. After 104 weeks the pass-through is 103 bps in Chile: in Colombia the process is finished with a rate increase, on average of 71 bps.21

–The coefficients of the other covariates are significant at conventional levels in almost every case. These results indicate that perceptions of higher regional risk, measured by the spread of the EMBI index for Latin America, tend to result in defensive monetary policy – that is in higher domestic interest rates – in Chile and Mexico, but not in Colombia. A higher expected inflation in the U.S., measured by the implied inflationary expectations in the spread between the 5 year note and 5 year TIPS, also generates a tightening in the domestic monetary policy. This is an interesting result, as it suggests that central bankers in Chile and Colombia react to a Fed action even when we control for the market’s expectations of inflation. This suggests that, during this period, central bankers in Chile and Colombia believed that the Fed had superior information and/or knowledge than the market.

–In the last four columns in Table 2 I present estimates of policy reaction functions that include the yield on the 10 year Treasury note as an additional regressor. The issue, as noted, is the extent to which the slope of the yield curve matters in the transmission of policy rates. More specifically I try to answer the following question: Does it make a difference if the Federal Funds rate is raised and the 10 year Treasury yield is constant or if it is allowed to adjust. As may be seen the results provide some preliminary evidence that there is no role for the long rate in the policy transmission process (see, however, the discussion below for an analysis of the possible effects of Treasuries of other tenors).

4.3 Instrumental variables and commodity prices

In this Sub-Section I discuss issues related to possible endogeneity, and I present a set regressions estimated with instrumental variables. I also report the results obtained from some extensions of the analysis.

For countries such as Chile, Colombia and Mexico, the Fed Funds rate, the yield on TIPS, and the yield on Treasuries are clearly exogenous to their monetary policy decisions. It is possible to argue, however, that some of the domestic variables, and in particular growth, may be subject to some degree of endogeneity.22 In order to explore this angle I estimated instrumental variables

21. Most (but not all) central banks conduct policy by adjusting their policy rates by multiples of 25 bps. The estimates discussed here refer to averages. Thus, they need not be multiples of 25 bps.

22. It is possible for lagged growth to be endogenous. This may especially be the case in a dynamic panel, like the ones in columns (2.4) and (2.8) and in the Sections that follow.
versions of some of the equations in Table 2. The results are presented in Table 3, and confirm the results reported previously, in the sense that during the period under study Chile and Colombia were subject to considerable policy “contagion.” This is not the case for Mexico.

Most of the coefficients of the other covariates continue to have expected signs and estimated with the standard level of precision. Table 3 also has a dynamic panel estimate; country fixed effects were included.

Notice, however, that there are some differences between the results in Tables 2 (least squares) and 3 (IV), in terms of the point estimates of the coefficients of interest. In the IV estimates the impact coefficient for Chile is larger than under LS. More important, perhaps, the long term pass-through is now significantly smaller than one; it has a point estimate of 0.732. The long term pass-through for Colombia is now 0.661. To summarize: the results in Table 3 indicate that during the period under analysis the central banks in Chile and Colombia tended to follow the Federal reserve; the pass-through coefficient was, in both countries, lower than one.

An interesting question is whether monetary policy in these countries has been historically affected by the behavior of commodity prices. In order to analyze this issue I included in each regression the log of the de-trended commodity prices of greater relevance for each of the three countries: copper for Chile, energy and coffee for Colombia and energy for Chile. The detrending of these indexes was obtained using the Hodrick-Prescott filter. The results are in Table 4. Broadly speaking, the results obtained conform our earlier findings regarding “contagion.” There is no strong evidence that commodity prices affected monetary policy during this period. Only one of the commodity coefficients is significant at conventional levels: energy in Colombia, with a negative coefficient.

5. EXTENSIONS, REFINEMENTS AND ROBUSTNESS

In this Section I present a number of extensions to the analysis. (1) First, I investigate whether the yield on Treasuries of shorter maturities than 10 years have had an effect in the policy “spillover” process. In particular I consider the yield on 2 and 5 year Treasuries. It is possible that central banks’ authorities in these countries take into account rates in the middle rather than at the long end of the yield curve. (2) I investigate if the volatility conditions in global financial markets had historically had an effect on the transmission of policy

23. The following instruments were used: log of lagged commodity prices (copper, coffee, metals, energy, WTI oil), lagged USD-Euro rate, 6 periods lagged effective devaluation, lagged expected depreciation, and lagged rates for the U.S. at a variety of maturities.
rates from the Fed to the countries in the sample. (3) I investigate the extent to which the degree of capital mobility has historically affected the extent of policy spillover. (4) I finally present a number of robustness tests.

In the analyses presented in this Section I focus on a dynamic panel for Chile and Colombia, the two nations that in the results in the previous section appeared to have been subject to some policy “spillover” during the period under study. There are a number of advantages of using a panel, including the fact that in a panel some of the covariates exhibit greater variability (this is particularly the case for the index of capital mobility).

5.1. Moving along the yield curve
The results in the preceding section for individual countries suggested that the yield on the long Treasury note (10 years) hadn’t affected, historically, monetary policy in the three countries in the sample. In this Subsection I investigate this issue further by incorporating the yields of other Treasury securities along the yield curve. In particular, I estimate dynamic panel regressions (with instrumental variables and fixed effects) for Chile and Peru, with the yield on the 2, 5 and 10 year Treasuries as additional regressors. Before proceeding it is interesting to look at how the spreads between the Fed Funds rate and these longer term Treasury securities behaved during the period under investigation—see Figure 4. As may be seen the spreads (slopes of the yield curve at different points) are fairly high between the mid-2001 and the mid-2005; they were quite low during the late 2000 and late 2007.

The results from the instrumental variables dynamic panel analysis are in Table 5, and may be summarized as follows:
– The coefficient of the Federal Funds rate is always significant, confirming the existence of policy “spillovers” in the two countries that make up the panel. It is interesting to notice that the point estimate of the coefficient of the Fed Funds is higher in the regressions where the yield on longer term Treasuries is incorporated. This indicates that the spillover effect is larger when we control for longer term yields, and a hike in the Fed Funds makes the yield curve flatter.
– The coefficient of longer term yields is always negative, and significantly so for the 2 and 5 year tenor. Moreover, the null hypothesis that the Fed Funds and longer Treasury yield sum up to zero cannot be rejected at conventional levels. This indicates that during the period under analysis a raise in the Fed Funds rate that was not accompanied by an increase in longer term yields had a greater effect on these countries monetary policy than a hike in the policy rate that results in a parallel shift of the midsection of the U.S. yield curve.
5.2. Global financial conditions and monetary policy spillover

Has policy spillover worked in a similar way when the global economy is in turmoil than when it is going through a tranquil period? In order to investigate this issue I used the “Ted spread,” defined as the spread between the 3 months LIBOR and the effective (as opposed to policy) Federal Funds rate, as an indicator of market volatility. During periods of financial turbulence the Ted spread increases; it declines during periods of tranquility. In Figure 5 I present the weekly evolution of the Ted spread for 2000-2008. During this period the mean was 0.21 (21 bps), the median was 0.18, and the standard deviation was 0.228. In the analysis I proceeded as follows: I estimated dynamic panel IV equations for two subsamples: “Low volatility” (or low Ted spread) and “High volatility” (high Ted spread). The definition of “high” and “low” was determined by the median value of the Ted spread.

The results from these regressions are in Table 6. They indicate that spillover is a phenomenon that occurs during period of higher global financial volatility. Indeed, these estimates suggest that there is no “policy contagion” during periods global financial markets are calmed. A possible explanation for this is that EM’s central bankers become particularly defensive during periods of global financial turmoil. It is during these times that they become particularly sensitive to global shocks, and decide to follow the advanced countries’ central banks. This notion is supported by the estimated coefficients of the EMBI variable: in the “high volatility” regressions they are significantly higher than in the regressions for the complete sample, and their p-values are significantly lower; indeed, these coefficients are not significant during the low volatility periods.

A preliminary analysis of the case of Mexico – remember that in the previous section I found no evidence of spillover for that country --, indicates that there was indeed some response by its central bank to Fed Funds changes during high volatility periods. However, in order to determine the robustness of this result, further research is required.

5.3. Policy “spillovers” and capital controls

In equation (1) I assumed that there was a tax of rate r on capital leaving the country. Alternatively, it is possible to think that there is a tax on capital inflows, of the type popularized by Chile during the 1990s. If, this is the case, equation (1) becomes:

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25. See, for example, Edwards (2012).
\[(1') \; r_t - r_t^* (1-t) + t = E_t \{\Delta e_{t+1}\},\]

where \( t \) is the rate of the tax on capital inflows.

As pointed out above, the three countries in this study had varying degrees of capital mobility during the period under study, with Chile being the most open one, and Colombia being the least open to capital movement. In addition, during the (almost) 500 weeks covered by this analysis there were some adjustments to the extent of mobility in all nations. This was especially the case of Chile, a country that in early 2001, and during the negotiation of the Free Trade Agreement with the United States, opened its capital account further. In Figure 6 I present the evolution of a comprehensive index of capital mobility. In constructing this index I took as a basis the indicator constructed by the Fraser Institute; I then used country-specific data to refine it. A higher number denotes a higher degree of capital mobility in that country in that particular year.

An interesting question, then, is whether the degree of capital mobility affects the extent of pass-through from Fed Funds rates into policy interest rates in emerging countries. In order to address this issue I estimated a number of IV dynamic panel regressions similar to those reported above, with two additional regressors: an index of capital mobility and a variable that interacts this index with the Fed Funds rate. The results reported in Table 7 should be considered preliminary and subject to further research for a number of reasons, including, the fact that the index of capital mobility is an aggregate summary that includes different modalities of capital controls. To understand better the role of mobility on interest rate pass-through it is necessary to construct more detailed and granular indexes. Second, in order to investigate this issue fully, a broader sample that includes countries with greater restrictions would be required.

The results in Table 7 are interesting and may be summarized as follows: Overall they tend to confirm the findings reported above: there continues to be evidence of a pass-through from Fed Funds rates into domestic policy rates, even after controlling for other variables. As may be seen, the Capital Mobility index is significant and positive when entered on its own; in this case the Fed Funds coefficient continues to be significant and positive. The interactive variable is negative and significant at the 10% level in all regressions. This suggests that the higher the degree of mobility, the lower the effect of a change in the policy rate. A possible reason for this is that a higher degree of capital mobility is acting as a proxy for the sophistication of domestic capital markets. It is possible that with deeper domestic financial markets a central bank could
maintain a higher degree of independence. As noted, however, this is an issue that merits further analysis.

5.4. Other extensions
In order to determine the robustness of the results I considered a number of alternative specifications and I introduced additional regressors. Here I summarize some of the results.

*Federal Funds rate:* I considered different lags in the Fed Funds rate (from contemporaneous to 2 weeks lags). This had no discerning effect on the results. Also, the results were basically unaffected if the estimation period was altered somewhat, and if the effective Federal Funds rate was used instead of the target rate.

*Additional global financial variables:* An interesting question is whether other variables related to global economic conditions enter these three countries policy rules. I address this issue by considering two additional covariates: a stock market index for the U.S. (first differences of the log), and the first difference in the (log of the) Euro-USD exchange rate. In two of the individual countries’ regressions (for Colombia and Mexico) the coefficient of the (one period lagged) Euro-USD exchange rate is significantly positive. The inclusion of this variable, however, doesn’t affect the main findings regarding policy “contagion” discussed above. The stock market covariate is not significant.

*Short term deposit rates:* I also investigated the extent to which Fed policies were translated into (short run) market interest rates. The results obtained – available on request – show that there is a significant and fairly rapid pass-through from Federal Reserve policies into 3-month CD rates in the three countries in the Latin American sample. This is the case even after controlling for expected depreciation, country risk, and global financial conditions such as the USD-Euro exchange rate and commodity prices – for a preliminary analysis on this issue see, for example, Edwards (2012) and the literature cited there.

6. A COMPARISON WITH EAST ASIAN NATIONS

How particular are the Latin American countries in this study? How does their central banks’ behavior compare to those of central banks in other EMs? In order to address this issue I estimated a number of IV dynamic panel equations for a panel of three East Asian nations: Korea, Malaysia and the Philippines. These three nations constitute a slightly more varied group than our Latin American countries: Korea and the Philippines had (some degree of) currency flexibility during 2000-2008, while during most of the period under
study Malaysia had fixed exchange rates (relative to the USD); the three East Asia nations’ central banks were de facto (but not necessarily de jure) quite independent from political pressure; and Korea and the Philippines followed inflation targeting.\(^{26}\)

The results for the East Asia panel are presented are in Table 8. The most important findings may be summarized as follows: (1) In contrast to the Latin American nations discussed above, for the East Asian nations the coefficients of the traditional Taylor Rule components (inflationary pressures and domestic growth) are not significant, suggesting that during this period these countries implemented monetary policy following a criterion that differed from traditional Taylor rules. (2) There is, however, evidence that changes in the policy stance in the U.S. were transmitted, to some extent, to these East Asian nations. (3) But the most interesting result is that the magnitude of the monetary policy “spillover” is much smaller in East Asia than in Latin America. This becomes particularly clear when we compare the results in Tables 5 and 8. The coefficients for the impact effect are smaller in the East Asian case. But, more important, the long term pass-through coefficient is significantly smaller in East Asia than in Latin America. Compare, for instance, equations (5.1) and (8.1), which have the same specification. According to (5.1) the long run pass-through in the Latin American nations is a relatively high 0.68, while it is only 0.29 in the East Asian nations. Interestingly this historical difference in response is consistent with EM’s central banks behavior during late 2015 and early 2016 that was discussed above: the Latin American countries tended to follow the Fed and raised their policy rates, while the East Asian nations stayed “on hold.”

7. CONCLUDING REMARKS

In December 2015 the Federal Reserve raised interest rates for the first time since 2006. At the time an important question was – and continues to be – how the tightening process would affect the emerging markets. Undellying that question was a bigger issue: To what extent do emerging markets follow an independent monetary policy? In this paper I attempt to provide a (partial) answer to this question by investigating the extent to which Fed policy actions have, in the past, been passed into monetary policy interest rates in a group of Latin American nations—Chile, Colombia and Mexico—during the period 2000-2008.

\(^{26}\) For indexes of central bank transparency and independence see Dinzer and Eichengreen (2013).
The results indicate that two of the three countries – Chile and Colombia – were subject to policy “spillovers” or policy “contagion” during this period. Even after controlling for other determinants of monetary policy stance – including the traditional Taylor Rule variables – changes in the Fed policy rate were transmitted into these countries’ own policy rates. Interestingly, there is no evidence for spillovers for Mexico.

The finding of a non-zero pass-through from the Fed to monetary policy in two of the three countries in the sample with exchange rate flexibility is important for the debate on optimal exchange rate regimes. Indeed, according to traditional models one of the key advantages of flexibility is that the country in question can run its own monetary policy. The results in this paper question that principle, by indicating that at least for two out of three countries there is a fairly high degree of “policy contagion” – there is also some evidence of “contagion” in the three East Asian countries of Section 6. A possible explanation for the results reported in this paper is “fear to float” That is not captured fully by the covariates included in the analysis. According to models in the Mundell-Fleming tradition, if there is less than perfect capital mobility, a hike in the global interest rate – generated by, say, Federal Reserve action – will result in an incipient external deficit and in a depreciation of the domestic currency. Indeed, it is currency adjustment what reestablishes equilibrium. If, however, there is “fear to float,” the local authorities will be tempted to tighten their own monetary stance (i.e. hike policy rates) as a way of avoiding the weakening of the currency. Further investigation along these lines should shed additional light onto the question of the “true” degree of monetary independence in small countries with flexible exchange rates. A particularly important point that follows from this analysis is that, to the extent that the advanced country central bank (i.e. the Fed) pursues a destabilizing policy, this will be imported by the smaller nations, creating a more volatile macroeconomic environment at home.

27. Calvo and Reinhart (2000) is the classical reference on this subject.
28. For a discussion along these lines see, for example, Taylor (2013), See, also, Edwards (2012) and Rey (2013).
DATA SOURCES

**Interest rates:** Policy rates were obtained from various issues of each country central bank. Data on U.S. Treasuries and Federal Funds rate were also obtained from Datastream. All the figures correspond to the Friday of that particular week.

**Exchange rates:** For the Latin American countries they correspond to units of domestic currency per USD. Expected devaluation is constructed as the 90 day forward discount also relative to the USD. The Euro-USD rate is defined as Euros per USD. The source is Datastream.

**Commodity Price Indexes:** Obtained from the JP Morgan data set.

**Country risk:** Defined as the EMBI premium above Treasuries, measured in percentage points. The data were obtained from Datastream.

**Inflation and growth:** Individual countries Central Bank bulletines.

### TABLE 1. MONETARY POLICY RATES IN LATIN AMERICA, 2000-2008, (LEAST SQUARES)

<table>
<thead>
<tr>
<th>Eq Name</th>
<th>Method</th>
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<th>COLOMBIA</th>
<th>MEXICO</th>
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<td>0.016</td>
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<td>[3.373]**</td>
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*, **, and *** refer to significance at 10%, 5% and 1%, respectively.

### TABLE 2. MONETARY POLICY RATES IN CHILE, COLOMBIA AND MEXICO, 2000-2008, (LEAST SQUARES)

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<th>(3) MEXICO</th>
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*, **, and *** refer to significance at 10%, 5% and 1%, respectively.

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**FLAR** JULIO 2016  
**PAPERS AND PROCEEDINGS**  
**THE FEDERAL RESERVE AND MONETARY POLICY IN LATIN AMERICA: IS THERE POLICY "SPILLOVER"?**

**DIRECCIÓN DE ESTUDIOS ECONÓMICOS**
### TABLE 3. MONETARY POLICY RATES IN CHILE, COLOMBIA AND MEXICO, 2000-2008, (INSTRUMENTAL VARIABLES)

<table>
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* *, **, and *** refer to significance at 10%, 5% and 1%, respectively.

### TABLE 4. MONETARY POLICY RATES AND COMMODITY PRICES IN CHILE, COLOMBIA AND MEXICO, 2000-2008, (INSTRUMENTAL VARIABLES)

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<tr>
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<tr>
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<td>351</td>
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<tr>
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<td>F-statistic:</td>
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<td>2.7953</td>
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* *, **, and *** refer to significance at 10%, 5% and 1%, respectively.
### Table 5. Monetary Policy Rates in Latin America and the Yield Curve, Dynamic Panel (Chile, Colombia), 2000-2008, (Instrumental Variables)

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<th>(5.3)</th>
<th>(5.4)</th>
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<td>0.0846[3.3751]***</td>
<td>0.0421[2.8125]***</td>
<td>0.0253[2.4035]**</td>
</tr>
<tr>
<td>C</td>
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<td>-0.0976[-0.5878]</td>
<td>-0.1300</td>
</tr>
<tr>
<td>POL_RATE(-1)</td>
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<td>-0.0246[-2.7927]***</td>
<td>-0.0205[2.3970]**</td>
<td>-0.0201</td>
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<tr>
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<td>0.1009[2.6842]***</td>
<td>0.0903[2.4531]***</td>
<td>0.0811[2.2328]**</td>
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<tr>
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<td>0.0077[1.4865]</td>
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<td>-0.0306[-0.7737]</td>
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<tr>
<td>INF_YOY(-4)</td>
<td>0.0204[2.6494]***</td>
<td>0.0101[1.6910]*</td>
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<td>0.0169[2.0742]**</td>
</tr>
<tr>
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<td>0.0171[1.6648]*</td>
<td>-0.0044[0.3255]</td>
<td>0.0020[0.1528]</td>
<td>0.0086</td>
</tr>
<tr>
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<td>-0.0935[-2.9143]**</td>
<td>--</td>
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</tr>
<tr>
<td>UST_5YR(-1)</td>
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<td>--</td>
<td>-0.0573[-2.0730]**</td>
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<tr>
<td>UST_10YR(-1)</td>
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<td>--</td>
<td>--</td>
<td>-0.0402[-1.3436]</td>
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</table>

Observations: 709  R-squared: 0.0529  F-statistic: 4.1658

* *, **, and *** refer to significance at 10%, 5% and 1%, respectively.

### Table 6. Monetary Policy Rates in Latin America and Global Volatility, Dynamic Panel (Chile, Colombia), 2000-2008, (Instrumental Variables)

<table>
<thead>
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<th>(6.3) Low Ted</th>
<th>(6.4) Low Ted</th>
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<td>0.0165[0.3983]</td>
<td>0.0090[0.3782]</td>
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<td>C</td>
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<td>-0.3113[-1.9305]</td>
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<td>0.0675[1.0910]</td>
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<td>0.0101[0.8774]</td>
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Observations: 709  R-squared: 0.1151  F-statistic: 4.6158

* *, **, and *** refer to significance at 10%, 5% and 1%, respectively.
TABLE 7. MONETARY POLICY RATES IN LATIN AMERICA AND CAPITAL MOBILITY, DYNAMIC PANEL (CHILE, COLOMBIA), 2000-2008, (INSTRUMENTAL VARIABLES)

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* *, **, and *** refer to significance at 10%, 5% and 1%, respectively.

TABLE 8. MONETARY POLICY RATES IN EAST ASIA, DYNAMIC PANEL, 2000-2008, (INSTRUMENTAL VARIABLES)

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<td>0.0004</td>
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* *, **, and *** refer to significance at 10%, 5% and 1%, respectively.
FIGURE 1. FEDERAL FUNDS TARGET RATE, 1994-2008

FIGURE 2. MONETARY POLICY RATES, SELECTED LATIN AMERICAN COUNTRIES, 2000-2008

FIGURE 3. POLICY RATES EQUILIBRIUM UNDER “POLICY CONTAGION” AND LARGE COUNTRIES
FIGURE 4. SPREAD BETWEEN 2, 5 AND 10 YEARS TREASURIES AND FEDERAL FUNDS RATE, WEEKLY 2000-2008

FIGURE 5. TED SPREAD, WEEKLY 2000-2008

FIGURE 6. CAPITAL MOBILITY INDEX FOR SELECTED LATIN AMERICAN COUNTRIES, 2000-2008
CAP_CONT_NEW
REFERENCES


América Latina: Expectativas no tan favorables

ADRIANA ARREAZA

¿Por qué los pronósticos para América Latina no muestran expectativas favorables? Lo primero que debemos mencionar es que el crecimiento promedio de la región se ha debilitado en los últimos años y las perspectivas para una recuperación no parecen ser favorables.

Como se observa en el Gráfico 1, luego de la fuerte caída del crecimiento económico experimentada antes de 2010, la región comenzó a desacelerarse y entró en recesión en 2015. Para 2016, se espera que la recesión continúe y que la recuperación de los próximos años se encuentre muy por debajo de las tasas de crecimiento de la década anterior, como resultado de un entorno externo menos favorable.

Dicho entorno se enmarca, en primera instancia, por la debilidad de la demanda global, que durante los últimos años se ha estancado alrededor de un 3% a la espera es una débil recuperación. Como un caso particular, las economías emergentes han experimentado una marcada desaceleración, teniendo un impacto muy importante en la región, particularmente para el caso de la economía china.

1. Directora de Estudios Macroeconómicos, CAF – Banco de Desarrollo de América Latina.
que no solo se convirtió en el primer socio comercial de muchos de los países de la región, sino también por su influencia sobre el precio de las materias primas.

Además de un debilitamiento de la demanda global, los flujos de capital hacia la región son cada vez más escasos y volátiles. El Gráfico 3, muestra la correlación de los flujos de portafolio hacia los mercados emergentes con el spread corporativo de las empresas BBB de Estados Unidos, como una medida de aversión al riesgo. Así, se observa que cuando la aversión al riesgo está descendiendo, los flujos de capital aumentan. Caso contrario, cuando la aversión al riesgo aumenta, porque los mercados financieros reciben noticias sobre la desaceleración de China o cambios en la política monetaria en Estados Unidos, presionando para abajo los flujos de capital hacia las economías emergentes. Entonces, bajo el actual contexto, los flujos de financiamiento de portafolio se están tornando cada vez más escasos y los spreads en algunos casos se han ampliado.
Algo importante para mencionar, sobre el último episodio de volatilidad que tuvieron los mercados, como resultado del Brexit, fue que los efectos de este suceso se vieron mitigados rápidamente por dos cosas: i) Las noticias de cierta estabilización en el segundo trimestre en China, luego de los estímulos financieros y fiscales y ii) La postergación de una nueva subida de la tasa de interés por parte de la Reservas Federal.

Es decir, que para el caso de las economías emergentes hay dos factores claves para entender la dinámica de los flujos de portafolio: i) Qué va a ocurrir con la política monetaria en Estados Unidos y Europa y ii) Las noticias sobre China.

Por último, se encuentra la caída en los precios de las materias primas y sus perspectivas de crecimiento bastante mitigadas, como se observa en el Gráfico 4. Esto ha tenido un marcado impacto, particularmente en los países exportadores de América del Sur y en cierta medida en México, donde ha limitado los incentivos para invertir en la industria petrolera, aún después de las importantes reformas implementadas en el sector.

GRAFICO 4. PERSPECTIVA EN LOS PRECIOS DE LAS MATERIAS PRIMAS


Bajo este complicado contexto, ¿Cuál es el pronóstico o el escenario base que se tiene para las economías de América Latina? Para este año, se espera una recesión seguida de una recuperación muy lenta a partir de 2017.

Sobre estas expectativas y como se muestra en el Gráfico 5, el riesgo más importante para la región está relacionado con la tendencia de desaceleración del crecimiento económico en China. El escenario base, descrito anteriormente, supone un aterrizaje suave. Sin embargo, bajo un aterrizaje fuerte, con tasas de crecimiento por debajo del 4%, la región experimentaría un mayor impacto sobre su desempeño económico, permaneciendo en recesión para 2017. Por
supuesto, otros escenarios que se contemplan, con un menor riesgo de ocurrencia, son una desaceleración en Estados Unidos que tendría efectos similares sobre la región.

Hasta ahora se ha analizado la región en promedio. Sin embargo, cuando observamos las cifras como casos particulares, notamos que la recesión esperada en 2016 esta explicada por Brasil y Venezuela, países que representan alrededor de 45% del PIB de la región. Sin embargo, el resto de las economías, si bien se han desacelerado, se mantienen creciendo en buena medida en tasas entre el 2% y 3%.

No obstante, el Gráfico 6 muestra una representación estilizada sobre la fase del ciclo económico en que se encuentran las economías de la región, dependiendo de la brecha de crecimiento observada en 2015 y la estimada para 2016. Por una parte, se observa que las economías que aún no experimentan la parte inferior del ciclo, que podrían continuar descendiendo con respecto al potencial en los próximos años, son precisamente los exportadores de materias de primas de América del Sur, aunque para algunas casos como Perú y Brasil se espera que entren en la fase de cambio de su ciclo económico. Mientras, los países que han estado más ligados a la evolución de la economía de Estados Unidos, como Centroamérica y México ya se encuentran en la fase de recuperación, aunque estén creciendo por debajo del potencial.

Sin embargo, la conclusión más importante es que la brecha del crecimiento económico de la región dependerá del origen del choque externo, al igual que...
de la implementación de las políticas domésticas, como se observa principalmente en casos como Venezuela y Brasil.

Pero más allá de un tema cíclico, el comportamiento de los países de América Latina tiene que ver con aspectos más estructurales. Como se observa en la muestra de países del Gráfico 7, el producto potencial se ha corregido a la baja, siendo el caso más pronunciado el de Brasil. Este comportamiento podría estar relacionado con un problema crónico en América Latina, la baja productividad. Cuando se hacen ejercicios de descomposición del crecimiento económico, un resultado que es muy común para la región es la contribución negativa de la productividad total de los factores, salvo en la última década. Pero si ese mismo ejercicio se repite para los últimos cinco años, esa contribución vuelve a ser negativa para algunos países e incluso se ha estancado en otros.
GRÁFICO 7. AJUSTE EN EL CRECIMIENTO ECONÓMICO POTENCIAL DE LA REGIÓN

Argentina

Colombia

Brasil

Chile

México

Perú

Tendencia

Tendencia del crecimiento (eje menor)

Fuente: CAF-Banco de Desarrollo de América Latina.
Mirando la productividad laboral con respecto a Estados Unidos como se muestra en el Gráfico 8, en América Latina esta permaneció relativamente estancada, a pesar del *boom* tan importante de los últimos años. Incluso para el caso de Chile, que tiene una de las productividades relativas más elevadas, esta se quedó constante en los últimos años, al igual que el resto de países de la región. Sin embargo, en el caso de China, la productividad aumento de manera acelerada, en línea con el crecimiento económico, comportamiento que observa en los países que han logrado superar la trampa del ingreso medio, ver Gráfico 9.

Esta debilidad macroeconómica está comenzando a afectar los mercados laborales. Como se observa en el Gráfico 10, la pobreza comenzó a crecer por primera vez en el último año, comportamiento relacionado con las tasas de desempleo, con la precarización del trabajo, donde se observa una reducción de la formalidad y con el deterioro de los salarios reales. Esta dinámica de los mercados laborales y las altas tasas de inflación están comprimiendo los salarios reales en varios de los países, lo cual presiona las mejoras en temas de pobreza que hubo en años anteriores y que en buena medida apuntaron a mejorar el empleo. Hay toda una discusión sobre la contribución de las políticas sociales y el desempeño de la pobreza en América Latina pero en buena medida cuando se externalizan estos resultados, eso se explica por el buen desempeño del mercado laboral derivado del buen desempeño económico.

**GRÁFICO 8. PRODUCTIVIDAD LABORAL EN AMÉRICA LATINA Y EN LAS ECONOMÍAS DE ASIA**

(% DE LA PRODUCTIVIDAD DE ESTADOS UNIDOS, PROMEDIO MÓVIL DE 5 AÑOS, CONTRIBUCIÓN POR PPP)

¿Cuáles han sido las respuestas de política en este contexto de desaceleración global? En primer lugar, en esta oportunidad buena parte del choque externo fue absorbido por tipos de cambio más flexibles, que no era lo común en América Latina, observándose una depreciación nominal bastante importante en varias monedas de la región. Esto se ha traducido, en un lento ajuste de los saldos de cuenta corriente, que en algunos países apenas se está comenzando a ver, Gráfico 11.
Este ajuste de la cuenta corriente, se da entonces, por la reducción de las importaciones y la desaceleración de la demanda interna, en vez de un aumento de las exportaciones. Comportamiento explicado, en parte, por los tipos de cambio multilaterales que no se han depreciado tanto como podría sugerirlo la depreciación nominal del dólar y en un contexto de una demanda global más débil.

Por otro lado, algo que nos enseña esto es que quizás es más fácil perder mercados cuando las monedas se aprecian que recuperar esos mercados cuando las monedas se deprecian. Esta política está comenzando a contribuir a un ajuste ordenado de los saldos externos aunque quizás un poco más lento de lo que se hubiera esperado. Sin embargo, la depreciación cambiaria ha tenido un costo, traducido en altas tasas de inflación para varios países de la región, prácticamente independientemente de si tienen regímenes de Inflación Objetivo o regímenes más intermedios, como se observa en el Gráfico 12.

Fuente: OECD/CAF/ECCLAC basado en IADB (2016)
Y en la medida en que las tasas de inflación se han elevado en el último año, la mayoría de los países de la región han elevado las tasas de interés. Es decir, han asumido una posición más restrictiva en sus políticas monetarias. El Gráfico 13, muestra un índice de difusión de la política monetaria que no es otra cosa que el número de países que elevaron las tasas menos el número de países que redujeron las tasas o las mantuvieron constantes y lo que se puede ver es que buena parte de los países de la región, es decir el número de países que han aumentado las tasas o que se han vuelto más restrictivos, supera a los países que han permanecido en una posición neutral.

Aun cuando muchas economías se encuentran por debajo del potencial, no hay tanto espacio para estímulos del lado monetario. Quizás el próximo año, una vez el cambio en los precios relativos con la depreciación cambiaria se absorba, sin esperar una depreciación mayor en los próximos años, y una vez las tasas de inflación comiencen a converger hacia las metas, quizás habrá mayor espacio en el mediano plazo para estímulos tipo monetario, pero en estos momentos no es tan claro.

Por el lado de la política fiscal, tampoco es tan claro que haya un espacio importante. Los balances fiscales, comparando los observados en 2007, antes de la crisis financiera internacional, y en 2015, muestran una reducción importante, pasando en varios casos de superávit a déficit, como se muestra en el Gráfico 14. Esto ha repercutido en un crecimiento relativamente acelerado de la deuda, particularmente en los casos de Venezuela y recientemente Brasil, país que lleva prácticamente dos años con un déficit cercano al 10% del PIB.
Si los países quisieran aplicar estímulos fiscales y a su vez mantener la sostenibilidad fiscal, tendría que tener espacio de endeudamiento o tener la manera de implementar ciertas reformas fiscales para elevar los ingresos provenientes de tributos, con respecto al PIB. Pero no todos los países están en una situación para estimular la economía por el lado del gasto y se encuentran más bien en una situación de ajuste fiscal, como muestra la gráfica 15 para el caso de Brasil y Argentina, los cuales tienen altos niveles de endeudamiento y una contribución de los impuestos con respecto al PIB que hacen difícil un incremento adicional.
de los impuestos para financiar gasto. Por esta razón, en el caso de Brasil, la consolidación fiscal claramente está viniendo por el lado de la reducción del gasto.

Incluso, las posturas de los gestores de política monetaria en países donde existe cierto espacio, como Perú, Chile y Paraguay, son tímidas en relación a los estímulos fiscales, dado que existe la posibilidad que decisiones como estas deterioren la posición fiscal y tengan impactos en las calificaciones de riesgo de los países. Luego están los casos más intermedios como el caso de Colombia y México, por poner dos ejemplos, que tienen niveles de endeudamiento relativamente moderados, quieren reducir la deuda y en ese caso lo que cabe son ciertas reformas fiscales, pero como se sabe, esto es mucho más fácil decirlo que hacerlo. Hay toda estructura de política monetaria detrás de esto, que dificulta la expansión del gasto y la reforma tributaria necesaria para financiarlo.

En el Gráfico 16, muestra los resultados de un estudio reciente del Banco Mundial, donde se muestra que la efectividad de un estímulo fiscal también
depende de las fortalezas fiscales, donde en la medida en que la deuda sea más grande, los multiplicadores del gasto pueden ser más pequeños. Entonces, desde este punto de vista, en la región habría serias dificultades para los estímulos por la vía del gasto. Si este es el caso, ¿qué queda por hacer? En la región, como se dijo anteriormente, el problema no es solamente el ciclo. Hay toda una serie de reformas de tipo estructural pendientes en las que se debe avanzar para recuperar el crecimiento de largo plazo.

¿Cuáles son esas políticas? Por un lado, preservar la sostenibilidad fiscal es clave para estas economías. Preservar y fortalecer la credibilidad de la política monetaria - que ha sido una de la más importante en la región - sigue siendo algo crucial, pero también hay una serie de reformas para fortalecer la productividad en la que los gobiernos pueden ir avanzando, como es el cerrar las brechas de infraestructura. Pero surge la pregunta ¿cómo cerrar las brechas de infraestructura si no se tiene espacio fiscal? Bueno, hay mecanismos como la incorporación de la participación del sector privado, los mecanismos de concesiones, y las ATP que varios países de la región exitosamente han estado implementando y esto ha contribuido a cerrar estas brechas de infraestructura.

Otro tema importante es fortalecer el capital humano de los trabajadores, y en ese sentido el tema de la educación se vuelve primordial. Pero no solamente aumentando el gasto para este sector, si no incentivando la calidad de la educación.

Y finalmente un tema en el que se está trabajando en CAF, es la mala asignación de recursos en la región. Es una tarea importante identificar cuáles son las distorsiones que generan una mala asignación de recursos en la región. En la región la mitad de la población, independientemente del tejido productivo de la región, de si son exportadores de materias primas o si son economías más industrializadas como el caso de México, hay un alto grado de informalidad y esto lo que quiere decir es que hay una gran parte de la masa laboral que no está incorporada al proceso productivo, lo cual pesa de manera muy importante sobre la productividad. Esto es un tema relevante para trabajar en los próximos años, investigando cuáles son las restricciones más importantes que hay que eliminar para que no siga ocurriendo en la región.
1. INTRODUCTION

Fondo Latinamericano de Reservas, or FLAR, can be thought of as an element of the global safety net with which countries insure against crisis risk and tap resources when crises hit. Most recently, at the end of March 2016, FLAR signed an agreement with the Ecuadorian government under which it provided the country with a liquidity credit of $156.5 million for up to three months (El Comercio 2016). This liquidity line is one of a range of credit facilities available to members, which include balance of payments credits (with access limits of 2.5 times paid-in capital for a period up to three years), foreign external debt restructuring credits (up to 1.5 times capital, again for up to three years), contingency lines of credit (twice paid-in capital for up to six months), and treasury lines of credit (twice paid-in capital for up to 30 days).²

Insurance is a contract in which an entity receives financial protection in the form of a transfer of resources in the event of accident or other contingency. The argument in its favor is as an effective way of dealing with costly events whose incidence is imperfectly correlated among policy holders. In the context of FLAR, “policy holders” are member countries that make premium payments in the form of capital subscriptions and can expect to draw credits, which are provided at favorable cost or would otherwise be unavailable to them, in multiples of the subscription amount subject to approval by the Executive President or Board of Directors. This can be thought of as a way of pooling risk, akin to the manner in which subscribers to long-term care insurance pool the risk of catastrophic illness. In one year, Country A draws dollar resources in excess of its paid-in capital, financed by the dollar reserves paid into the pool by its partners, while in some future year resource flows are reversed. Members have

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1. George C. Pardee and Helen N. Pardee, professor of Economics and Political Science, University of California, Berkeley.
2. Liquidity lines of credit are available for periods of up to 12 months in amounts equal to paid-in capital.
access to a larger pool of dollars without having to invest to the same extent in costly reserve accumulation. Having a cost-effective form of international financial insurance is increasingly important in a world where global external liabilities have consistently been growing faster than global GDP (as shown in Figure 1).³

The argument against a more extensive global safety net, as with the argument against insurance more generally, rests on moral hazard. Insurance encourages risk taking. In the present context the knowledge that credit lines are available encourages governments to pursue policies or delay adjustments that make crises more likely, since they know financial assistance will be available in their event. For example, it can be argued that the availability of credit lines encourages Ecuador to pursue a policy of dollarization, which is risky in the face of volatile commodity prices and an appreciating U.S. dollar exchange rate.⁴

Underwriters deal with moral hazard by writing into insurance contracts provisions to deter risky behavior. Car insurers raise premiums or cancel the policies of drivers with multiple moving violations. Moral-hazard problems are further addressed by requiring corrective action by the insured; some health insurers require policy holders with a history of tobacco use to attend smoking cessation programs. In the present context, FLAR introduced a macroeconomic surveillance function in 2011, which entails monitoring financial and banking-stability conditions in member countries.⁵ When lending, it conducts a technical analysis of economic and financial policies intended to verify the borrower’s ability to repay with high likelihood and confirm that the borrower is taking the necessary corrective action. It makes disbursement of its largest credit lines subject to the approval of the full Board of Directors representing member countries collectively.

But if there is a problem of moral hazard making for excessive recourse to insurance, there can also be a problem of stigma making for inadequate recourse to the facility. Policy holders who make repeated claims on their homeowner’s insurance risk having their policies cancelled when underwriters are unable to verify the actual risk-taking behavior of the policy holder but seek to infer it from the pattern of claims. In this case the homeowner risks having his name added to the registry of cancelled policy holders, in which case other underwriters will similarly refuse to provide him with coverage. The rational policy holder may therefore hesitate to file a claim in response to a significant event.

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³ Global external liabilities here are from the Milesi-Ferretti-Lane data base, while global GDP is from the IMF’s World Economic Outlook webpage.
⁴ It is possible to question whether the availability of this insurance was or is a major factor in the country’s choice of a dollarized monetary regime; the argument in the text is meant only to illustrate the analytical point.
⁵ Rhee, Sumulong and Vallee (2013), p.16.
for fear of losing coverage for an even more significant event in the future. This is one explanation for the problem of IMF stigma, where countries hesitate to tap the International Monetary Fund’s facilities.

As this discussion of FLAR, the IMF, and international reserves makes clear, the global safety net has multiple components. Again, the situation is not unlike that in many health-insurance markets, where an individual might have plain-vanilla health insurance for everyday healthcare but also long-term care insurance for catastrophic illness and personal savings for health-related expenses that are otherwise uncovered. In the context of the global safety net, the question is whether the components fit together or whether there are circumstances where costs and risks fall between the cracks.

2. CONTOURS OF THE GLOBAL SAFETY NET

Figure 2, following Denbee et al. (2016) shows the contours of the global safety net, scaled by global external liabilities calculated in the manner of Lane and Milesi-Ferretti (2007). The components include foreign exchange reserves held nationally, IMF facilities, regional lending arrangements such as FLAR, and bilateral swap agreements (which have been multilateralized since 2011 in the cases of the Bank of Canada, Bank of England, European Central Bank, Bank of Japan, Federal Reserve and Swiss National Bank have been multilateralized).

Three aspects of the figure stand out. First, regional and multilateral initiatives notwithstanding, foreign reserves remain far and away the largest component of the global safety net, as signified by their separate vertical axis. Self-insurance remains the single most important form of financial insurance, in other words.

Second, the size of the global safety net relative to external assets traces out a u-shaped pattern. It first fell in the 1990s with the explosive growth of international lending and borrowing (most of the action in Figure 2 is in the denominator, what with both foreign exchange reserves and IMF facilities rising sharply in the 1990s). It then rose starting in the early 2000s in the case of international reserves, and in 2007-8 with the outbreak of the global financial crisis in the case of IMF facilities, regional financial arrangements, and bilateral swap lines. Put another way, whereas reserves relative to external liabilities trace out a u-shaped pattern, the other components of the safety net look more like a hockey stick, with a long flat handle at the left and a sharply rising blade at the right.

Third, there are signs that the growth of the global safety net relative to global external assets has peaked, or plateaued at a higher level. Global foreign ex-
change reserves have stopped growing as emerging markets led by China used their reserves to finance capital outflows and support exchange rates. (According to the IMF, global foreign exchange reserves fell from $11.9 trillion in 2014 Q1 to USD$10.9 trillion in 2015 Q4.) Temporary loans to the IMF through the New Arrangements to Borrow and bilateral borrowing agreements have been made permanent with final ratification of the 14th General Review of Quotas, but they too have stopped growing. The U.S. Federal Reserve, the European Central Bank, the Bank of Canada, the Bank of England, the Bank of Japan and the Swiss National Bank have transformed their temporary bilateral currency swaps into standing arrangements; this has at least prevented them from shrinking, but neither are they growing. The People’s Bank of China now has a long list of bilateral swap agreements with foreign central banks (Table 1), but it has not added to that list since 2015.

In sum, none of the regional arrangements considered here has been expanded in recent years.

3. LESS THAN MEETS THE EYE

All this assumes, of course, that countries are able and willing to draw on these notional facilities and utilize their reserves. In practice, there are grounds for questioning the extent to which this is the case.

To start, there is the reluctance of central banks to actually use their reserves. The Bank of Korea famously entered the global financial crisis with more than USD$260 billion of reserves, but once the crisis struck, and reserves began to decline, $200 billion somehow came to be identified as a critical threshold or floor below which reserves should or could not be allowed to safely fall (Asian Development Bank 2011, Aizenman and Sun 2012, Goldman Sachs 2016). When China’s reserves began falling in the autumn and winter of 2015-6 from in excess of USD$3.5 trillion, numbers like USD$2.8 trillion were identified as a “lower bound” below which reserves could not be allowed to fall (Chang 2016), and Chinese officials showed signs of taking these statements seriously.

Economists have models in which investors run on a currency and exhaust a central bank’s reserves when these hit a critical lower bound and the relevant arbitrage conditions are met (see e.g. Krugman 1979). But these models are formulated for economies with fixed exchange rates and open capital markets, conditions that the countries in question do not exactly satisfy. And the mod-

6. See the next paragraph for more on how reserve adequacy depends on the flexibility of the exchange rate regime and the openness of the capital account.
els do not point to such round numbers or high levels as the thresholds at which the relevant arbitrage conditions are met.

If anything, this behavior suggests that the IMF’s calculations of the maximum level of reserves that a country requires have come to be interpreted by the markets, perversely, as the minimum level that is safe. The IMF (2011) rule of thumb takes reserve adequacy as a function of exports (so as to capture the potential loss of reserves from a drop in external demand or a terms of trade shock), short- and long-term debt (as a measure of interest payments and rollover risk), and broad money (as a measure of the scope for capital flight), with weights that depend on the exchange rate regime and the openness of the capital account. For China, the resulting estimate of the maximum necessary level of reserves ranges from $1.1 trillion on the assumption that the country’s capital account will remain relatively closed and its exchange rate will be relatively flexible to $2.8 trillion on the assumption that its capital account will be open and its exchange rate will be pegged.

In other words, $2.8 trillion, to take the higher estimate that has been in the news, is the maximum level of reserves that the country can expect to need to finance an unexpected export shortfall, service and repay short- and long-term external debt in the event of unexpected financing difficulties, and offset the impact on the exchange rate and financial system of unexpected capital flight – without running a risk of exhausting its reserves and being unable to intervene further. These are the reserves the country will need in the worst-case scenario, not to have on hand after the worst-case scenario has already obtained. To return to the healthcare analogy, a retiree who self-insures needs to have sufficient savings to finance the costs of long-term care in the event that he falls catastrophically ill, not to have that amount of savings in the bank after all his long-term-care expenses have been met.7

Be this as it may, investors in their wisdom appear to regard these thresholds as a floor rather than a ceiling. They act as if reserves should not be permitted to fall below this threshold under any circumstances, implying that they should not be used to finance shocks to the balance of payments, where ironically this is the express purpose for which they are held and the use relative to which their adequacy is calibrated. This may be a fundamental misperception of the meaning of reserve adequacy, but to the extent that it is held in financial circles, governments and central banks may feel inhibited from using their oth-

7. Another analogy, suggested by Donald Kohn at the conference, is with capital adequacy standards for banks. Capital adequacy standards identify the amount of capital that a bank should keep on hand to absorb adverse shocks to its balance sheet, not the level at which capital must remain when those shocks materialize. After a time, a bank will be expected to rebuild its capital to that same threshold level, but that is over time and is an analytically separate matter.
erwise perfectly adequate reserves. It is a misperception that the IMF and the international policy community, through better communication, should make it a priority to correct.

Then there is the reluctance of governments to draw IMF resources. That the problem of “IMF stigma” is much commented upon does not mean that it is well understood. One interpretation is that IMF conditions are especially onerous. But while this may have been true in the past it is not obviously true today, now that the Fund has a more flexible attitude toward fiscal consolidation and debt restructuring than some of its members and when it has adopted a “streamlined” and “focused” approach to conditionality. Today’s IMF has lightly conditioned facilities like the Flexible Credit Line (FCL) and the Precautionary and Liquidity Line (PLL). These are designed for countries with strong fundamentals of which few if any policy adjustments are required; in addition, they are cheap to tap. But only a small handful of countries have shown a willingness to sign up for these facilities. Evidently, more than simply onerous conditionality is involved.

Another interpretation is in terms of signaling. Historically, countries have gone to the IMF for financial assistance only in extremis. That a country is resorting to financial assistance from the Fund therefore leads investors to infer that it must be in truly bad shape, even worse than is evident on the basis of readily available information. The markets will therefore respond negatively to the news that a government has entered into program discussions with the Fund.

A final interpretation is in terms of history. IMF stigma may be rooted in the historical experience of financial crises, an experience that shapes perceptions, norms and behavior. The experience of the 1997-8 financial crisis in Asia created not only an aversion to tapping the IMF but also a greater sense of group solidarity, whereby Asian countries sought to engage in financial self-help by creating inter alia the Chiang Mai Initiative Multilateralization, the Asian Bond Fund and the Asian Bond Market Initiative. The literature in psychology on social stigma (Goffman 1964, Kurzban and Leary 2001) suggests that one motivation for stigmatizing “the other” is to create a sense of group solidarity among those doing the stigmatizing. Stigmatizing financial recourse to the IMF – deeming it inconsistent with “the Asian way” (Manzano 2001) – is thus a way of encouraging Asian countries to develop the solidarity needed for financial self-help. For those who believe that IMF lending and financial assis-

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8. Greater transparency – attaching a financial Fitbit to the budget ministry’s collective wrist – may discourage investors from drawing inaccurate inferences. But all efforts to enhance transparency notwithstanding, information about the current and, more to the point, expected future policies of governments is necessarily incomplete.
tance from regional financial arrangements like CMIM should not be regarded as incompatible alternatives, this encouragement comes at a price.

This reluctance to utilize available facilities extends to regional arrangements as well. The CMIM, for example, was not activated during the global financial crisis, nor has it been activated at any time in its more than 15 years of existence. The BRICS’ Contingent Reserve Facility has never been utilized, despite the much-publicized reserve losses and financial difficulties of some of its members. Ecuador is the only country to have borrowed from FLAR since 2004, if my information is up to date.

Governments evidently worry, much as in the case of the IMF, about the negative signaling effects. Members of the CMIM are discussing the introduction of a Precautionary Line for which countries with strong policies would prequalify and drawings on which would therefore not be seen as sending a negative signal, but they have found it difficult to agree on terms and procedures, much less to actually prequalify countries, mirroring the case of the IMF’s precautionary lines (Pitakdumrongkit 2015). Countries contributing to regional arrangements naturally hesitate to put their money at risk; they want to be paid back. But this implies conditionality and intrusive monitoring, which neighbors resent when it comes from neighbors. This is one reason why European governments outsourced the negotiation of conditions for their Troika programs for Greece, Ireland and Portugal to the IMF. The CMIM retains its IMF link, where borrowing in excess of 30 per cent of a country’s quota is subject to prior negotiation of an IMF program. This link and lingering problems of IMF stigma are widely cited as an explanation for why the CMIM has not been utilized (Lamberte and Morgan 2012, Council on Foreign Relations 2015).

What is true of regional facilities is true as well of bilateral currency swaps. The People’s Bank of China’s high-profile network of bilateral swap lines (Table 1) has been used to finance trade-related transactions but not for emergency lending: it was used by Hong Kong to finance imports from China (to settle with Chinese enterprises seeking payment in renminbi) and in one instance by China itself (in 2014, when China used its swap line with Korea to obtain won which were used to provide payment for imports from Korean firms). But it was not used during the taper tantrum in 2013 or when capital flows to emerging markets reversed direction in 2015.

9. Instead, South Korea negotiated a $40 billion dollar swap with the Federal Reserve, as noted below, and Indonesia secured a $5.5 billion standby loan facility from Japan, Australia, the Asian Development Bank and the World Bank.
The dollar swaps extended by the U.S. Federal Reserve, including to emerging markets, are an exception to the rule. They had a calming effect on financial markets (Goldberg, Kennedy and Miu 2010, Park 2011) and were actively utilized during the crisis (Destais 2014). Why there was no reluctance to enter into Fed swap lines and why their receipt was seen as a positive rather than a negative signal are interesting questions.\footnote{One can ask the same question about the ECB’s swap lines with the central banks of Denmark, Sweden, Hungary, Latvia and Poland.} A conjecture is that they are extended by an apolitical entity, namely an independent central bank, and therefore do not come lumbered with political conditions and obligations, either explicit or implicit. The IMF and CMIM, in contrast, are directly answerable to and therefore perceived as carrying out the bidding of governments.

But apolitical for how long, one might ask. Whether the Federal Reserve would have the inclination and political cover to provide swaps to emerging market economies in the future is uncertain, in other words. One wonders what a President Trump would think of dollar swaps with the Bank of Mexico.

4. WHAT IS TO BE DONE?\footnote{This section draws on Eichengreen (2016).}

The patchwork nature of the existing swap network has led observers like Reserve Bank of India Governor Raghuram Rajan to suggest that this network should be multilateralized and channeled through the IMF. The Fund would provide swaps of dollars and euros obtained from the Fed, the ECB and other issuers of international currencies to emerging markets and other countries with sound policies and temporary liquidity needs.

A moment’s reflection suggests that this is less a new proposal than a repackaging of existing ideas. IMF dollar and euro swaps for countries with sound policies and temporary liquidity needs are simply the FCL and PLL in another guise. The idea that such swaps should be made available through the Fund is exactly analogous to proposals for further increases in IMF quotas, together with more active use of the Designation Rule under which the IMF can oblige member countries to provide it and other members with their currencies in return for SDRs.

As such, any such scheme is subject to familiar objections and obstacles. Countries remain reluctant to sign up for the FCL and PLL. Issuers of international currencies, like the United States, are reluctant to incur the financial risk, real or imagined, of swapping dollars for SDRs and to thus dilute their decision-making control.
What is to be done? A first step would be to authorize the IMF to unilaterally prequalify groups of countries for the FCL and PLL, as suggested before (Moghadam et al. 2010, Eichengreen 2010). If prequalified countries continued to display a reluctance to tap these facilities, further reforms might then be needed. Reinhart and Trebesch (2016) suggest limiting future IMF lending to short-term liquidity support for countries with “correctible maladjustments” in their balance of payments. They argue that because the IMF also lends for other purposes – it provides the equivalent of debtor-in-possession finance to “insolvent” governments forced to restructure their debts – a country that takes an IMF loan would be signaling that it is insolvent, thereby preventing the Fund from acting as an emergency lender to countries that are illiquid. This international equivalent of the Bagehot Rule – provide only temporary liquidity support to solvent borrowers against good collateral – is intuitively appealing. But others of us would observe that limiting IMF lending to short-term liquidity assistance, to the exclusion of other programs and facilities, would have costs as well as benefits. They would question whether it is possible to draw a clear distinction analytically between insolvency and illiquidity in the sovereign context.13

The reluctance of countries like the United States to provide additional dollar swaps could be addressed by allowing the IMF to offer the U.S. a guarantee against financial losses in the event that the SDR depreciated significantly against the dollar while the swap line was being utilized. This would not eliminate the risk, but it would shift it from the balance sheet of the Fed to the balance sheet of the Fund. Such an arrangement would therefore have to be accompanied by agreement among IMF members to recapitalize the Fund in the event of significant capital losses. The United States would not be protected from all losses, but its part would be reduced to its quota share, currently some 17 per cent. This is an acceptable price, it can be argued, for a global insurance policy. Whether the U.S. Congress would view it this way remains to be seen.

It is tempting to argue that further governance reform – rebalancing voting shares toward emerging markets – will help to create the necessary confidence that the IMF will execute these functions evenhandedly. But the preceding discussion suggests that focusing on voting shares and government control of the IMF’s day-to-day operations may not be the correct emphasis. If the reason Fed swaps are seen by the recipients as more attractive and effective

13. As argued in Eichengreen and Woods (2016). Denying all IMF assistance under all circumstances to countries with debt-sustainability problems is especially problematic in a world where institutions for efficient restructuring of sovereign debts is absent. There is of course a large literature on how to create or reform those institutions, but pursuing this issue would take us too far afield in what is already a long paper.
than IMF lending is that they are provided by an independent agency that does not attach politically-motivated conditions, either explicitly or implicitly, then strengthening the control of national governments over the Fund’s day-to-day operations may be a mixed blessing. An alternative is to give the IMF’s managing directors more independence, like that possessed by the members of the Federal Open Market Committee responsible for authorizing the extension of Federal Reserve swap lines. The role of governance reform would then be to create a more representative executive board to which the managing directors would periodically report and which would be better positioned to hold those managing directors accountable for their decisions. Such an arrangement would be more in line with Keynes’ original vision of the role of the IMF in the global monetary order.

5. COORDINATION BETWEEN REGIONAL AND MULTILATERAL FACILITIES

But even if the IMF is strengthened and given additional resources, regional financial arrangements will not go away. This raises questions about the comparative advantages of regional and global institutions and about how they should work together.

Starting with the surveillance function, there is no obvious argument for coordination – no reason why a thousand flowers shouldn’t be allowed to bloom. Competition is good for information provision, research, and identification of best practice. Regional entities have deep local knowledge, while global institutions like the IMF can bring to bear lessons from other parts of the world. Both perspectives are useful for anticipating and warning of risks. Coordinating surveillance might only encourage group-think.

Considerations bearing on program design and monitoring are more complex. The IMF has more experience with program design than most regional entities. ASEAN+3 countries show a clear preference for outsourcing program design to the Fund, given their retention of the CMIM’s IMF link; they not only lack experience with program design but also show reluctance to make demands of their regional neighbors, since “lack of distance” creates “emotional tensions” (Lombardi 2012). European countries have gone back and forth on

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14. Proposals to this effect have a long history, from the Keynes-authored UK proposal for an International Clearing Union to De Gregorio, Eichengreen, Ito and Wyplosz (2001).

15. To the extent that the same reluctance – the same stigma problem – is attached to regional arrangements, this suggests similarly enhancing the independent decision-making powers of the directors of those arrangements so as to better distance them from political influence. In the case of the European Stability Mechanism, for example, each participating country’s finance minister currently possesses a veto over disbursement decisions (Manasse 2011).
this, as Blustein (2015) notes, although the German government for one has insisted on IMF involvement in program design (which is different from saying that it supports IMF control of program design, given Berlin’s resistance to the Fund’s calls for haircuts on Greek debt). The treaty establishing the European Stability Mechanism, Europe’s rescue fund, encourages but does not require IMF involvement. “The ESM will cooperate very closely with the International Monetary Fund (“IMF”) in providing stability support,” it reads. “The active participation of the IMF will be sought, both at the technical and financial level. A euro area Member State requesting financial assistance to the ESM is expected to address, wherever possible, a similar request to the IMF.”

Regional arrangements, it would appear, are in a position to make smaller, short-term loans where repayment risk is limited without negotiating extensive conditionality. They rather than the IMF are the logical source of the equivalent of Flexible Credit Line and Precautionary and Liquidity Line-like facilities. FLAR is a clear case in point. One might think of the first 30 per cent of CMIM quotas in analogous fashion. But when there is the need for larger loans to countries in riskier positions and for an adjustment program, with associated conditionality, there is then a case for IMF involvement, given the difficulty neighbors have in designing and imposing conditions on their neighbors and in monitoring compliance.

In principle, the IMF can design a program and monitor compliance without putting up funds, leaving this entirely to the regional entity. This possibility has been mooted repeatedly in the case of Greece. But when the loan is large, there is a natural desire and sometimes essential need on the part of the regional entity for the IMF to provide part of the finance. Moreover, there is the belief, in some circles, that the IMF will provide strict monitoring and demand ambitious adjustment only when its own money is at stake.

Co-financing requires agreement on seniority. The de facto presumption is that IMF debt is senior on the grounds that, when a regional rescue operation fails, the regional facility can turn to the IMF, but when an IMF operation fails there is no fallback. In 2011 the G20 as one of its “Principles for Cooperation between the IMF and RFAs” affirmed that “RFAs must respect the preferred creditor status of the IMF.” Earlier this year, the European Union discussed the possibility of using ESM funds to pay off Greece’s debt to the IMF as a way of not having to administer haircuts to IMF loans (Barker and Donnan 2016). But there have been exceptions: in the 1980s Peru under Alan Garcia honored its

obligations to FLAR even while falling into arrears with the IMF (Lombardi 2012, Kawai and Lombardi 2012).

When several parties pony up money, it is unavoidable that each will want some say in program design and negotiation. But it would be unacceptable to IMF membership as a whole for a small subset of members, representing a particular region, to have the loudest voice in a program financed by Fund membership as a whole, since that subset of members would be putting the entire membership's funds and the institution’s reputation at risk. This danger arises when that subset of members puts up the majority of the finances. It was apparent in 2008 when the IMF initially insisted on currency devaluation as part of a joint Fund-EU program for Latvia but was compelled to accept the EU’s insistence on no change in the currency peg because the Fund contributed only 20 per cent of the finance (Henning 2011). It was evident in 2010-11, when European authorities’ successfully rejected the IMF's call for Greek debt restructuring, in part because they contributed two-thirds of the funding.

The IMF can always walk away from a program in midstream. In early 2016 IMF officials indicated that they would walk away from the Greek program if the next installment did not include meaningful debt reduction. But walking away can jeopardize systemic stability, especially if the country in question and its program are large. It can damage the Fund’s reputation, given its interest in the success of a program in which it has been involved. As a result, there is an argument that the IMF should only agree to co-financing when it contributes the majority of program funds (as in Hungary in 2008 and Romania in 2009), so that it can be expected to have the loudest voice in the design of conditionalities and go ahead, at least on reduced scale, in the event of disagreements with its regional partner (Eichengreen 2012, Pisani-Ferry, Sapir and Wolff 2013).

6. CONCLUSION

There are essentially two scenarios for the future development of regional and global financial facilities. One is for regional entities to further develop their surveillance, program design and monitoring functions with the goal of freeing their members from having to resort to the IMF. This is one interpretation of the efforts of CMIM members to establish and strengthen the ASEAN+3 Macroeconomic Research Office (AMRO), ASEAN+3’s nascent surveillance unit. In this view, AMRO and the CMIM will ultimately develop into an Asian Mo-

17. As Pisani-Ferry, Sapir and Wolff (2013, p.119) write, “Accepting the minority lender role [in Europe] represented a clear threat for the independence of the Fund, for its ability to treat all members on equal terms and for its role as a ‘trusted advisor’.”
netary Fund capable of not just firm surveillance but also program design and compliance monitoring. This makes sense if one believes that local knowledge is more valuable than the information from other regions that can be brought to bear by a global financial institution. It is a plausible scenario if one believes that the constraint on program design is lack of experience and not lack of distance – not the reluctance of neighbors to force conditions on neighbors. It is realistic if one believes that it will be possible over time to enhance the independence from governments of the boards of directors who make lending and disbursement decisions on behalf of these institutions, reducing political influence and the political flavor of those lending decisions.

The other scenario is for regional entities to provide limited liquidity facilities, in the manner of FLAR and the FCL and PLL, while working together with the IMF in providing larger amounts of finance that require strict conditional-ity and monitoring. Cooperation on finance, program design and monitoring will work only if IMF members have reason to believe that the institution will take the lead in these negotiations. And it can realistically be expected to do so only if it provides the majority of the finance. This requires a continuing commitment to augment the IMF’s financial resources as necessary. It requires further governance reform so that IMF management are seen as possessing the independence to make decisions free of excessive political influence but also so that they are strongly accountable to their members.

Some will be skeptical of the feasibility of these ideas. To this my response is: reforms along these lines are essential for the construction of a workable global safety net. Failing to pursue them will require countries to self-insure, requiring them and the world economy to bear all the costs associated with the accumulation of large foreign exchange reserves.

Others will question whether these two scenarios sketched in the first two paragraphs of this conclusion are in fact incompatible with one another. Both avenues, they would suggest, can be pursued simultaneously. To them my response is: maybe you’re right.

REFERENCES


De Gregorio, Jose, Barry Eichengreen, Takatoshi Ito and Charles Wyplosz (2001), An Independent and Accountable IMF, London: CEPR.


### TABLE 1. SWAP ARRANGEMENTS WITH THE PEOPLE’S BANK OF CHINA

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>DATE</th>
<th>AMOUNT IN YUAN</th>
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</tr>
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<td>Brazil</td>
<td>2013.03</td>
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<tr>
<td>Thailand</td>
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<td>15 billion</td>
</tr>
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<td>2013.06</td>
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</tr>
<tr>
<td>Uzbekistan</td>
<td>2011.04</td>
<td>0.7 billion</td>
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Source: Garcia-Herrero and Xia (2013), AP, China Daily, PBoC, Xinhua, Reuters, Bloomberg, Reserve Bank of Australia, Reserve Bank of New Zealand.

### FIGURE 1. GLOBAL EXTERNAL LIABILITIES AS A SHARE OF EXTERNAL LIABILITIES, 1980-2015

Note: Global liquidity is sum of G20 investment-grade bonds, G20 high powered money, the debt securities of multilaterals, and gold in public and private hands. External liabilities are extended version of data set constructed by Lane and Milesi-Ferretti (2007).

Source: See text.
FIGURE 2. GLOBAL FINANCIAL SAFETY NET AS PERCENTAGE OF EXTERNAL LIABILITIES, 1980–2015

Note: Ratification of the IMF’s 14th General Review of Quotas will see IMF permanent resources double and temporary resources fall by a similar amount.
Sources: IMF International Financial Statistics, IMF World Economic Outlook, RFAs, updated and extended version of data set constructed by Lane and Milesi-Ferretti (2007).
Dear conference organisers – Ms. Ana María Carrasquilla and Mr. Enrique García, dear session moderator – Mr. Julio Verlarde, Ladies and Gentlemen, it is a great pleasure for me to participate in this panel alongside such distinguished fellow speakers.

Back in 2010, in the middle of the global financial crisis, G20 countries agreed on the strengthening of a multi-layered Global Financial Safety Net (GFSN) at their Seoul Leaders’ Summit. This reform proposal aimed at mitigating the effects of the systemic crisis and limiting cross-country contagion. Since then, the available lending resources at the International Monetary Fund (IMF) have been doubled, new precautionary instruments designed, and large regional resources mobilised, most notably in Europe.

In my remarks, I would thus like to use the European experience in resolving the euro area crisis to illustrate how RFAs have provided solid firewalls to safeguard regional and global financial stability. I will also share my view on how to enhance cooperation between RFAs and the IMF, which is at the heart of the GFSN.

1. COMPARATIVE ADVANTAGES OF EUROPEAN FIREWALLS IN RESOLVING THE EURO AREA CRISIS

At the height of the European debt crisis, markets cast serious doubt on the stability of the euro area and the single currency. Fortunately, Europe reacted quickly and proposed a comprehensive package of bold reforms, including the establishment of strong financial firewalls – the European Financial Stability

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1. I would like to thank Gong Cheng for his contribution in preparing this statement.
2. Member of the Management Board, European Stability Mechanism.
Facility (EFSF) and the European Stability Mechanism (ESM). With a combined lending capacity of €700 billion, the EFSF and ESM played the role of lender of last resort for the sovereigns in Ireland, Portugal, Greece, and Cyprus via macroeconomic adjustment programmes. The EFSF and ESM provided liquidity to these countries when they lost market access against conditionality set by European institutions and the IMF. The ESM also assisted Spain but only for bank recapitalisation.

I would like to highlight three strengths of European firewalls in resolving the euro area crisis. First, the European RFAs mobilised a large amount of regional resources. The IMF would have been overburdened if it had been required to cover European financing needs in programme countries. Between 2011 and July 2016, the EFSF and ESM together disbursed €262 billion to our five programme countries, almost three times what the IMF disbursed under its General Resources Account during the same period. The IMF co-financed four country programmes in the euro area and its committed financing reached 26% for Ireland, 33% for Portugal, 28% for the first Greek programme, 12% for the second Greek programme, and 10% for Cyprus (see Figure 1). Greece provides a good example of the relative importance of regional resources in assisting a Member State of a monetary union. In three different programmes, Greece received €226 billion from its European partners. The IMF financed about a third of the 1st Greek programme and contributed just 1/10th as much as the EFSF to the 2nd. Nevertheless, the IMF loans to Greece were already the biggest in terms of quotas in the Fund’s history. Following the revocation of the systemic exemption clause in the Fund’s Exceptional Access Lending policy, to attain sustainability, the Fund now calls for the use of RFAs as a prior line of defence before deploying its own resources.

Second, RFAs can provide specific tools to address regional problems. In Europe, as the bank-sovereign feedback loop was particularly strong, the ESM developed dedicated tools for bank recapitalisation. The IMF cannot do sectoral lending and I assume that will not change. In practice, the IMF participated in the co-financing of most of the euro area programmes, with the exception of Spain, as it does not have specific instruments for bank recapitalisation. In this case, it provided technical assistance. The ESM has, in addition, the ability to directly recapitalise banks and intervene in the secondary market.

3. In addition, the comprehensive package of reforms comprises the following elements: (1) courageous structural reforms and fiscal consolidation carried out by euro area Member States; (2) a complete overhaul of the framework for economic policy coordination in Economic and Monetary Union; (3) the construction of the Banking Union; and (4) unconventional monetary policy measures adopted by the European Central Bank.
This shows a stronger focus on intervention directed towards the financial sector.

Third, RFAs can be more flexible with their lending terms. In the euro area, we provide long-term financing to countries that need to correct large imbalances, with average maturities of 20–30 years (see Figure 2). In comparison, the maturities of IMF programmes are shorter; the longest repayment period, under the Fund’s Extended Fund Facility (EFF), does not exceed 10 years. The EFSF and ESM also have low funding costs, currently at below 1% for the ESM, which we pass on to the countries that borrow from us. These favourable lending terms reflect a high degree of regional solidarity and generate substantial budgetary savings – 5.1% of Greek GDP in 2015.

2. ELEMENTS FOR SUCCESSFUL IMF-RFA COOPERATION

The comparative advantages of RFAs, in terms of financing resources, instruments, and lending conditions, are, however, best embedded in sound and efficient cooperation with the IMF, which has established programme design surveillance and monitoring capacity, and a global role at the centre of the International Monetary System. Moreover, in the face of new challenges facing the global economy, any single layer of the GFSN on its own seems insufficient to provide macroeconomic and financial stabilisation. Well-structured cooperation between the IMF and RFAs will likely generate synergies for resource allocation and surveillance. It will also trigger a mutual learning process for institutions to improve their own policy frameworks. Coordination failure, especially with respect to conditionality, could lead to ‘programme shopping’ and associated moral hazard.

Based on the European experience, I think that three elements seem to provide a sound basis for successful cooperation between the IMF and RFAs: strong political commitment to cooperation, consistency in conditionality setting, and complementarity regarding the lending framework. I have already presented my view on financial complementarity and would like to talk now about the commitment to cooperation and consistency in conditionality setting.

First, cooperation has been based on a deep political commitment by European countries and the IMF. The cooperation of European institutions and the IMF is a political *sine qua non* among European countries for the approval of a financial adjustment programme. The founding documents of the ESM embody this view. Recital 8 of the ESM Treaty stipulates that “*[t]he active participation of the IMF will be sought, both at technical and financial level.
A euro area Member State requesting financial assistance from the ESM is expected to address, wherever possible, a similar request to the IMF. In turn, the IMF has made a strong commitment to engage in programme financing alongside the European institutions.

Moreover, the European institutions and the IMF jointly designed the conditionality in all programmes in which the IMF participated. These conditions were enshrined in the relevant legal documents (i.e. the Memorandum of Understanding for European institutions and the letter of intent and Memorandum of Economic and Financial Policies for the IMF). The EFSF and ESM share a similar approach with the IMF on crisis resolution. We provide liquidity support to countries facing financial distress on the back of an adjustment programme, which aims at reducing macroeconomic imbalances and structural weaknesses in the requesting country. This jointly agreed political conditionality provides the requesting country with a clear roadmap of policy reforms needed to bring its domestic economy back on track.

Liquidity provision and well-conceived conditionality induced fruitful reforms in our programme countries, which have since delivered better macroeconomic results. Conditionality helped countries restore fiscal sustainability, improve external competitiveness, and restructure banking sectors where necessary. Very often, a strong reform agenda aimed to reverse losses in competitiveness and labour environments. All programmes, with the exception of Spain's, included a series of reforms that sought to enhance competition and remove distortions from product and labour markets. Nominal unit labour costs have been significantly reduced since 2010 in all our programme countries.

To conclude, this year has been a promising year to promote discussions on the Global Financial Safety Net and the role of RFAs in it. Under the Chinese presidency of the G20, a working group on International Financial Architecture has been working on concrete proposals to strengthen the adequacy of the GFSN and to enhance coordination among its layers. RFAs are organising an initiative to enhance coordination and share experiences. This entails considerations on how to establish effective and efficient cooperation with the IMF and among RFAs themselves.
Total amount disbursed EFSF and ESM loans 2011-07-2016 €262 billion

FIGURE 1. SHARES OF CONTRIBUTING PARTIES IN EURO AREA PROGRAMMES

Notes: All figures indicate the initial financial commitment, which may differ from the actual disbursements.
* Other financing for Ireland comes from the European Financial Stabilisation Mechanism (EFSM), bilateral loans from Sweden, Denmark, the United Kingdom, as well as funds from the Irish Treasury and National Pension Reserve Fund.
** Other financing for Portugal comes from the European Financial Stabilisation Mechanism (EFSM).
*** Other financing for Greece I comes from the pooled bilateral loans from European countries. The undisbursed amounts under Greece I were transferred to Greece II.
**** The precise amount of ESM financial assistance in Greece III will depend on the participation of the IMF and on the success of reform measures by Greece.
Source: ESM calculation

FIGURE 2. GREEK DEBT REDEMPTION PROFILE

Source: ESM calculation
1. CURRENT STATUS OF ASEAN+3 REGIONAL FINANCIAL SAFETY NET

Let me start by taking stock of ASEAN+3 regional financial safety net. As the building block of ASEAN+3 regional financial arrangement, the Chiang Mai Initiative Multilateralization (CMIM) – came into existence in 2010, superseding the former Chiang Mai Initiative. It has two main objectives: serving as a self-help mechanism to address balance of payments and/or short-term USD liquidity difficulties in the region; and complementing existing international financial arrangements. The CMIM was further upgraded in 2014 to include a crisis prevention facility, and its size doubled to USD240 billion.

To support the effective operation of CMIM, AMRO was set up in 2011 to provide to conduct surveillance during peacetime and to provide the macroeconomic policy recommendations that are needed. Initially, AMRO operated as a company registered in Singapore in 2011, and then was re-established with full legal personality as an international organization, based on the agreement among 13 member countries, effective from 9 February 2016.

2. POSITIONING THE CMIM AND AMRO FROM A GLOBAL PERSPECTIVE.

The ultimate objective of the international monetary system has always been to contribute to broader global economic and financial stability. The IMF is required to exercise oversight of the international monetary system, focusing on exchange rates and external stability.
Given the increased frequency of banking and currency crises, the international monetary system has not been able to meet its primary objective. Both the Asian Financial Crisis and the most recent Global Financial Crisis revealed some shortcomings in the international monetary system, and also have acted as a catalyst for reform of the international monetary system and the IMF.

Following the Global Financial Crisis, how to build a robust Global Financial Safety Net (GFSN) has been one of the top priorities of the international monetary system’s reform agenda. In fact, G20 Leaders have repeatedly highlighted the importance of the GFSN.

The GFSN comprises four components:
- prudential macro-economic management and foreign reserves,
- bilateral swap arrangements (BSAs),
- regional financial arrangements (such as CMIM)
- and IMF resources.

While each of the GFSN components has its merits and demerits, the system as a whole remains fragmented.

It is important to note that a single component may not provide sufficient insurance in the event of a crisis. This has led to an understanding that effective cooperation between the different layers of the GFSN – particularly cooperation between the IMF and the regional financial arrangements – is very important; and it may also help address issues such as ‘facility shopping’ or ‘duplication of functions’.

Drawing from the experiences from recent European crisis, I understand global community is now keen to establish a close cooperative relationship with regional financial arrangements. The IMF has also recognized that regional surveillance contributes to global economic stability and this has fostered closer ties between the global and regional frameworks.

From regional perspective, an important role of the CMIM and AMRO is to complement existing international financial arrangements. In this sense, CMIM and AMRO may go beyond their regional mandate. As an integral part of the GFSN, a successful CMIM and AMRO also help build a strong and well-functioning GFSN, in harmony with the other components of GFSN. This, in turn, will help ensure stability in the global economy.

3. SOME PRESSING ISSUES RELATED TO THE DEVELOPMENT OF THE CMIM AND AMRO

While the CMIM and AMRO have evolved significantly in recent years, there are a few pressing issues which deserve attention and in-depth thinking before the CMIM can move to the next level of development.
The first is adequacy of resources. Given the magnitude and volatility of capital flows in the region, some observers have raised doubts on the adequacy of resources and the members’ maximum swap quota. In particular, they are concerned about the adequacy of the IMF de-linked portion, which is fixed at 30% of the maximum swap quota. In this regard, whether the IMF-delinked portion should be increased from 30 percent to 40 percent is a pending issue at the moment for the CMIM.

The second is procedural uncertainty. So far the CMIM has not been activated yet. In that sense, we have not been tested yet. Despite the members’ best efforts to ensure the operational readiness of the CMIM, a few critics have raised questions over the CMIM’s activation procedures – in other words, whether CMIM liquidity support is available for disbursement under due process when a member makes a request. Besides, a coordination procedure has not been established with the IMF, despite the fact that the full utilization of each member’s swap quota is linked with an IMF program.

The third is conditionality. The authorities are still discussing the conditions under which the CMIM facilities are to be activated, keeping in mind the lingering strong stigma in Asian region. The stigma is partly due to conditionality imposed by the IMF programs during the Asian crisis period. At the same time, it is noted that there have been calls from regional and global groupings for the CMIM to require safeguards to avoid issues of facility shopping and moral hazard.

And lastly, institutional, the CMIM lacks a permanent secretariat. The CMIM Agreement defined that the formal secretariat function is being performed by the two Coordinating Countries, Co-Chairs of the members, which run the CMIM on a rotational basis, one from an ASEAN member state, and the other from among China, Japan or Korea. While this arrangement brings the benefit of instilling regional ownership, it also makes it more challenging to accumulate institutional memory, which will ensure smooth operations in a real situation.

4. THE WAY FORWARD; TOWARD AN EFFECTIVE REGIONAL FINANCIAL SAFETY NET

Over the next two years, the CMIM will undergo a periodic review of the adequacy of its resources and swap quotas, as well as the key terms and conditions of its facilities. AMRO will do its part with enhanced expertise to support the next review which is due in 2018.
Besides the periodic review process, we can think about an interim measure to address the potential shortage in resources. One way to do this is through deeper collaboration with other components of GFSN, such as central bank bilateral swap arrangements (BSAs), to fill the resource gap. The issue of an increase in the IMF de-linked portion has been intensively discussed by ASE-AN+3 authorities.

Second, regarding the issue of procedural clarity, we have worked hard to improve the procedures and operational readiness of CMIM. We have adopted and revised the Operational Guidelines, checked members’ compliance with the CMIM’s legal and institutional requirements – the CMIM peacetime checklist – and conducted a number of Test Runs to test its operational readiness. A coordination mechanism with the IMF can be developed through the test run in the second half of 2016. In this regard, it is also timely to study how the CMIM can be better integrated into the global financial safety net, as instructed by Ministers and Governors at their meeting in May.

The third is the question relating to conditionality. It is well-noted that CMIM has a legal basis to bring conditionality for its facilities. However, its contents have yet to be determined specifically. One consideration is that we need to strike a balance in formulating the CMIM’s conditionality policy, while being mindful of the lingering IMF stigma in the region, and at the same time, of the need to minimize moral hazard.

Lastly, with its permanent staff and facilities, AMRO (currently with 41 staffs) is well positioned to take on more secretariat responsibilities for operations. The AMRO Agreement mandates that AMRO is required “to support members in the implementation of CMIM”. In this regard, it is hoped AMRO can be a ‘Crisis Manager’ within its mandates.

To fulfil this job, AMRO needs to be developed into an independent, professional and reliable regional surveillance organization in support of CMIM, armed with its own resources of highly competent staff and unique value proposition, and to provide regional public goods in order to safeguard economic and financial stability in the region and contribute to regional cooperation and prosperity.

The priorities is to make AMRO a Trusted Policy Advisor in the region by becoming a premier international organisation for regional macroeconomic and financial surveillance, a Competent Crisis Manager by enhancing our crisis management capabilities in support of CMIM.

AMRO will also aim to become a regional In-house Consultant providing training and technical assistance to build-up regional capacity in macroeco-
nomic surveillance. At the same time, AMRO will expand the partnerships with other IFIs, think tanks and the private sector increase its visibility.

5. CONCLUSION

In conclusion, in an era of rapidly changing environment, it is important for RFAs to further improve themselves to better fulfil its mandate of securing financial stability. At the same time, it is also important to enhance the coordination between RFAs and IMF, and among RFAs to build a robust, effective and responsive global financial safety net.
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