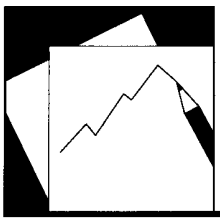
WP/14/61



IMF Working Paper

Exchange Rate Flexibility and Credit during Capital Inflow Reversals: Purgatory…not Paradise

Nicolas E. Magud and Esteban R. Vesperoni

INTERNATIONAL MONETARY FUND

 WP/14/61

IMF Working Paper

Western Hemisphere Department

Exchange Rate Flexibility and Credit during Capital Inflow Reversals:

Purgatory …not Paradise

Prepared by Nicolas E. Magud and Esteban R. Vesperoni

Authorized for distribution by Dora Iakova

April 2014

Abstract

We document the behavior of macro and credit variables during episodes of capital inflows reversals in economies with different degrees of exchange rate flexibility. We find that exchange rate flexibility is associated with milder credit growth during the boom but, even though smaller than in more rigid regimes, it cannot shield the economy from a credit reversal. Furthermore, we observe what we dub as a recovery puzzle: credit growth in economies with more flexible exchange rate regimes remains tepid well after the capital flow reversal takes place. This results stress the complementarity of macro-prudential policies with the exchange rate regime. More flexible regimes could help smoothing the credit cycle through capital surchages and dynamic provisioning that build buffers to counteract the credit recovery puzzle. In contrast, more rigid exchange rate regimes would benefit the most from measures to contain excessive credit growth during booms, such as reserve requirements, loan-to-income ratios, and debt-to-income and debt-service-to-income limits.

JEL Classification Numbers: F32, F41, E32.

Keywords: capital inflows, reversals, credit, macro-prudential

Author's E-Mail Address: nmagud@imf.org; evesperoni@imf.org. We thank comments and suggestions from Carlos de Barros, Marcos Chamon, Fabio Comelli, Bob Flood, Gian-Maria Milesi Ferretti, Erlend Nier, Inci Otker-Robe, and Alejandro Werner, discussion at IMF seminar, as well as superb research assistance from Marie Kim, Anayo Ouseke, and Carlos Rondon. All remaining errors are ours.

Contents Page

I. INTRODUCTION

Large capital inflows usually have an important impact on macroeconomic conditions—and in particular, on fluctuations in domestic credit. Capital inflows booms can finance investment and economic growth, and can also bolster the deepening of oftentimes shallow financial sectors. Banking sector credit usually expands and stimulates consumption. The volatility associated to these cycles, however, may pose significant macroeconomic challenges. Reversals in capital inflows could potentially result in credit busts and asset price deflation, with devastating effects on the macroeconomic conditions. Notably, the recent fluctuations in global risk aversion triggered by the Federal Reserve 'tapering' talk in 2013 are a reminder of the likelihood for reversals in large capital inflows. Consequently, these events strengthen the need for a proper debate about the policy framework and the corresponding policy mix needed to deal with large fluctuations in international capital flows. We tackle some of these issues here.

The impact of capital inflows bonanzas into the domestic credit cycle in emerging economies has prompted a renewed interest in academic and policy circles over recent years. This literature has shown that large capital inflows are associated with a deterioration in the current account, an appreciation of the real exchange rate, and oftentimes a rapid expansion in credit. The literature has also documented that large capital flows—especially those related to 'other non-portfolio investment' flows in the capital account—are good predictors of credit booms, and that these booms are more likely to end in credit crunches. More recently, Mendoza and Terrones (2008, 2012) and Magud et al (2011, 2014) looked at the role played by exchange rate flexibility in credit booms fueled by large capital inflows. The latter find that rapid expansions in domestic credit driven by large capital flows are particularly acute in less flexible exchange rate regimes; moreover, these regimes tilt the composition of domestic credit toward credit in foreign currency.

This paper contributes to the existing literature by looking at how economies with different degrees of exchange rate flexibility behave during capital inflows *reversals*. To this end, we construct a large data set comprising 179 countries for the period 1969–2012. Then, we use standard algorithms to identify reversal that are *conditional on following a bonanza in capital inflows*. This identification is the first contribution of the paper. In order to focus the analysis on (a more homogeneous group of) countries with relatively open capital accounts and access to international private capital flows, we then narrow our sample to emerging economies during the last 25 years, identifying about 130 reversal events. The second contribution is to document stylized facts during +5/-5-year windows centered in the reversals, and focus on differences between economies with relatively fixed and flexible exchange rate regimes. The last technical contribution results from running panel regressions to assess the specific role played by the flexibility of the exchange rate during capital inflows booms and reversals, controlling for a number of macroeconomic factors. The findings are then used to discuss potential policies to mitigate the effects of credit fluctuations that are driven by capital flows cycles.

All in all, the buffering role played by exchange rate flexibility during credit cycles looks like a ticket to purgatory, but no entrance to paradise. In effect, our results suggest that exchange rate

flexibility helps containing banking credit growth compared to more rigid exchange rates during capital inflows booms. Yet, the fall in credit growth in economies with more flexible exchange regimes suggests that flexibility cannot fully shield the economy during the reversal, even though the fall in credit growth rates are more modest than in fix regimes. Furthermore, we observe what we dub as a recovery puzzle: credit growth in more flexible exchange rate regimes remains tepid well after the capital flow reversal takes place.

Our findings suggest that flexible exchange rate regimes could be complemented by macro-prudential policies to smooth credit cycles—which could potentially raise systemic financial risks—during capital flows booms and reversals. It is often acknowledged that macro-prudential policies may find it challenging to control credit growth during booms. Comparatively, these policies seem to be more effective in building buffers to help the economy avoid a crunch in banking sector credit when—for whatever reason—the credit cycle reverses after the boom. Exchange rate flexibility can keep credit growth relatively at bay during bonanzas, and it could be complemented by measures like capital surcharges or countercyclical provisions during the credit expansion phase. By building buffers, these macro-prudential instruments can help deal with the recovery puzzle experienced by flexible exchange rate regimes during reversals. On the other hand, measures aimed at containing excessive credit growth—such as debt-to-income, debt service-to-income, and loan-to-value ratios, or reserve requirements—seem to be very relevant in the context of less flexible exchange rate regimes, as credit tends to grow faster than in more flexible exchange rate arrangements.

The importance of understanding the dynamics of capital flows cycles and the optimal policies to deal with them could not be timelier. Expansionary monetary policies in advanced countries have had significant spillovers from low international interest rates in emerging economies. These spillovers have been strong this time around because advanced economies have maintained exceptionally expansionary monetary policies—including unconventional measures embedded in the multiple quantitative and credit easing initiatives—for a longer period of time than in past "normal" business cycles, as these are external financing cycles. And given that the withdrawal of these unconventional monetary policies has recently started—even if at a slow rate—, discussing the appropriate policy responses in emerging markets becomes critical.

The paper is organized as follows. The next section presents a short literature review of some recent contributions. Section III describes the construction of the data set, while Section IV identifies the episodes of reversals in capital flows. Section V presents the stylized facts, which are tested through panel estimations in Section VI. Against this backdrop, Section VII discusses the policy implications and Section VIII concludes.

II. Selected (Recent) Literature Review

There is a growing literature focusing on the macroeconomic impact of capital inflows bonanzas in emerging economies, and in particular on the relationship between capital flows and credit booms. Cardarelli et al (2009), Elekdag and Wu (2011), and Forbes and Warnock (2012) document the

macroeconomic dynamics during capital flows surges. They notice the presence of real exchange rate appreciations and growth accelerations, which are forced into an abrupt reversal when capital inflows retrench. Mendoza and Terrones (2008, 2012) identify episodes of credit booms, and show that they are usually accompanied by large capital flows. In related work, Calderon and Kubota (2012) show that surges in capital inflows are good predictors of credit booms, particularly if driven by non-portfolio investment inflows, and that these credit booms are more likely to end in a crisis.

Some recent work has also focused on the role played by exchange rate flexibility in banking sector credit during capital inflow bonanzas. Magud et al (2011, 2014) document evidence from emerging economies in Asia, Latin America, and Emerging Europe since the early 1990s. They show that bank credit expanded more rapidly in more rigid exchange rate regimes, particularly foreign currency-denominated bank loans. Ghosh et al. (2014) find similar results and highlight the differences in how various degrees of exchange rate flexibility impact credit growth. They also show how the alternative degrees of exchange rate flexibility are more or less prone to different type of crises, noting that not only pure floating regimes, but also managed floats, reduce the likelihood of banking, financial, debt, and growth crises. IMF (2011) focuses on Asia and finds that credit booms that ended in crises tend to occur when large external financing is available, but also on the back of strong domestic factors, which appear to be stronger in that region. Exchange rate flexibility, though, mitigates the impact of external factors. Furceri et al. (2011) also find that in the presence of large capital inflows, the impact on credit expansions is less pronounced in countries with higher real exchange rate flexibility—measured as the standard deviation of the real exchange rate. Lane (2013) document boom-bust capital flows cycles in Europe.

The literature on capital inflow reversals is less extensive. Calvo et al. (2004, 2006) have documented the dynamics of sudden stops in capital inflows. In particular, they have focused on the role played by trade openness and balance sheet issues—i.e. liability dollarization—in the required adjustment in the real exchange rate, and in the macroeconomic impact of events in which capital flows suddenly dry out. Abiad et al. (2011), Calvo et al. (2006), and Elekdag and Wu (2011) also notice that economic recoveries preceded by both a credit booms and banking crises tend to be credit-less.

The literature on sudden stops, however, encompasses any sudden cut in external financing, regardless of having a boom in capital inflows as a pre-condition. This subtle difference is relevant, as our focus is on external financing *cycles*. By focusing on episodes of capital flows reversals that follow booms in capital flows, we can narrow the discussion of policy issues. This is important, as not every sudden stop episode is necessarily preceded by a boom in capital inflows. Furthermore, notice that the current environment is precisely that of a potential reversal of sustained capital inflows as the expansionary monetary policies that were deployed in advanced economies following the global crisis are now approaching its withdrawal stage.

III. DATA DESCRIPTION

The data set is constructed based on series from IMF's World Economic Outlook (WEO) and the International Financial Statistics (IFS). The time span of the data is 1969–2012. The frequency is annual, and the coverage comprises 179 countries.

The macroeconomic variables include real GDP, the real effective exchange rate, private sector consumption, investment, government expenditures, net exports, and domestic saving. The demand components, as well as saving, are computed as a share of GDP. The real exchange rate and real GDP are indexes, which are made equal to one at the time capital inflows reverse, without loss of generality. We also include the rate of inflation, which is used to approximate real growth rates when needed.

The financial variables focus on banking credit and broad money. For robustness, we also computed the loan-to-deposit ratios (LTDs). When necessary, the variables are expressed in growth rates (in nominal and real terms, as appropriate).

The exchange rate regime follows Reinhart and Rogoff (2004) and Ilzetzki et al. (2012). This enables to base our estimation on *de facto* exchange rate regimes, as opposed to *de jure* arrangements. This classification defines "coarse" and "fine" *de facto* exchange rate regimes. Table 1 shows the different exchange rate regimes. The fine classification disaggregates these coarse measures in slimmer bands. We use both classifications, obtaining similar results. For expositional purposes, we focus here on the results from the coarse classification only, which works as a semi-continuous series. To avoid misinterpretation of the role played by the exchange rate regime, we eliminate those observations classified as "free falling" and "dual markets with missing parallel markets" (regimes 5 and 6, respectively). Using the latter regimes might distort the results, as they could be counted as flexible exchange rates when using the semi-continuous classification. For details see Ilzetzki et al (2012) and Magud et al. (2011, 2014).

Table 1. Coarse Exchange Rate Classification

1	No separate legal tender
1	Pre announced peg or currency board arrangement
1	Pre announced horizontal band that is narrower than or equal to +/-2%
1	De facto peg
2	Pre announced crawling peg
2	Pre announced crawling band that is narrower than or equal to +/-2%
2	De factor crawling peg
2	De facto crawling band that is narrower than or equal to +/-2%
3	Pre announced crawling band that is wider than or equal to +/-2%
3	De facto crawling band that is narrower than or equal to +/-5%
3	Moving band that is narrower than or equal to +/-2% (i.e., allows for both appreciation and depreciation over time)
3	Managed floating
4	Freely floating
5	Freely falling
6	Dual market in which parallel market data is missing.

Source: Reinhart and Rogoff (2004).

IV. IDENTIFYING CAPITAL FLOWS REVERSALS: METHODOLOGY

We define capital flows reversals as abrupt contractions in capital flows into a country, conditional on following a boom in capital inflows. Consequently, to identify these reversals, we first identify booms and then assess which of those ended with a substantial retrenchment of capital flows. We describe the methodology, and then present the salient features of the identified episodes.

A. Capital Inflows Booms

Capital inflows booms are defined according to alternative criteria, to increase the robustness of the identification process. The analysis of stylized facts and the panel regressions are conducted for these alternative identified samples. We use two approaches:

- *Distribution criteria*. In line with Reinhart and Reinhart (2008), for each country we identify capital inflows booms as those events that lie in the top 20th percentile of the distribution of the external financial account balance to GDP ratio. These are considered the country-specific episodes for which capital inflows are the largest. To avoid double-counting, if two or more consecutive years belong to the top quintile they are considered part of the same episode. Additionally, a minimum of two years in which the external financial account balance to GDP is not in the top 20th percentile is required for two events to be considered separate episodes.

- *Cyclical deviations criteria*. Mendoza and Terrones (2008, 2012) use an algorithm to identify credit booms. We follow their methodology to single out episodes of capital flows booms instead. Based on a Hodrick-Prescott filter, we compute the cyclical components of the external financial account balance (as a percentage of GDP). Against this backdrop, for an event to qualify as a capital inflows boom, the cyclical component of the financial account ratio has to be larger than or equal to a multiple m of the standard deviation of each country's series. For robustness, this criterion uses various parameterizations, namely m= 1.0, 1.5, 1.75, and 2.0.

B. Capital Flows Reversals

For each approach, we label as episodes of capital inflows reversals those events for which we observe a drop of x percent following the peak on inflows. As a benchmark, we take x=10 percent. Robustness checks for alternative values of x produce similar results. The identification requirements give us a wealth of alternative specifications to identify periods of capital inflows booms, and the reversals that follow them. As shown below, the results are consistent across identifying approaches, making the results robust. Below we present the main characteristics of the identified capital flows episodes.

C. Identification Results: Some Descriptive Statistics

As the algorithms used to identify capital flows reversal vary by approach, the number of identified reversals differs. Table 2 shows the number of episodes identified for the full sample in

each methodology, and the appendix lists them–including the year in which the reversal was triggered. The distribution criterion (RR henceforth) identifies over 700 events. In turn, using the cyclical deviations approach, the number of events decreases with the size of *m*. The larger *m* is, the more extreme the cyclical deviation value needs to achieve to be considered a boom in capital inflows. For this criterion (MT henceforth), the algorithm finds capital flow reversals ranging from close 550 events to just over 130 episodes. Table 2 also groups the reversal by the flexibility of its exchange rate regime. Defining as fixed exchange rate regimes those with coarse classifications 1 and 2 (see Table 1), and flex for classifications 3 and 4, we find that about 65 percent of the events are related to fixed exchange rate regimes in most cases.

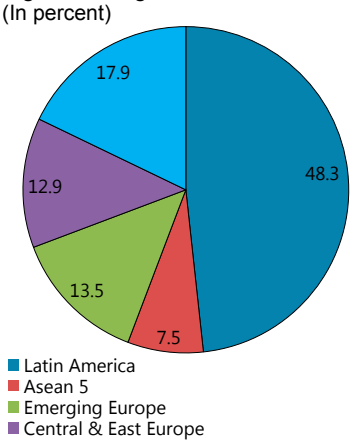
Table 2. Capital Inflow Reversal Events

	RR	MT1	MT2	MT3	MT4
Events	701	544	285	203	132
of which: since 1990 (percent of total)	18.5	21.7	20.4	18.7	15.2
Fixed Regimes (percent events after 1990)	68.5	67.8	67.2	63.2	50
Flexible Regimes (percent of events after 1990)	31.5	32.2	32.8	36.8	50

Sources: authors' calculations

The regional distribution shows a bias toward Latin America (Figure 1). About 48 percent of the sample belongs to this region. Emerging Europe accounts for about 13 percent of the identified episodes, of a similar order of magnitude as events identified in Central and East Asia. A smaller share of the reversals episodes occurs in Asia.

Figure 1. Regional Distribution
(In percent)



Sources: authors' calculations

We narrow the sample to analyze capital inflows reversals in emerging economies after the 1990s. Looking at the last 25 years allow us to focus on a period in which capital accounts in emerging economies became more open and received increasing private capital inflows. We eliminated developing and poor countries from the sample, as these countries present relatively close capital

accounts and depend on official financing. Interestingly, the sample shows that between 20 to 25 percent of the identified capital inflow reversals took place after 1990.

V. Event Analysis: Documenting Stylized Facts

We construct 11-year windows centered on reversals of capital inflows. The data is organized by event. For each episode, regardless of the actual year in which it took place, we label period *T* as the first year of the reversal. Hence, the data goes back to year *T-5* and forward to *T+5*. In this set up, we compute alternative "cross-section" statistical measures for each period in the interval (*T-5, T+5*). Of particular interest is the median, in each time period and for each series, as this measure is not influenced by outliers. The medians are then used to depict the dynamics of macroeconomic and financial variables.

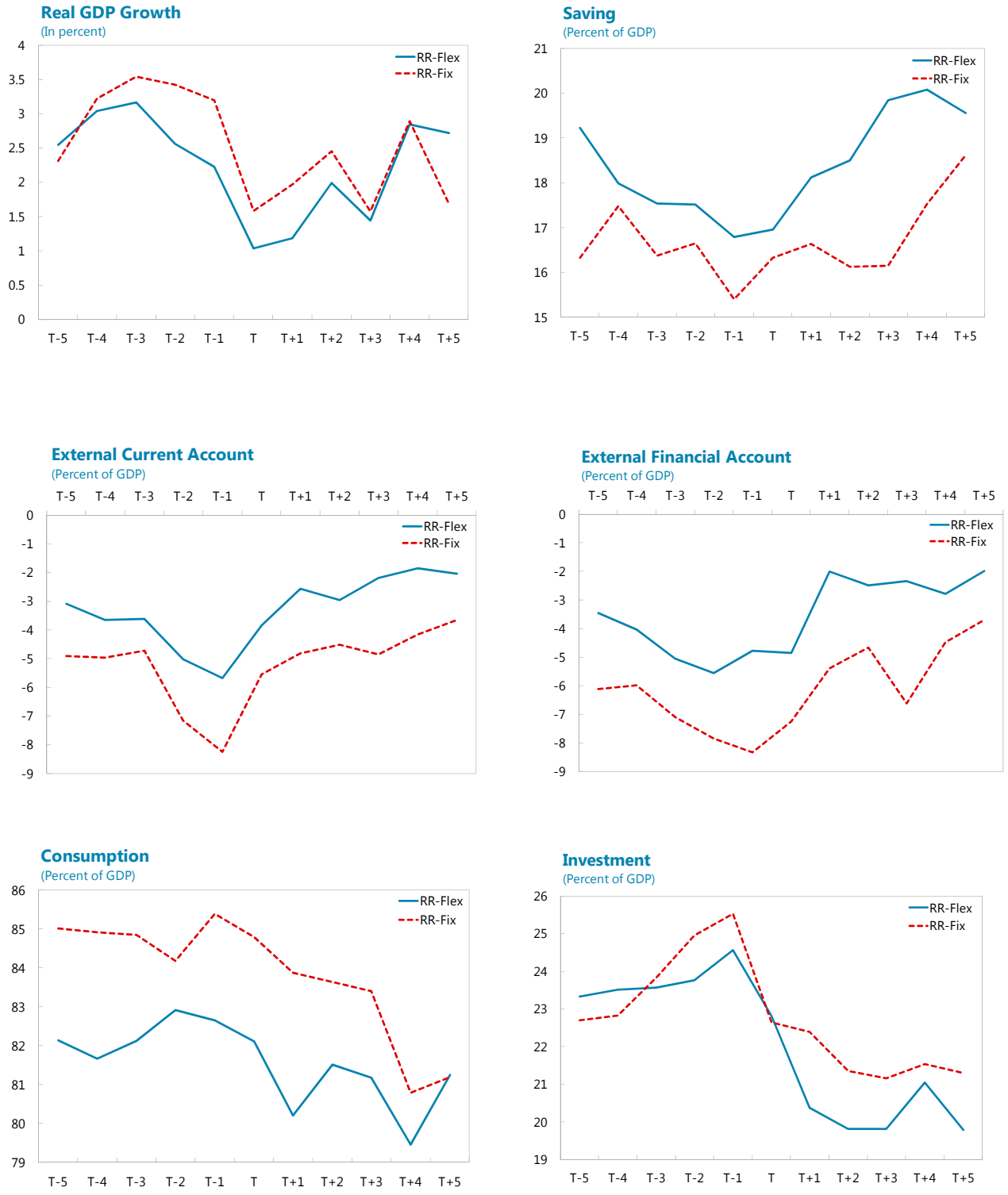
A. The Macroeconomic Environment

Capital inflow reversals are characterized by a collapse in economic activity and sharp adjustments in the current account (Figure 2). Economic activity picks up and the current account deteriorates during the capital inflow boom—the median GDP growth is about 2 percentage points lower in the year of the reversal compared to the peak during the boom, and the current account adjust by between 2 and 3 percent of GDP. The slowdown in growth is particularly strong during the first couple of years of the reversal, to recover gradually—although not monotonically—thereafter. Concurrently, as capital flows reverse, the current account adjusts, forcing the accommodation of domestic absorption.

Investment falls strongly during reversals. At the peak of capital inflow booms, investment is about 4-5 percentage points of GDP higher than during the reversal year. Moreover, its recovery is particularly sluggish. Even five years following the reversal, investment is still lower in terms of GDP than in the year of the reversal. Private consumption remains fairly stable during the boom, and even accelerates slightly prior to the reversal. As capital inflows retrench, however, consumption falls, consistent with the reduction in external financing. Additional issues—such as factors that might have an impact on banking sector credit, usually critical to the financing of consumption—could lie behind these dynamics.

We now focus on the differences between exchange rate regimes. We observe that investment dynamics are apparently not much affected by the exchange rate regime in a country during capital inflows reversals. Marginally, it appears that as the peak of the boom phase approaches, investment accelerates faster in more rigid exchange rate regimes. If anything, it might be signaling a potential misallocation of resources on the back of a misperceived sustainability of the cycle in the more rigid exchange rate arrangements.

Figure 2. Macroeconomic Variables



Sources: authors' calculations

The dynamics in economic activity and the current account do not differ markedly in countries with different exchange rate regimes. Yet, the external financing is larger in less flexible regimes. Domestic saving is larger in more flexible regimes throughout the boom and reversal, and accelerates faster after capital flows reverse. Measured as a share of GDP, consumption is significantly larger in less flexible exchange rate arrangements during capital inflow booms, and its adjustment during reversals substantially sharper. In contrast, consumption is more stable in more flexible regimes and shows a much milder adjustment during reversals. As a result, consumption tends to converge under different degrees of exchange rate flexibility as the capital flow cycle fades out. As we will see below, consumption, typically financed through banking system credit, reflects the behavior of banking credit under different exchange rate regimes.

B. Banking Sector Credit

Real growth in banking credit to the private sector collapses during capital inflow reversals (Figure 3). As showed in Magud et al. (2011, 2014), banking credit accelerates during capital inflow booms, and the real growth rate of credit peaks a couple of years before capital flows reverse. During the reversal stage of the cycle, however, real credit growth markedly slows down. We also observe that after capital flows reversal episodes end, real credit growth stabilizes at a rate substantially lower than that of the boom phase.

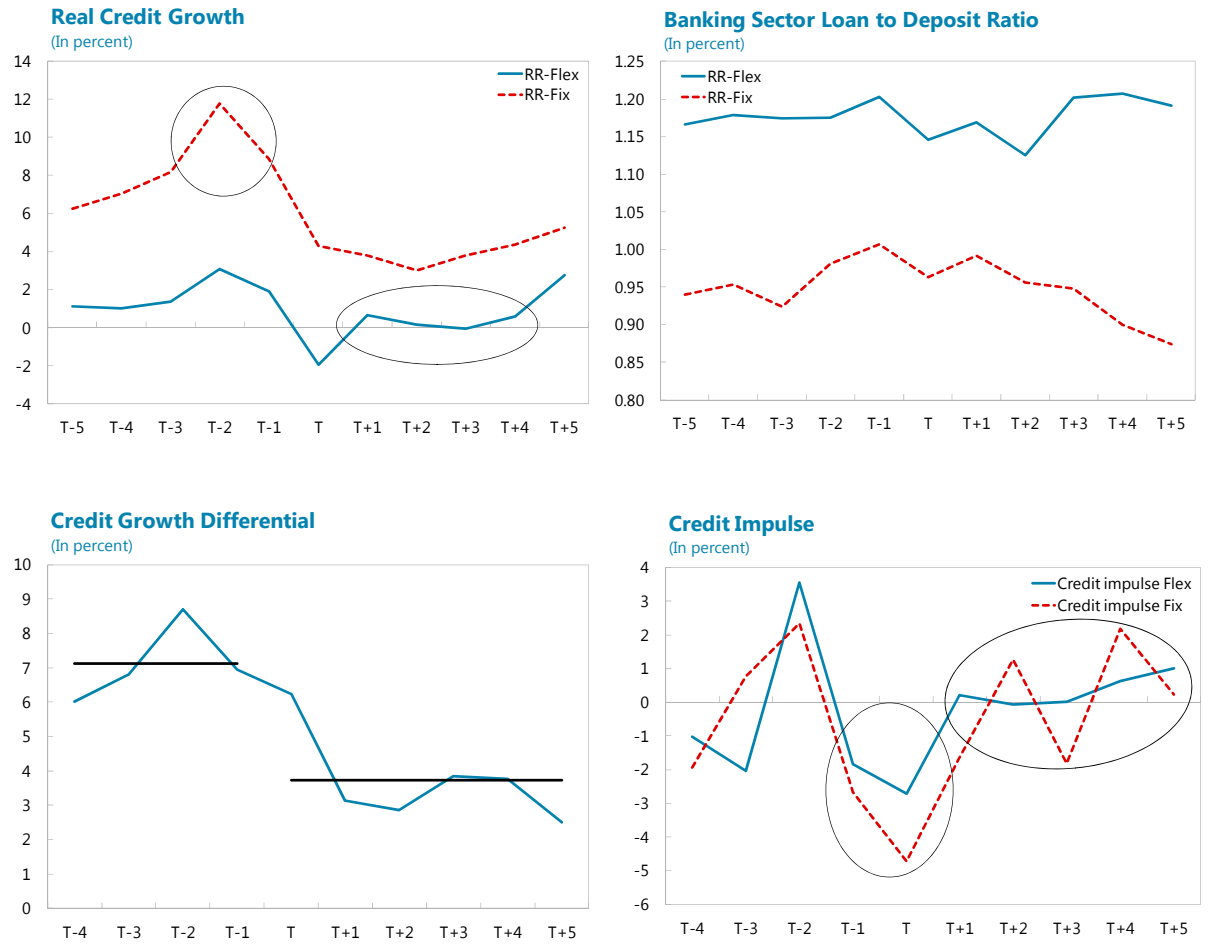
The dynamics of banking sector credit, however, show significant contrasts in economies with different exchange rate regimes. In particular:

- *Credit growth: consistently higher in fixed regimes, but less so during reversals.* Less flexible exchange rate regimes show consistently faster growth in domestic credit to the private sector during booms. The median of real growth in bank credit peaks at about 12 percent in fixed exchange rate regimes during capital inflow booms, while it does so at less than 3 percent for flexible regimes. The growth differential between regimes, however, falls significantly during reversals. Figure 3 shows that the average difference in median growth—i.e., credit growth in fixed regimes net of growth in flex regimes—falls from 9 percent during booms to 5 percent during reversals. Hence, even if partially, flexible exchange rate regimes show some more resilience during reversals as external financing dries up.

- *Containing credit growth during the boom is the key policy challenge for fixed regimes.* Credit growth in less flexible exchange rate regimes accelerates sharply during booms—its median doubles, from around 6 percent five years before the reversal to around 12 percent at the peak. In contrast, flexible regimes show a rather modest credit growth during capital inflow booms, with the median accelerating from slightly less than 2 percent during the initial stage of the boom to less than 3 percent at the peak. While differences in financial deepness makes it very complex to assess and compare credit growth among economies,

double-digit credit growth in fixed exchange rate regimes economies strikes as too high in the context of 3-3½ percent average GDP growth during booms years.[1] Economies with flexible exchange rate regimes show real credit growth in line with the expansion in economic activity.

Figure 3. Banking Sector Credit



Sources: authors' calculations

- *Supporting credit recovery seems to be a policy challenge for flexible regimes after reversals.* The fact that credit growth is more contained in economies with flexible exchange regimes during booms—and that loan-to-deposit ratios remain stable, see below—raises the question of whether the adjustment in credit growth during capital

[1] We looked at potentially different dynamics around capital inflows reversals for economies with different degrees of financial deepness—characterized by the size of bank and bond market credit compared to GDP. Results were not conclusive. They suggest that while credit growth rates are somewhat—although not clearly—higher for shallower financial markets in fixed exchange rate economies, this is not the case for economies under a flexible regime.

inflow reversals may be smoother. Furthermore, the slow recovery in credit growth for several years after the reversal—it is only towards the end of the capital flow cycle that credit growth rates significantly differ from zero—also raises questions. Why it is so difficult for banks to resume lending in a system that was characterized by a more contained pick-up in credit during the booms years? We dub this as the (credit) recovery puzzle.

- *Fixed regimes are exposed to sharp adjustments in non-deposit funding.* The LTDs can be considered as a proxy for banking sector external funding, as it reflects the share of total banking sector credit in excess of deposits. The sharp increase in LTDs in economies under fixed regimes suggests that capital inflows help finance the expansion of the lending portfolio through leverage. However, banks are forced to retrench this financing once these flows disappear—in fact, LTDs fall below the level attained at the initial stages of the capital inflows cycle. In contrast, in more flexible exchange rate regimes, although higher throughout, this ratio is fairly stable over the capital flows cycle.

- *The credit impulse is more procyclical in economies under fixed exchange rate regimes.* Using the change in credit to GDP as a proxy for credit impulse—or a measure of acceleration—we observe that following a positive impulse during the boom phase, a strongly negative impulse is observed as capital flows reverse, in particular for fixed regimes. The credit impulse also looks more volatile after the reversal in these economies.

Higher order moments of the distribution of credit growth rates during reversals also suggest that credit in fixed regimes are more volatile over the whole cycle. The standard deviation of real credit growth in fixed regimes equals 2.7 for the whole period, while for flexible regimes reaches about only half of that, at 1.4. It is worth noticing, though, that while the standard deviation is higher in fixed regimes during booms, it is nonetheless lower than in flex regimes during the reversal—suggesting that the sharp adjustment at the reversal plays an important role in the assessment of volatility over the entire window. We also find that the distribution of real credit growth for economies with flexible exchange rate regimes exhibits negative skewness, while the one for less flexible regimes shows positive skewness. This suggests that economies under fixed regimes tend to concentrate a larger part of the distribution in observations with larger growth rates.

Table 3. Real Credit Growth

	Fixed	Flex
Std. dev full sample	2.7	1.4
Std. dev boom	2.1	0.8
Std. dev full reversal	0.8	1.5
Skewness	1.0	-0.5

Source: authors' calculations

C. Robustness

While the results presented in this section are based on the RR identification process, they remain broadly similar under the MT identification process described above. Only small differences are found, and they only apply to the most stringent MT identification specifications—i.e. the ones using the highest deviation from the mean as the identification criteria. The latter shouldn't surprise, as the highest "*m*-values" are related to tail events. Yet, all the results, and consequently their dynamics and interpretation, remain unaltered.

VI. Econometric Analysis

In this section, we focus on the dynamics of credit during capital inflow reversals in the context of different exchange rate regimes. The latter, based on the panel regressions presented below, will inform the policy discussion in the next section.

A. Models

Panel Regressions

We model the following panel specification:

$$Y_{t,i} = \alpha X_{i,t} + \beta M_{t,i} + \gamma F_{t,i} + \delta R_i + \vartheta T_t + \varepsilon_{t,i} \qquad (1)$$

where sub-indices *t* and *i* stand for period and event respectively. $Y_{t,i}$ refers to the real growth rate of credit. $X_{i,t}$ denotes the main explanatory variable, the *de facto* exchange rate regime. As mentioned above, we use the coarse classification, which ranges from 1 to 4, as we leave out the free falling observations. Given this classification, the larger this variable is, the more flexible the exchange rate regime is—as a 4 refers to a free floating regime, while a 1 corresponds to pegs.

We introduce several controls. $M_{t,i}$ stands for the set of macroeconomic controls, which include real GDP growth and the real effective exchange rate. Other controls are aimed at correcting for financing conditions, namely $F_{t,i}$. These include financial deepness (proxied by the lagged ratio of banking credit to GDP), the real growth of broad money (M2), as well as the ratio of the balance of the (external) financial account to GDP, to control for external financing. Formally,

$$M_{t,i} = \begin{bmatrix} RGDPgrowth_{t,i} \\ REER_{t,i} \end{bmatrix}$$

$$F_{it,} = \begin{bmatrix} realBroadMongrowth_{t,i} \\ FinAccBal_{t,i} \\ Credit/GDP_{t-1,i} \end{bmatrix}$$

Equation (1) is the baseline regression model. Alternative specifications are added for robustness. We include dummy variables for each region, R_i, a sort of "fixed effect" control. We also test for

the impact of "time effects" by adding a period dummy, T_t. We also run an instrumental variables specification in which the financial account balances and the real growth rate of broad money are instrumented by their one-period lags. The data set, based on the series used in the event analysis above, is a balanced panel. It is worth stressing that the series are not a country panel, but an episode-based panel including a total of 129 events with a maximum of 11 observations each. Countries in the sample could have experienced more than one episode of capital inflow reversals.

Cross-Section Model

We also build a cross-section sample by computing the average of the series during the boom phase and the reversal stage of the capital flows cycles, respectively. Then, we compute the change in average real credit growth between the different stages. As we want to understand the factors behind the deceleration in credit during the reversal, and in particular the role played by the exchange rate regime, we run the following regression:

$$CredRev_i = \pi Z_i + \varphi W_i + \tau V_i + \omega_i \qquad (2)$$

where $CredRev_i$ stands for the change in average real credit growth between the boom and the reversal phases. Z_i stands for the exchange rate regime (again, based on the coarse classification, excluding free falling observations). The controls—W_i, V_i—stand for macroeconomic and financial variables respectively, and are given by the following vectors:

$$W_i = \begin{bmatrix} avgRGDP_i \\ avgREER_i \end{bmatrix}$$

$$V_i = \begin{bmatrix} avgFinAcc_i \\ avgRBrMongrowth_i \end{bmatrix}$$

The controls include the average growth rate of real GDP, and the average growth of the real effective exchange rate among the macroeconomic explanatory variables, and the average balance of the external financial account (as a percentage of GDP) and the average real growth rate of the growth of broad money as the financial variables. Variables in the right hand side of (2) are averages at the boom stage of the cycle, as we want to understand how much each of these boom-value levels conditions the change in real credit growth when capital flows reverse.

B. Results

The panel regressions suggest that credit growth is lower in economies with more flexible exchange rate regimes over the whole capital flow cycle. The coefficient for the exchange regime is negative and significant at the 1 percent level in every specification. Table 4, column 1 shows the baseline specification, which is corrected for heteroscedasticity. The baseline specification is checked for robustness by including regional and time dummies variables, as described above. Additionally, instrumental variable specifications are run by lagging broad money growth and the external financial account balance—not only in the baseline specification, but also when including