

# Quantitative Easing and United States Investor Portfolio Rebalancing towards Foreign Assets

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## **Abstract**

*We show robust evidence that quantitative easing policies implemented by the Federal Reserve cause portfolio rebalancing by USA investors towards foreign assets in emerging market economies. These effects are on top of any effects such policies might have through global or specific conditions of the recipient economies. To control for such conditions, we use capital flows from the rest of the world to the same recipient economy as the counterfactual behavior for USA investors or, formally, as a proxy variable for unobserved common drivers of the flows. We gather a comprehensive dataset for Brazilian capital flows and a smaller dataset for other emerging market economies from completely independent sources. Both datasets show that more than 50% of USA flows to the recipient economies in the period is accounted for by quantitative easing policies. We use the detailed datasets to break down this overall effect on the specific asset categories and sectors of the recipient economies.*

*Keywords: quantitative easing; capital flows; portfolio rebalancing; USA investor; emerging markets; Brazil.*

*JEL classification: E52, F42, G11, G15*

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## 1. INTRODUCTION

Regarding its large-scale asset purchase programs, the Federal Reserve has supported the view that portfolio rebalancing is an important transmission channel to the macroeconomy.<sup>1</sup> The basic intuition of portfolio rebalancing is that, under imperfect asset substitution, say between bonds of different maturities or between foreign and domestic bonds, asset prices are sensitive to the relative supply of the assets (Tobin, 1969 and 1982). That is, the reduced supply of long-term domestic treasuries resulting from quantitative easing reduces the marginal benefit of short-term domestic treasuries, pressuring long-term bond prices and motivating investors to shift their portfolios towards other assets. The domestic and global macroeconomic environment would then respond to the asset price incentives, to the likely lower financial constraints and to the flow of capital to specific trades.

In spite of its relevance, and the several years of policy experiment, there is at best partial evidence supporting directly the portfolio rebalancing channel of quantitative easing. This includes a small macroeconomic literature that captures stylized facts with general equilibrium models featuring imperfect asset substitution (e.g., Chen et al., 2012; Sami and Kabaca, 2012), as well as an international finance literature that points to portfolio rebalancing towards foreign assets in response to unconventional monetary policies (e.g., Fratzscher et al., 2013; Ahmed and Zlate, 2014). However, from our point of view, the empirical evidence so far is not particularly convincing due to the lack of an observable counterfactual that would render possible a causal interpretation.

This paper contributes to the debate by proposing an observable counterfactual to quantitative easing policies as referring to the United States of America (USA) investor (or, for that matter, with immediate adaptations, to any similar balance sheet policy conducted by advanced or emerging market economies). By using a proper counterfactual, we hope to establish credible causality claims between unconventional policies and investor behavior. The essential idea of the paper is to consider USA capital flows to a foreign recipient economy and to use the rest of the world (ROW) capital flows to

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<sup>1</sup> See, e.g., Ben Bernanke's speech at the Jackson Hole Symposium, August 31, 2012.

the same economy as the counterfactual, or, in other words, as the control group. Since the portfolio and wealth of USA-based investors are disproportionately affected (*vis a vis* foreign investors) by the operationalization of USA-based unconventional policies, it is natural to expect they rebalance their portfolio in distinctive manners—therefore our interpretation of a residual effect captured by comparison to the counterfactual. Just to be clear, this does not rule out that quantitative easing affects the global economy and, as result, ROW capital flows. It only requires a disproportional effect on USA-based investors. As a result, any evidence of an effect conditional on our counterfactual would be particularly strong evidence, since we are not accounting for other effects in common with ROW investors.

We formalize the exact conditions under which ROW flows to the same recipient economy as USA flows is a proper counterfactual. Our argument formally interprets ROW flows as a proxy variable to unobservable global and local conditions in the recipient economy jointly affecting USA flows and ROW flows. The parameter of interest, in this case, is the partial effect of quantitative easing policies on USA flows controlling for such global and local variables.

We show that the quality of the proxy variable counterfactual is proportional to how closely global and local variables drive ROW flows. To support the assumption, therefore, we propose to include controls in the regression that capture differences in the home environment of USA and ROW investors, since these could be residual drivers of the respective capital flows. Interestingly, the introduction of these variables leads to a capital flow regression that controls for differentials in source economies, unlike the usual regression that controls for the differential in source and recipient economies.

Even though the overall procedure is intuitive, it may well be the case that ROW flows do not provide a good counterfactual. However, in a formal sense, our proxy variable approach always brings us closer to the truth. Indeed, under weak conditions, the use of our counterfactual is guaranteed to reduce bias in estimating the parameter of interest. The crucial assumption to obtain this result is that quantitative easing should drive USA flows directly, but ROW flows only indirectly. In essence, it only requires that flows resulting from unconventional policies at home should follow the shortest path to the final destination, a weak substantive statement.

With the proper methodology in place, we collect novel datasets and estimate the causal effect of quantitative easing policies on USA

flows directed to foreign assets in emerging market economies. In case of a positive effect, this is evidence of portfolio rebalancing, at least in its international dimension (perhaps, also rendering more plausible likely effects on the domestic dimension). The two novel datasets constructed for this paper are based on completely independent sources. The fact that the data comes from different sources increases the credibility of our results.

The main dataset of the paper consists of monthly capital flows with Brazil as the recipient economy and the USA and ROW as the sources. This is a unique dataset constructed for this paper over the course of several months. The data construction follows the exact same methodology of the balance of payments statistics of the country. It is worth highlighting that balance of payments statistics in Brazil (and our dataset in particular) are of above average quality due to the legal requirement of filing electronic contracts in all transactions with foreigners. The dataset is comprehensive in terms of categories of flows and distinguishes flows to the banking sector from flows to other sectors.

As a secondary dataset, we use quarterly data from the Treasury International Capital (TIC) System for USA-based portfolio flows jointly with data from the International Financial Statistics's (IFS) net capital flows for imputing ROW flows. Relative to Brazilian data, this has a lower frequency, covers a smaller subset of flow categories, and may have problems due to the differences in methodology between TIC and IFS sources. Nonetheless, by pooling the information from different capital flow recipients, it allows one to check if the results obtained with the main dataset generalize.

The paper has several contributions. The first contribution is the definition of the novel identification strategy based on observed counterfactual for investor behavior, which allows a proper assessment of the portfolio rebalancing channel of unconventional monetary policies. The second contribution is the construction of a new, high quality and detailed dataset of capital flows to Brazil resulting from USA investors and ROW investors. In particular, the dataset distinguishes flow to the banking sector, allowing us to address the importance of banks as a conduit to the transmission of portfolio rebalancing effects, illuminating relevant questions in the literature.<sup>2</sup>

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<sup>2</sup> There is an ongoing debate in the literature regarding the relative size of bank flows versus bond market flows in the transmission of global liquidity after the global financial crisis. See the literature review below.

The third contribution is the mapping of available datasets for other emerging markets into the conceptual framework of our methodology, therefore expanding its applicability. The fourth contribution is the set of estimated causal effects of quantitative easing on USA investor behavior, in the sense of capital flows to emerging market foreign assets.

Our results show significant USA investor portfolio rebalancing towards emerging economies' assets in response to quantitative easing policies as measured by the monthly change in the balance sheet of the Federal Reserve. In the case of the Brazilian dataset, the estimated effect runs mostly through the USA flows into portfolio assets, particularly debt. USA direct investment, including equity capital and affiliated enterprise loans, do not respond; this is also the case for cross-border USA credit flows. Regarding USA capital flows to the banking sector, only portfolio assets are affected, and debt flows drive the results as before. Results are robust to the inclusion of controls and to measurement in real or nominal terms. They are about the same when partitioning quantitative easing into three different periods, corresponding to the first, second and third round of balance sheet expansion (QE1, QE2 and QE3).

The magnitudes are economically significant when measured relative to the recipient economies, although somewhat small relative to the size of the quantitative easing policies. Across different specifications, additional flows due to quantitative easing range from USD 54 to USD 58 billion. This corresponds to around 54% of the USA flows to Brazil accumulated over the period of the policies or 10% of foreign flows to the country over the same period. The effect on portfolio flow ranges from USD 41 billion to USD 48 billion, and portfolio debt flows from USD 28 billion to USD 31 billion. Regarding the banking sector, the effect on portfolio flow ranges from USD 10 billion to USD 12 billion (83% of USA, or 24% of total) and portfolio debt flow ranges from USD 6 billion to USD 7 billion. Additional bank portfolio flows are therefore 26% of additional total portfolio flows, and additional bank debt flows are 23% of additional total debt flows. This is consistent with the view that, after the financial crisis, market based instruments are more important.

Results for TIC-IFS dataset on portfolio flows are also consistent with a significant effect from quantitative easing on USA flows to emerging markets. The effect is economically significant and interestingly is of the same order of magnitude as obtained in the Brazilian

dataset: Between 55% and 65% of USA flows to emerging markets in the sample. The effect of quantitative easing on global portfolio flow ranges from USD 111 billion to USD 130 billion. In contrast with the results using Brazilian data, most of the effect comes from portfolio equity flows (up to USD 102 billion), and debt flow effects are actually not significant.

The paper is structured as follows. The next section presents the related literature. It is followed, first, by the methodology section that formalizes the counterfactual as a proxy variable and, second, by the data section that describes the primary and secondary capital flow datasets. Results for the two datasets are presented in turn in the next section, along with a complementary appendix for additional results. The last section summarizes results and conclusions.

## 2. RELATED LITERATURE

As mentioned in the introduction, the portfolio rebalancing argument goes back to Tobin (1969, 1982). Unconventional monetary policies renewed the interest in the argument, stimulating theoretical and empirical research in several intertwined literatures. There is macro research focusing on real consequences of the policies, finance research studying segmented asset markets sometimes with an event study approach, and international finance research focusing on international portfolio flows.

Recent attempts to incorporate portfolio rebalancing as a transmission channel of unconventional monetary policy in calibrated general equilibrium models include, e.g., Chen et al. (2012), Flagiarda (2013), and Sami and Kabaca (2015). Imperfect substitution in these models results from financial constraints, adjustment costs or preferences for asset holdings. Sami and Kabaca (2015) come closest to this paper by considering international portfolio holdings. However, the authors assume USA-based investors hold only domestic assets, so that all the international portfolio rebalancing runs through substitution effects of foreign investors holding some share of USA assets. In spite of this limitation, which is at odds with the data and with the results of this paper, the authors do show their model is able to capture some stylized asset price spillovers. From the point of view of identifying the portfolio balance channel, however, this macroeconomic literature does nothing more than assume the effect and model the connections with the macroeconomy.

The finance literature has moved into modeling segmented asset markets to explain the impact of unconventional monetary policies on asset prices. Gromb and Vayanos (2010) survey the broader segmented markets literature, Greenwood and Vayanos (2014) apply the insights to term structure models, while Hamilton and Wu (2012) extend the argument to quantitative easing and show it contributes to lower long term rates. Bruno and Shin (2014) argue that monetary easing in the USA improves funding conditions of foreign banks and puts in motion a feedback loop between bank cross-border lending, foreign currency appreciation and balance sheet improvement that eases constraints. They argue banks drive the cycle up to the financial crisis, with the market for debt securities taking a similar role afterwards. Plantin and Shin (2014) argue that interest rate differential may lead carry traders to coordinate on the supply of excessive capital to the targeted economy.<sup>3</sup>

There is a related event study literature in great part motivated by the segmented markets approach. Gagnon et al. (2011) use event study methods and document that large-scale asset purchase programs led to a reduction in USA long-term interest rates for a range of securities, including those not included in the purchase programs. Neely (2015) shows that unconventional monetary policy by the Federal Reserve influences long-term interest abroad as well as bilateral exchange rates. From our perspective, the theoretical term structure papers are heavily dependent on the theoretical structure, much like the general equilibrium models. On the other hand, the event study papers face problems related to confounding events and the short run nature of the estimated effects.

The empirical international finance literature addresses the portfolio balance hypothesis in a more direct way, focusing on the substitution between domestic and foreign assets. Fratzscher et al. (2013) use panel regressions and show that flows into USA equity and bond funds go in the opposite direction of flows into funds dedicated to emerging markets conditional on the policies. There are corresponding movements in equity returns, bond yields and exchange rate

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<sup>3</sup> It is interesting to compare this with the traditional portfolio rebalancing literature (e.g., Gohn and Tesar, 1996 Hau and Rey, 2008), which documents return chasing behavior and rebalancing to keep investment shares constant, so that, in particular, foreign currency appreciation would be a disincentive to further inflows.

returns. Ahmed and Zlate (2013) also use panel regressions to show that net portfolio flows (that is, including domestic resident flows) to emerging markets shift in composition, but not in levels in response to quantitative easing, and that such change seems to be towards bonds and equities. An important problem of these approaches is probably the presence of omitted variables in the empirical specifications. From our perspective, this also translates into the lack of a proper counterfactual for conducting causal inference.

A closely related paper that is at the crossroads of the macroeconomic and international finance literature and deals with Brazilian capital flows is Barroso et al. (2015). The authors show that USA quantitative easing influences capital inflows to the country and, through this channel, the overall economic outlook and, to some extent, financial stability. The authors also propose counterfactuals to evaluate the effect of the policy. However, the counterfactuals there are model constructs not observable in the data. This leads the authors to consider a range of possible counterfactuals and to focus only on qualitative results holding for most of the possibilities. Moreover, the counterfactuals do not speak directly to the behavior of the USA-based investor, but to the global macroeconomic conditions. Relative to that paper, therefore, this paper focus on a specific group of investors, with an observable counterfactual (based on a control group of less affected investors), and offers direct, quantitative inference on the portfolio balance channel.

### 3. METHODOLOGY

This section formalizes the intuition presented in the introduction. The basic idea is that ROW flows are proper counterfactual for USA flows to the same recipient economy. We formalize this idea by characterizing ROW flows as a proxy variable for unobserved global and local factors to the recipient economy. In this sense, the structural regression of interest is the following:

$$1 \quad usflow_t = \beta qe_t + \gamma w_t + e_t,$$

where  $usflow_t$  refers to the capital flows from the USA to the recipient economy in period  $t$ ,  $qe_t$  measures the quantitative easing policies



affecting flows in this period,<sup>4</sup>  $w_t$  stands for unobserved variables and  $e_t$  is the innovation to the process relative to this information set. The coefficient of interest is  $\beta$  which measures the partial effect of quantitative easing policies on USA flows.

The OLS estimator of  $\beta$  in a regression omitting the unobserved variable  $w_t$  converges to the true parameter plus a bias term. For example, if global conditions affect flows positively and correlate with quantitative easing, omitting them may overestimate the effect of quantitative easing. Similarly, if prudential regulation in the recipient economy correlates with quantitative easing this may bias downward the coefficient of interest.

It is convenient to express the bias in the context of the following auxiliary regressions:

$$\begin{aligned} \text{rowflow}_t &= \delta w_t + v_t, \\ qe_t &= \alpha w_t + u_t, \end{aligned}$$

where  $\text{rowflow}_t$  refers to capital flows from rest of the world to the recipient economy in period  $t$ , and  $E(w_t v_t) = E(w_t u_t) = 0$ . Notice, in particular, that quantitative easing may be associated with the unobserved variables, such as global conditions or domestic prudential policies. Auxiliary regressions are only *linear projections*, which only capture the correlation structure in the data. In particular, we make no assumption regarding causal relations or direction or causality in the auxiliary equations. In this framework, the probability limit of the omitted variable regression coefficient is:

$$p \lim \beta = \beta + \frac{\gamma \alpha E(w_t^2)}{\alpha^2 E(w_t^2) + E(u_t)}.$$

The challenge posed by the structural equation is to minimize the omitted variable bias. Controlling for some observable factors ameliorates the problem, but does not rule out still unobserved ones. The solution proposed here is to use capital flows from the ROW to the same recipient economy as a proxy for omitted factors, or, from another

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<sup>4</sup> We measure this by the change in the Federal Reserve's balance sheet, possibly forwarded a few months if suggested by information criteria. See the data and result sections for details.

perspective, as a counterfactual for the behavior of USA flows had it not been disproportionately affected by quantitative easing policies. The fact that both variables are capital flows to the same recipient economy hopefully adds credibility to the estimator. We argue that it necessarily reduces the asymptotic bias and formalize the exact condition under which it is a perfect counterfactual.

Formally, we propose to estimate the proxy-variable regression:

$$4 \quad usflow_t = \beta^b qe_t + \gamma^b rowflow_t + \varepsilon_t.$$

In the context of the auxiliary regressions defined in 2, the proxy variable assumption is introduced by requiring 1)  $\delta \neq 0$  and 2)  $u_t \perp v_t$ . The first assumption ensures that rest of the world flows is related to the unobserved factors it should proxy. The second assumption, which is the crucial assumption in the paper, means that, *beyond indirect effects driven by the unobserved factors*, quantitative easing does not impact ROW flows to the recipient economy. Substantively, this means capital flows follow the shortest path to the recipient economy and therefore do not move from the USA to the rest of the world just before reaching their final destination. One may also simply interpret the assumption as a definition or methodological device that allows for identifying factors associated with QE that affect exclusively the USA investor. The credibility of such interpretation of a QE effect depends on properly controlling for other local factors affecting investor behavior in the USA and abroad, and we show below how to extend the framework to this case.

Substituting the structural equations into the equation for OLS proxy variable estimator  $\hat{\beta}^b$ , it is simple to show that<sup>5</sup>:

$$5 \quad p \lim \hat{\beta}^b = \beta + \frac{\gamma \alpha E(w_t)}{\alpha^2 E(w_t^2) + E(u_t) / R_{rw,v}^2},$$

where  $R_{rw,v}^2$  is the  $R^2$  from regressing  $rowflow_t$  on  $v_t$ . Intuitively, if most of the variation in the proxy variable is associated with the unobservable variable, then there is a large reduction in the asymptotic bias. In the limit, there is complete reduction in the bias and we are

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<sup>5</sup> Apart from our substantive interpretation, the argument is essentially the one presented in Sheehan-Connor (2010),

completely safe in our assumption of a proper counterfactual.

So far results suppose a scalar unobserved variable  $w_i$ . It is simple to generalize this to a scalar *index function* of several unobserved variables, as long as the function is the same in all structural equations of the model.

It is also simple to introduce additional controls. Indeed, with such controls, the exact same results as before follow from a simple application of the Frisch-Waugh theorem. For our framework, differences in the environment between United States and rest of the world investors are observable controls, while local conditions to the recipient economy and global conditions enter in the unobserved index function. The introduction of local controls to the source economies is important if one is to interpret the results as an additional impact of QE affecting exclusively the USA investor.

Another variation of the methodology may use the residual from the candidate proxy variable regressed on quantitative easing policies as the proxy variable, with an adjustment for generated regressor. We consider this variation when using data for jurisdictions other than the Brazilian economy to control for data quality issues.

## 4. DATA

The data consists of: 1) indicators of capital flows from the USA and ROW with Brazil as the recipient economy; 2) capital flows from the USA and ROW to other emerging market economies; 3) unconventional monetary policy by the Federal Reserve; and 4) additional control variables. For the Brazilian data, the frequency is monthly and the sample runs from January 2003 to March 2014. For other recipient economies, the data is quarterly from the first quarter of 2005 to the first quarter of 2014. The other time series are set to monthly or quarterly accordingly.

### 4.1 Capital Flows for Brazil

For historical reasons, the monitoring of capital flows in Brazil is uniquely comprehensive. It relies on a system of mandatory electronic contracts for all transactions with foreigners. Based on this, the Central Bank of Brazil can maintain a data warehouse that allows, among other features, breaking down capital flows according to the

nationality of the counterparty.<sup>6</sup> This is true for any capital flow category up to the full level of detail of balance of payments statistics. It is also possible to assign flows directed to the banking sector. All these different views of foreign capital flows to the country add up to the official balance of payments statistics because the data warehouse is the basis for its compilation. Except when made explicit in the text, all capital flow variables are in billions of dollars.

The dataset covers all gross capital flow categories, including foreign direct investment, foreign portfolio investment and foreign credit investment. Direct investment is discriminated into equity capital investment and affiliated enterprise loans.<sup>7</sup> Portfolio investment is decomposed into equities and debt securities, and then into debt issued in the country and debt issued abroad. Foreign credit investment is composed exclusively of direct loans.<sup>8</sup> The corresponding aggregated series are available at the Central Bank of Brazil online time series system with detailed metadata descriptions. The break down by nationality used in this paper was custom-made to this study with extensive checks for data quality performed by the staff responsible for balance of payments compilation.

Flows directed to the Brazilian banking sector are also available for the same categories (except affiliated enterprise loans which are treated as credit flows), both from the United States and from the rest of the world. There are two caveats here. First, we must impute portfolio equity flows and portfolio debt flows towards banks from the relative size of the banking sector in the equity and debt market, respectively (but debt issued abroad is from actual transactions). Second, we cannot assure full coverage of bank credit flows. Indeed, lines of credit between banks are exempt from electronic contracts that are the base for our dataset. For aggregate balance of payment statistics, accounting data

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<sup>6</sup> For the record, another feature is the very fast compilation of balance of payments statistics; preliminary numbers for all the major accounts are available and monitored in almost real time.

<sup>7</sup> In the case of foreign direct investment, we include inflows of national corporations borrowing abroad through foreign affiliates and exclude outflows of direct investors lending to headquarters abroad. In this way, we keep track of changes in liabilities of corporations with domestic residency, in line with the latest edition of the balance of payments manual.

<sup>8</sup> In the case of credit flows, we choose to exclude trade credit flows because they follow trade in goods and are uninformative of portfolio decisions by foreign investors.

can complement the information available in the data warehouse, but the same solution is not available when discriminating by the nationality of the counterparty. This second caveat applies to total flows as well, since banks are a subset of the full dataset.

The correlation between ROW flows and USA flows is a first rough indicator of the credibility of the proxy variable assumption. A strong correlation is a signal of common drivers. Yet, if the correlation is too strong, it can signal there is little room for additional effects from quantitative easing. Figure 1, panels *a* to *j*, shows the corresponding flows to the recipient economy: Total flows have a correlation coefficient of 0.37, portfolio flows 0.36, portfolio equity 0.15, portfolio debt 0.17, portfolio debt in the country 0.14, portfolio debt abroad  $-0.11$ , foreign direct investment 0.46, credit 0.13, foreign equity capital investment 0.31 and affiliated enterprise loans 0.49. Figure 2, panels *a* to *h*, shows the corresponding flows to the banking sector: Total flows to banks have a correlation coefficient of 0.24, portfolio flows 0.32, portfolio equity 0.42, portfolio debt 0.16, portfolio debt in the country 0.21, portfolio debt abroad 0.04, foreign direct investment 0.09 and credit flows 0.03.

We may also compare the behavior of moving averages of ROW flows and USA flows, particularly for periods of quantitative easing policies. A distinct behavior of USA flows during policy periods is a signal of possible effects. Figures 3 and 4 show the six months moving average of ROW and USA flows to Brazil, respectively. To get a clearer picture of the other flows, we exclude foreign direct investment due to large scale and volatility differentials between ROW and USA flows. There are pronounced differences between total flows during each of the quantitative easing policy rounds, with subcategories of flows apparently reacting more strongly to certain rounds. For example, the first and third policy rounds show up more clearly in the USA flows. Debt flows respond relatively more in the third round and credit flows in the second. The general picture is consistent with the results summarized in the introduction. Figures 5 and 6 show the corresponding moving averages of ROW and USA flows to the banking sector of the recipient economy. Again, there are pronounced differences, including the relatively stronger behavior of USA flows around the first and third rounds of quantitative easing and a role for credit flows during the second round. The exact definition of the policy rounds considered in the paper are presented in the following section.

**Figure 1**

**CAPITAL FLOWS FROM THE US AND ROW TO BRAZIL**

(USD billions)

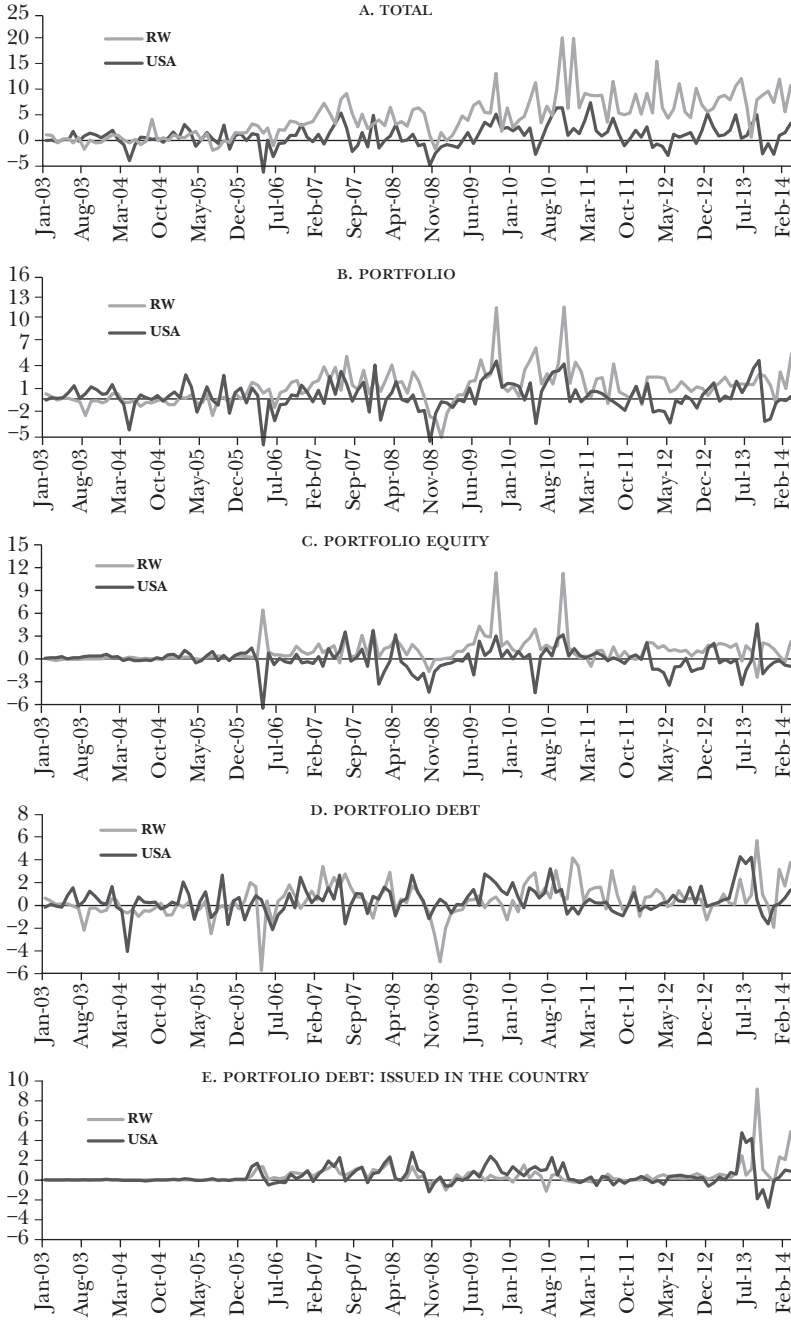
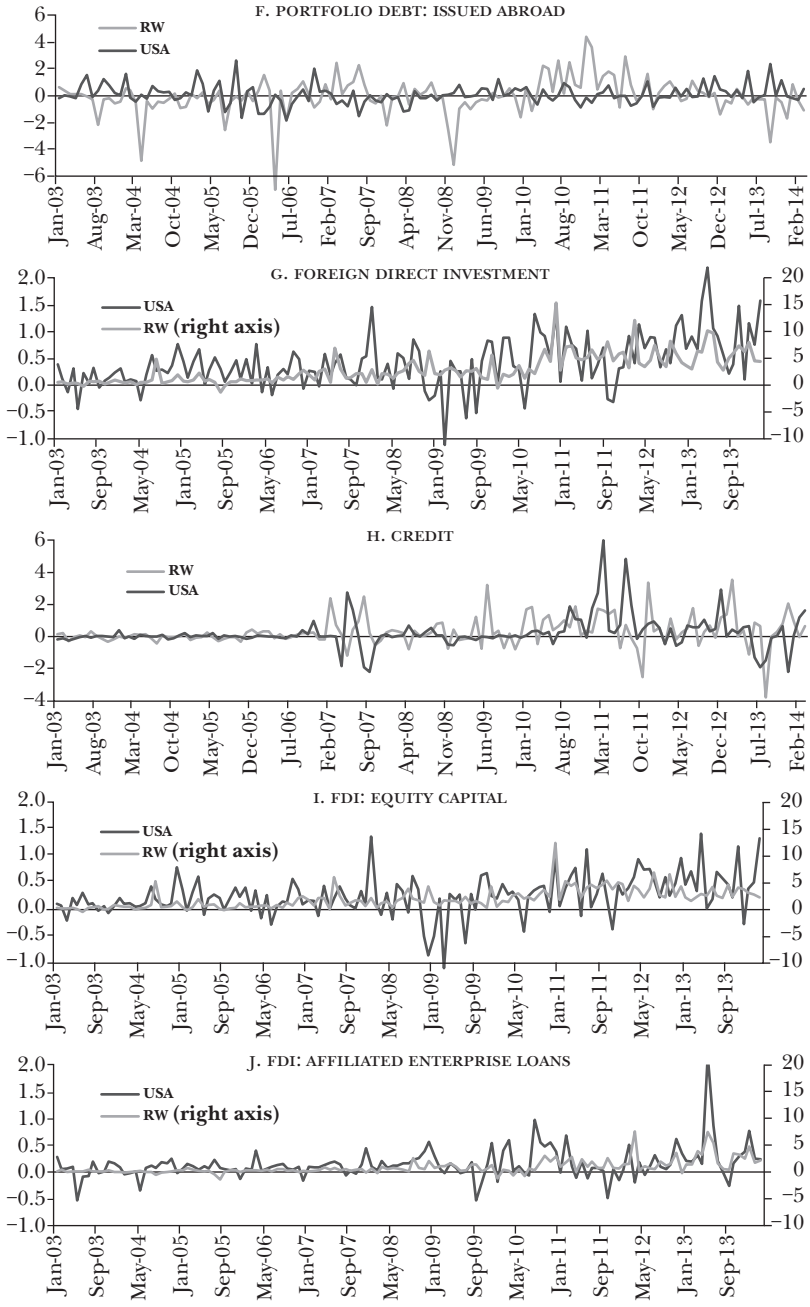


Figure 1 (cont.)

CAPITAL FLOWS FROM THE US AND ROW TO BRAZIL

(USD billions)



**Figure 2**

**CAPITAL FLOWS FROM THE USA AND ROW TO THE BRAZIL'S BANKING SECTOR**

(USD billions)

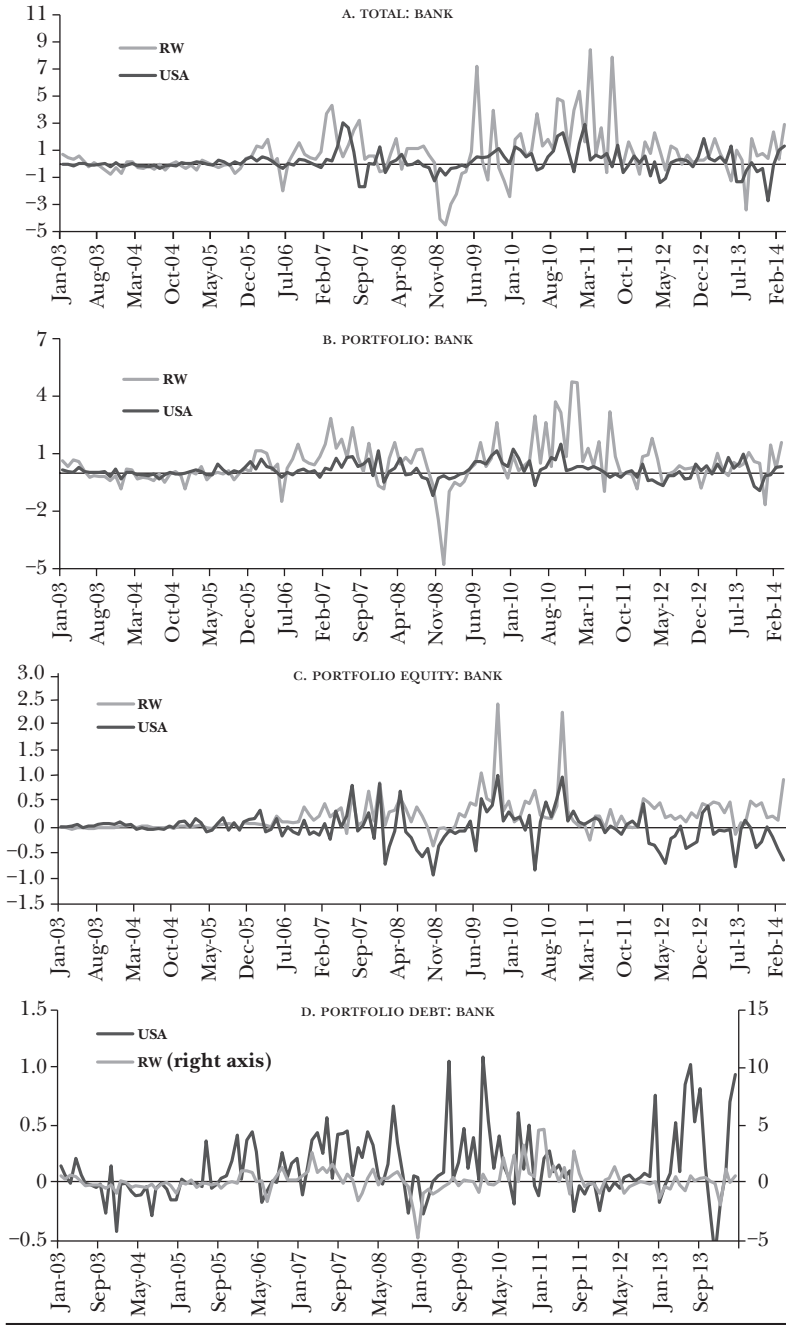
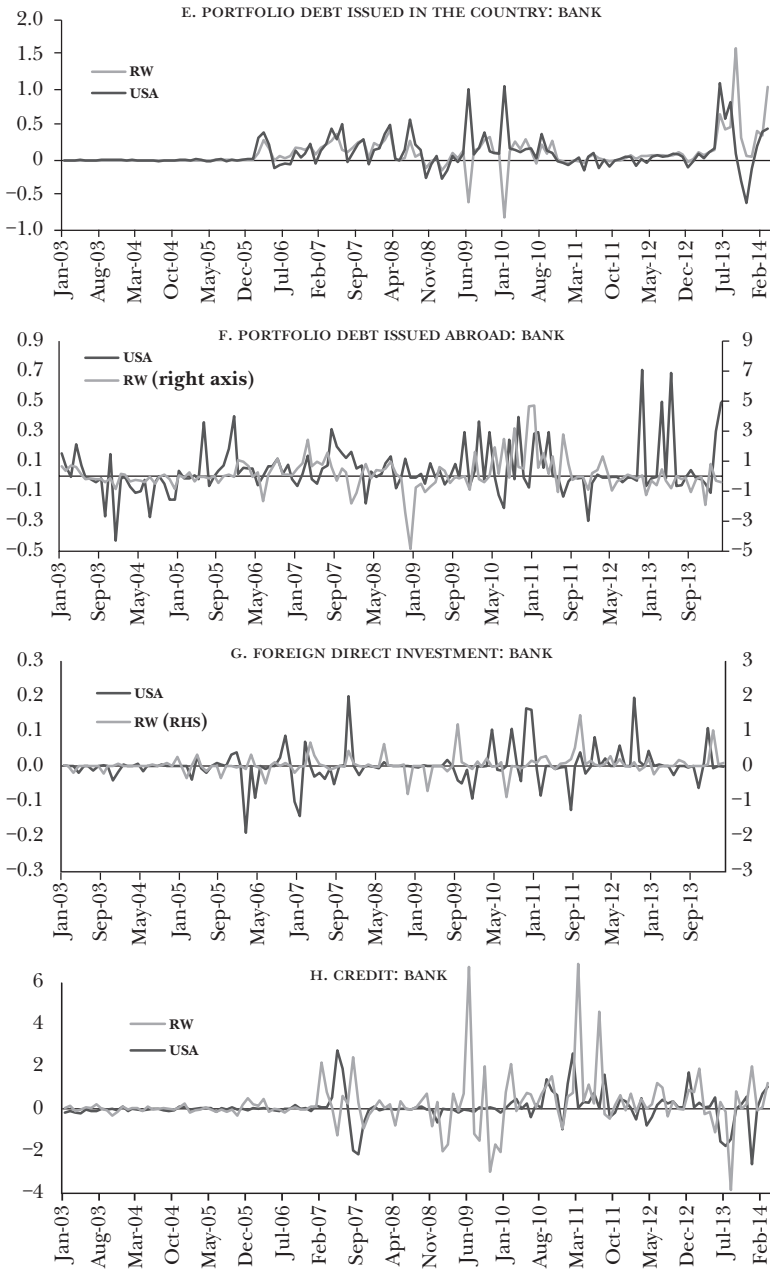




Figure 2 (cont.)

CAPITAL FLOWS FROM THE USA AND ROW TO THE BRAZIL'S BANKING SECTOR

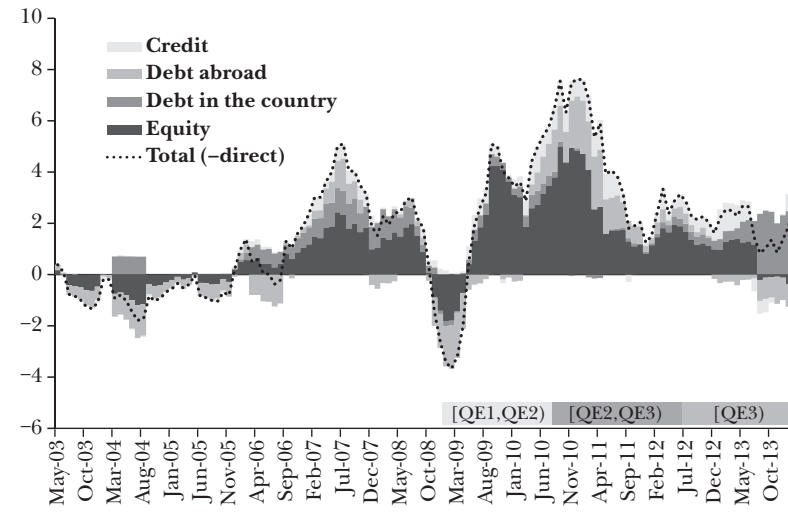
(USD billions)



**Figure 3**

**CAPITAL FLOWS FROM ROW TO BRAZIL AND QE PERIODS**

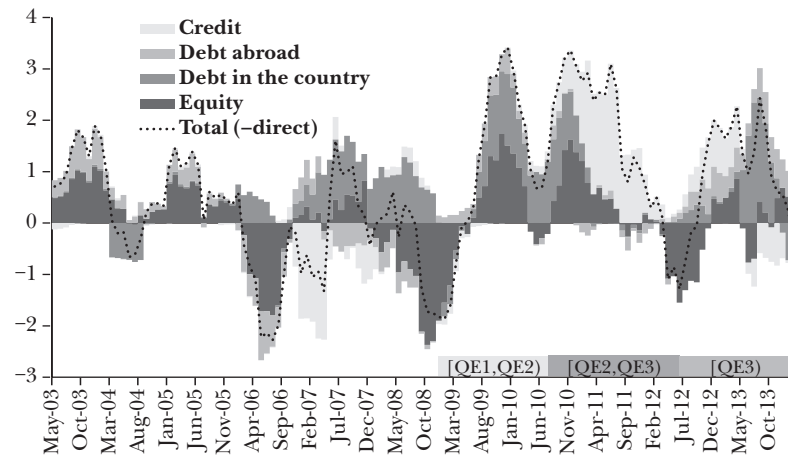
(USD billions, six-months moving average)



**Figure 4**

**CAPITAL FLOWS FROM US TO BRAZIL AND QE PERIODS**

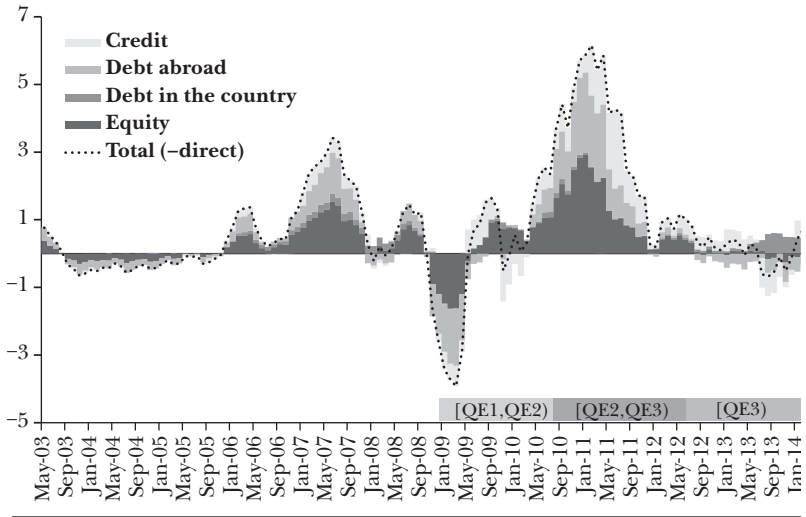
(USD billions, six-months moving average)



**Figure 5**

**CAPITAL FLOWS FROM ROW TO THE BRAZIL'S BANKING SECTOR  
AND QE PERIODS**

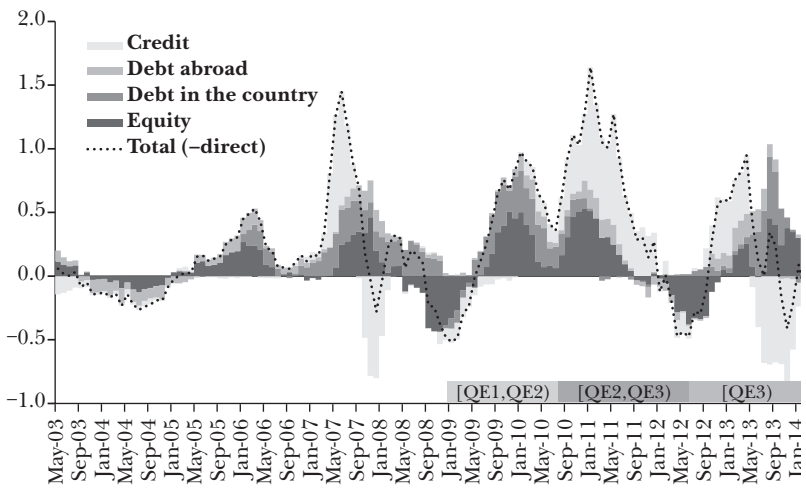
(USD billions, six-months moving average)



**Figure 6**

**CAPITAL FLOWS FROM US TO THE BRAZIL'S BANKING SECTOR  
AND QE PERIODS**

(USD billions, six-months moving average)



## 4.2 Capital Flows for other Jurisdictions

The Treasury International Capital (TIC) System is the source of portfolio debt and equity flows from the USA to other countries. The International Financial Statistics (IFS) database maintained by the IMF is the source of total gross debt and equity flows to the same countries. The frequency of this IFS source is quarterly and so we aggregated the monthly TIC data. The sample includes 17 emerging markets: Argentina, Brazil, Chile, China, Colombia, Hungary, Indonesia, Mexico, Peru, Philippines, Poland, Romania, Russia, South Africa, Thailand, Turkey, and Uruguay. Notice there is no guarantee the two datasets align as smoothly as the Brazilian dataset. For example, comparing the TIC flows data for Brazil, there are large discrepancies. On the other hand, the IFS data aligns smoothly with our dataset since it is just balance of payment statistics. Therefore, it is not recommended to subtract TIC data from IFS data to get ROW flows. Instead, we use the residuals of IFS total flows (TOT) regressed on quantitative easing policies as our proxy variable as suggested in the last paragraph of the methodology section.

## 4.3 Quantitative Easing

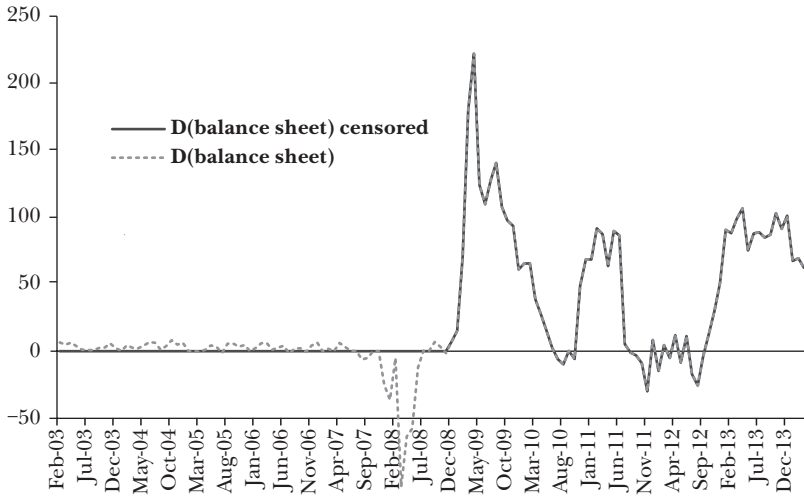
The indicator for unconventional monetary policy by the Federal Reserve is the monthly change in securities held outright in its balance sheet. As the capital flow variables, it is in billions of dollars unless stated otherwise. The source of the series is the Federal Reserve Economic Data (FRED). We censored the monthly change series to be zero before the start of the quantitative easing policies, that is, before November 2008. Figure 7 shows the resulting indicator. The main advantage of using this indicator is the transparent interpretation of its coefficient in the baseline regressions, which relates dollar amounts of policy to dollar amounts of capital flows. In some specifications, for robustness, we normalize both variables by the aggregate Brazilian import price index, but with the average of the index over the policy period normalized to one so that a similar interpretation applies.

Another robustness check is to interact the balance sheet variable with dummy variables indicating the policy round. For this paper, we consider three policy rounds of balance sheet expansion: QE1, QE2 and QE3. We use dates where the policy begins (in the case of QE1) or

Figure 7

QUANTITATIVE EASING INDICATOR

(USD billions, monthly change in securities held outright in the Federal Reserve's balance sheet)



the policy is hinted to the public (in the case of QE2 and QE3). Following the dates of Fawley and Neeley (2013), QE1 begins in November 2008, QE2 in August 2010 and QE3 in August 2013. We stipulate that the policy rounds end just before another round begins. This means we count the extension of QE1 as a phase of QE1, Operation Twist as a phase of QE2 and the tapering as a phase of QE3. In principle, it is possible to increase the granularity and capture these as separate policy rounds. However, the resulting periods would be too short, so that essentially we would run regressions with dummy variables for the policy. There are important inferential problems associated with such dummy variable regressions, so we have a strong preference for using a continuous policy variable.

#### 4.4 Additional Controls

The trust of the paper is that ROW flows proxy for unobserved common determinants of USA flows. In principle, the index function representing the common determinants may control for observables as

well, as long as the homogeneity assumption for the index function holds. For robustness, we also study regression with observable controls. For parsimony, we introduce the controls as differences between United States variables and the corresponding average values for euro area, UK and Japan, which are representative for the rest of the world capital flows to Brazil. The specific control variables are 10-year government bond yields, CITI economic surprise indexes, and monthly stock returns, all obtained from the Bloomberg terminal. We also introduced a crisis dummy variable in all regressions to avoid attributing the strong first round of negative effects from the crisis to the unconventional policies designed to address them. It is an indicator variable of the months from October 2009 to March 2009. In the appendix, we run regressions including capital flow taxes in Brazil as controls.

## 5. RESULTS

### 5.1 Brazil Dataset

All results are in Tables 1 to 12 (see the Annex). They have a similar structure, so we take some time to describe it. We always present four regressions for each capital flow category, all based in the minimal equation 4, distributed in columns of the table with the following roman labels and meaning: 1) omits the ROW flows proxy, 2) includes the proxy, 3) includes the proxy and additional controls, and 4) normalizes dollar variables by import price indexes. Notice the price indexes used to normalize the series gave unit average during the policy period, so that the scale of the coefficients is still comparable.

All regressions include a constant to capture average monthly flows. They also include a crisis dummy, introduced in the previous section, to avoid confounding it with unconventional policies. Regressions may include dummy variables to capture outliers in the USA flows. We identify an outlier automatically whenever the absolute deviation from the mean is greater than four standard deviations. This results in a couple of outliers for some capital flow categories. To save space in the tables, we do not report some coefficients. This includes the dummy variables for outliers and the additional controls.

The *baseline regressions* include the quantitative easing policy indicator described in the previous section. The *extended regressions* contain separate quantitative easing indicators for each policy round of balance sheet expansion. The last ROW of each reported regression brings the point estimate for the accumulated effect of quantitative easing – or, in the case of extended regression the accumulated effect for each policy round. For each baseline and extended regressions, we present separate results for *economy-wide flows* and for *banking sector flows*. For extended regressions we also perform additional regressions including own lag of USA flow and capital flow taxes as additional controls.

It is important to recall that the quantitative easing policy indicator refers to monthly balance sheet expansions by the Federal Reserve. To allow for anticipation of balance sheet expansion by market participants, all regressions include a lead of the policy indicator. In accordance with information criteria, we use *three months lead* of the policy indicator in all regressions.

### **5.1.1 Baseline Regressions: Economy-wide**

Table 1 summarizes the results for aggregated concepts of USA flows, such as total flows, portfolio flows, direct investment flows, and credit flows. Table 2 presents results for disaggregated concepts, such as direct investment in equity capital or in affiliated enterprise loans and portfolio investment in equity, debt, debt issued in the country and debt issued abroad.

There are some common results. First, the coefficient on the quantitative easing policy is always positive and it is lower when including the proxy variable (column 2) than when omitting it (column 1). This points to a positive bias from omitting unobservable determinants of USA flows. When considering the implied accumulated effects of the policy (last ROW), the bias is economically significant.

Second, the crisis dummy is always significant, which points to an economically important reduction in flows from the USA in the most acute phase of the crisis (e.g., multiply the crisis coefficient by its duration of six months and compare this with the accumulated effect of the policy in the last ROW). Third, the ROW proxy is strongly statistically significant except for credit, debt and debt issued abroad.

Forth, including the proxy variable improves the fit significantly as judged by the adjusted  $R^2$ , but the inclusion of additional controls provides only marginal if any improvement (and coefficients are stable between the two specifications). This signals that the proxy variable is capturing most of the relevant information of the common drivers of capital flows to Brazil from different source economies.

Focusing now on Table 1, the coefficient on the QE policy indicator for the total flows regression (upper left panel) shows that each one USD billion balance sheet expansion leads to additional capital flows into Brazil in the order of USD 0.015 billion. Considering the total size of the balance sheet expansion in the period, this corresponds to additional flows in the range of USD 54 to 58 billion, or 54% of the USA flows to Brazil accumulated over the period. The flows are *additional* in the sense that they are on top of any effect quantitative easing might have through the common drivers of USA and ROW flows that are controlled for in the regression.

The analogous coefficient for the portfolio flows regression (upper right panel) shows that each one USD billion balance sheet expansion implies additional portfolio flows into Brazil in the order of USD 0.11 or 0.12 billion. This represents additional portfolio flows in the range of USD 40 to 48 billion in the period, or 140% of portfolio flows from the USA in the period (recall from Figure 1, panel c, which portfolio flows from the USA fall significantly during this period). The effects on direct investment and credit flows (lower panels) are not statistically significant. For direct investment, ROW flows are significant and therefore the result is conclusive for no additional effect. For credit flows, the proxy variable is not significant and so the result is less conclusive.

Table 2 has detailed results. As in aggregate direct investment, both equity capital and affiliated enterprise loans (upper panels) show no additional effect from quantitative easing. Portfolio equity is also not significant (middle left panel). Things change for portfolio debt (middle right panel). For each USD one billion of quantitative easing, portfolio debt flows increase by USD 0.008 billion, which represents USD 28 to 30 billion during the period, or 62% of USA debt flows to the country in the period. Further decomposing portfolio debt, only debt issued abroad (lower right panel) shows significant additional effects from quantitative easing. For the same USD 1 billion of policy easing, debt issued abroad increases by USD 0.003 billion, between USD 1 billion and USD 13 billion during the period, or 96% of USA investment in Brazilian debt issued abroad.



### 5.1.2 *Baseline Regressions: Banking Sector*

Mimicking the same structure of the economy-wide flows, Table 3 summarizes the results for aggregated concepts of USA flows to the Brazilian banking sector, while Table 4 reports the results for disaggregated concepts.

There are some broad results. First, as in the case of economy-wide regressions, the coefficient on the quantitative easing policy is always positive and it is lower when including the proxy variable than when omitting it. This points to a positive bias from omitting unobservable determinants of USA flows. Second, the crisis dummy is significant in some cases, but less than in the corresponding economy-wide regressions. Third, the ROW proxy is statistically significant only for total flows, portfolio flows, equity flows and debt issued in the country. Forth, including the proxy variable and additional controls improves the adjusted fit.

According to Table 3, only portfolio flows (upper right panel) show significant effects from quantitative easing. In this case, a USD one billion balance sheet expansion leads to additional portfolio flows into the Brazilian banking sector in the order of USD 0.003 billion. This corresponds to additional flows in the range of USD 10 billion to 12 billion, or 83% of the USA portfolio flows to the Brazilian banking sector over the period.

Table 4 shows that USA investment in Brazilian banks' debt (upper right panel) and, in particular, debt issued abroad (lower right panel) respond to quantitative easing. Each USD one billion balance sheet expansion is responsible for additional USD 0.002 billion of flows into debt and USD 0.001 billion of flows into debt issued abroad by Brazilian banks. This corresponds, respectively, to USD 7 billion and USD 3 billion, or 50% of USA flows into bank debt and 73% of USA flows into bank debt issued abroad. The effects of quantitative easing on portfolio equity (upper left panel) and debt issued in the country (lower left panel) are not significant.

### 5.1.3 *Extended Regressions: Economy-wide*

Table 5 and 6 summarizes the results.<sup>9</sup> The common features of the regressions are broadly in line with the corresponding baseline regressions. That is, we observe lower QE coefficients once including

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<sup>9</sup> To check for robustness, Table 5 and 6 show the same regressions but with own lag of USA capital flows and control for capital flow taxes.

the proxy variable, generally significant proxy variables when included, gains in the adjusted fit of including the proxy variable, marginal gains if any from including other variables and significant crisis effects.

One common feature present only in the extended regression is that sometimes the sum of the effect of all quantitative easing episodes is significant even if some of them do not appear significant individually, which is possible given the correlation between the different parameter estimates. Another feature is that, relative to the estimated effects from the baseline regressions, the sum of the effects in the extended regression is of similar scale (except for affiliated enterprise loans, which is larger in the extended regression).

Table 5 shows results for aggregated flows. There is robust evidence that total flows are affected by QE2 (around USD 26 billion of accumulated additional effect, 46% of the flows in the period) and some evidence that they are affected by QE3 (around USD 16 billion effect, 42% of the flows). There is some evidence across specifications that portfolio flows are affected by QE1 (around USD 22 billion). There is some evidence that foreign direct investment by the USA is affected by QE3, and that credit flows respond to QE2.<sup>10</sup>

Table 6 explores flows in detail. Contrary to the baseline, for direct investment, both equity capital and affiliated enterprise loans are affected by QE3.<sup>11</sup> Again, in contrast with the baseline, the behavior of USA investors on foreign equity markets and debt issued abroad responds to QE2 (around USD 8 billion and USD 2.5 billion, respectively, or 300% and 50% of the corresponding USA flows). Similarly to the baseline, portfolio debt and portfolio debt issued abroad are affected by QE1 (around USD 14 and 4.5 billion, respectively, or 75% and 115% of the flows) and by QE3 (around USD 14.5 billion and USD 7 billion, respectively, or 57% and 83% of the USA flows in the period of the policy).

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<sup>10</sup> Result is different when including additional controls (Table 5), in which case total flows and portfolio flows show a substantially larger effect from QE3, and FDI and credit flows are no longer affected. Results from Table A.5 also suggest significant negative effects of capital flow taxes on portfolio flows, and the order of magnitude is similar to the overall effect of QE policies, which is a bit surprising given the likely bias of the tax coefficient. Most of the tax effect comes from portfolio debt flows (Table 6).

<sup>11</sup> Yet, the result is not robust to the inclusion of additional controls (Table A.2).

### 5.1.4 *Extended Regressions: Banking Sector*

The common features of the banking sector extended regressions (Tables 7 and 8) are broadly in line with the corresponding baseline regressions. In the Annex, we show this is also the case when including own lag of USA capital flows and capital flow taxes as controls (Tables 7 and 8). That is, we observe lower QE coefficients once including the proxy variable, some significant proxy variables when included, gains in the adjusted fit of including the proxy variable, and generally significant crisis effects.

Table 7 shows aggregate flows to the banking sector. Contrary to the baseline regression, total flows are now affected. Portfolio flows to the banking sector respond mostly to QE1 (around USD 7 billion or 108% of the flows). Results are similar when adding capital flow tax and own lag as controls.

Table 8 shows further details. Portfolio equity and portfolio debt issued abroad by Brazilian banks are affected by QE2 (around USD 2 and 0.7 billion, respectively, or 80% and 100% of the corresponding flows). Portfolio debt is affected by QE1 (around USD 3 billion or 65% of the flow). However, the proxy variable is not significant for the portfolio debt regressions. Results are again broadly similar when adding capital flow tax and own lag as controls.

## 5.2 Global Dataset

Table 9 shows the results for the TIC-IFS dataset. The columns in the table follow the same structure as before, except for column (4) that reports the regression with heterogeneous coefficients for each country in the sample.

Since TIC and IFS data do not allow for deducing ROW flows with a consistent methodology, we consider a variation of our main method.<sup>12</sup> We use total capital flows (TOT) from the IFS as a candidate proxy variable. This candidate is regressed on quantitative easing policy (on a country-by-country basis) and the residual from this first stage regression is used as the actual proxy variable in the regressions. Of course, this introduces a possible generated regressor bias. We

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<sup>12</sup> We tried just subtracting TIC from IFS but the coefficient on the implied ROW flows is negative, which is counterintuitive and suggests a problem. With our procedure, the total flow (TOT) proxy has the expected positive sign.

bootstrapped the first stage regression and the difference in the results is in the order of magnitude of numerical errors, and are therefore dismissed in the following.

Results suggest that quantitative easing affects USA flows to emerging markets. Including the proxy variable lowers the estimated effect, which is consistent with an upward bias from omitted variables. The effect of quantitative easing on global portfolio flows range from USD 111 billion to USD 130 billion, and this represents from 55% to 65% of USA flows to emerging markets in the sample. Indeed, it is a bit surprising (and reassuring) that the percentage figure is so close to the corresponding Brazilian result given the very different dataset and the adjustments to the methodology. In contrast with the results using Brazilian data, most of the effect comes from portfolio equity flows, and debt flow effects are actually not significant. Results are robust to the inclusion of controls for differences in the environment of USA and other advanced economies that may originate capital flows to emerging markets, including differences in return and economic activity. Results are also robust to allowing for heterogeneous coefficients in recipients economies.

## 6. CONCLUSION

There is robust evidence that quantitative easing policies by the Federal Reserve cause portfolio rebalancing by USA investors towards foreign assets in emerging market economies. These effects are on top of any effects such policies might have through global or local conditions, since they are controlled for in the regressions.

According to our main dataset, which focuses on capital flows to Brazil, the effects are concentrated into portfolio assets, particularly debt, both for economy-wide and banking sector flows. This is consistent, for example, with these assets being closer substitutes to long-term USA treasuries. There is less evidence of effects on direct investment and credit flows, except for extended regressions partitioning quantitative easing into different policy rounds. The magnitudes are economically significant and correspond to sizable shares of the accumulated USA flows during the policy period. Additional flows directed at the banking sector in response to the policy are a quarter of the economy-wide flows. This is consistent with the view that market-based instruments are more important than banks in

the direct cross-border transmission in these particular events of quantitative easing. The recent reversal of fortunes of economies employing large-scale quantitative easing measures and economies receiving the resulting capital flows shows that portfolio rebalance mechanisms operating during such periods involve significant risks.

Regarding the global dataset, there is also evidence that quantitative easing causes portfolio rebalancing to emerging market economies. In contrast to the result for Brazil, most of the effect seems to be concentrated on equity flows. The magnitudes are economically significant as well, with up to 65% of total USA portfolio flows to the countries in our sample accounted for by quantitative easing. This is surprisingly similar to the 54% figure for total flows to Brazil. That is, even though flows are small relative to the overall balance sheet expansion in the USA, they are considerably large relative to the recipient economies.

The results obtained with our methodology are uniquely informative to the portfolio balance channel of unconventional policies due to the use of a proper counterfactual for USA-based investor behavior. By construction, our methodology isolates the effect of quantitative easing affecting exclusively the USA investor, that is, an effect on top of any factor that also affects global investors. It is natural to interpret such effect as resulting from portfolio rebalancing under the assumption that operationalization of USA unconventional monetary policies affects disproportionately the portfolio and wealth of USA based investors and financial intermediaries. Further work using similar data may consider other estimation strategies, such as system methods or the inclusion of several of the available proxies in each regression. The strategy proposed here is relevant for other jurisdictions if data is available, as may be the case for other economies that closely monitor capital flows for historical or other reasons. After the accumulation of pertinent data, it applies to recent episodes of quantitative easing in the euro area and Japan. More generally, it applies to any central bank accumulating unconventional assets in its balance sheet and for which bilateral capital flows data are available.

Table 1

	Total				Portfolio			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
<b>FOREIGN CAPITAL FLOWS FROM THE USA</b>								
C	0.6843 <sup>a</sup>	0.1325	0.2495	0.2965	0.2265	-0.0814	-0.2185	-0.0817
QE	2.8955	0.4589	0.8153	0.9605	1.1589	-0.3662	-0.9837	-0.3932
	0.0214 <sup>a</sup>	0.0151 <sup>a</sup>	0.0156 <sup>a</sup>	0.0145 <sup>b</sup>	0.0136 <sup>a</sup>	0.0108 <sup>b</sup>	0.0129 <sup>a</sup>	0.0120 <sup>a</sup>
	3.6901	2.7831	2.7776	2.4327	2.9492	2.4763	2.8816	2.6682
CRISIS	-5.1565 <sup>a</sup>	-3.9954 <sup>a</sup>	-4.3873 <sup>a</sup>	-3.6481 <sup>a</sup>	-3.4387 <sup>a</sup>	-2.3473 <sup>a</sup>	-2.3836 <sup>a</sup>	-2.0137 <sup>a</sup>
	-6.3940	-4.7710	-4.3906	-4.2863	-4.0237	-2.8161	-2.6613	-2.8297
ROW		0.1469 <sup>a</sup>	0.1266 <sup>c</sup>	0.1188		0.2286 <sup>a</sup>	0.2356 <sup>a</sup>	0.2266 <sup>a</sup>
		2.7643	1.8905	1.5909		2.9716	3.0691	2.8029
R <sup>2</sup>	0.348	0.385	0.392	0.387	0.142	0.205	0.228	0.186
Adjusted R <sup>2</sup>	0.332	0.366	0.363	0.357	0.129	0.186	0.198	0.153
QE (USD)	79.90 <sup>a</sup>	56.64 <sup>a</sup>	58.19 <sup>a</sup>	54.23 <sup>b</sup>	50.92 <sup>a</sup>	40.54 <sup>b</sup>	48.34 <sup>a</sup>	45.01 <sup>a</sup>

	Direct				Credit			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.3442 <sup>a</sup>	0.1719 <sup>a</sup>	0.1394 <sup>c</sup>	0.1568 <sup>a</sup>	0.0469	0.0074	0.1710	0.1091
	7.2261	3.9746	1.9783	2.8810	0.2862	0.0429	1.1675	0.8458
QE	0.0033 <sup>c</sup>	0.0011	0.0012	0.0008	0.0035	0.0030	0.0007	0.0010
	1.7764	0.8224	0.8900	0.6429	0.8690	0.8075	0.2067	0.3008
CRISIS	-0.8755 <sup>a</sup>	-0.6728 <sup>b</sup>	-0.6512 <sup>b</sup>	-0.5339 <sup>b</sup>	-0.6631	-0.5587	-0.7230 <sup>c</sup>	-0.5996 <sup>c</sup>
	-2.6774	-2.3579	-2.1673	-2.0675	-1.3886	-1.3577	-1.7795	-1.8319
ROW	0.0797 <sup>a</sup>	0.0797 <sup>a</sup>	0.0869 <sup>a</sup>	0.0778 <sup>a</sup>	0.1725	0.1725	0.1253	0.1054
	4.1335	4.3737	4.3737	4.2142	1.3348	1.3348	1.0618	0.7891
R <sup>2</sup>	0.752	0.796	0.797	0.730	0.472	0.480	0.515	0.571
Adjusted R <sup>2</sup>	0.744	0.788	0.786	0.715	0.460	0.464	0.491	0.550
QE (USD)	12.21 <sup>c</sup>	4.08	4.34	2.83	13.28	11.19	2.77	3.64

Results from USA flows to Brazil regressions for aggregate flow categories. Column (1) omits the ROW flows proxy, (2) includes the proxy, (3) includes the proxy and additional controls (coefficients not shown to save space) and (4) normalizes dollar variables by import price indexes. Outlier dummy variable included for USA flows greater than four standard deviations (coefficients not shown). <sup>a</sup>Values below coefficient estimates are from HAC standard errors. The last row shows the total effect of QE policy in the period. <sup>a</sup> 1%, <sup>b</sup> 5%, <sup>c</sup> 10 percent.

Table 2

## FOREIGN CAPITAL FLOWS FROM THE USA, DETAIL

	<i>Direct: Equity capital</i>				<i>Direct: Affiliated enterprise loans</i>			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.2572 <sup>a</sup>	0.1502 <sup>a</sup>	0.1743 <sup>a</sup>	0.1735 <sup>a</sup>	0.0866 <sup>a</sup>	0.0533 <sup>b</sup>	0.0353	0.0379
	7.8396	5.1422	3.5710	4.2557	4.4405	2.5210	1.2856	1.5360
QE	0.0011	0.0004	0.0003	0.0000	0.0015 <sup>b</sup>	0.0006	0.0007	0.0006
	1.2476	0.3942	0.2718	-0.0525	2.1804	0.7476	0.9192	0.8452
CRISIS	-0.7886 <sup>a</sup>	-0.7043 <sup>a</sup>	-0.7176 <sup>a</sup>	-0.5836 <sup>a</sup>	-0.0098	0.0604	0.0621	0.0494
	-3.3126	-3.1336	-3.1220	-3.3270	-0.0774	0.5190	0.5092	0.5021
ROW	0.0626 <sup>a</sup>	0.0626 <sup>a</sup>	0.0556 <sup>a</sup>	0.0459 <sup>a</sup>	0.0714 <sup>a</sup>	0.0802 <sup>a</sup>	0.0802 <sup>a</sup>	0.0762 <sup>a</sup>
	4.8891	4.8891	3.9783	3.0437	2.6375	3.3323	3.3323	3.3051
R <sup>2</sup>	0.575	0.619	0.620	0.557	0.899	0.908	0.910	0.861
Adjusted R <sup>2</sup>	0.565	0.607	0.602	0.536	0.896	0.904	0.905	0.853
QE (USD)	4.26	1.33	0.95	-0.17	5.56 <sup>b</sup>	2.13	2.57	2.30
	<i>Portfolio: Equity</i>				<i>Portfolio: Debt</i>			
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
C	-0.0385	-0.2592	-0.4174 <sup>c</sup>	-0.2968 <sup>c</sup>	0.3286 <sup>a</sup>	0.2474 <sup>c</sup>	0.2376 <sup>c</sup>	0.2354 <sup>c</sup>
	-0.2451	-1.5357	-1.8884	-1.8329	2.6753	1.8690	1.7172	1.7650
QE	0.0034	0.0001	0.0019	0.0018	0.0077 <sup>b</sup>	0.0077 <sup>b</sup>	0.0082 <sup>b</sup>	0.0076 <sup>b</sup>
	0.8103	0.0191	0.3865	0.4141	2.2044	2.1656	2.1431	2.0084
CRISIS	-1.7413 <sup>b</sup>	-1.0964	-0.9199	-0.7623	-1.4559 <sup>a</sup>	-1.0772 <sup>a</sup>	-1.3072 <sup>a</sup>	-1.0891 <sup>a</sup>
	-2.0416	-1.3025	-1.0064	-1.1015	-3.6483	-3.0952	-3.3361	-3.0537



ROW	0.2617 <sup>a</sup>	0.2866 <sup>a</sup>	0.2902 <sup>a</sup>	0.1619	0.1314	0.1274
R <sup>2</sup>	3.1099	3.4900	3.7293	1.4623	1.2038	1.2413
Adjusted R <sup>2</sup>	0.059	0.149	0.205	0.347	0.381	0.347
QE (USD)	0.129	0.161	0.173	0.340	0.346	0.310
	0.32	7.15	6.62	28.65 <sup>b</sup>	28.84 <sup>b</sup>	30.81 <sup>b</sup>
						28.49 <sup>b</sup>
				<i>Portfolio: Debt abroad</i>		
	(1)	(2)	(3)	(4)	(1)	(2)
C	0.3637 <sup>a</sup>	0.0930	0.0913	0.0796	0.0033	0.0171
	4.2247	1.0846	0.9683	1.0025	0.0441	0.2259
QE	0.0029	0.0019	0.0021	0.0024	0.0038 <sup>a</sup>	0.0037 <sup>a</sup>
	1.0951	0.7786	0.8115	0.9605	2.8598	2.9740
CRISIS	-1.0738 <sup>a</sup>	-0.5401 <sup>c</sup>	-0.6411 <sup>c</sup>	-0.5680 <sup>b</sup>	-0.3073 <sup>c</sup>	-0.4160 <sup>b</sup>
	-3.0301	-1.7346	-1.8866	-2.0705	-1.8878	-2.1836
ROW	0.8754 <sup>a</sup>	0.8670 <sup>a</sup>	0.8620 <sup>a</sup>	0.8620 <sup>a</sup>	-0.0682	-0.0736
	7.1249	6.8665	7.0339	7.0339	-1.0383	-1.0971
R <sup>2</sup>	0.295	0.503	0.511	0.497	0.494	0.499
Adjusted R <sup>2</sup>	0.273	0.483	0.484	0.469	0.478	0.479
QE (USD)	10.74	7.18	8.01	8.93	14.39 <sup>a</sup>	13.72 <sup>a</sup>
						12.75 <sup>a</sup>
						10.62 <sup>b</sup>

Results from USA flows to Brazil regressions for disaggregate flow categories. Column (1) omits the ROW flows proxy, (2) includes the proxy, (3) includes the proxy and additional controls (coefficients not shown to save space) and (4) normalizes dollar variables by import price indexes. Outlier dummy variable included for USA flows greater than four standard deviations (coefficients not shown). *t*-values below coefficient estimates are from HAC standard errors. The last row shows the total effect of QE policy in the period. <sup>a</sup> 1%, <sup>b</sup> 5%, <sup>c</sup> 10 percent.

Table 3

	Total				Portfolio			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.1970 <sup>c</sup>	0.0999	0.1190	0.1008	0.1052 <sup>b</sup>	0.0634	0.0285	0.0316
	1.8482	1.1464	1.1347	1.1840	2.1707	1.5440	0.6611	0.8999
QE	0.0035	0.0034	0.0032	0.0032	0.0029 <sup>a</sup>	0.0028 <sup>a</sup>	0.0033 <sup>a</sup>	0.0032 <sup>a</sup>
	1.5202	1.4378	1.2147	1.3635	2.7287	2.7965	3.2424	3.2558
CRISIS	-1.3658 <sup>a</sup>	-0.9679 <sup>a</sup>	-0.9768 <sup>a</sup>	-0.8105 <sup>a</sup>	-0.8244 <sup>a</sup>	-0.6254 <sup>a</sup>	-0.6027 <sup>a</sup>	-0.4663 <sup>a</sup>
	-4.8145	-3.0069	-3.1698	-3.6033	-4.6951	-3.5257	-3.1260	-3.0441
ROW		0.1364 <sup>b</sup>	0.1343 <sup>b</sup>	0.1293 <sup>b</sup>		0.0830 <sup>b</sup>	0.0838 <sup>b</sup>	0.0998 <sup>b</sup>
		2.3376	2.4062	2.5968		2.1669	2.1286	2.5306
R <sup>2</sup>	0.278	0.319	0.321	0.294	0.377	0.410	0.431	0.397
Adjusted R <sup>2</sup>	0.261	0.298	0.288	0.260	0.363	0.392	0.404	0.368
QE (USD)	13.24	12.86	11.81	11.94	10.99 <sup>a</sup>	10.37 <sup>a</sup>	12.39 <sup>a</sup>	12.05 <sup>a</sup>

	<i>Direct</i>				<i>Credit</i>			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	-0.0017	-0.0027	0.0000	-0.0006	0.0432	0.0409	0.0783	0.0565
	-0.3462	-0.5506	-0.0082	-0.1299	0.5961	0.5519	1.0599	0.9022
QE	0.0001	0.0001	0.0001	0.0001	-0.0001	-0.0001	-0.0007	-0.0005
	1.2867	1.2655	0.8807	0.8006	-0.0558	-0.0559	-0.3283	-0.2564
CRISIS	-0.0190	-0.0183	-0.0240	-0.0193	-0.1604	-0.1514	-0.1301	-0.1226
	-1.1947	-1.1494	-1.3923	-1.2980	-0.6254	-0.5839	-0.4909	-0.5977
ROW	0.0256	0.0256	0.0228	0.0241	0.0143	0.0143	0.0055	-0.0113
	1.2314	1.2314	1.0762	1.0642	0.1752	0.1752	0.0681	-0.1497
R <sup>2</sup>	0.836	0.838	0.842	0.819	0.408	0.409	0.418	0.363
Adjusted R <sup>2</sup>	0.825	0.826	0.827	0.802	0.390	0.385	0.385	0.327
QE (USD)	0.55	0.56	0.43	0.38	-0.45	-0.45	-2.72	-1.86

Results from USA flows to Brazilian banking sector regression for aggregate flow categories. Column (1) omits the ROW flows proxy, (2) includes the proxy, (3) includes the proxy and additional controls (coefficients not shown to save space) and (4) normalizes dollar variables by import price indexes. Outlier dummy variable included for USA flows greater than four standard deviations (coefficients not shown). *t*-values below coefficient estimates are from HAC standard errors. The last row shows the total effect of QE policy in the period. <sup>a</sup> 1%, <sup>b</sup> 5%, <sup>c</sup> 10 percent.

Table 4

	Portfolio: Equity				Portfolio: Debt			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.0016	-0.0669 <sup>c</sup>	-0.1037 <sup>b</sup>	-0.0755 <sup>b</sup>	0.1036 <sup>a</sup>	0.0937 <sup>a</sup>	0.0838 <sup>a</sup>	0.0690 <sup>a</sup>
	0.0461	-1.7444	-2.0506	-1.9879	3.8071	3.4979	2.9765	3.0231
QE	0.0012	0.0002	0.0006	0.0006	0.0016 <sup>b</sup>	0.0016 <sup>b</sup>	0.0018 <sup>b</sup>	0.0017 <sup>b</sup>
	1.2461	0.2125	0.6266	0.6339	2.0912	2.1055	2.1868	2.2594
CRISIS	-0.4247 <sup>b</sup>	-0.2287	-0.1956	-0.1643	-0.3843 <sup>a</sup>	-0.3265 <sup>b</sup>	-0.3352 <sup>b</sup>	-0.2448 <sup>b</sup>
	-2.3793	-1.4143	-1.1043	-1.2033	-3.3609	-2.5489	-2.4094	-2.1792
ROW		0.3783 <sup>a</sup>	0.4049 <sup>a</sup>	0.4106 <sup>a</sup>		0.0305	0.0278	0.0447
		4.2291	4.8070	5.3168		1.1075	0.9866	1.5632
R <sup>2</sup>	0.067	0.226	0.269	0.287	0.526	0.532	0.536	0.469
Adjusted R <sup>2</sup>	0.052	0.207	0.240	0.258	0.515	0.518	0.514	0.443
QE (USD)	4.39	0.73	2.38	2.21	6.11 <sup>b</sup>	6.17 <sup>b</sup>	6.84 <sup>b</sup>	6.54 <sup>b</sup>

	Portfolio: Debt in the country				Portfolio: Debt abroad			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.0732 <sup>a</sup>	-0.0162	-0.0165	-0.0122	0.0228	0.0205	0.0171	0.0129
	3.3508	-1.3674	-1.3538	-1.2512	1.4887	1.2760	1.0192	0.8155
QE	0.0002	-0.0004	-0.0003	-0.0003	0.0007 <sup>b</sup>	0.0007 <sup>b</sup>	0.0008 <sup>b</sup>	0.0007 <sup>c</sup>
	0.4318	-1.2547	-1.1020	-1.1249	1.9820	2.0267	2.0664	1.9325
CRISIS	-0.1976 <sup>a</sup>	-0.0065	-0.0114	-0.0151	-0.0990 <sup>c</sup>	-0.0820	-0.0572	-0.0246
	-2.8363	-0.1739	-0.3099	-0.5296	-1.7998	-1.3325	-0.8850	-0.4611
ROW		1.1151 <sup>a</sup>	1.1083 <sup>a</sup>	1.0837 <sup>a</sup>		0.0099	0.0131	0.0245 <sup>c</sup>
		11.4810	10.6037	12.2958		0.8408	1.1485	1.7168
R <sup>2</sup>	0.330	0.688	0.689	0.683	0.695	0.697	0.701	0.627
Adjusted R <sup>2</sup>	0.309	0.676	0.671	0.665	0.683	0.682	0.682	0.603
QE (USD)	0.90	-1.37	-1.29	-1.18	2.72 <sup>b</sup>	2.76 <sup>b</sup>	2.86 <sup>b</sup>	2.56 <sup>c</sup>

Results from USA flows to Brazilian banking sector regressions for disaggregate flow categories. Column (1) omits the ROW flows proxy, (2) includes the proxy, (3) includes the proxy and additional controls (coefficients not shown to save space) and (4) normalizes dollar variables by import price indexes. Outlier dummy variable included for USA flows greater than four standard deviations (coefficients not shown). <sup>a</sup>Values below coefficient estimates are from HAC standard errors. The last row shows the total effect of QE policy in the period. <sup>a</sup> 1%, <sup>b</sup> 5%, <sup>c</sup> 10 percent.

Table 5

	FOREIGN CAPITAL FLOWS FROM THE USA, EACH EPISODE							
	<i>Total</i>		<i>Portfolio</i>					
	(1)	(2)	(3)	(4)				
C	0.6640 <sup>a</sup>	0.2581	0.4590	0.4583	0.2436	-0.0544	-0.1891	-0.0542
QE1	2.7590	0.8913	1.4707	1.4337	1.2525	-0.2410	-0.8337	-0.2507
QE2	0.0143 <sup>c</sup>	0.0125 <sup>c</sup>	0.0124	0.0115	0.0170 <sup>b</sup>	0.0144 <sup>c</sup>	0.0164 <sup>b</sup>	0.0146 <sup>b</sup>
QE3	1.8157	1.6653	1.6002	1.5276	2.0797	1.9520	2.1553	2.0257
QE	0.0477 <sup>a</sup>	0.0375 <sup>a</sup>	0.0387 <sup>a</sup>	0.0378 <sup>b</sup>	0.0188 <sup>c</sup>	0.0125	0.0138	0.0126
Q3	4.1059	2.9966	2.6222	2.4072	1.7041	1.3076	1.5571	1.3959
Q	0.0171 <sup>a</sup>	0.0121 <sup>c</sup>	0.0122 <sup>c</sup>	0.0109	0.0081	0.0069	0.0093	0.0082
CRISIS	2.8227	1.7925	1.8166	1.5610	1.2306	1.1569	1.5129	1.2455
ROW	-4.2571 <sup>a</sup>	-3.7359 <sup>a</sup>	-4.1898 <sup>a</sup>	-3.4622 <sup>a</sup>	-3.8162 <sup>a</sup>	-2.7865 <sup>b</sup>	-2.8188 <sup>b</sup>	-2.2949 <sup>b</sup>
R <sup>2</sup>	-3.7291	-3.3791	-3.4649	-3.5807	-3.0560	-2.4100	-2.2760	-2.3819
Adjusted R <sup>2</sup>	0.1106 <sup>c</sup>	0.0786	0.0721	0.0721	0.2199 <sup>a</sup>	0.2199 <sup>a</sup>	0.2275 <sup>a</sup>	0.2192 <sup>a</sup>
QE1 (USD)	1.9259	1.0510	0.8621	0.8621	0.159	0.215	0.237	0.191
QE2 (USD)	0.392	0.411	0.419	0.407	0.132	0.184	0.194	0.146
QE3 (USD)	0.368	0.383	0.381	0.369	26.55 <sup>b</sup>	22.58 <sup>c</sup>	25.71 <sup>b</sup>	22.82 <sup>b</sup>
QE (USD)	22.46 <sup>c</sup>	19.54 <sup>c</sup>	19.45	18.00	10.180 <sup>c</sup>	6.792	7.455	6.843
R <sup>2</sup>	25.87 <sup>a</sup>	20.34 <sup>a</sup>	20.96 <sup>a</sup>	20.48 <sup>b</sup>	11.05	9.43	12.67	11.15
Adjusted R <sup>2</sup>	23.40 <sup>a</sup>	16.47 <sup>c</sup>	16.62 <sup>c</sup>	14.93	47.787 <sup>a</sup>	38.799 <sup>b</sup>	45.832 <sup>a</sup>	40.817 <sup>b</sup>
CRISIS	71.72 <sup>a</sup>	56.34 <sup>a</sup>	57.03 <sup>a</sup>	53.41 <sup>a</sup>				

	<i>Direct</i>				<i>Credit</i>			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.3249 <sup>a</sup>	0.2023 <sup>a</sup>	0.1961 <sup>a</sup>	0.1928 <sup>a</sup>	0.0354	0.0126	0.1876	0.1177
	7.1759	4.7755	2.8603	3.4604	0.2044	0.0692	1.2245	0.8649
QE1	-0.0015	-0.0017	-0.0017	-0.0016	-0.0007	-0.0008	-0.0029 <sup>b</sup>	-0.0024 <sup>b</sup>
	-1.2376	-1.3973	-1.2811	-1.2732	-0.5270	-0.6242	-2.4187	-2.1451
QE2	0.0063 <sup>a</sup>	0.0032	0.0031	0.0035	0.0216 <sup>b</sup>	0.0206 <sup>b</sup>	0.0187 <sup>c</sup>	0.0186 <sup>b</sup>
	4.3707	1.3699	1.3981	1.5748	2.3318	2.1382	1.8799	1.9895
QE3	0.0069 <sup>a</sup>	0.0045 <sup>a</sup>	0.0045 <sup>a</sup>	0.0042 <sup>b</sup>	0.0000	-0.0001	-0.0030	-0.0028
	3.6840	2.6512	2.7058	2.5006	0.0064	-0.0285	-0.6361	-0.5856
CRISIS	-0.2878	-0.3081	-0.3092	-0.2802	-0.1450 <sup>b</sup>	-0.1075	-0.2878	-0.2464 <sup>c</sup>
	-1.0574	-1.1765	-1.1232	-1.2233	-2.1092	-1.0386	-1.6221	-1.6649
ROW	0.0592 <sup>a</sup>	0.0592 <sup>a</sup>	0.0607 <sup>a</sup>	0.0540 <sup>a</sup>	0.1011	0.0468	0.0335	0.0335
	3.1106	3.1106	3.2939	3.0813	0.9439	0.4529	0.2754	0.2754
R <sup>2</sup>	0.795	0.816	0.816	0.751	0.522	0.525	0.561	0.602
Adjusted R <sup>2</sup>	0.785	0.805	0.802	0.732	0.503	0.502	0.533	0.576
QE1 (USD)	-2.34	-2.72	-2.65	-2.48	-1.06	-1.28	-4.57 <sup>b</sup>	-3.77 <sup>b</sup>
QE2 (USD)	3.42 <sup>a</sup>	1.71	1.69	1.89	11.727 <sup>b</sup>	11.144 <sup>b</sup>	10.110 <sup>c</sup>	10.061 <sup>b</sup>
QE3 (USD)	9.45 <sup>a</sup>	6.19 <sup>a</sup>	6.19 <sup>a</sup>	5.80 <sup>b</sup>	0.05	-0.19	-4.14	-3.86
QE (USD)	10.52 <sup>a</sup>	5.19	5.22	5.21	10.711	9.677	1.397	2.437

Results from USA flows to Brazil regressions for aggregate flow categories and each policy round. Column (1) omits the ROW flows proxy, (2) includes the proxy, (3) includes the proxy and additional controls (coefficients not shown to save space) and (4) normalizes dollar variables by import price indexes. Outlier dummy variable included for USA flows greater than four standard deviations (coefficients not shown). <sup>a</sup>values below coefficient estimates are from HAC standard errors. The last row shows the total effect of QE policy round in the period. <sup>a</sup> 1%, <sup>b</sup> 5%, <sup>c</sup> 10 percent.

Table 6

	Direct: Equity capital				Direct: Affiliated enterprise loans			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.2469 <sup>a</sup>	0.1518 <sup>a</sup>	0.1811 <sup>a</sup>	0.1723 <sup>a</sup>	0.0005	0.0086	0.0222	0.0525
QE1	7.2137	4.8430	3.4531	4.0105	0.0066	0.1078	0.3186	0.7209
	-0.0014	-0.0014	-0.0016	-0.0015	0.0034 <sup>a</sup>	0.0032 <sup>a</sup>	0.0030 <sup>a</sup>	0.0027 <sup>b</sup>
QE2	-1.2106	-1.1669	-1.2776	-1.2427	3.7234	3.0371	2.7980	2.3873
	0.0017 <sup>c</sup>	-0.0003	-0.0002	0.0000	-0.0001	0.0006	0.0005	0.0001
QE3	1.9263	-0.2229	-0.1337	0.0331	-0.0519	0.2086	0.1695	0.0220
	0.0035 <sup>a</sup>	0.0026 <sup>c</sup>	0.0025 <sup>a</sup>	0.0022 <sup>a</sup>	0.0059 <sup>a</sup>	0.0056 <sup>a</sup>	0.0053 <sup>a</sup>	0.0047 <sup>b</sup>
CRISIS	5.4086	3.4301	3.1957	2.8279	3.3748	3.0086	2.6897	2.0722
	-0.4787 <sup>b</sup>	-0.4889 <sup>b</sup>	-0.4931 <sup>b</sup>	-0.4308 <sup>b</sup>	-0.2440 <sup>c</sup>	-0.2938 <sup>c</sup>	-0.3198 <sup>c</sup>	-0.2993 <sup>c</sup>
ROW	-2.3817	-2.3596	-2.2378	-2.2948	-1.9496	-1.8951	-1.7068	-1.8420
	0.0572 <sup>a</sup>	0.0572 <sup>a</sup>	0.0481 <sup>a</sup>	0.0408 <sup>b</sup>	-0.0410	-0.0462	-0.0462	-0.0523
R <sup>2</sup>	0.610	0.643	0.645	0.578	0.503	0.505	0.505	0.534



	Portfolio: Equity				Portfolio: Debt			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Adjusted R <sup>2</sup>	0.595	0.626	0.622	0.550	0.479	0.477	0.469	0.500
QE1 (USD)	-2.16	-2.18	-2.50	-2.28	5.35 <sup>a</sup>	4.97 <sup>a</sup>	4.68 <sup>a</sup>	4.20 <sup>b</sup>
QE2 (USD)	0.93 <sup>c</sup>	-0.15	-0.08	0.02	-0.08	0.35	0.29	0.04
QE3 (USD)	4.78 <sup>a</sup>	3.56 <sup>a</sup>	3.41 <sup>a</sup>	3.02 <sup>a</sup>	8.09 <sup>a</sup>	7.60 <sup>a</sup>	7.23 <sup>a</sup>	6.39 <sup>b</sup>
QE (USD)	3.55	1.23	0.82	0.76	13.36 <sup>a</sup>	12.92 <sup>a</sup>	12.20 <sup>a</sup>	10.63 <sup>b</sup>
C	-0.0115	-0.2172	-0.3687 <sup>c</sup>	-0.2512	0.3279 <sup>b</sup>	0.2246 <sup>c</sup>	0.2099	0.2211
QE1	-0.0773	-1.3392	-1.7078	-1.5417	2.4714	1.6675	1.4176	1.5548
QE2	0.0087	0.0046	0.0058	0.0042	0.0078 <sup>a</sup>	0.0089 <sup>a</sup>	0.0097 <sup>a</sup>	0.0091 <sup>a</sup>
QE3	1.6433	0.8843	1.0454	0.8719	2.7615	2.9920	2.9232	2.6725
CRISIS	0.0161 <sup>b</sup>	0.0131 <sup>a</sup>	0.0149 <sup>a</sup>	0.0140 <sup>a</sup>	0.0019	-0.0015	-0.0011	-0.0015
	2.4807	2.7168	3.1661	3.3266	0.6369	-0.5224	-0.3741	-0.4355
	-0.0071	-0.0090	-0.0069	-0.0074	0.0101 <sup>b</sup>	0.0106 <sup>b</sup>	0.0111 <sup>b</sup>	0.0103 <sup>c</sup>
	-1.3128	-1.6097	-1.0869	-1.1818	2.0946	2.2536	2.1734	1.8128
	-2.3760 <sup>b</sup>	-1.6745 <sup>c</sup>	-1.4266	-1.0540	-1.4499 <sup>a</sup>	-1.0829 <sup>a</sup>	-1.3201 <sup>a</sup>	-1.1489 <sup>a</sup>
	-2.4327	-1.7516	-1.3858	-1.3704	-4.4390	-3.1063	-3.3580	-3.4223



QE3	0.0021	-0.0019	-0.0016	-0.0017	0.0059 <sup>a</sup>	0.0056 <sup>a</sup>	0.0053 <sup>a</sup>	0.0047 <sup>b</sup>
	0.3620	-0.4719	-0.3580	-0.3781	3.3748	3.0086	2.6897	2.0722
CRISIS	-1.2115 <sup>a</sup>	-0.7328 <sup>b</sup>	-0.8423 <sup>b</sup>	-0.7029 <sup>b</sup>	-0.2440 <sup>c</sup>	-0.2938 <sup>c</sup>	-0.3198 <sup>c</sup>	-0.2993 <sup>c</sup>
	-3.4594	-2.1334	-2.2086	-2.1885	-1.9496	-1.8951	-1.7068	-1.8420
ROW	0.9321 <sup>a</sup>	0.9221 <sup>a</sup>	0.9221 <sup>a</sup>	0.9032 <sup>a</sup>	-0.0410	-0.0410	-0.0462	-0.0523
	6.3642	6.2798	6.2798	6.3200	-0.5581	-0.5581	-0.6170	-0.6170
R <sup>2</sup>	0.298	0.519	0.527	0.511	0.503	0.505	0.505	0.534
Adjusted R <sup>2</sup>	0.264	0.492	0.492	0.475	0.479	0.477	0.469	0.500
QE1 (USD)	6.35	5.84	6.20	5.84	5.35 <sup>a</sup>	4.97 <sup>a</sup>	4.68 <sup>a</sup>	4.20 <sup>b</sup>
QE2 (USD)	0.871	2.579 <sup>b</sup>	2.417 <sup>b</sup>	2.386 <sup>b</sup>	-0.077	0.348	0.288	0.041
QE3 (USD)	2.84	-2.53	-2.24	-2.33	8.09 <sup>a</sup>	7.60 <sup>a</sup>	7.23 <sup>a</sup>	6.39 <sup>b</sup>
QE (USD)	10.059	5.890	6.376	5.900	13.362 <sup>a</sup>	12.921 <sup>a</sup>	12.199 <sup>a</sup>	10.631 <sup>b</sup>

Results from USA flows to Brazil regressions for disaggregate flow categories and each policy round. Column (1) omits the ROW flows proxy, (2) includes the proxy, (3) includes the proxy and additional controls (coefficients not shown to save space) and (4) normalizes dollar variables by import price indexes. Outlier dummy variable included for USA flows greater than four standard deviations (coefficients not shown). *t*-values below coefficient estimates are from HAC standard errors. The last row shows the total effect of QE policy round in the period. <sup>a</sup> 1%, <sup>b</sup> 5%, <sup>c</sup> 10 percent.

Table 7

## FOREIGN CAPITAL FLOWS FROM THE USA TO BANKS, EACH EPISODE

	<i>Total</i>				<i>Portfolio</i>			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.1992 <sup>c</sup>	0.1343	0.1620	0.1328	0.1115 <sup>b</sup>	0.0750 <sup>c</sup>	0.0410	0.0427
QE1	1.8246	1.6412	1.4873	1.4737	2.2984	1.7961	0.9317	1.1839
QE2	0.0029 <sup>c</sup>	0.0031	0.0027	0.0025	0.0040 <sup>b</sup>	0.0041 <sup>b</sup>	0.0046 <sup>a</sup>	0.0043 <sup>a</sup>
QE3	1.6606	1.4657	1.1818	1.1931	2.3588	2.5502	2.7986	2.8284
CRISIS	0.0150 <sup>a</sup>	0.0123 <sup>a</sup>	0.0122 <sup>b</sup>	0.0123 <sup>a</sup>	0.0053 <sup>b</sup>	0.0036	0.0041 <sup>c</sup>	0.0034
ROW	2.6263	2.6839	2.2821	2.8213	2.2961	1.5131	1.8059	1.4637
R <sup>2</sup>	0.0000	0.0006	0.0001	-0.0001	0.0007	0.0010	0.0016	0.0014
Adjusted R <sup>2</sup>	-0.0113	0.2660	0.0477	-0.0194	0.3652	0.5451	0.8744	0.7298
QE1 (USD)	-1.2835 <sup>a</sup>	-1.0469 <sup>a</sup>	-1.0606 <sup>c</sup>	-0.8446 <sup>a</sup>	-0.9473 <sup>a</sup>	-0.8039 <sup>a</sup>	-0.7754 <sup>a</sup>	-0.5882 <sup>a</sup>
QE2 (USD)	-5.3645	-3.5177	-3.7858	-3.9288	-3.8637	-3.5463	-3.1953	-3.1564
QE3 (USD)	0.0909	0.0909	0.0870	0.0874 <sup>b</sup>	0.0732 <sup>c</sup>	0.0732 <sup>c</sup>	0.0740 <sup>c</sup>	0.0941 <sup>b</sup>
QE (USD)	1.4664	1.5274	1.5274	1.9973	1.9742	1.8930	1.8930	2.3697
Adjusted R <sup>2</sup>	0.331	0.347	0.350	0.324	0.409	0.431	0.450	0.413
QE1 (USD)	0.305	0.316	0.308	0.280	0.386	0.403	0.414	0.375
QE2 (USD)	4.53 <sup>c</sup>	4.81	4.20	3.98	6.25 <sup>b</sup>	6.44 <sup>b</sup>	7.15 <sup>a</sup>	6.68 <sup>a</sup>
QE3 (USD)	8.13 <sup>a</sup>	6.67 <sup>a</sup>	6.59 <sup>b</sup>	6.65 <sup>a</sup>	2.861 <sup>b</sup>	1.943	2.203 <sup>c</sup>	1.868
QE (USD)	-0.05	0.87	0.19	-0.08	0.91	1.32	2.16	1.85
Adjusted R <sup>2</sup>	12.61 <sup>c</sup>	12.35 <sup>b</sup>	10.98	10.56	10.020 <sup>b</sup>	9.696 <sup>b</sup>	11.518 <sup>a</sup>	10.397 <sup>a</sup>

	<i>Direct</i>				<i>Credit</i>			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	-0.0025	-0.0036	-0.0009	-0.0016	0.0420	0.0425	0.0843	0.0613
QE1	-0.0001	-0.0001	-0.0001	-0.0001	-0.0011 <sup>b</sup>	-0.0011 <sup>c</sup>	-0.0018 <sup>a</sup>	-0.0016 <sup>b</sup>
QE2	-0.7875	-0.7599	-0.9597	-0.9284	-1.9853	-1.9653	-2.6534	-2.4263
QE3	0.0007	0.0007 <sup>c</sup>	0.0006	0.0006	0.0097 <sup>a</sup>	0.0097 <sup>a</sup>	0.0095 <sup>a</sup>	0.0097 <sup>a</sup>
CRISIS	1.5837	1.7393	1.3995	1.3919	2.9381	2.9182	2.9220	3.2024
ROW	0.0002	0.0002	0.0001	0.0001	-0.0028	-0.0028	-0.0036	-0.0036
R <sup>2</sup>	1.3055	1.3390	1.0179	1.0722	-0.6820	-0.6781	-0.8659	-0.8618
Adjusted R <sup>2</sup>	0.0106	0.0126	0.0060	0.0047	-0.0500	-0.0519	-0.0107	-0.0126
QE1 (USD)	0.9549	0.9487	0.4544	0.4200	-1.2455	-0.8981	-0.1145	-0.1692
QE2 (USD)	0.0278	0.0278	0.0245	0.0256	-0.0032	-0.0032	-0.0146	-0.0291
QE3 (USD)	1.3572	1.3572	1.2114	1.1892	-0.0439	-0.0439	-0.1988	-0.3961
QE (USD)	0.844	0.847	0.850	0.827	0.459	0.459	0.473	0.420
Adjusted R <sup>2</sup>	0.831	0.833	0.833	0.808	0.433	0.429	0.434	0.377
QE1 (USD)	-0.10	-0.12	-0.15	-0.14	-1.64 <sup>b</sup>	-1.65 <sup>b</sup>	-2.80 <sup>a</sup>	-2.51 <sup>b</sup>
QE2 (USD)	0.37	0.37 <sup>c</sup>	0.34	0.35	5.263 <sup>a</sup>	5.270 <sup>a</sup>	5.164 <sup>a</sup>	5.258 <sup>a</sup>
QE3 (USD)	0.23	0.24	0.18	0.20	-3.76	-3.77	-4.87	-4.93
QE (USD)	0.49	0.50	0.38	0.40	-0.142	-0.143	-2.510	-2.185

Results from USA flows to Brazilian banking sector regressions for aggregate flow categories and each policy round. Column (1) omits the ROW flows proxy, (2) includes the proxy, (3) includes the proxy and additional controls (coefficients not shown to save space) and (4) normalizes dollar variables by import price indexes. Outlier dummy variable included for USA flows greater than four standard deviations (coefficients not shown). *t*-values below coefficient estimates are from HAC standard errors. The last row shows the total effect of QE policy round in the period. <sup>a</sup>1%, <sup>b</sup>5%, <sup>c</sup>10 percent.

Table 8

## FOREIGN CAPITAL FLOWS FROM THE USA TO BANKS, EACH EPISODE, DETAIL

	Portfolio: Equity				Portfolio: Debt			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.0084	-0.0579 <sup>c</sup>	-0.0932 <sup>b</sup>	-0.0659 <sup>c</sup>	0.1033 <sup>a</sup>	0.0894 <sup>b</sup>	0.0793 <sup>b</sup>	0.0657 <sup>b</sup>
QE1	0.2709	-1.7169	-1.9924	-1.8284	2.8893	2.5504	2.1951	2.0894
QE2	0.0024 <sup>c</sup>	0.0011	0.0014	0.0011	0.0016 <sup>b</sup>	0.0018 <sup>b</sup>	0.0019 <sup>b</sup>	0.0020 <sup>a</sup>
QE3	1.7632	0.9375	1.1117	0.8801	2.2172	2.3853	2.5625	2.8106
CRISIS	0.0041 <sup>b</sup>	0.0033 <sup>a</sup>	0.0037 <sup>a</sup>	0.0035 <sup>a</sup>	0.0012	0.0002	0.0004	0.0000
ROW	2.4926	3.2607	3.6908	3.8418	1.3619	0.1805	0.3322	-0.0297
Adjusted R <sup>2</sup>	-0.0013	-0.0019 <sup>b</sup>	-0.0014	-0.0015	0.0019	0.0022	0.0023	0.0023
QE1 (USD)	-1.3513	-1.9948	-1.3142	-1.3737	1.0215	1.1770	1.2280	1.1753
QE2 (USD)	-0.5768 <sup>a</sup>	-0.3491 <sup>c</sup>	-0.3000	-0.2199	-0.3704 <sup>a</sup>	-0.3114 <sup>a</sup>	-0.3163 <sup>a</sup>	-0.2455 <sup>a</sup>
QE3 (USD)	-2.7746	-1.8276	-1.4339	-1.3532	-5.2557	-4.4273	-4.1900	-3.8082
QE (USD)	0.3555 <sup>a</sup>	0.3524 <sup>a</sup>	0.3824 <sup>a</sup>	0.3878 <sup>a</sup>	0.0448	0.0421	0.0607	0.0607
Adjusted R <sup>2</sup>	4.6118	5.1763	5.3988	5.3988	1.2748	1.1732	1.6291	1.6291
QE1 (USD)	0.175	0.313	0.351	0.352	0.527	0.538	0.541	0.477
QE2 (USD)	0.149	0.286	0.315	0.316	0.509	0.516	0.511	0.443
QE3 (USD)	3.81 <sup>c</sup>	1.79	2.25	1.66	2.43 <sup>b</sup>	2.80 <sup>b</sup>	3.05 <sup>b</sup>	3.19 <sup>a</sup>
QE (USD)	2.231 <sup>b</sup>	1.803 <sup>a</sup>	2.022 <sup>a</sup>	1.915 <sup>a</sup>	0.628	0.120	0.226	-0.021
Adjusted R <sup>2</sup>	-1.83	-2.61 <sup>b</sup>	-1.92	-2.04	2.62	2.95	3.21	3.10
QE (USD)	4.212	0.980	2.352	1.533	5.685 <sup>c</sup>	5.871 <sup>b</sup>	6.484 <sup>b</sup>	6.269 <sup>b</sup>

*Portfolio: Debt abroad*

*Portfolio: Debt in the country*

	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.0739 <sup>a</sup>	-0.0169	-0.0169	-0.0120	0.0202	0.0195	0.0155	0.0103
QE1	2.8766	-1.2961	-1.2732	-1.1300	1.2891	1.1674	0.9085	0.6479
QE2	0.0004	-0.0002	-0.0002	-0.0002	0.0001	0.0001	0.0001	0.0002
QE3	1.2008	-1.2864	-1.1995	-1.3992	0.4674	0.4937	0.4479	0.7538
ROW	-0.0002	0.0001	0.0001	0.0000	0.0015 <sup>a</sup>	0.0014 <sup>b</sup>	0.0014 <sup>b</sup>	0.0011
CRISIS	-0.3728	0.3825	0.3162	0.1245	3.0436	2.3822	2.3145	1.4364
ROW	0.0002	-0.0007	-0.0007	-0.0007	0.0010	0.0010	0.0011	0.0011
ROW	0.2251	-1.0035	-0.9404	-0.8763	1.4884	1.4820	1.5737	1.5183
ROW	-0.2221 <sup>a</sup>	-0.0211	-0.0255	-0.0240	-0.0222	-0.0184	0.0119	0.0220
ROW	-4.7935	-0.7677	-0.9502	-1.1672	-0.6032	-0.4521	0.2553	0.5030
ROW	1.1323 <sup>a</sup>	1.1270 <sup>a</sup>	1.1270 <sup>a</sup>	1.0953 <sup>a</sup>	0.0034	0.0034	0.0068	0.0213
ROW	10.586	9.784	9.784	11.392	0.2298	0.2298	0.4707	1.2323
R <sup>2</sup>	0.332	0.693	0.693	0.686	0.702	0.702	0.708	0.632
Adjusted R <sup>2</sup>	0.300	0.675	0.670	0.663	0.685	0.683	0.684	0.601
QE1 (USD)	0.70	-0.38	-0.35	-0.37	0.18	0.21	0.21	0.36
QE2 (USD)	-0.110	0.040	0.038	0.015	0.792 <sup>a</sup>	0.753 <sup>b</sup>	0.769 <sup>b</sup>	0.597
QE3 (USD)	0.31	-1.02	-1.00	-0.95	1.36	1.39	1.49	1.55
QE (USD)	0.899	-1.354	-1.309	-1.299	2.332 <sup>b</sup>	2.356 <sup>b</sup>	2.470 <sup>b</sup>	2.511 <sup>b</sup>

Results from USA flows to Brazilian banking sector regressions for disaggregate flow categories and each policy round. Column (1) omits the ROW flows proxy, (2) includes the proxy, (3) includes the proxy and additional controls (coefficients not shown to save space) and (4) normalizes dollar variables by import price indexes. Outlier dummy variable included for USA flows greater than four standard deviations (coefficients not shown). *t*-values below coefficient estimates are from HAC standard errors. The last row shows the total effect of QE policy round in the period. <sup>a</sup> 1%, <sup>b</sup> 5%, <sup>c</sup> 10 percent.

Table 9

FOREIGN CAPITAL FLOWS FROM THE USA												
(Panel data: 17 EME)												
	Portfolio: Total				Portfolio: Equity				Portfolio: Debt			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
QE	0.0025 <sup>a</sup>	0.0017 <sup>a</sup>	0.0021 <sup>a</sup>	0.0020 <sup>a</sup>	0.0016 <sup>a</sup>	0.0013 <sup>b</sup>	0.0015 <sup>a</sup>	0.0016 <sup>a</sup>	0.0008 <sup>c</sup>	0.0003	0.0005	0.0053
	3.9116	2.8019	3.1814	3.5073	3.3868	2.8259	3.1434	3.5192	1.8660	0.8119	1.0248	1.3171
CRISIS	-1.4386 <sup>a</sup>	-0.5167	-0.5402	-0.6239	-0.833 <sup>a</sup>	-0.4464	-0.5392 <sup>c</sup>	-0.5184	-0.6191 <sup>b</sup>	0.0085	0.0807	-0.0484
	-3.8858	-1.2941	-1.3008	median	-2.9605	-1.6007	-1.8620	median	-2.3337	0.0334	0.3117	median
TOT	0.1279 <sup>a</sup>	0.1291 <sup>a</sup>	0.1291 <sup>a</sup>	0.0716	0.1400 <sup>a</sup>	0.1381 <sup>a</sup>	0.1381 <sup>a</sup>	0.0426	0.1340 <sup>a</sup>	0.1340 <sup>a</sup>	0.1377 <sup>a</sup>	0.1521
	3.9539	4.0068	4.0068	median	3.1002	3.0592	3.0592	median	4.8664	5.0090	5.0090	median
R <sup>2</sup>	0.052	0.132	0.137	0.312	0.027	0.094	0.099	0.194	0.044	0.138	0.141	0.299
Adjusted R <sup>2</sup>	0.050	0.127	0.131	0.269	0.026	0.090	0.095	0.167	0.042	0.133	0.136	0.257
QE (%)	79.92 <sup>a</sup>	55.57 <sup>a</sup>	65.60 <sup>a</sup>	64.69 <sup>a</sup>	74.15 <sup>a</sup>	60.05 <sup>a</sup>	70.10 <sup>a</sup>	74.32 <sup>a</sup>	85.59 <sup>b</sup>	35.38	46.54	54.28
QE (USD)	158.64 <sup>a</sup>	111.22 <sup>a</sup>	131.29 <sup>a</sup>	129.47 <sup>a</sup>	102.39 <sup>a</sup>	82.93 <sup>b</sup>	96.81 <sup>a</sup>	102.62 <sup>a</sup>	53.10 <sup>b</sup>	21.95	28.87	33.67

Results from USA portfolio flows (TIC data) to 17 emerging market economies. Proxy variable TOT is the country specific residual of total flows (IFS data) regressed on QE policy. QE policy is the change in Federal Reserve balance sheet. All regressions allow for heterogeneous intercepts. Column (1) omits the TOT proxy, (2) includes the proxy, (3) includes the proxy and additional controls (coefficients not shown) and (4) allows heterogeneity in all coefficients except QE effect. Outlier dummy variable included for USA flows greater than four standard deviations (coefficients not shown). *t*-values below coefficient estimates are from White robust standard errors. All results robust to generated regressors, as verified by bootstrapping the TOT regression. The last row show the total global effect of QE policy in the period as a percentage of USA portfolio flows to the countries in the sample and in dollars.<sup>a</sup> 1%, <sup>b</sup> 5%, <sup>c</sup> 10 percent.



## ANNEX

The following tables report additional results for Brazil's capital flow dataset. The tables here follow the same structure as Tables 5-8. The only difference is that we now include own lag of the dependent variable as control, as well as dummy variables representing the duration of the capital flow taxes on debt flow, equity flows except American depositary receipts (ADR) and ADR flows. To facilitate cross-referencing with the tables in the main text, we number the tables from hereon as A.5 to A.8. As mentioned in the results section of the main text, results with the additional controls are broadly consistent with the ones without such controls. Yet, some effects are no longer significant, particularly for foreign direct investment and credit flows.

For portfolio flows, QE3 gains importance relative to the QE1, particularly for portfolio flows.

Table A.5

	Total				Portfolio			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.3564	0.2071	0.4707	0.5206	0.3173	0.1152	0.3009	0.3987
QE1	1.2373	0.6807	1.3311	1.4772	1.4932	0.4728	0.9140	1.2272
QE2	0.0138 <sup>b</sup>	0.0125 <sup>b</sup>	0.0110 <sup>c</sup>	0.0092	0.0141 <sup>b</sup>	0.0122 <sup>c</sup>	0.0116	0.0095
QE3	2.2512	1.9840	1.6605	1.4642	2.0345	1.7330	1.5153	1.3467
ROW	0.0327 <sup>b</sup>	0.0296 <sup>b</sup>	0.0320 <sup>b</sup>	0.0314 <sup>c</sup>	0.0152 <sup>c</sup>	0.0128	0.0146 <sup>c</sup>	0.0144 <sup>c</sup>
CRISIS	2.3509	2.2148	2.0807	1.9304	1.7125	1.6549	1.8267	1.7308
IOF (USD)	0.0221a	0.0209b	0.0235b	0.0240b	0.0245 <sup>a</sup>	0.0236 <sup>a</sup>	0.0257 <sup>a</sup>	0.0260 <sup>a</sup>
Adjusted R <sup>2</sup>	2.7160	2.4512	2.4376	2.3092	3.1547	3.3681	3.5590	3.4131
QE1 (USD)	-3.7014 <sup>a</sup>	-3.4682 <sup>a</sup>	-3.8327 <sup>a</sup>	-3.1277 <sup>a</sup>	-3.4654 <sup>a</sup>	-2.7112 <sup>b</sup>	-3.1155 <sup>b</sup>	-2.5519 <sup>b</sup>
QE2 (USD)	-3.8967	-3.4711	-3.4508	-3.6900	-2.9659	-2.2938	-2.4355	-2.5623
QE3 (USD)	0.0622	0.0542	0.0542	0.0512	0.2078 <sup>a</sup>	0.2078 <sup>a</sup>	0.1959 <sup>a</sup>	0.1893 <sup>b</sup>
IOF (USD)	0.8861	0.7234	0.7234	0.6649	2.8846	2.8846	2.6466	2.5244
Adjusted R <sup>2</sup>	0.433	0.437	0.442	0.434	0.235	0.279	0.289	0.235
QE1 (USD)	0.391	0.390	0.385	0.377	0.184	0.226	0.223	0.165
QE2 (USD)	21.61 <sup>b</sup>	19.57 <sup>b</sup>	17.23 <sup>c</sup>	14.35	22.08 <sup>b</sup>	19.08 <sup>c</sup>	18.08	14.91
QE3 (USD)	17.70 <sup>b</sup>	16.02 <sup>b</sup>	17.33 <sup>b</sup>	17.01 <sup>c</sup>	8.219 <sup>c</sup>	6.942 <sup>c</sup>	7.920 <sup>c</sup>	7.792 <sup>c</sup>
IOF (USD)	30.16 <sup>a</sup>	28.59 <sup>b</sup>	32.13 <sup>b</sup>	32.85 <sup>b</sup>	33.48 <sup>a</sup>	32.30 <sup>a</sup>	35.16 <sup>a</sup>	35.52 <sup>a</sup>
Adjusted R <sup>2</sup>	69.46 <sup>a</sup>	64.18 <sup>a</sup>	66.68 <sup>a</sup>	64.21 <sup>a</sup>	63.784 <sup>a</sup>	58.322 <sup>a</sup>	61.163 <sup>a</sup>	58.221 <sup>a</sup>
IOF (USD)	23.98	11.43	-11.22	-27.55	-30.57 <sup>c</sup>	-40.23 <sup>b</sup>	-58.00 <sup>b</sup>	-71.48 <sup>b</sup>

*Credit*

*Direct*

	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.2482 <sup>a</sup>	0.1842 <sup>a</sup>	0.1184	0.1251 <sup>c</sup>	-0.1759	-0.1795	0.0112	-0.0069
	6.6048	4.7608	1.4605	1.7637	-0.9569	-0.9416	0.1093	-0.0767
QE1	-0.0009	-0.0013	-0.0008	-0.0008	0.0004	0.0004	-0.0015	-0.0013
	-0.6962	-0.9854	-0.5190	-0.5421	0.3206	0.2972	-1.3467	-1.1885
QE2	0.0051 <sup>a</sup>	0.0037	0.0032	0.0034	0.0117	0.0115	0.0129	0.0130
	2.8463	1.6084	1.3254	1.3554	1.0814	1.0434	1.2089	1.3339
QE3	0.0032	0.0025	0.0018	0.0013	0.0007	0.0008	0.0023	0.0026
	1.3789	1.1836	0.8563	0.5565	0.1893	0.2016	0.5192	0.5479
CRISIS	-0.2917	-0.3221	-0.2730	-0.2375	-0.0390	-0.0297	-0.1126	-0.1037
	-1.0499	-1.2001	-0.9647	-1.0103	-0.3617	-0.2497	-0.6809	-0.6895
ROW	0.0488 <sup>b</sup>	0.0488 <sup>b</sup>	0.0521 <sup>a</sup>	0.0478 <sup>a</sup>	0.0282	0.0282	0.0178	0.0136
	2.4306	2.4306	2.7296	2.7274	0.2925	0.2925	0.1801	0.1064
R <sup>2</sup>	0.813	0.821	0.823	0.759	0.604	0.604	0.610	0.643
Adjusted R <sup>2</sup>	0.797	0.805	0.803	0.732	0.575	0.571	0.570	0.607
QE1 (USD)	-1.38	-2.01	-1.21	-1.20	0.68	0.60	-2.34	-2.10
QE2 (USD)	2.77 <sup>a</sup>	2.01	1.71	1.82	6.330	6.209	6.965	7.023
QE3 (USD)	4.34	3.37	2.48	1.71	0.98	1.04	3.09	3.55
QE (USD)	5.73	3.37	2.98	2.33	7.996	7.851	7.711	8.470
iof (USD)	12.35 <sup>a</sup>	5.12	10.94	12.97	24.88 <sup>b</sup>	24.41 <sup>b</sup>	7.15	5.72

Results from USA flows to Brazil regressions for aggregate flow categories and each policy round. All regressions include own lag of USA flows and dummy variables indicating a tax on capital flow tax for some category, including American Depository Receipts (coefficients not shown; total effect of IOF last row). Column (1) omits the ROW flows proxy, (2) includes the proxy, (3) includes the proxy and additional controls (coefficients not shown to save space) and (4) normalizes dollar variables by import price indexes. <sup>a</sup>values below coefficient estimates are from HAC standard errors. The last rows show the total effect of QE policy round in the period. <sup>a</sup>1%, <sup>b</sup>5%, <sup>c</sup>10 percent.

Table A.6

FOREIGN CAPITAL FLOWS FROM THE USA, EACH EPISODE, DETAIL,  
WITH OWN LAG AND IOF CONTROLS

	<i>Direct: Equity capital</i>				<i>Direct: Affiliated enterprise loans</i>			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.2200 <sup>a</sup>	0.1791 <sup>a</sup>	0.1679 <sup>b</sup>	0.1665 <sup>a</sup>	0.0631 <sup>a</sup>	0.0466 <sup>b</sup>	0.0050	0.0056
QE1	6.4059	4.9433	2.5224	2.9584	3.1774	2.2303	0.0910	0.1086
QE2	-0.0015	-0.0016	-0.0015	-0.0015	0.0000	-0.0003	0.0001	0.0001
QE3	-1.1789	-1.2161	-1.0807	-1.1161	-0.0134	-0.7649	0.1744	0.2613
CRISIS	0.0002	-0.0003	-0.0004	-0.0003	0.0050 <sup>a</sup>	0.0041 <sup>a</sup>	0.0038 <sup>b</sup>	0.0039 <sup>b</sup>
ROW	0.2062	-0.2726	-0.3521	-0.2372	4.2143	2.9652	2.5882	2.5186
R <sup>2</sup>	0.0018	0.0019	0.0018	0.0017	0.0000	-0.0008	-0.0012	-0.0014
Adjusted R <sup>2</sup>	1.0096	1.0587	0.9778	0.9075	0.0074	-0.5871	-0.8882	-1.0713
QE1 (USD)	-0.4497 <sup>a</sup>	-0.4678 <sup>b</sup>	-0.4477 <sup>a</sup>	-0.3998 <sup>b</sup>	0.1830 <sup>a</sup>	0.1723 <sup>b</sup>	0.1935 <sup>b</sup>	0.1649 <sup>a</sup>
QE2 (USD)	-1.9699	-2.0484	-1.8886	-2.0251	1.6681	2.1568	2.1568	1.9614
QE3 (USD)	0.0372 <sup>b</sup>	0.0374 <sup>a</sup>	0.0374 <sup>a</sup>	0.0337 <sup>a</sup>	0.0612 <sup>b</sup>	0.0636 <sup>b</sup>	0.0636 <sup>b</sup>	0.0557 <sup>a</sup>
R <sup>2</sup>	1.9822	1.9698	1.8447	1.8447	2.0106	2.1294	2.1294	1.7961
Adjusted R <sup>2</sup>	0.650	0.658	0.659	0.592	0.919	0.923	0.925	0.882
QE1 (USD)	0.623	0.630	0.624	0.550	0.912	0.916	0.916	0.869
QE2 (USD)	-2.38	-2.50	-2.41	-2.31	-0.01	-0.49	0.13	0.19

	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	<i>Portfolio: Equity</i>				<i>Portfolio: Debt</i>			
QE2 (USD)	0.12	-0.19	-0.24	-0.16	2.69 <sup>a</sup>	2.24 <sup>a</sup>	2.07 <sup>a</sup>	2.13 <sup>b</sup>
QE3 (USD)	2.46	2.60	2.45	2.31	0.01	-1.04	-1.61	-1.93
QE (USD)	0.21	-0.09	-0.20	-0.16	2.69	0.71	0.59	0.39
IOF (USD)	11.88 <sup>a</sup>	7.43	8.56	7.65	3.49 <sup>a</sup>	1.42	5.31	6.70
C	0.0812	-0.0803	-0.3884	-0.2567	0.3007 <sup>b</sup>	0.2421 <sup>a</sup>	0.4635 <sup>a</sup>	0.4627 <sup>b</sup>
QE1	0.0070	0.0034	0.0058	0.0044	0.0063 <sup>a</sup>	0.0074 <sup>a</sup>	0.0063 <sup>b</sup>	0.0057 <sup>a</sup>
QE2	0.0128 <sup>b</sup>	0.0120 <sup>a</sup>	0.0100 <sup>a</sup>	0.0103 <sup>a</sup>	0.0013	-0.0006	0.0015	0.0015
QE3	0.0085	0.0056	0.0029	0.0023	0.0106	0.0118 <sup>a</sup>	0.0145 <sup>b</sup>	0.0150 <sup>b</sup>
CRISIS	-2.2171 <sup>b</sup>	-1.6209 <sup>a</sup>	-1.3817	-1.0818	-1.2233 <sup>a</sup>	-0.9367 <sup>a</sup>	-1.3452 <sup>a</sup>	-1.1974 <sup>a</sup>
ROW	-2.3757	-1.7823	-1.4529	-1.4390	-4.6689	-3.3151	-4.0735	-3.8036
		0.2303 <sup>a</sup>	0.2461 <sup>a</sup>	0.2520 <sup>a</sup>	0.1944 <sup>b</sup>	0.1772 <sup>b</sup>	0.1772 <sup>b</sup>	0.1676 <sup>a</sup>
		3.0173	3.0292	3.1898	2.0280	1.9998	1.9998	1.8451

	Portfolio: Equity				Portfolio: Debt			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
R <sup>2</sup>	0.235	0.299	0.316	0.304	0.401	0.422	0.440	0.395
Adjusted R <sup>2</sup>	0.185	0.247	0.253	0.239	0.351	0.369	0.378	0.328
QE1 (USD)	11.01	5.25	9.02	6.81	9.84 <sup>a</sup>	11.59 <sup>a</sup>	9.80 <sup>b</sup>	8.94 <sup>a</sup>
QE2 (USD)	6.949 <sup>b</sup>	6.517 <sup>a</sup>	5.442 <sup>a</sup>	5.563 <sup>a</sup>	0.729	-0.342	0.820	0.817
QE3 (USD)	11.64	7.67	3.92	3.17	14.48	16.14 <sup>a</sup>	19.85 <sup>b</sup>	20.54 <sup>b</sup>
QE (USD)	29.601 <sup>b</sup>	19.434	18.380	15.545	25.048 <sup>b</sup>	27.389 <sup>a</sup>	30.471 <sup>a</sup>	30.295 <sup>a</sup>
IOF (USD)	-30.42 <sup>b</sup>	-35.20 <sup>b</sup>	-7.43	-9.29	-3.58	-7.95	-29.16 <sup>b</sup>	-37.09 <sup>b</sup>
	Portfolio: Debt in the country				Portfolio: Debt abroad			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.2308 <sup>a</sup>	0.0466	0.1925 <sup>a</sup>	0.1511	-0.0053	-0.0056	0.0644	0.1465
	3.0514	0.8189	1.6589	1.6009	-0.0493	-0.0539	0.4430	0.9233
QE1	0.0025	0.0026	0.0018	0.0018	0.0034 <sup>a</sup>	0.0032 <sup>a</sup>	0.0026 <sup>a</sup>	0.0018
	1.1975	1.1134	0.7103	0.7297	3.3976	2.9565	1.7562	1.0419
QE2	-0.0005	0.0010	0.0022	0.0020	0.0006	0.0010	0.0015	0.0018
	-0.2240	0.5172	1.0366	0.9143	0.2148	0.3597	0.5059	0.5788
QE3	0.0023	0.0014	0.0030	0.0030	0.0042 <sup>b</sup>	0.0038 <sup>a</sup>	0.0045 <sup>a</sup>	0.0047
	0.7894	0.4331	0.8892	0.8456	2.1698	1.8493	1.7675	1.6447

CRISIS	-0.7750 <sup>b</sup>	-0.5265 <sup>a</sup>	-0.7300 <sup>b</sup>	-0.5940 <sup>b</sup>	-0.2388 <sup>a</sup>	-0.2805 <sup>a</sup>	-0.3343	-0.3388 <sup>a</sup>
ROW	-2.0235	-1.6849	-2.0837	-2.0586	-1.7968	-1.7768	-1.5984	-1.8237
R <sup>2</sup>	0.507	0.607	0.616	0.599	0.508	0.509	0.511	0.540
Adjusted R <sup>2</sup>	0.465	0.570	0.573	0.555	0.467	0.464	0.456	0.488
QE1 (USD)	3.98	4.14	2.76	2.75	5.36 <sup>a</sup>	5.06 <sup>a</sup>	4.11 <sup>a</sup>	2.81
QE2 (USD)	-0.262	0.547	1.184	1.075	0.299	0.538	0.807	0.971
QE3 (USD)	3.18	1.89	4.04	4.10	5.71 <sup>b</sup>	5.22 <sup>a</sup>	6.11 <sup>a</sup>	6.49
QE (USD)	6.899	6.574	7.982	7.929	11.371 <sup>a</sup>	10.816 <sup>a</sup>	11.028 <sup>a</sup>	10.273 <sup>b</sup>
IOF (USD)	-6.361	-3.466	-16.984	-16.804	2.925	4.048	-2.691	-11.850

Results from USA flows to Brazil regressions for disaggregate flow categories and each policy round. All regressions include own lag of USA flows and dummy variables indicating a tax on capital flow tax for some category, including American Depository Receipts (coefficients not shown; total effect of IOF last row). Column (1) omits the ROW flows proxy, (2) includes the proxy, (3) includes the proxy and additional controls (coefficients not shown to save space) and (4) normalizes dollar variables by import price indexes. Outlier dummy variable included for USA flows greater than four standard deviations (coefficients not shown). *t*-values below coefficient estimates are from HAC standard errors. The last rows show the total effect of QE policy round in the period: <sup>a</sup> 1%, <sup>b</sup> 5%, <sup>c</sup> 10 percent.

Table A.7

FOREIGN CAPITAL FLOWS FROM THE USA TO BANKS, EACH EPISODE,  
WITH OWN LAG AND IOF CONTROLS

	<i>Total</i>				<i>Portfolio</i>			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.0975	0.0617	0.0378	0.0210	0.1321 <sup>a</sup>	0.1096 <sup>b</sup>	0.0800	0.0684
QE1	1.1284	0.7733	0.3461	0.2429	2.7792	2.5146	1.2371	1.2249
QE2	0.0026 <sup>b</sup>	0.0027 <sup>b</sup>	0.0028 <sup>c</sup>	0.0028 <sup>c</sup>	0.0034 <sup>b</sup>	0.0035 <sup>b</sup>	0.0038 <sup>b</sup>	0.0036 <sup>b</sup>
QE3	2.3541	2.0056	1.7407	1.9435	2.3787	2.5101	2.5082	2.5292
CRISIS	0.0081	0.0065	0.0063	0.0063	0.0043 <sup>c</sup>	0.0032	0.0030	0.0023
ROW	1.2013	0.9878	0.8734	0.9273	1.9286	1.3934	1.2531	0.9265
R <sup>2</sup>	0.0066	0.0075 <sup>c</sup>	0.0073 <sup>c</sup>	0.0066	0.0056 <sup>a</sup>	0.0058 <sup>a</sup>	0.0056 <sup>a</sup>	0.0052 <sup>a</sup>
Adjusted R <sup>2</sup>	1.6270	1.9479	1.6728	1.4848	3.0071	3.2397	2.9859	2.7231
QE1 (USD)	-1.0249 <sup>a</sup>	-0.8622 <sup>a</sup>	-0.8161 <sup>a</sup>	-0.6352 <sup>a</sup>	-0.8867 <sup>a</sup>	-0.7878 <sup>a</sup>	-0.7711 <sup>a</sup>	-0.5729 <sup>a</sup>
QE2 (USD)	-5.6101	-3.6229	-3.4114	-3.7707	-3.7323	-3.2983	-3.0414	-2.9468
QE3 (USD)	0.0672	0.0672	0.0686	0.0654	0.0635 <sup>c</sup>	0.0635 <sup>c</sup>	0.0620 <sup>c</sup>	0.0819 <sup>b</sup>
IOF (USD)	1.1804	1.2428	1.2428	1.3718	1.8504	1.7111	1.7111	2.2425
IOF (USD)	0.436	0.444	0.445	0.428	0.478	0.493	0.494	0.450
IOF (USD)	0.394	0.398	0.388	0.369	0.439	0.450	0.442	0.394
IOF (USD)	4.14 <sup>b</sup>	4.24 <sup>b</sup>	4.42 <sup>c</sup>	4.41 <sup>c</sup>	5.26 <sup>b</sup>	5.52 <sup>b</sup>	5.95 <sup>b</sup>	5.58 <sup>b</sup>
IOF (USD)	4.41	3.51	3.39	3.40	2.305 <sup>c</sup>	1.733	1.630	1.264
IOF (USD)	9.03	10.24 <sup>c</sup>	9.96 <sup>c</sup>	8.96	7.70 <sup>a</sup>	7.99 <sup>a</sup>	7.61 <sup>a</sup>	7.15 <sup>a</sup>
IOF (USD)	17.57 <sup>a</sup>	17.99 <sup>a</sup>	17.77 <sup>a</sup>	16.77 <sup>b</sup>	15.261 <sup>a</sup>	15.236 <sup>a</sup>	15.188 <sup>a</sup>	13.999 <sup>a</sup>
IOF (USD)	-0.06	-1.80	0.76	1.25	-8.66 <sup>b</sup>	-9.49 <sup>b</sup>	-6.63	-6.64



	Direct				Credit			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	-0.0048	-0.0055	0.0003	0.0003	-0.0049	-0.0021	-0.0345	-0.0338
	-0.8065	-0.9688	0.0468	0.0521	-0.0674	-0.0292	-0.4270	-0.4909
QE1	0.0000	0.0000	-0.0001	-0.0001	-0.0005	-0.0005	-0.0005	-0.0003
	-0.2099	-0.5297	-0.7296	-0.8483	-0.8523	-0.8157	-0.5508	-0.3090
QE2	0.0008	0.0008	0.0008	0.0008	0.0068	0.0070	0.0068	0.0070
	1.4965	1.6041	1.6338	1.5527	1.1043	1.0881	1.0770	1.1491
QE3	-0.0003 <sup>b</sup>	-0.0003 <sup>b</sup>	-0.0002	-0.0002	-0.0004	-0.0006	-0.0010	-0.0015
	-2.4596	-2.4740	-1.6358	-1.3387	-0.1195	-0.1692	-0.2911	-0.4296
CRISIS	0.0070	0.0087	-0.0001	-0.0003	-0.0382	-0.0520	0.0451	0.0202
	0.9949	0.9221	-0.0087	-0.0278	-0.5849	-0.6041	0.3939	0.1964
ROW		0.0318	0.0309	0.0309		-0.0211	-0.0219	-0.0421
		1.3612	1.3492	1.3551		-0.2835	-0.2923	-0.5590
R <sup>2</sup>	0.852	0.855	0.857	0.833	0.539	0.539	0.544	0.507
Adjusted R <sup>2</sup>	0.834	0.836	0.835	0.808	0.500	0.497	0.493	0.452
QE1 (USD)	-0.03	-0.08	-0.12	-0.15	-0.83	-0.81	-0.77	-0.44
QE2 (USD)	0.41	0.43	0.45	0.46	3.712	3.794	3.669	3.817
QE3 (USD)	-0.42 <sup>b</sup>	-0.43 <sup>b</sup>	-0.34	-0.31	-0.55	-0.81	-1.38	-2.10
QE (USD)	-0.04	-0.08	-0.01	-0.01	2.337	2.173	1.525	1.278
IOF (USD)	0.88 <sup>c</sup>	0.85 <sup>c</sup>	0.24	0.14	1.03	1.24	5.11	5.72

Results from USA flows to Brazil bank sector for aggregate flow categories and each policy round. All regressions include own lag of USA flows and dummy variables indicating a tax on capital flow tax for some category, including American Depository Receipts (coefficients not shown; total effect of IOF last row). Column (1) omits the ROW flows proxy, (2) includes the proxy, (3) includes the proxy and additional controls (coefficients not shown to save space) and (4) normalizes dollar variables by import price indexes. <sup>a</sup>Values below coefficient estimates are from HAC standard errors. The last rows show the total effect of QE policy round in the period. <sup>a</sup> 1%, <sup>b</sup> 5%, <sup>c</sup> 10 percent.

Table A.8

FOREIGN CAPITAL FLOWS FROM THE USA TO BANKS, EACH EPISODE,  
DETAIL, WITH OWN LAG AND IOF CONTROLS

	Portfolio: Equity				Portfolio: Debt			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.0230	-0.0296	-0.0875	-0.0599	0.1065 <sup>a</sup>	0.0980 <sup>b</sup>	0.1000	0.0738
QE1	0.7150	-0.8678	-1.1478	-0.9419	2.6425	2.5216	1.5981	1.3980
QE2	0.0020 <sup>c</sup>	0.0008	0.0013	0.0010	0.0013 <sup>b</sup>	0.0016 <sup>b</sup>	0.0016 <sup>c</sup>	0.0018 <sup>b</sup>
QE3	1.6904	0.6960	0.9637	0.7629	2.0376	2.1785	1.8291	2.0629
IOF (USD)	0.0031 <sup>c</sup>	0.0029 <sup>a</sup>	0.0026 <sup>b</sup>	0.0026 <sup>b</sup>	0.0011	0.0003	0.0004	-0.0001
CRISIS	1.9692	3.2207	2.3793	2.3584	0.9143	0.2271	0.2536	-0.0679
ROW	0.0025	0.0016	0.0011	0.0010	0.0029	0.0032 <sup>c</sup>	0.0032 <sup>c</sup>	0.0029
R <sup>2</sup>	1.3805	1.0211	0.7024	0.6393	1.5795	1.7180	1.7990	1.6572
Adjusted R <sup>2</sup>	-0.5262 <sup>a</sup>	-0.3341 <sup>c</sup>	-0.2898	-0.2230	-0.3469 <sup>a</sup>	-0.2996 <sup>a</sup>	-0.3140 <sup>a</sup>	-0.2379 <sup>a</sup>
IOF (USD)	-2.6853	-1.7201	-1.3996	-1.3425	-5.4730	-4.6269	-4.2729	-3.5064
CRISIS	0.3378 <sup>a</sup>	0.3505 <sup>a</sup>	0.3579 <sup>a</sup>	0.3579 <sup>a</sup>	0.0420	0.0403	0.0403	0.0572
ROW	4.4667	4.5680	4.8113	4.8113	1.2012	1.1380	1.1380	1.5568
R <sup>2</sup>	0.264	0.383	0.395	0.386	0.538	0.547	0.547	0.483
Adjusted R <sup>2</sup>	0.216	0.338	0.339	0.330	0.504	0.509	0.501	0.430
QE1 (USD)	3.10 <sup>c</sup>	1.27	2.00	1.50	2.11 <sup>b</sup>	2.49 <sup>b</sup>	2.51 <sup>c</sup>	2.77 <sup>b</sup>
QE2 (USD)	1.663 <sup>b</sup>	1.597 <sup>a</sup>	1.400 <sup>b</sup>	1.397 <sup>b</sup>	0.577	0.185	0.215	-0.061
QE3 (USD)	3.35	2.21	1.52	1.40	4.00	4.31 <sup>c</sup>	4.34 <sup>c</sup>	3.93 <sup>c</sup>
IOF (USD)	8.113 <sup>b</sup>	5.075 <sup>c</sup>	4.917	4.301	6.692 <sup>b</sup>	6.982 <sup>b</sup>	7.063 <sup>b</sup>	6.631 <sup>b</sup>
CRISIS	-6.26 <sup>c</sup>	-7.54 <sup>b</sup>	-2.28	-2.66	-2.26	-2.60	-2.86	-1.90

*Portfolio: Debt abroad*

*Portfolio: Debt in the country*

	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.0551 <sup>a</sup>	-0.0112	0.0093	0.0084	0.0198	0.0195	-0.0127	-0.0164
	2.9278	-0.7224	0.3057	0.3546	1.0406	0.9900	-0.4592	-0.6057
QE1	0.0003	-0.0003	-0.0004	-0.0004	0.0001	0.0001	0.0003	0.0004
	0.7206	-1.1221	-1.3090	-1.3970	0.4718	0.4646	0.9202	1.1080
QE2	0.0000	0.0001	0.0003	0.0003	0.0013 <sup>c</sup>	0.0013 <sup>c</sup>	0.0010	0.0007
	-0.0064	0.4319	0.7591	0.7352	1.8575	1.6854	1.2570	0.7316
QE3	0.0002	-0.0003	0.0000	-0.0001	0.0014 <sup>c</sup>	0.0014 <sup>c</sup>	0.0011	0.0010
	0.3551	-0.4164	-0.0565	-0.0672	1.8631	1.8549	1.4584	1.1651
CRISIS	-0.1524 <sup>b</sup>	-0.0198	-0.0453	-0.0402	-0.0224	-0.0204	0.0296	0.0395
	-2.1315	-0.5646	-1.0036	-1.1627	-0.6092	-0.5034	0.6339	0.8666
ROW	1.1020 <sup>a</sup>	1.0890 <sup>a</sup>	7.839	9.645	0.0019	0.0027	0.0027	0.0166
	0.478	0.706	0.709	0.700	0.706	0.706	0.715	0.640
Adjusted R <sup>2</sup>	0.434	0.679	0.677	0.666	0.678	0.676	0.680	0.596
QE1 (USD)	0.43	-0.40	-0.60	-0.59	0.19	0.20	0.52	0.67
QE2 (USD)	-0.001	0.071	0.155	0.150	0.717 <sup>c</sup>	0.698 <sup>c</sup>	0.543	0.364
QE3 (USD)	0.31	-0.35	-0.05	-0.07	1.96 <sup>c</sup>	1.97 <sup>c</sup>	1.53	1.37
QE (USD)	0.748	-0.672	-0.502	-0.504	2.860 <sup>b</sup>	2.874 <sup>b</sup>	2.595 <sup>b</sup>	2.407 <sup>c</sup>
IOF (F)	-1.779	-1.935	-3.805	-3.728	-0.466	-0.482	2.858	3.529

Results from USA flows to Brazil bank sector for aggregate flow categories and each policy round. All regressions include own lag of USA flows and dummy variables indicating a tax on capital flow tax for some category, including American Depository Receipts (coefficients not shown; total effect of IOF last row). Column (1) omits the ROW flows proxy, (2) includes the proxy, (3) includes the proxy and additional controls (coefficients not shown to save space) and (4) normalizes dollar variables by import price indexes. <sup>a</sup>values below coefficient estimates are from HAC standard errors. The last rows show the total effect of QE policy round in the period. <sup>a</sup> 1%, <sup>b</sup> 5%, <sup>c</sup> 10 percent.

## References

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