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Abstract

This paper tests the presence of balance sheets effects and analyzes the implications for exchange rate policies in emerging markets. The results reveal that the emerging market bond index (EMBI) is negatively related to the banks. foreign currency leverage, and that these banks. foreign currency exposures are relatively unhedged. Panel SVAR methods using EMBI instead of advanced country lending rates find, contrary to the literature, that the amplitude of output responses to foreign interest rate shocks are smaller under relatively fixed regimes. The findings are robust to the local projections method of obtaining impulse responses, using country specific and GARCH-SVAR models.

Journal of Economic Literature Classification: E44, F31, F41

Keywords: EMBI, bank balance sheets, leverage, country risk premium, exchange rates.

1. Introduction and Motivation

With the globalization of capital markets, emerging market economies have relied more on foreign finance and their economies have become vulnerable to sudden outflows of capital.[1]

Financial crises related to abrupt exchange rate movements in emerging markets have either been caused or aggravated by excess unhedged foreign currency liabilities of the banking sector in these countries. More specifically, foreign currency leverage measured by net foreign liabilities over net worth of these banks in crisis countries has been quite high.

Table 1 reports the change in exchange rates and real GDP for the period before and after the crises together with the foreign currency leverage of the banking sector for countries that have had financial crisis, and countries that have financial and trade linkages with these countries. The important observation is that in most of the cases large depreciations coupled with high bank leverage have caused a decline in output and countries that have banking sectors with low or negative leverage like Uruguay, Philippines, Vietnam and Panama have recorded an increase in output after the crises.

Balance sheet approach literature has formalized these concepts after Krugman's (1999) criticism of the existing bank run and currency crisis models. The author has argued that any viable model has to incorporate the balance sheet effects and financial fragility to explain currency and banking crises and blames the failure of first and second generation models to represent the causes of the Asian Financial Crisis on the lack of these mechanisms.

Chang and Velasco (1998) have included balance sheet effects into a Diamond-Dybvig framework to analyze the outcomes of different exchange rate regimes in a multiple equilibrium model. Similar research was conducted by Aghion, Bachetta, Banerjee (2000), Burnside Eichenbaum, Rebello (1999) and Chang Velasco, Cespedes (2001) in a small open economy DSGE setting. This line of research identifies two opposing effects of changes in real exchange rates. The more common wisdom observation is that flexible regimes are better absorbers of external shocks and central banks involuntary

[1] Figure 1 shows the increasing importance of foreign finance for emerging market economies over the years. The ratio in the graph denotes a weighted average of 30 emerging market economies' ratios.

interest rate adjustments under fixed regimes exacerbate the effects of external shocks. In light of the work on balance sheet effects a more recent explanation is that emerging markets with high unhedged foreign denominated liabilities are vulnerable to exchange rate fluctuations. There is a consensus in the literature that the former effect dominates and flexible regimes are superior in terms of output volatility when the economy faces external shocks.

Despite the growing amount of theoretical work formalizing balance sheet effects, there is no empirical research that studies the existence of balance sheet effects and it's implication for exchange rate policies. The only relevant paper found was by Berganza, Chang and Herrero (BCH) (2003) who work with annual data and find that foreign debt stock together with unexpected depreciations are affective in explaining the changes in Emerging Market Bond Index (EMBI) which is a proxy for foreign interest rates.

This paper empirically analyzes balance sheets effects and answers the following three questions. Do foreign creditors demand different interest rates or adjust the share of their portfolio allocated to an emerging market country, depending on the strength of banking sector balance sheets in that country? To what degree do domestic banks hedge their foreign currency exposures and hence are affected by exchange rate fluctuations? How is the real sector affected by foreign interest rate shocks under different exchange rate regimes in the presence of balance sheet effects?

I study the first question using a panel data fixed effects model with two different proxies for foreign interest rates[2], and find that there is a positive leverage, interest rate relationship. More specifically, foreign creditors have increased (decreased) their interest rates when the domestic banks increased (decreased) their net foreign liabilities relative to their net worth. This finding has two important implications. One is that foreign interest rates that are assumed to be exogenous in small open economy models do actually depend on bank balance sheets which in turn are affected by the macroeconomic developments in the country. Second, given that foreign interest rates are partially endogenous, the

[2] EMBI and S&P credit ratings.

strength of bank balance sheets and thus central bank exchange rate policy becomes more important compared to a framework not including these effects.

Even if banks have significant foreign currency leverage, if they hedge their exposures, detrimental effects of exchange rate depreciations would be limited. First, I estimate the effects of exchange rate movements on the banking sector stock market index net of their effects on the non-bank market index. Next, using balance sheet data, I construct a measure, which captures returns to bank capital, and I analyze the effects of exchange rate fluctuations on this variable. Results imply that developing country banks are relatively unhedged in terms of foreign currency compared to developed country counterparts.

Finally, I consider the effect of exchange rate policy on output within the framework of balance sheet effects by analyzing the impulse responses from a VAR model. The novelty in this section is to represent foreign interest rates by the EMBI[3] or net foreign liability/total assets ratio[4]. Panel Structural Vector Autoregressive (PSVAR) and country specific analysis yield results that contradict the conventional wisdom. I find that output volatility is smaller under tight exchange rate policies when a country faces foreign interest rate shocks. Pure float regimes are unfavorable in this setting since the deprecation of exchange rates following external shocks inflates the domestic currency value of foreign liabilities, and increases foreign interest rates further. It is important to note here that I omit crisis periods for the countries that have been affected to avoid stacking the odds against flexible regimes.

Following the literature I compare the results with the model including a weighted average of developed country lending rates instead of EMBI and find no significant difference between the two regimes in terms of the output response. I also test if the exchange rate uncertainty is greater with relatively more flexible regimes and if amplitude of the output response to external shocks is larger under these regimes when I include this uncertainty in the model. Following the methodology of Jorda

[3] Emerging Market Bond Spread is equal to EMBI – return on US bonds of similar maturity. Hence, EMBI is equal to foreign interest rates plus the country spread. In this paper when I refer to foreign interest rates, I mean EMBI since these are the rates at which emerging market countries can borrow abroad.

[4] The literature comparing exchange rate regimes using VARs mostly assume that foreign interest rates are some weighted average of G-7 country interest rates.

and Salyer (2003), I use a SVAR-GARCH model and incorporate conditional exchange rate standard deviations to compare the performance of the two exchange rate regimes and find that the difference in output response between the two is amplified, implying greater sensitivity of the domestic economy to external shocks, with a flexible regime.

Finally, I check the robustness of the VAR results by using the local projections method, and find that the results hold. Local projections method has been recently introduced by Jorda (2004) as an alternative to VARs due to their poor long run forecast performance, and consists of iterative forecasting at different horizons to obtain impulse responses.

The results imply that monitoring the balance sheet of banks becomes essential given that foreigners' perception of risk depends on the financial health of the country. Flexible regimes, amplify the effects of foreign interest rate shocks by allowing banks' net foreign liabilities to fluctuate with the exchange rate. These balance sheet effects dominate the negative effects of the lack of independent monetary policy under fixed regimes.

These results should not be interpreted as a case for fixed exchange rate regimes. The vulnerability of these regimes to speculative attacks has been proven over and over again. Rather the excess volatility stemming from external shocks under flexible regimes offers a possible explanation for the fear of floating[5] observed in these countries.

Part 2 analyses the relationship between bank balance sheets and foreign interest rates, Part 3 measures the degree of foreign exchange exposure of emerging market banks, Part 4 compares the performance of different exchange rate regimes in terms of output volatility within the balance sheet approach framework and Part 5 concludes.

Besides the BCH paper I could not find a relevant paper for part 2. Other than that a brief summary of the literature on measuring foreign currency exposure and the choice of exchange rate regimes in emerging markets is provided in parts 3 and 4 respectively.

[5] See Calvo Reinhart (2000)

2. Foreign Interest Rates and Leverage Relationship, Simple Regression Analysis

This part tests if foreign currency leverage of the domestic banks affects foreign interest rates faced by the economy using different specifications. The variables that mimic foreign interest rates are, the emerging market bond index (EMBI) and the Standard and Poor's (S&P) credit ratings.

EMBI is a widely used proxy for external cost of credit in the literature and is constructed by subtracting total returns on US Treasury bonds from a country's EMBI return. The index tracks the total returns to external currency denominated debt instruments of the emerging markets including sovereign bonds issued by governments as well as fixed income securities issued by public and private companies. S&P credit rating on the other hand takes into account the credit worthiness of guarantors and their capacity to meet their commitment on the obligation.

Due to data limitations, EMBI+ index and the S&P ratings are compiled for 21 emerging market countries[6] for the 1998-2004 period and quarterly data are analyzed. The countries included along with the S&P credit rating definitions are provided in appendix 1.

Regression results are depicted in table 2. The explanations for the independent variables in these regression equations are given in appendix 2. Tables 2a through 2c show the results from the regressions of EMBI and S&P[7] credit ratings on the net worth/GDP and net foreign liability/GDP ratios controlling for some macroeconomic variables as well as the global EMBI. To avoid causality problems the lags of the net worth/GDP and the net foreign liability/GDP ratios are used as instruments.[8]

Overall the main finding points to a positive relationship between foreign currency leverage and foreign interest rates. This observation is robust to different dependent variables, different models and different lag lengths.

[6] JP Morgan EMBI covers 31 emerging market countries. Some of these countries were left out due to the unavailability of some control variables on a quarterly basis. This omission does not decrease the power of the EMBI regression very much since bond index data of most of the countries left out are missing.

[7] S&P regression is based on a count data model since the credit ratings are discrete categories.

[8] Augmented Dickey-Fuller tests failed to find a unit root for all the variables in the regression. Hence, all the variables are in levels.

The negative sign of the net worth coefficients and the positive sign of the net foreign liabilities coefficients for the EMBI regressions indicate that as countries rely more on foreign finance given a certain amount of net worth, the spread needed to attract this extra capital increases. This claim is also supported by a model including cross section fixed effects as shown in columns 4 and 5 of table 2a.

Since EMBI is in terms of basis points, the coefficients of net worth and net foreign liability indicate the basis points increase in EMBI in response to a 100 percent increase in the net worth or net foreign liability, GDP ratio. For instance, the value of 298.7 represents the expected increase in EMBI stemming from a 100 percent increase in net foreign liabilities, GDP ratio. Other than the leverage variables, all the control variables have the expected signs and EMBI exhibits high serial correlation.

S&P regression coefficients on the other hand can be interpreted as the probability of switching from one category to another. For example the -0.4 value for the net foreign liability coefficient in table 2b indicates that if net foreign liabilities/GDP ratio doubles holding everything else constant, there is a 40% chance that the credit rating of that country will be downgraded. Once again the positive coefficient on net worth and negative coefficient on net foreign liabilities implies a positive leverage, foreign interest rate relationship. S&P publishes credit ratings based on the ability to pay back domestic currency denominated debt as well as foreign currency denominated debt. Table2c illustrates the results from the regression using domestic currency ratings and finds similar results.

Other than the leverage, foreign interest rate relationship, there are two other salient observations regarding the S&P regression results. First one is that the coefficients of all the independent variables are larger and more significant in the long term[9] which implies that as data becomes more available in the long run, the fundamental variables in the economy have a greater impact on foreign interest rates. Second, the global emerging market bond index which measures the creditors risk perception towards emerging market countries is highly significant. This implies that there is a portfolio effect and that capital flows out of these countries when there is an adverse development in a single country.

[9] Short term ratings are assigned to those obligations considered short term in the relevant market. In U.S. short term obligation has a maturity date less than a year.

3. Estimating the Degree of Hedging in Emerging Markets

In the previous section, I showed evidence supporting the relationship between terms of foreign finance and balance sheets of domestic banks. Despite this relationship if domestic banks sufficiently hedge their foreign currency exposure using off balance sheet items, monetary policy which affects exchange rate volatility would have limited impact on bank balance sheets and foreign interest rates. More specifically the translation exposure[10] of banks would be eliminated and economic exposure would be the only source of risk remaining.

I measure the degree of hedging in emerging markets using two methods. First, I look at stock market data and then the balance sheets of the banking sector, to measure the impact of exchange rate fluctuations on banks' stock returns and returns to bank capital respectively. Latter measure is included to account for the fact that stock prices are being less and less determined by earnings and asset base especially in these economies.

The objective of this paper is to determine the effect of exchange rate regimes on the real sector in emerging markets. In this respect measuring the degree of hedging is essential in assessing the need for central bank foreign exchange market intervention. The basic model used follows Jorion (1990), and is as follows:

$$R_{i,t} - R_{F,t} = \beta_{0,i} + \beta_{1,i}\left(R_{M,t} - R_{F,t}\right) + \beta_{2,i}\Delta ER_t + \varepsilon_t \qquad (1)$$

$R_{i,t}, R_{M,t}, R_{F,t}, \Delta ER_t$ are the returns on the *i*th firm, the market and the risk free rate, and change in the trade weighted exchange rate. In this model coefficient $\beta_{2,t}$ captures the effect of a change in the exchange rate on the market value of the firm controlling for the changes in the market index. I measure the degree of hedging by using banking sector index for $R_{i,t}$ and using non bank market index for $R_{M,t}$. The reason for excluding the banking sector from the market index is to avoid a causality problem.

The advantage of this method is that it accounts for the possibility that while foreign borrowing may be done through a fewer number of banks; the rest of the economy does not have foreign exchange

[10] Refers to the effect of an unanticipated change in exchange rates on the consolidated financial reports of domestic banks.

exposure. Hence, the findings of the commonplace method that associates the proportion of firms that have significant exposure with the degree of hedging might be inaccurate in such countries.

There are two issues pertaining to equation (1) and the analysis in this section. One is that as volume of trade and capital movements increased drastically over the past 20 years, derivative markets and the tools to avoid exchange rate risks have also increased in variety and in volume. Therefore a time series analysis that spans over the past couple of decades has to take account of these changes.

Second problem with measuring foreign exchange exposure by determining the response of firm value to exchange rate fluctuations is that one needs to isolate the effects of monetary policy. For example an expansionary monetary policy which tends to inflate the exchange rate and the market value of the firm at the same time overshadows the detrimental effect of the depreciation on the balance sheet of a bank with positive net foreign liabilities. Including the non-bank market rate of return as an independent variable in equation (1) takes account of this factor together with other macroeconomic changes that affect exchange rates and rates of return simultaneously.

The analysis in this section contributes to the literature on three grounds. One is the emphasis on the exposure of emerging market countries as a whole versus individual banks. Second is measuring exposure in the period following the Asian financial crisis. Third is the utilization of balance sheet data to measure foreign exchange exposure.

3.1 Related Literature

The great majority of the literature on foreign exchange exposure focuses on multinational firms of developed countries. The common finding in most of this literature is that the exposure is insignificant.

Jorion (1990) in his pioneering work studies the exchange rate exposure of 287 US firms for the 1971-1981 period and finds that only 15 of these firms have significant exposure, and that exposure is positively correlated with foreign involvement. A sectoral analysis by Bodnar and Gentry (1993) for Japan, Canada and US reports the insignificance of exposure in many industries but similar to Jorion points to the positive correlation between degree of openness and exposure. Griffin and Stulz (2001)

look at US, Canada, UK, France and Germany to measure the impact of competitive devaluations on the returns to firms and find that these devaluations do not provide an advantage to these firms

The foreign exchange exposure of emerging markets has gathered more attention after the crises in 1990's. The results from the small number of research in this area are mixed. In a paper similar to the analysis in this section, Kho and Stulz (1999) find that the currency crisis in Asia did not cause problems for the banks with large foreign exchange exposure vis-à-vis the market except for Indonesia and Philippines. The analysis conducted in this paper differs from this study by also considering non crisis periods[11]. On the other hand, Dominguez and Tesar (2001) find that Chile and Thailand have significant exposure from 1980 to 1999. Similarly, Parsley and Popper (2002) show that East Asian firms have been exposed to fluctuations in the US dollar, Mark and Yen. Highly relevant to the main theme in my analysis Parsley and Popper study the importance of different exchange regimes for East Asian firm exposure and find that exposure is more wide spread than industrialized economies and the number of firms with significant exposure is larger under pegged regimes compared to non pegged.

Except for the Kho, Stulz paper, all of the above studies identify the degree of exposure in a country with the overall ratio of firms that are exposed. This methodology can be misleading if majority of the foreign currency denominated borrowing in a country is by a small number of firms[12].

3.2 Data, Methodology and Results

The first experiment uses quarterly data of 10 emerging market and 10 developed countries from the IFS database. Sample period is 1998 to 2004. A list of these countries along with the explanation of the variables is provided in appendix 3. Not all the 21 emerging market countries listed in the JP Morgan EMBI index were included due to data unavailability. Income per capita and the concern for a more even distribution of economy size lead to the choice of the developed countries. The equation estimated is as follows,

[11] Kho and Stulz(1999) analysis uses the market index as a control variable. I use the non-bank market index to avoid a possible causality problem.

[12] See Sachs , Schwab and Woo (2000) for a discussion of high bank share of foreign denominated debt for Asian economies.

$$ROR_t = \beta_1 \Delta ER_t + Control Variables + Entity Fixed Effects + Crisis Dummies + \varepsilon_t \quad [13] \tag{2}$$

where ROR_t is the rate of return on bank assets, and is calculated as follows:

$$ROR_t = \frac{(Net Worth - Net Worth(-1))}{Assets(-1)} \tag{3}$$

ΔER_t is the change in exchange rate over the previous quarter. Exchange rate in this setting refers to an equally weighted average of Dollar, Yen and Pound's value in terms of the national currencies[14]. The common consensus in the recent research is that having a weighted average of exchange rates leads to an underestimation of exchange rate exposure. This in turn stacks the odds against finding significant exposure or a significant β_1 coefficient in equation (2).

Country specific effects are controlled by including dummy variables and allowing for groupwise heteroscedasticity[15]. Also included are dummies for the 1994 Mexico, 1997 Asian, 1998 Brazil and 2001 Turkish, Argentina crises.

The control variables along with the results are displayed in table 3a. Growth rate of GDP and inflation is included to control for simultaneous effects of monetary policies on exchange rates and return on assets and other developments that affect the performance of the banking sector. Also included are the banking sector balance sheet variables such as claim on government and private assets, liquidity of the banks measured by the bank reserves, bank assets ratio and the bank net foreign liability/bank assets ratio. The latter ratio is included since a banking sector that is sufficiently hedged in relative terms but has a large open foreign currency position can still be vulnerable to the fluctuations in the exchange rate.

The results show that the banking sectors of the emerging market economies considered have been significantly affected by the fluctuations of the exchange rate. According to the model, a devaluation of 1 percent has lead to a decrease in returns to assets of 0.067 percent. Developed countries over the same sample period were not affected significantly.

[13] I obtained similar results using the lag of exchange rate variable as an instrument.
[14] Due to the unavailability of trade weighted average, equal weights have been used.
[15] The method employed is 2-Step FGLS.

The second experiment conducted uses stock market data from the Global Financial Data (GFD) database and utilizes equation (1) to measure the degree of hedging. Data is monthly and the sample spans 1973 to 2004 for 11 developed and 17 emerging market countries. Equation (1) is rewritten below for convenience,

$$\%\Delta BankingSectorIndex - T\,BillRate = \beta_{0,i} + \beta_{1,i}(\%\Delta non - bankMarketIndex - T\,BillR.) + \beta_{2,i}\Delta WeightedExchangeRate + \varepsilon_t \quad (4)$$

where the change in the aggregate banking sector stock market index is over the previous month, the annual treasury bill rate is converted to a monthly rate and the exchange rate is again an equally weighted average of Dollar, Pound and Yen's domestic currency values.

The results are illustrated in table 3b. Similar to the first experiment emerging market countries tend to be negatively affected from their foreign exchange exposures while the developed countries in general are not. While there were 2 out of 11 developed countries with significant β_2 coefficients, there were 10 out of 17 emerging market countries for the 1973-2004 period. It should also be pointed out that while all of the emerging market countries during this period had negative coefficients implying a reduction in the firm's market value as the result of depreciations, 5 out of the 11 developed countries had positive coefficients.

Another observation is that the detrimental effects of foreign currency exposure was mainly observed after 1994 for both emerging market and developed countries. While S. Africa was the only country with a significant coefficient before 1994, every emerging market country except for Korea had a significant coefficient after 1994. The insignificant coefficients for the US and UK are in line with the previous literature but the significant coefficients for Japan and Canada are different from the previous research. The reason for the difference might stem from the consideration of banking sector as a whole as opposed to considering individual firms.

4. Balance Sheet Effects, Exchange Rate Regimes and the Real Sector

[16] Similar to the previous experiment, I used the lags of the non-bank market index variable and obtained similar results.

The previous sections provided some evidence suggesting that foreign finance costs that an emerging market country faces depends on the strength of its banking sector balance sheets and that these banks are relatively unhedged in terms of their foreign currency exposures.

This section utilizes these findings to analyze the implications of different exchange rate regimes on the real economy that faces external finance shocks within the framework of balance sheet effects.

Different from the existing empirical literature the approach proposed uses the EMBI instead of a weighted average of foreign interest rates as a measure of external finance cost. This approach allows foreign interest rates to be affected by domestic economy variables in addition to their exogenously determined component.

Theory provides two explanations for the relationship between exchange rate regimes and output volatility when the economy is faced with unexpected changes in foreign interest rates or capital flows. The first one pertains to the observation that the monetary authority has to match the change in foreign rates under fixed regimes which exacerbates the effect of the original shock and under flexible regimes part of the necessary adjustment is absorbed by exchange rates which in turn limits output volatility. The second explanation is related to balance sheet effects and implies that flexible regimes may add a source of volatility to the system by affecting the country's net foreign liabilities. More specifically, exchange rate depreciations following external shocks can deteriorate the strength of balance sheets by inflating the domestic currency value of foreign currency liabilities.

The latter explanation has attracted more attention after the increasing number of crises originating from problems in the banking sector and the abrupt outflows of capital in the 90's. Although currency mismatches have been analyzed intensively on theoretical grounds, empirical evidence is scarce.

In this context, this section tries to determine if the balance sheet effects are strong enough to overturn the conventional wisdom or the first explanation. I use three different methods in my analysis. First, quarterly data is employed in a PSVAR model to obtain impulse responses. In this framework, I also use a weighted average of foreign interest rates instead of the EMBI, following the literature, and compare

the results. Finally, I consider the unsystematic volatility in the exchange rates in measuring the response of output under different exchange rate regimes using a SVAR-GARCH method. Second, I use monthly country specific data to compare the performance of different exchange rate regimes. Third, I check the robustness of the results to a different method of measuring impulse responses.

4.1 Related Literature

Recently the consensus in the limited empirical literature studying the effects of exchange rate regimes on real sector variables is that output is more volatile under fixed regimes. The recurring explanation for higher volatility in these papers is the inability of central banks to respond to external shocks.

Similar to the methodology followed in this paper, Hoffman (2003) conducts a PSVAR analysis for the 1973 – 1999 period on emerging market countries to test the performance of different exchange rate regimes using de facto and de jure classification. He identifies structural innovations by assuming that foreign interest rates and foreign output is exogenous to the system and finds that under both classifications flexible regimes outperform pegged regimes in terms of output volatility.

Using a different approach Hochreiter, Korinek and Siklos (2003) study the performance of different Taylor rules for Austria, Netherlands, Canada and New Zealand to determine if joining a monetary union is or was the appropriate choice. The authors argue that using a Taylor rule that is exogenous to the system of equations does not violate the Lucas Critique since the imposition of a Taylor rule incorporating a fixed exchange rate regime implies that, other structural shocks hit the economy to sustain the policy rule.

I do not use this identification scheme due to data limitations and instead separate countries in terms of their exchange rate volatility in to two groups and compare the impulse responses of these two groups as explained in detail below. Bergvall (2005) similarly finds evidence for greater output volatility under fixed regimes for Sweden is faced with fiscal and monetary policy shock. The author uses a small open economy model for identification purposes. The foreign interest rate is exogenous.

Using a regression analysis LevyYeyati-Sturzenegger (2003) find that under fixed exchange rate regimes, output volatility is higher and output growth is lower. The authors capture the effect of the regimes by adding dummy variables and using a de facto classification for the exchange rate regime.

Irresponsive of these findings pointing to higher output volatility with flexible regimes developing countries limit their exchange rate movements. Calvo and Reinhart's research (2000) which analyzes 154 exchange rate arrangements has shown that countries that announce a floating regime do not de facto float their currency. The approach in this section again allows foreign interest rates to be endogenously determined and offers a possible explanation for the fear of floating.

4.2 Data

There are two limitations encountered in the data set for emerging market economies. First, EMBI data for these countries was only available after 1998 and is unbalanced. Second, real sector data for some of the countries is only available annually. I employ two methods taking into account these limitations. First, I use a PSVAR model using a data set comprised of quarterly observations between 1998 and 2004 for the 13 emerging market countries listed in appendix 4. The reason for using a panel model is again the unavailability of long time series.

Next, motivated by the findings in part 2 that there is a positive relationship between net foreign liabilities of the domestic banks and the external finance cost of countries, net foreign liabilities is utilized as a proxy for EMBI. This convention allows me to use a longer time series and perform country specific analysis. In this respect, I use monthly data from 1980 to 2004 for the countries listed in appendix 4 in a SVAR model.

4.3 Methodology and Results

4.3.1 PSVAR

4.3.1.1 PSVAR with EMBI

The first experiment uses a de facto classification to determine the countries that have followed a relatively tight and a flexible exchange rate policy during the time period 1998 to 2004. Appendix 4 lists

the countries in the two groups. Data corresponding to the crisis periods of Russia, Brazil, Turkey and Argentina are excluded from the analysis for these countries.

I construct a PSVAR for the two groups of countries and obtain impulse responses to foreign interest rate shocks. I assume that the economy is described by the following structural form equation,

$$\Phi(L)y_t = u_t \tag{5}$$

$\Phi(L)$ is a matrix polynomial in the lag operator L, u_t are serially uncorrelated structural disturbances and $\text{var}(u_t) = \Omega_t$. The structural form parameters are recovered from the reduced form equation,

$$y_t = \Psi(L)y_t + country\ fixed\ effects + e_t \tag{6}$$

where $\Psi(L)$ is a matrix polynomial in the lag operator L and $\text{var}(e_t) = \Sigma_t$. Different from the usual reduced from estimation country fixed effects are also included to control for omitted variables that change across entities. Reduced form variance covariance matrix Σ_t can be decomposed as follows,

$$\Sigma_t = A_0^{-1}\Omega A_0^{-1'} \tag{7}$$

where reduced form and structural form disturbances are related by,

$$u_t = A_0 e_t \tag{8}$$

Finding A_0 allows us to obtain impulse response functions from the following moving average representation,

$$y_t = A_0 u_t + A_1 u_{t-1} + A_2 u_{t-2} + ... \tag{9}$$

where $A_j \ \ j = 1\ to\ \infty$ represents the impulse response functions and can be found using the A_0 matrix and reduced form coefficients.

To identify the structural disturbances n x (n-1)/2 restrictions have to be imposed on the A_0 matrix. The two commonly used methods are imposing short run restrictions on the contemporaneous relationship matrix and using Blanchard Quah (1989) procedure to impose long run restrictions.

In the model employed, the data vector y is {GDP, CPI, E, EMBI, R}[17], where E is the weighted exchange rate, and R is the domestic quarterly lending rate and EMBI is used as a proxy for foreign interest rates. All the variables except the interest rate are log differenced due to the existence of unit roots.

For identification, I use Blanchard Quah long run restrictions since it is reasonable to assume that the variables in the system respond to disturbances in other variables within a quarter. More specifically, I restrict the matrix of long run responses to be lower triangular and thereby assume that GDP growth is not affected by the other variables, and monetary disturbances do not affect inflation, EMBI and the exchange rate in the long run. Hence the elements of the A_0 matrix can be recovered from the following restrictions.

$$\sum_{i=0}^{\infty} A_i(1,j)=0 \quad for\ j=2\ to\ 5\text{,}\quad \sum_{i=0}^{\infty} A_i(2,j)=0 \quad for\ j=3\ to\ 5\text{,}\quad \sum_{i=0}^{\infty} A_i(3,j)=0 \quad for\ j=4\ to\ 5\text{,}\quad \sum_{i=0}^{\infty} A_i(4,j)=0 \quad for\ j=5\ to\ 5$$

The responses to a 1 standard deviation shock in EMBI are displayed in figure 2a. There are three important observations. First, contrary to the literature, the impulse responses point to higher output volatility under flexible regimes. Second, under fixed regimes central banks have not responded as aggressively as they have under flexible regimes. Finally, the response of EMBI under flexible regimes is much higher than with fixed regimes. These findings point to the significance of the destabilizing affect of foreign creditor perception towards a country and to the fact that more controlled regimes were better equipped with sustaining external shocks after 1998 in emerging market countries.

4.3.1.2 PSVAR with Foreign Interest Rates

This section uses an equally weighted average of the lending rates of U.S., U.K. and Japan instead of the EMBI in the PSVAR model outlined above. The results are illustrated on figure 2b and point to the lack of evidence in favor of either of the two exchange rate regimes in terms of output volatility. More

[17] The results were mostly robust to the different orderings I tried.

specifically change in output and interest rates in response to foreign interest rate shocks are much smaller compared to the responses in the model including EMBI[18].

This result, together with the findings in part 2 implies that the domestic economy is more sensitive to external shocks that are in turn related to fundamental variables of the economy than shocks involving developments in advanced countries.

4.3.1.3 SVAR-GARCH

To measure the impact of exchange rate uncertainty on the economy under different regimes, I identify the unsystematic component of the exchange rate using the PSVAR model explained above. Next, I fit a GARCH(1,1) model to exchange rate volatility to obtain the conditional standard deviation series as

$$\sigma_t^2 = \beta_0 + \beta_1\left(\varepsilon_{t-1}^{us}\right)^2 + \beta_2\sigma_{t-1}^2 + \nu_t \qquad (10)$$

ε_{t-1}^{us} is the Cholesky orthogonalized exchange rate shock and σ_t^2 is the unconditional exchange rate variance. Finally, I include the conditional standard deviation of the exchange rate $\hat{\sigma}_t$ obtained from the estimation of (10) in the PSVAR model such that the data vector y includes { $\hat{\sigma}_t$,GDP,CPI, E,EMBI, R}.

The impulse responses are displayed in figure 2c. Results show that with flexible regimes, responses are larger in amplitude compared with the PSVAR model above, and that under fixed regimes the drop in output is mitigated. This observation implies that with greater uncertainty, risk premiums associated with exchange rates are more sensitive to external shocks and that these uncertainties are greater with more flexible regimes.

4.3.2 Country Specific Analysis (Monthly Data)

Although country fixed effects are included in the previous section, panel model results can still be driven by few countries. In this part, I analyze different exchange rate regimes for different countries by separating periods with low and high exchange rate volatility, and fitting a VAR model to each period to obtain impulse responses to foreign interest rate shocks.

[18] These results are not sensitive to different weighting schemes. Weights favoring U.S., U.K. and Japan interest rates and weights based on the proximity of the emerging market economies to these countries have yielded similar results.

Figure 3 shows the percent change in exchange rates over the last month for 11 emerging market countries. For Colombia, Korea, Peru, Malaysia and Mexico the shifts in exchange rate volatility are evident while for the other countries they are not as clear.

The variables employed are the same as in the previous section except for EMBI and GDP. The measure for foreign interest rates EMBI is only available for the 1998-2004 period. The length of this period is insufficient to execute a country specific analysis hence I utilize Net Foreign Liabilities / Assets ratio of deposit banks as a proxy for foreign interest rates based on the findings in section 2 that there is positive relationship between these two variables.

Instead of GDP, I use the monthly industrial production index. Number of observations under fixed exchange rate periods is adjusted to be close to that under flexible regimes to attain a similar degree of efficiency under the two estimations. Finally, exchange rate fluctuations that are 3 standard deviations higher or lower than the mean fluctuation are excluded from the analysis to avoid a bias against flexible regimes. Hence, crises periods stemming from or resulting in large depreciations are excluded.

Due to these adjustments and data unavailability, the analysis is limited to the 1980:01 - 2004:12 period, and the country set is reduced to, {Brazil, Chile, Colombia, Korea, Mexico, Malaysia}.

For identification, cholesky decomposition is utilized with the following ordering {Output, CPI, NFLDB, R, E}, where output denotes industrial production, NFLDB is net foreign liabilities to assets ratio of the deposit banks and every variable is log differenced except for interest rates and NFLDB. This ordering is consistent with Kim and Roubini (2000) and implies that output and CPI are not affected contemporaneously by the shocks to the other variables in the system and that exchange rates respond within the same period to shocks to every other variable.

Results are displayed in figures 4 and 5. There are four important observations. First, the impulse responses are qualitatively similar to the responses from the panel model. Second, contrary to common wisdom the change in output is lower under fixed regimes except for Mexico. Third, central banks respond more aggressively to foreign interest rate shocks under flexible regimes. Finally, foreign

creditor perception of country risk reflected in NFLDB increases by a greater amount under flexible regimes in response to a shock to itself except for Mexico and Brazil.

These results again imply that as currencies depreciate in response to foreign interest rate shocks foreign interest rates increase further due to a deterioration of foreign creditors' perception. Hence, central banks adjust interest rates further due to this effect and the decline in output is exacerbated and these effects are greater in amplitude under flexible regimes.

The results imply that as the currency depreciates, emerging market banks with foreign currency open positions face deteriorating balance sheets and foreign creditors adjust their interest rates or there is a capital outflow which in turn forces central banks to adjust interest rates and depress economic activity.

4.3.3 Local Projections (Monthly Panel Data)

Structural VAR methods have been put under scrutiny by recent research. According to this literature two of the important short comings of these methods are that the misspecifications of VARs are large enough that they can lead to mistaken inferences and VARs which are designed to execute one period ahead forecasts, are subject to compounding misspecification errors with the forecast horizon. The latter shortcoming poses a problem for impulse responses which are functions of forecasts at distant horizons.

In this respect, Chari, Kehoe and McGrattan (2005) show that impulse responses using artificial data from a simple RBC model contradict the responses from the model itself. The authors argue that this misspecification stems from the inability of specifications involving few lags to capture the persistence in model data that come from the low rate of depreciation of capital.

Jorda (2004), proposes an alternative method for calculating impulse responses that is robust to the misspecification of the data generating process and uses projections local to each forecast horizon. More specifically, the following equation is estimated for each forecast horizon to obtain impulse responses,

$$y_{t+s} = \alpha^s + \beta_1^{s+1} y_{t-1} + \beta_2^{s+1} y_{t-2} + \ldots\ldots + \beta_p^{s+1} y_{t-p} + u_{t+s}^s \qquad s = 0,1,2,\ldots\ldots h \tag{11}$$

where h denotes the maximum forecast horizon, y is {Output, CPI, EMBI, R, E} and output denotes industrial production. Optimal p is determined at each horizon using the Akaike Information Criterion.

The impulse responses corresponding to equation (10) are calculated from,

$$IR(t,s,d_i) = \hat{\beta}_1 d_i \qquad s = 0,1,2,.....,h \tag{12}$$

where d_i represents the structural shock to the ith element in y and corresponds to the ith column of the D matrix obtained from the cholesky decomposition of the variance covariance matrix of the reduced form, Ω as follows:

$$\Omega = PP' \quad and \quad D = P^{-1}$$

In this section, I use monthly panel data from the 1998-2004 period to obtain impulse responses via local projections. The reasons for using this period and estimating a panel model are to avoid using a proxy for the EMBI variable and insufficient data respectively. I seperate the countries in the data set into two groups similar to the strategy followed in section 4.3.1. The countries which had relatively fixed and flexible regimes within the period are tabulated in appendix 4.

The results are displayed in figure 6, and are consistent with the representations in the previous two sections. In this respect, I observe a larger hike in interest rates and EMBI, and a higher drop in industrial production under flexible regimes in response to a positive foreign interest rate shock.

5. Conclusion

Current empirical and theoretical literature emphasizes the advantage of flexible regimes over fixed regimes in terms of output stability when a small open economy faces external shocks. This advantage stems from the involuntary adjustment of domestic interest rates that exacerbate the effect of the shock under fixed regimes.

This paper finds evidence that supports a relationship between bank leverage and foreign interest rates in emerging markets, and hence provides a case against the exogenous foreign interest rate assumption under small open economy models.

VAR methods show how the conclusions of the literature can be reversed when I allow for this contemporaneous relationship between foreign interest rates and bank balance sheets. More specifically, exchange rate regimes that limit the effect of external shocks on bank balance sheets and hence on

foreign interest rates are better coped with limiting output volatility in markets that are not hedged in terms of foreign currency.

This analysis can be extended by including the endogenous relationship between foreign interest rates and bank balance sheets in a theoretical model and comparing the results with exogenous foreign interest rates case. In this respect it would be interesting to check the robustness of the identification scheme in this paper by using the cross equation restrictions from such a model obtained by maximum likelihood or Bayesian methods.

Finally except for the Chang and Velasco type models, empirical and theoretical literature on maturity mismatches and the implications for monetary policy in emerging markets is very scarce at this point. I find this surprising since maturity mismatches have played a crucial role in currency crises together with currency mismatches.

Appendix 1:

Countries: Argentina, Brazil, Bulgaria, Colombia, Ecuador, Egypt, Korea, Malaysia, Mexico, Morocco, Nigeria, Panama, Peru, Philippines, Poland, Qatar, Russia, S. Africa, Turkey, Ukraine, Venezuela

Credit Rating Definitions:

The following definitions are the same for foreign currency and domestic currency credit ratings:

Log Term Issuer Credit Ratings:

The following ratings also have plus or minus signs to show the relative standing within the major categories. Together with the plus and minus definitions there are 29 categories.

AAA: The obligor has **extremely strong** capacity its meet their financial commitments.

AA: The obligor has very **strong capacity** its meet their financial commitments.

A: The obligor has **strong capacity** its meet their financial commitments.

BBB: The obligor has **adequate capacity** its meet their financial commitments.

BB: The obligor is **less vulnerable** in the near term than other lower rated obligors. However it faces major ongoing uncertainties and exposure to adverse business that could lead to an inadequate capacity to meet it's commitments.

B: The obligor is **more vulnerable** in the obligors rated BB, but the obligor has the capacity to meet its financial commitments. Ongoing uncertainties and exposure to adverse business will likely impair the obligor's capacity or willingness to meet its financial commitments.

CCC: The obligor is **currently vulnerable** and is dependent upon favorable business, financial or economic conditions to meet its financial commitments.

CC: The obligor is **currently highly vulnerable.**

D, SD: Default

Short Term Ratings:

The following show the obligor's capacity to meet its financial commitments. There a total of 8 categories.

A-1+: Extremely Strong

A-1: Strong

A-2: Satisfactory. Obligor is more susceptible to adverse effects.

A-3: Adequate. Adverse effects will most likely lead to weakened capacity.

B: Vulnerable. There are major ongoing uncertainties.

C: Currently Vulnerable. Meeting commitments depend on favorable economic conditions.

D, SD: Default

Appendix 2:

Inflation(*): Annual change in CPI.

Reserves(*): Central Bank foreign currency and gold reserves.

Global Emerging Market Bond Index: Weighted average spread of all the emerging market country bond indices also reported by JP Morgan.

Current Account/GDP(*):Current Account Deficit is originally in dollars. This variable is converted to local currency and then divided by GDP.

Budget Deficit/GDP(*): Consolidated budget deficit divided by GDP.

Net Foreign Liabilities(*): Foreign liabilities net of foreign assets for domestic deposit banks.

Net Worth (*): Capital Accounts(**) of domestic deposit banks.

(*) Source IFS

(**) Total assets minus total liabilities.

Appendix 3:

Emerging Market Countries: Argentina, Brazil, Bulgaria, Korea, Malaysia, Mexico, Philippines, Poland, S.Africa, Turkey

Developed Countries: Australia, Cyprus, Denmark, Iceland, Israel, Japan, Singapore, Sweden, UK, US

Variables:

Net Worth: Referred to as Capital Accounts in IFS. If not available, equals Bank Assets-Bank Liabilities.

Banking Sector Control Variables

Banking Sector Claim on Gov. Assets: Claims on the central government and other levels of government including the social security system.

Claim on Private Assets: Comprised mostly of domestic credit

Net Foreign Liability/Assets: Measures foreign currency open position: (Foreign Liabilities - Foreign Assets)/Assets.

Liquidity: Bank Reserves/Assets

Macroeconomic Control Variables

GDP Growth: Change in real GDP, Base year: 2000

Inflation: Quarterly change in the CPI index.

Dependent Variable

Rate of Return on Bank Assets: $\frac{(NetWorth - NetWorth(-1))}{Assets(-1)}$

Period: 1998:1 to 2004:4

Source: IFS

Appendix 4:

Quarterly Panel Countries: **Period:** 1998:1 – 2004:2 Quarterly

		Standard Deviation(E-R) / Average(E-R)
Relatively Fixed E-R		
	Ukraine	1.44
	South Africa	1.48
	Ecuador	1.80
	Colombia	1.82
	Russia	2.50
	Brazil	2.81
	Philippines	2.87
Relatively Flexible E-R		
	Poland	2.90
	Mexico	3.28
	Argentina	3.96
	Turkey	8.47
	Bulgaria	9.04
	Malaysia	9.38

Local Projections Monthly Panel Model Countries:
Period: 1998:1 - 2004:12 Monthly

		Standard Deviation(E-R) / Average(E-R)
Relatively Fixed E-R		
	Brazil	0.086556
	Bulgaria	0.02376
	Colombia	0.085313
	Philippines	0.060625
	Turkey	0.078727
Relatively Flexible E-R		
	Korea	0.312762
	Malaysia	0.120951
	Mexico	0.219923
	Peru	0.134252
	Poland	0.524909

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Figure 1: Foreign Liabilities / Total Assets:

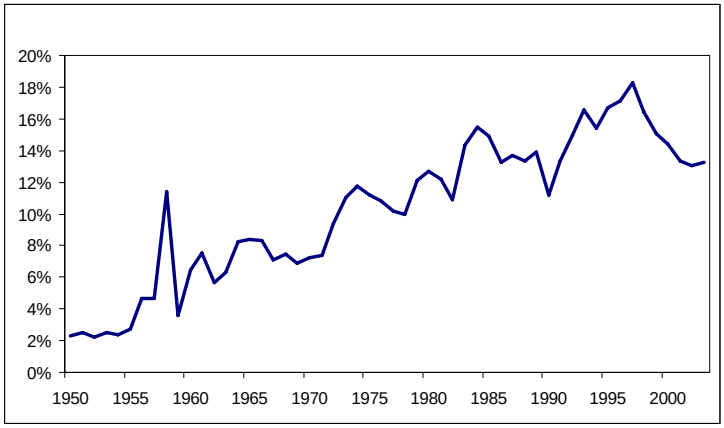

Figure 2a: Panel Model Response to a Foreign Interest Rate Shock (EMBI, Quarterly Data)

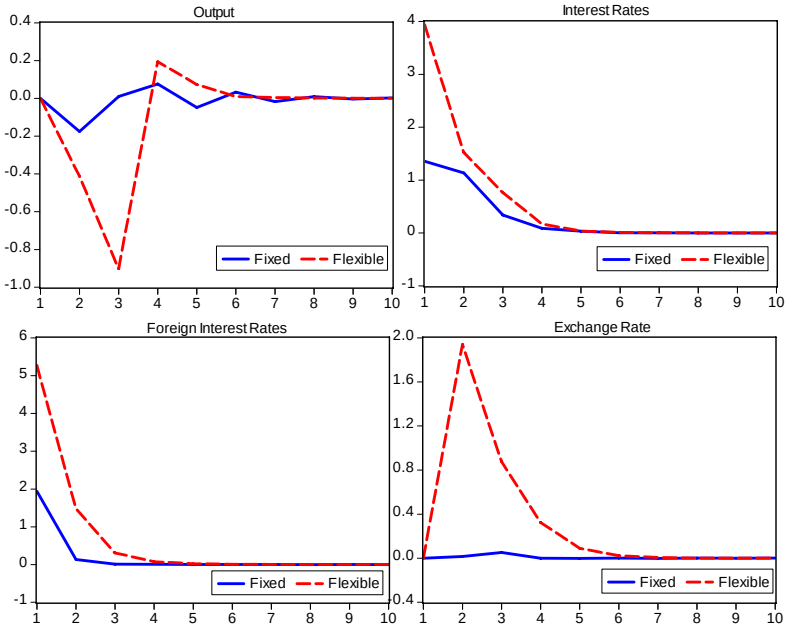

Figure 2b: Response to a Foreign Interest Rate Shock (Developed Country Lending Rates)

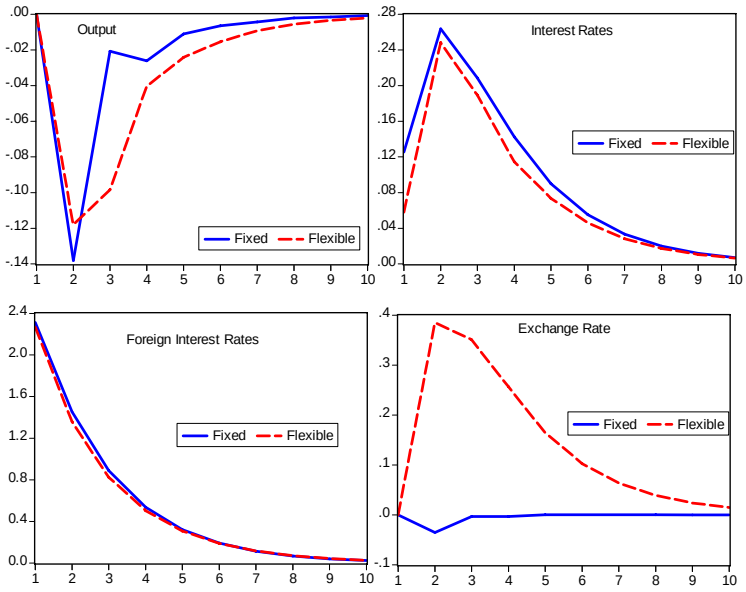

Figure 2c: Panel Response to a Foreign Interest Rate Shock (SVAR-GARCH, Quarterly Data)

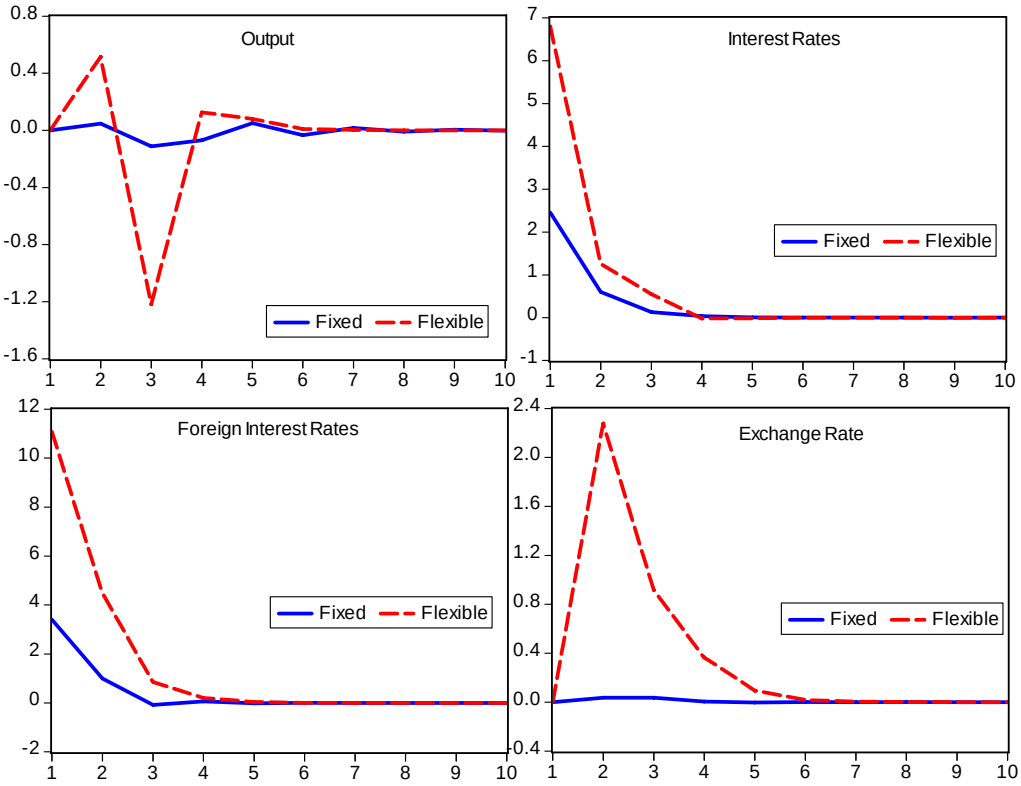

Figure 3: % Change in Exchange Rates

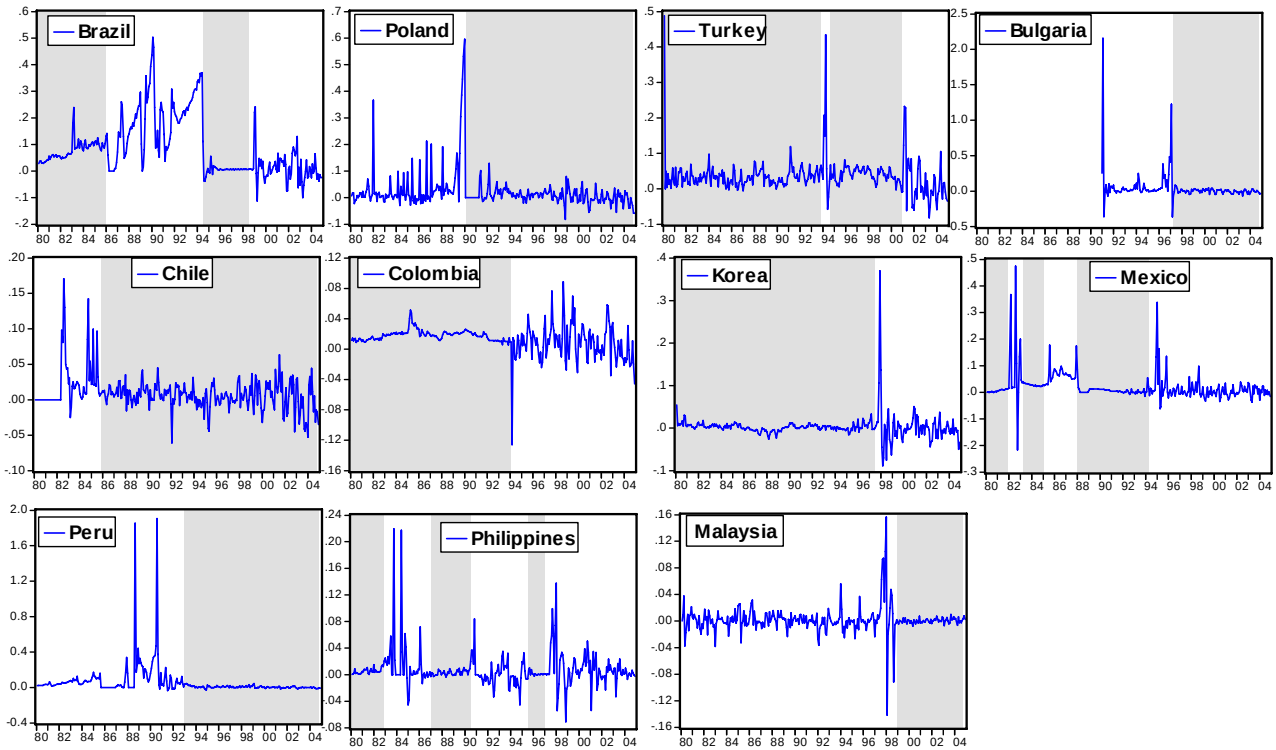

Figure 4: Impulse Responses to a 1% Positive Shock to Net Foreign Liabilities (Monthly Data)

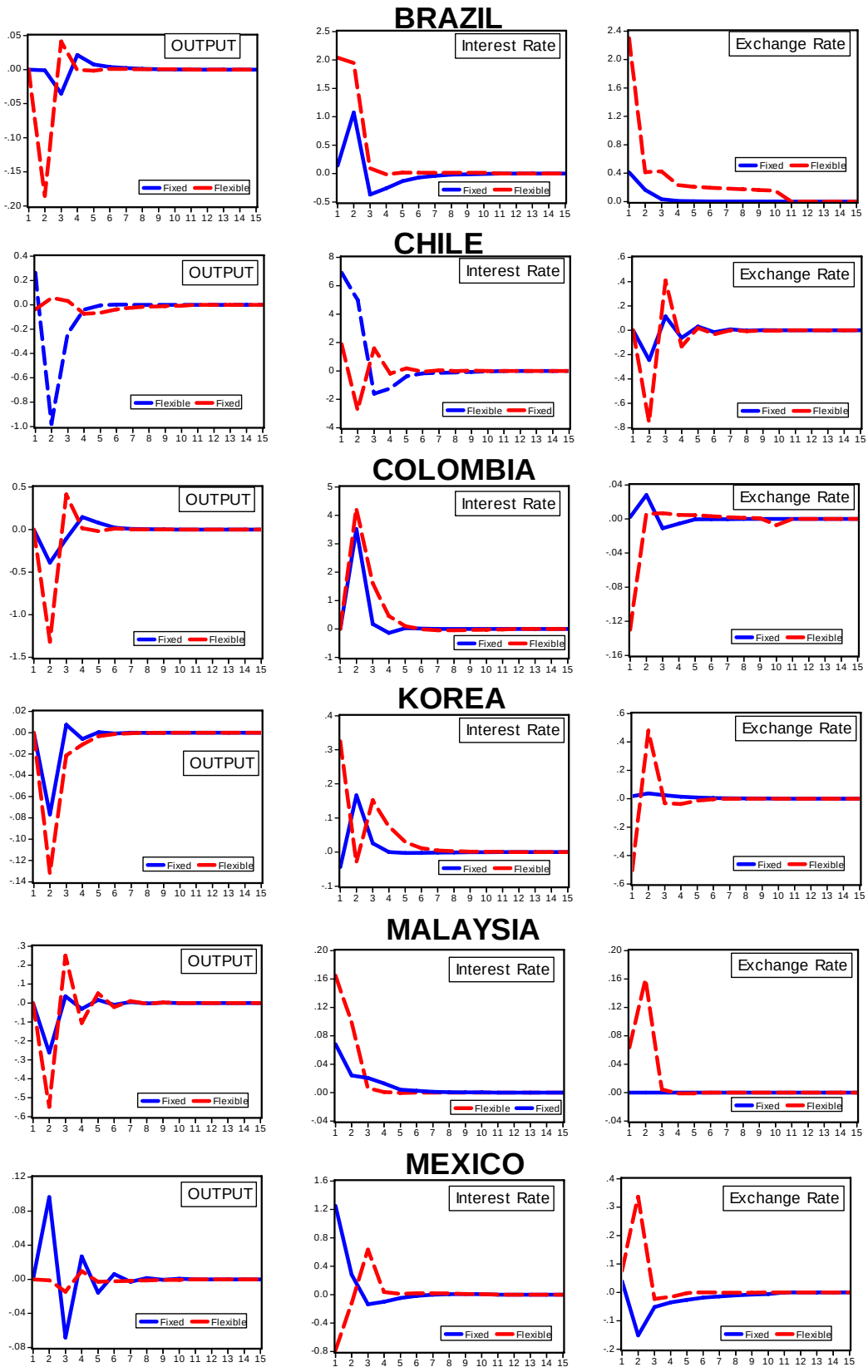

Figure 5: Response of Foreign Liabilities to a Foreign Liability Shock (Monthly Data)

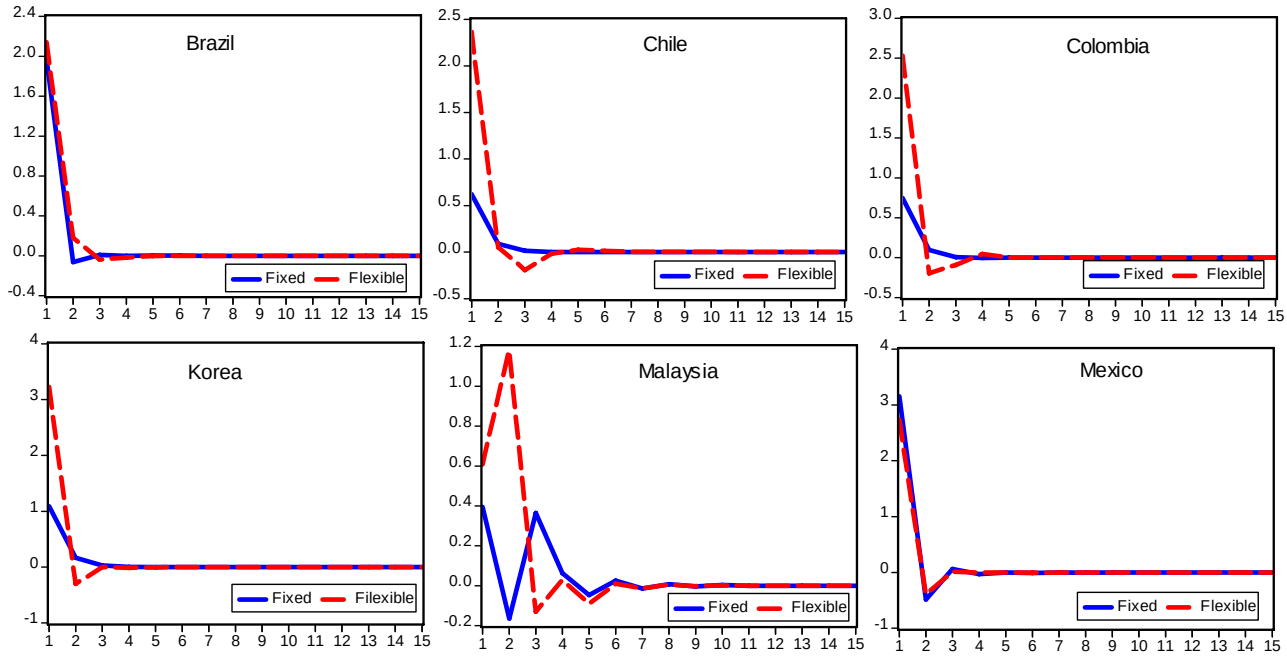

Figure 6: Local Projections Impulse Responses to a Foreign Interest Rate Shock (Monthly Data)

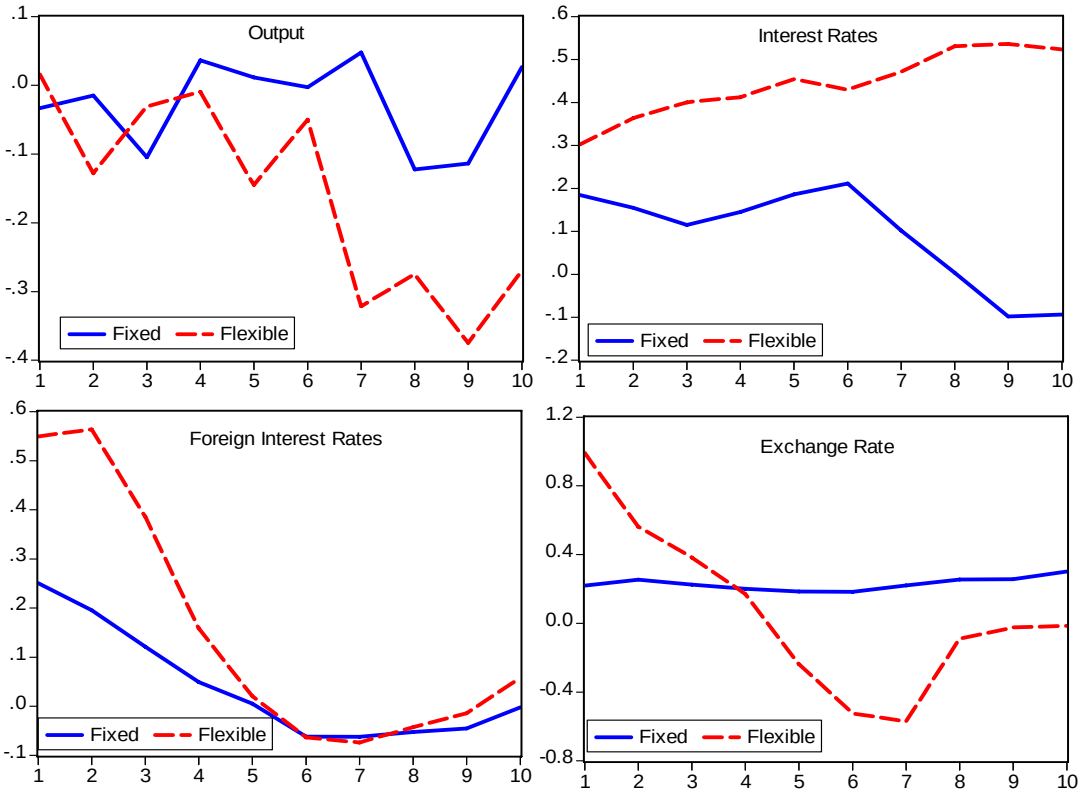

Table1 *

		%Change in Exchange Rate	Leverage	GDP Growth
Asian Crisis	Indonesia	29.4	31.1	-3.4
	Korea	23.3	9.4	-8.3
	Malaysia	12.4	61.9	-4.5
	Philippines	14.6	-10.7	0.1
	Singapore	4.2	23.1	-1.2
	Thailand	25.8	136.3	-9.6
	Vietnam	5.8	-92.7	7.3
1994 Peso Crisis	Argentina	0.0	40.0	-3.0
	Chile	-5.6	48.8	10.3
	Ecuador	16.7	37.7	-11.5
	Mexico	89.9	-30.7	-4.2
	Panama	0.0	-134.0	1.2
	Peru	2.3	-23.3	10.3
	Uruguay	26.0	-412.6	3.0
1998 Russian Default plus Brazil abandoning the band	Argentina	0.0	37.6	-4.0
	Chile	10.5	12.6	-1.6
	Colombia	23.2	42.9	-2.7
	Mexico	4.6	-155.1	2.4
	Panama	0.0	-101.4	3.5
	Peru	15.4	7.3	1.3
	Russia	153.6	26.5	-12.1
	Uruguay	8.3	-283.0	3.2
2001 Turkey	Turkey	96.0	41.1	-7.2
2002 Argentina	Argentina	206.0	122.1	-7.6

* % changes are over the year before and after the crisis

Table 2a: EMBI and Leverage

	EMBI [(1)]		EMBI (Fixed Effects)	
	Coefficients	**t-stat**	**Coefficients**	**t-stat**
Control Variables				
Inflation	14.46	4.1	12.57	3.4
CB Reserves	-31.38	-3.0	-7.64	-1.9
Global EMBI	0.13	2.6	0.15	1.6
EMBI(-1)	0.94	22.3	0.91	20.8
EMBI(-2)	-0.52	-6.3	-0.52	-6.1
EMBI(-3)	0.26	4.4	0.24	3.7
Current Account/GDP	909.7	2.3	731.9	1.7
Budget Deficit/GDP	305.4	1.3	331.7	1.0
Leverage				
Net Foreign Liabilities/GDP(-1)	**298.7**	2.3	**490.2**	1.9
Net Worth/GDP (-1)	**-129.8**	-1.8	**-521.6**	-2.0
Adjusted R-squared	0.9371		0.9370	
Total Observations	298		299	

(1) Cross Section weights are used in the variance covariance matrix

Table 2b: S&P Foreign Currency Credit Rating[(1)]

	Short Term		Long Term	
	Coefficient	**t-stat**	**Coefficient**	**t-stat**
Control Variables				
Inflation	0.01	1.0	0.0157	3.97
CB Reserves	0.0001	0.8	0.0157	1.72
Global EMBI	0.0012	12.8	0.0023	45.11
SP(-1)	-0.0003	-2.0	-0.0005	-5.91
SP(-2)	-0.0001	-0.4	-0.0002	-2.21
SP(-3)	0.0002	1.5	0.0005	6.39
Current Account/GDP	-0.8435	-1.1	-1.2727	-3.03
Budget Deficit/GDP	-0.1	-0.3	-0.2252	-0.88
Leverage				
Net Foreign Liabilities/GDP (-1)	**-0.40**	-1.70	**-0.45**	-3.72
Net Worth/GDP (-1)	**0.45**	3.36	**1.00**	13.86
Adjusted R-squared				
Total Observations	287		287	

(1) Count Data Model is employed

Table 2c:S&P Domestic Currency Credit Rating[(1)]

	Short Term		Long Term	
	Coefficient	**t-stat**	**Coefficient**	**t-stat**
Control Variables				
Inflation	0.00	0.1	0.0142	3.18
CB Reserves	0.0121	0.7	0.0230	2.65
Global EMBI	0.0015	15.4	0.0024	48.10
SP(-1)	-0.0004	-2.5	-0.0005	-5.45
SP(-2)	0.0001	0.5	-0.0001	-1.13
SP(-3)	0.0001	0.6	0.0005	5.82
Current Account/GDP	-0.3285	-0.3	-1.0190	-2.45
Budget Deficit/GDP	0.0	0.0	-0.0299	-0.12
Leverage				
Net Foreign Liabilities/GDP (-1)	**-0.47**	-2.00	**-0.33**	-2.84
Net Worth/GDP (-1)	**0.64**	4.05	**1.03**	14.72
Adjusted R-squared				
Total Observations	251		268	

(1) Count Data Model is employed

Table 3a: Relationship Between Exchange Rate Movements and Rate of Return on Bank Assets

Dependent Variable: Rate of Return on Bank Assets, Method: Fixed Effects, 2-Step FGLS Regression						
	Emerging Markets			**Developed**		
	Coefficient	t-stat	p-value	Coefficient	t-stat	p-value
Control Variables						
Inflation	0.0003	17.17	0.000	0.0002	0.40	0.692
Inflation(-1)	-0.0004	-10.63	0.000	0.0001	0.12	0.907
GDP Growth(-1)	0.0003	8.68	0.000	0.0003	1.01	0.312
Liquidity	-0.1745	-1.91	0.057	-0.3190	-1.62	0.106
Liquidity(-1)	0.1708	1.99	0.048	0.3541	1.75	0.081
Banks' Claim on Government Assets	-0.0099	-0.27	0.786	-0.0095	-1.16	0.246
Banks' Claim on Private Assets	0.0005	1.68	0.094	0.0001	0.88	0.378
Bank Net Foreign Liabilities / Assets	-0.0067	-0.20	0.842	0.0035	0.45	0.651
AR(1)	-0.0118	-0.18	0.854	-0.1395	-2.45	0.015
AR(2)	-0.0995	-2.00	0.047	-0.1558	-3.17	0.002
Change in Exchange Rate	**-0.0671**	**-6.28**	**0.000**	**0.0029**	**0.19**	**0.847**
Number of Observations		460			406	
Adjusted R_Squared		0.59			0.10	

Table 3b:Foreign Exchange Exposure: Evidence From Stock Returns(*)

	1973 --- 2004			**1973 --- 1994**			**1994 --- 2004**		
	Coeff.	t-stat	p-value	Coeff.	t-stat	p-value	Coeff.	t-stat	p-value
Developed									
Australia	-0.21	-0.96	0.34	-0.22	-1.43	0.15	-0.32	-2.07	0.04
Canada	-0.27	-1.59	0.11	-0.33	-1.18	0.24	-0.52	-2.72	0.01
Cyprus	0.00	0.00	1.00						
Denmark	-0.17	0.25	0.49						
Iceland	0.23	1.09	0.28						
Israel	-0.15	-1.48	0.14	-0.22	-1.19	0.24	-0.39	-2.65	0.01
Japan	-0.58	-3.03	0.00	-0.41	-0.94	0.35	-0.57	-2.93	0.00
Singapore	-1.47	-5.14	0.00	-0.11	-0.47	0.64	-2.28	-4.87	0.00
Sweden	0.08	0.54	0.59	0.08	0.57	0.57	0.00	0.01	0.99
UK	0.10	0.97	0.33	-0.02	-0.23	0.82	0.15	0.89	0.38
US	0.21	1.00	0.32	-0.01	-0.23	0.82	0.22	1.01	0.32
Emerging Markets									
Chile	-0.37	-1.34	0.19						
China	-0.35	-1.67	0.10						
Ecuador	-0.36	0.42	0.39						
Egypt	0.00	-0.03	0.98						
Indonesia	-0.16	-2.86	0.00	-0.57	-0.26	0.80	-0.16	-3.73	0.00
Korea	-0.35	-1.98	0.05	-0.43	-1.12	0.27	-0.34	-1.62	0.11
Malaysia	-0.47	-4.61	0.00	0.33	1.39	0.16	-0.58	-5.64	0.00
Mexico	-0.07	-1.49	0.14						
Morocco	-0.21	-1.73	0.09	0.04	0.59	0.55	-0.49	-1.86	0.07
Peru	-1.34	-0.63	0.53	-1.53	-0.29	0.77	-0.20	-5.94	0.00
Phillipines	-0.81	-5.10	0.00						
Poland	-0.16	-0.89	0.38						
Russia	-0.25	-1.79	0.08						
S.Africa	-0.35	-4.15	0.00	-0.27	-2.16	0.03	-0.48	-4.26	0.00
Thailand	-0.23	-2.10	0.04	0.10	0.68	0.50	-0.26	-1.71	0.09
Turkey	-0.25	-2.00	0.05						
Venezuela	-0.05	-1.50	0.14	-0.01	-0.41	0.68	-0.12	-1.95	0.05
Ratio of Developed Countries with a significant coefficient(**)		2/11			0/8				5/8
Ratio of Emerg. Mar. Countries with a significant coeff.(**)		10/17			1/8				7/8

(*)Source: Global Financial Data and IFS (**) Significant with 10% confidence