THE ROLE OF INTEREST RATES IN BUSINESS CYCLE FLUCTUATIONS IN EMERGING COUNTRIES: THE CASE OF THAILAND

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Emerging economies have enjoyed an exceptionally favourable economic and financing environment throughout 2004 and 2005, supported by solid global growth, low interest rates and suppressed credit spreads. The easy-money policy of the United States of America in recent years has spread worldwide, creating an environment of low interest rates in international markets. If global interest rates were to take a sudden course upward, this would increase the cost of borrowing for emerging economies and lead to less hospitable financing conditions for emerging markets. The purpose of this paper is to measure the effect of shocks on global interest rates on real activity in Thailand. The analysis employs the Global Economy Model developed by the Research Department of the International Monetary Fund and finds that it would be best for Thailand to minimize the effects of rising global interest rates if it were to follow a flexible exchange rate policy.

I. INTRODUCTION

Emerging market countries have enjoyed an exceptionally favourable economic environment throughout 2004 and 2005. Solid global growth, a broadening investor base and soaring asset prices buoyed by abundant global liquidity have dramatically suppressed credit spreads. Moreover, an accommodative United States monetary policy in recent years has helped create an environment of low interest rates in international capital markets. However, if global interest rates were to take a sudden upward course, this would increase the cost of borrowing for emerging market countries and lead to less hospitable financing conditions for them.

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The purpose of this paper is to measure the effects of global interest rate shocks on real activity in Thailand. The paper also investigates how three different exchange rate regimes – flexible, managed float and fixed – would affect key macroeconomic variables in Thailand under shock conditions. The methodology of this paper involves conducting simulation experiments of alternative policy scenarios, using the Global Economy Model developed recently by the International Monetary Fund Research Department.

Of course, Thailand is not the only emerging market country that would be affected by higher United States interest rates. Our analysis could certainly be applied to a wider pool of emerging market countries, not only in the Asian and Pacific region but also throughout the world. Thailand provides an excellent case study of the subject at hand mainly because, in the Asian and Pacific region, Thailand was the first country that initiated a tightening cycle in August 2004; therefore, the issue how this policy action would affect the domestic economy arose first in Thailand. The paper finds that it would be best for Thailand to minimize the adverse effects of rising global interest rates by implementing a flexible exchange rate regime. The paper also discusses the conclusion in a regional context.
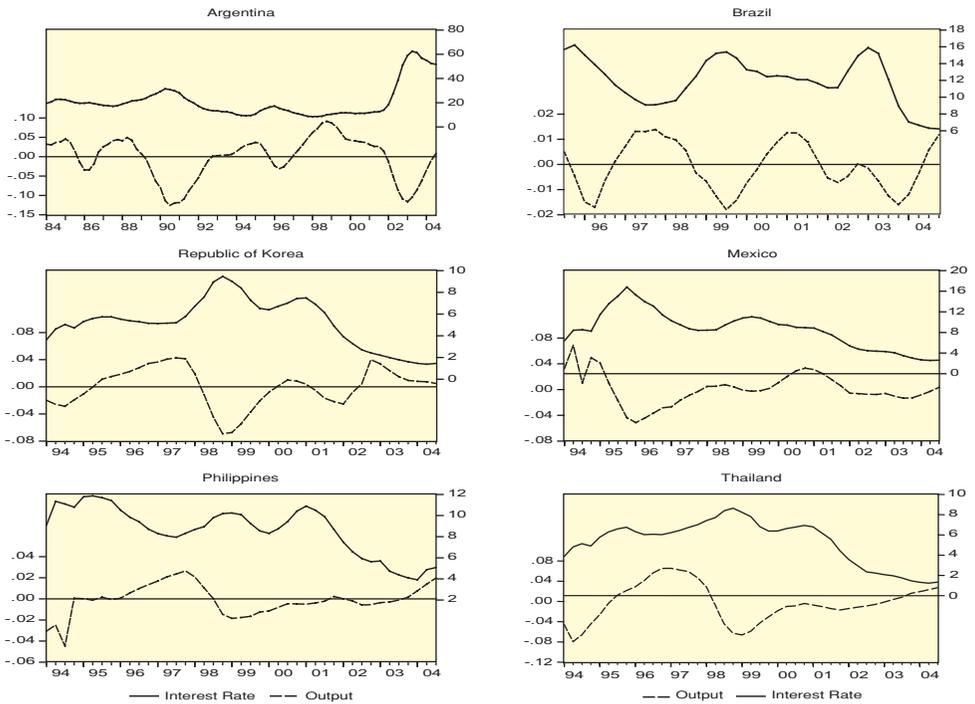
The rest of the paper is organized as follows. Section II describes the importance of interest rates in determining business cycles in emerging market countries. Section III provides an overview of the model and its calibration. Section IV describes the effects of a 1 per cent United States interest rate rise on the Thai economy. Section V discusses an experiment that resembles the global bond market rout of 1994. Section VI assumes a more prolonged United States interest rate hike when Thailand is calibrated to be more vulnerable than in the baseline case. Finally, Section VII provides conclusions and implications for policy.

II.   INTEREST RATES AND BUSINESS CYCLES

Interest rates are a key determinant of business cycles in emerging market countries. Over the last decade, many such countries have coped with frequent and large changes in the interest rates that they face in international financial markets. These changes have usually been associated with significant business cycle fluctuations. This observation is illustrated in figure 1, which graphs output and country interest rates for six emerging market countries.[1] Periods of low interest rates are typically coupled with relatively rapid economic expansion, whereas times of high interest rates are often associated with lower growth.

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[1]   We should note that, as in Neumeyer and Perri (2005), country interest rates include the United States interest rate plus individual countries' Emerging Markets Bond Index spreads.

Figure 1. Real interest rates and GDP in selected emerging market countries

Note: Output is the seasonally adjusted real GDP; it is detrended using the HP filter (using a linear trend to separate the trend from the cycle yields similar results). The interest rates are constructed as the sum of the 90-day United States treasury bill and the J.P. Morgan Emerging Markets Bond Index *Global Spread* for the respective country, adjusted for expected inflation in the United States.

The link between interest rates and output in emerging market countries is markedly different from that in developed economies. While figure 1 demonstrates that interest rates in emerging market countries are clearly countercyclical, in the developed countries interest rates are at best acyclical. Figure 2 depicts this relationship for four, small, open, developed countries. This point is further reinforced by the correlation coefficient estimates for these countries shown in table 1.

Why is the impact of interest rates different in emerging market countries and developed economies? Theoretical models usually find that interest rates are not a key determinant of business cycle fluctuations for developed economies. Moreover, in these models, interest rates exhibit either acyclical or procyclical patters, which accords well with the findings of figure 2.

Table 1. Correlation of real interest rates with GDP

Emerging economies					
Argentina	Brazil	Mexico	Republic of Korea	Philippines	Thailand
-0.64	-0.41	-0.24	-0.49	-0.31	-0.14
Developed economies					
	Australia	Canada	Sweden	New Zealand	
	0.30	0.32	0.00	0.18	

Source: Authors' calculations.

Figure 2. Real interest rates and GDP in selected developed markets
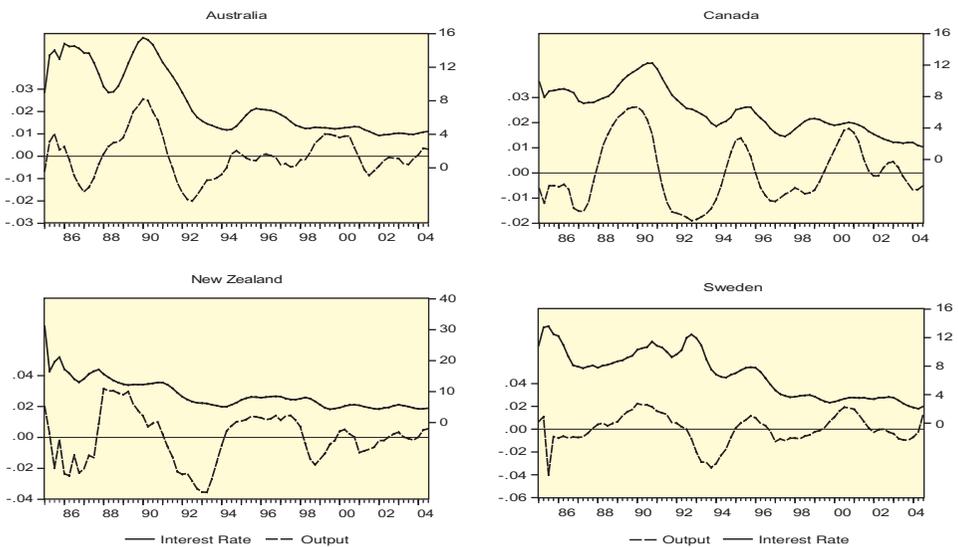
Source: IMF, *International Financial Statistics*; and authors' calculations.
*Note*:   Output is the seasonally adjusted real GDP; it is detrended using the HP filter (using a linear trend to separate the trend from the cycle yields similar results). The interest rates are the 90-day money market rates, adjusted for expected inflation.

          In contrast, Neumeyer and Perri (2005) develop a business cycle model that is consistent with the empirical regularities observed in emerging market countries. The key feature is that firms have to pay for factors of production before production takes place. The need for working capital makes the demand for labour sensitive to interest rate fluctuations. If interest rates increase, working capital becomes more expensive and firms tend to reduce their demand for labour. In addition, the utility function specification ensures that labour supply is independent

of interest rate fluctuations. This guarantees that falling labour demand leads to a lower level of equilibrium output. While there is no reason to believe that this mechanism may not be relevant for a developed country as well, it underscores the kind of adjustment that has to be introduced in a model framework to generate countercyclical interest rates.

In addition, real interest rates in emerging market countries lead the cycle, whereas in developed economies interest rates lag the cycle. This point is illustrated in figure 3, which shows the cross correlations between GDP and interest rates for both groups of countries. Emerging market countries depict a distinctive U-shaped pattern, whereas in developed countries, the cross correlations exhibit a concave shape and are less synchronized.

Figure 3. Cross correlations between real interest rates and GDP in emerging markets and developed economies
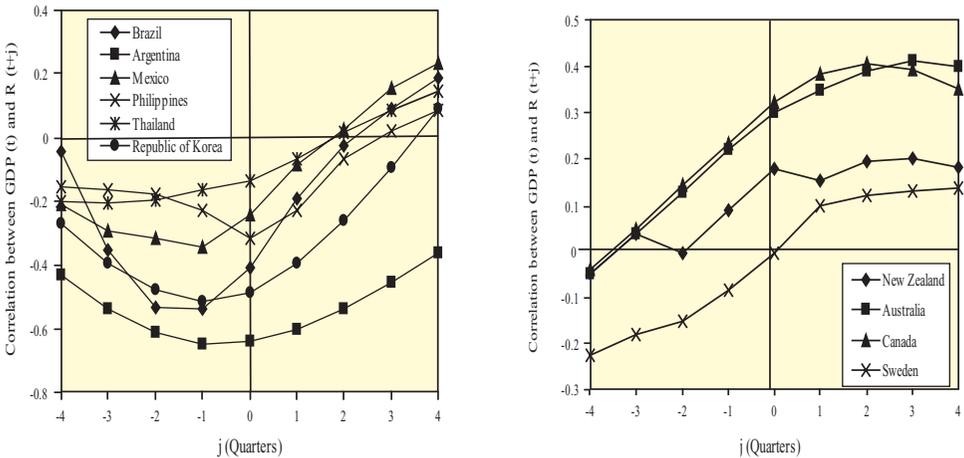
Source: Authors' calculations.

III. THE GLOBAL ECONOMY MODEL WITH THE FINANCIAL ACCELERATOR

The Global Economy Model (GEM) is a new type of policy model based on strong microeconomic foundations, in which consumers and firms maximize utility and profits respectively.[2] The policy model of choice in IMF over the last two

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[2] For details, see Bayoumi (2004).

decades was MULTIMOD. While that model is able to generate realistic dynamic responses to cyclical disturbances, its lack of solid theoretical foundations makes it susceptible to the "Lucas critique". In particular, policy analysis using reduced-form equations that fit the data but are only loosely tied to theory cannot, among other things, properly account for resulting shifts in behaviour. GEM, on the other hand, combines production, consumption, trade, nominal and real rigidities, as well as international financial markets in a coherent theoretical framework.

GEM has many important strengths. First, GEM can study policies in a general equilibrium setting, thus taking into account the full range of interactions between consumers and producers as well as linkages across sectors and countries. Second, the costs and benefits of a policy can be measured directly by the impact on consumer welfare, rather than by using less accurate and more ad hoc proxies of welfare. Third, GEM has a very flexible structure, so that one can include or exclude features easily in accordance with the issue at hand.

However, moving to a model with tight theoretical structure may impose some limitations. First, models are not easy to build and run. Second, the need to create a large interlinked structure occasionally constrains theoretical specifications and hence model properties.[3] Third, calibration is time-consuming, as the model concepts do not dovetail with existing data.[4] Fourth, the capital account is not richly modelled and, therefore, issues related to capital flows are given only a cursory consideration.

A. Extending the Global Economy Model

Figure 4 displays the simplest version of a two-country GEM structure.[5] Labour and capital are combined to produce a single type of tradable good that can be used for consumption or investment. Given the preferences of consumers, firms and the government, these goods are then distributed across countries.

We extend the basic version of GEM in two ways. First, we allow for balance sheet-related credit market frictions. As will be discussed in detail below, this creates a valuation channel that amplifies the impact of external shocks on the domestic economy. Second, we add another country, which we call the "rest of

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[3]   For example, since the model is based on a single representative consumer, it cannot be used to address issues of income distribution.

[4]   For example, it is not easy to split output into traded and non-traded goods or to determine the role of commodities and semi-finished goods in production.

[5]   For a full technical description of GEM, see Laxton and Pesenti (2003).

Figure 4. Simple GEM structure

Home country   Foreign country
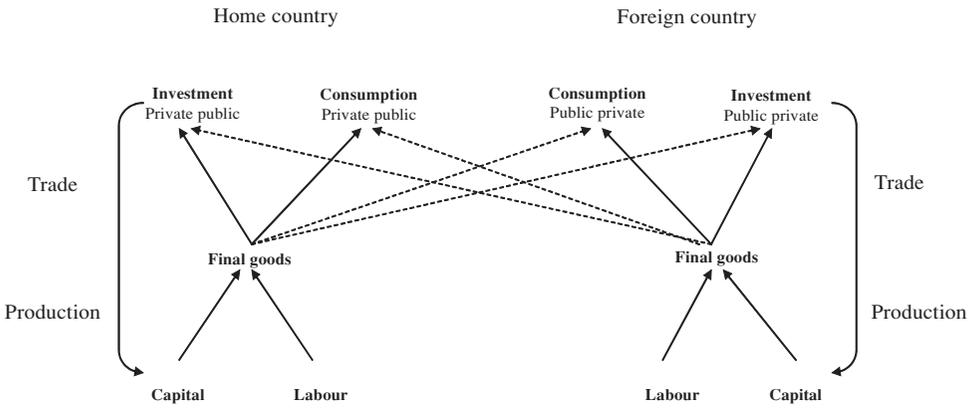
Source: Bayoumi (2004).

the world". This composite third country, among other things, allows a more realistic calibration of international financial and trade linkages.

One of the key features of our model is that the foreign interest rate is the sum of the global interest rate, plus a country-specific external finance premium. In the context of emerging market countries, hikes to world interest rates do not usually translate into equivalent movements in country interest rates due to the presence of country risk premiums. These premiums may also be positively related to global interest rates, and may therefore amplify the interest rate cycle initiated by industrial countries.[6] The attempt to analyse the relationship between interest rates and real activity is also complicated by the fact that these premiums respond systematically and countercyclically to business conditions in emerging market countries.[7]

Against this backdrop, our model endogenizes the risk premium by assuming that it is inversely related to the conditions of the domestic economy's balance sheets. For example, if a shock triggers a decline in asset prices, this lowers the value of firm equity, thereby increasing the debt-to-equity ratio and thus raises the risk premium. In other words, it becomes increasingly difficult for an

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[6]   Evidence in support of this notion can be found in Fernandez-Arias (1996), Kaminsky and Schmukler (2002) and Uribe and Yue (2003).

[7]   See, for example, Cline (1995), Cline and Barnes (1997), Cantor and Packer (1996) and Eichengreen and Mody (1998).

emerging market country to finance investment when the country faces unfavourable shocks, thus generating a vicious cycle.

We formally model these credit market frictions by incorporating the financial accelerator into GEM.[8] The financial accelerator captures two salient features of emerging market countries that complicate the conduct of monetary policy. First, these countries can typically borrow only in foreign currency denominations, a phenomenon labelled "original sin".[9] Second, emerging market countries usually have imperfect access to capital markets. Foreign credit is typically associated with an external finance premium which is linked to the condition of borrower balance sheets. Through the impact on the balance sheets of an emerging market country, these credit market frictions may substantially magnify the effects of shocks on the economy.[10]

Balance sheets and the financial accelerator

The financial accelerator mechanism amplifies the effects of shocks to the global interest rate on the domestic economy. Adjusted for expected exchange rate movements, the domestic interest rate is the sum of the foreign interest rate plus the risk premium. Therefore, interest rate hikes in the foreign country induce interest rate increases in the domestic economy. Owing to nominal rigidities, this also leads to a rise in the real domestic interest rate, which in turn engenders a contraction in real activity. Furthermore, the fall in asset prices generated by the output drop increases the debt-to-equity ratio, thereby raising the premium. This additional channel further suppresses consumption, investment and production beyond the initial impact caused by the foreign interest rate hike.[11]

B. Model Calibration

The long-run properties of the model are calibrated for Thailand, the United States and the rest of the world (RoW). Table 2 provides a summary of the key

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[8]   The closed economy version of the financial accelerator was developed by Bernanke, Gertler and Gilchrist (1999).

[9]   For details, see Eichengreen and Hausman (1999).

[10]   Elekdag, Justiniano and Tchakarov (2006) provide empirical evidence supporting the inclusion of the financial accelerator into models attempting to capture these key emerging market country features.

[11]   Furthermore, in the context of a flexible exchange rate regime, an increase in the foreign interest rate would induce a depreciation of the domestic currency. Given balance sheets with currency mismatches, the depreciation would inflate the value of foreign currency-denominated debt, further amplifying the impact of the shock.

steady state ratios calibrated using 2004 annual data. Size is based on a simple average of the shares of these countries relative to the global population and real GDP. Thailand makes up 1 per cent, the United States 19 per cent, and RoW 80 per cent of the world. Consumption- and investment-to-GDP ratios for Thailand and the United States are calculated from national accounts data. Since the precise computation of these ratios for RoW would require aggregating all individual countries' consumption and investment data, it is simply assumed that consumption and investment in RoW account for 67 per cent and 33 per cent of output respectively.

Table 2. Model calibration

	Thailand	United States	RoW
Size	0.01	0.19	0.8
Consumption-to-GDP ratio	0.67	0.86	0.66
Investment-to-GDP ratio	0.26	0.18	0.33
Imports-to-GDP ratio	0.58	0.12	0.04
Import of consumption goods-to-GDP ratio	0.17	0.09	0.02
Import of investment goods-to-GDP ratio	0.41	0.03	0.02
Imports from Thailand-to-GDP ratio	n.a.	0.002	0.004
Imports from United States-to-GDP ratio	0.05	n.a.	0.036
Imports from RoW-to-GDP ratio	0.54	0.118	n.a.
Risk premium (basis points)	70	n.a.	n.a.

Source: IMF, *International Financial Statistics*; Bank of Thailand; and authors' calculations.

The imports-to-GDP ratio is large in Thailand, amounting to 57 per cent of GDP. The share of goods imported from the United States is 5 per cent of GDP; the rest of the goods are imported from RoW. The United States is a much less open economy with an imports-to-GDP ratio of 12 per cent of GDP. The imports from Thailand are negligible, with the bulk of imports coming from RoW, which is almost a closed economy with an imports-to-GDP ratio of 4 per cent of GDP. Imports from the United States and Thailand account for 3.6 per cent and 0.4 per cent of GDP respectively.

The deep parameters in such microfounded models are calibrated based on estimates from microeconomic studies. These deep parameters define the long-term responses of firms and consumers, such as the elasticity of substitution among different types of goods and the responsiveness of the hours worked to

changes in real wages, as well as the sensitivity of consumption to movements in real interest rates.

Currently, the only available GEM calibration for an emerging market country is based on the Czech Republic, upon which our calibration draws.[12] However, since we have incorporated balance sheet-related credit market frictions, we need to calibrate the steady-state external finance premium as well. The risk premium is calibrated using the Emerging Markets Bond Index Global (EMBIG) spread for Thailand. The premium has been steadily decreasing since the 1997 Asian financial crisis, and its average value in 2004 was 70 basis points, which we use in our baseline simulations.

The monetary framework assumes inflation targeting. Monetary policy for the United States and RoW follows a classic Taylor rule, with no weight on the exchange rate. Since the Asian crisis, in 1997, Thailand has adopted an inflation-targeting regime that targets only core inflation and does not provide for an explicit or implicit target of the exchange rate. At the same time, the Thai authorities routinely intervene in the foreign exchange market to prevent excessive baht volatility. In the that sense, although the de jure policy does not call for targeting the exchange rate, the de facto regime takes into account baht fluctuations when formulating monetary policy. Therefore, to capture better the actual conduct of monetary policy in Thailand, the model posits the Taylor rule augmented with an explicit targeting of the exchange rate. Our baseline simulation assumes that the weight on the exchange rate is smaller than the weights on expected inflation and the output gap.[13]

IV. THE EFFECTS OF A 1 PER CENT UNITED STATES INTEREST RATE HIKE

To model an increase in international interest rates, we consider a 1 per cent hike in the United States interest rate. The shock lasts one quarter, after which United States interest rates are governed by the Taylor rule. The foreign interest rate shock moderately suppresses economic activity in Thailand, as shown in figure 5. Although Thai monetary policy limits transitional volatility in the foreign exchange market, the shock still induces a mild depreciation, implying that about half of the increase in the foreign interest rate is transmitted to the domestic interest rate.

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[12] For details, see Laxton and Pesenti (2003).

[13] The weights on output, inflation and the real exchange rate in the Taylor rule are calibrated to 0.5, 1.3 and 0.2 respectively.

**Figure 5. Impulse response functions in Thailand to a 1 per cent
interest rate shock in the United States**
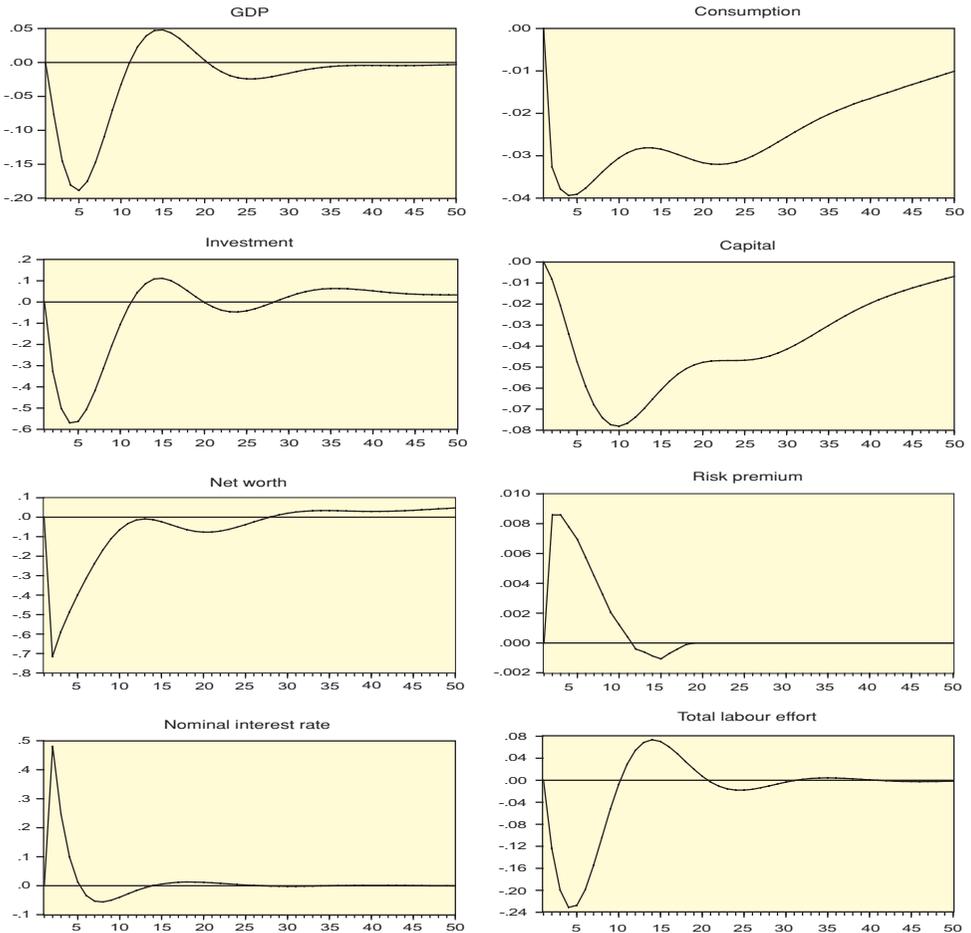
The impulse response functions in figure 5 depict the dynamic behaviour of key macroeconomic variables. The figure shows that the real variables hit their respective troughs four to five quarters after the onset of the shock. Consumption, investment, labour effort and output drop by 0.04 per cent, 0.57 per cent, 0.23 per cent and 0.19 per cent relative to the steady state respectively. Owing to the presence of adjustment costs, the capital stock reaches a low point of -0.08 per cent relative to the steady state 10 quarters after the shock. Because the risk

premium is calibrated to be only 70 basis points in the steady state, there is only a minor reduction in entrepreneurial net worth, reflecting the negligible role of the balance sheet channel in this scenario.[14]

**Table 3. Cumulative losses from a 1 per cent
United States interest rate hike**

	Thailand	United States
Output	-0.23	-0.46
Consumption	-0.28	-0.52
Investment	-0.51	-1.21
Capital stock	-0.62	-1.34

Source: Authors' calculations.

The cumulative costs of the interest rate shock are also limited. Table 3 computes the cumulative output, consumption, investment and capital stock losses for Thailand and the United States caused by the United States interest rate increase.

V.   A REPEAT OF THE GLOBAL BOND MARKET
ROUT OF 1994?

The United States monetary tightening cycle during 1994 was followed by heightened bond market volatility and the widening of emerging market country credit spreads. The Federal Reserve began raising policy rates in February 1994. During the following 12 months, the federal funds rate doubled to 6 per cent in the course of seven successive rate increases. Bond market volatility and 10-year United States treasury yields shot up by 250 basis points, peaking at 8 per cent in November 1994. In the process, international portfolio managers shifted their exposure from short-term to longer-dated securities. This resulted in a marked widening of emerging bond market yield spreads from 405 basis points at the end of 1993 to about 800 basis points by mid-December 1994.

The current benign global market conditions for emerging market countries are reminiscent of the period preceding the sell-off of 1994. Low interest rates in major financial centres, a broadening investor base and soaring asset prices buoyed by abundant global liquidity have dramatically suppressed credit spreads on

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[14]   The slight oscillation in the impulse response functions are caused by an additional delayed increase in Thai interest rates needed to mop up second-round inflationary pressures.

emerging market bonds. These factors have created a very favourable external environment for emerging market borrowers – with the EMBIG composite spread declining from about 725 basis points at the end of 2002 to 237 basis points at the end of 2005 – despite the onset of monetary policy tightening in the United States, significant commodity price volatility and a further widening of global imbalances.

Nevertheless, the risks that did not materialize in 2004 and 2005 remain a concern. Government bond yields and credit spreads remain quite low, leaving plenty of room for further increases in global interest rates. An unanticipated spike in United States treasury yields could trigger a widening of credit spreads on emerging market bonds. Under these circumstances, emerging market countries would face higher borrowing costs, and underlying vulnerabilities that have been masked by the recent benign external financing environment could quickly resurface.

A. United States Monetary Policy and emerging market country spreads

A recent IMF study found that mature market interest rates and global liquidity have become the most important determinants of emerging market spreads after September 2001. The 2004 Global Financial Stability Report of the IMF estimates a simple econometric model with a view to identifying the drivers of the latest emerging bond market rally. Theoretical models suggest that the econometric specification should include relevant measures of country-specific fundamentals, global liquidity as represented by mature market interest rates, the expansion of demand for emerging market bonds, caused by a widening investor base, and risk preferences.

The study finds that the explanatory variables are statistically significant and intuitive: improved fundamentals, greater investor demand and decreased volatility all drive down spreads. More critically, however, the estimation results indicate that liquidity stemming from accommodative United States monetary policy has become the most important factor driving the recent emerging bond market rally.

B. A Sudden Decrease in Global Liquidity

To mimic a sudden decrease in global liquidity, we consider a larger and more protracted increase in global interest rates. In addition, we calibrate the steady state external finance premium to 700 basis points, thereby making Thailand more financially vulnerable relative to the previous simulation.[15]

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[15] The EMBIG composite spread averaged about 730 basis points during the 1990 to 2004 period.

After the most recent tightening cycle began in mid-2004, the federal funds rate reached 2.5 per cent during the first quarter of 2005. At the time, it was believed that the Federal Reserve would continue to raise rates to a "neutral" level. Roughly speaking, a neutral rate should minimize inflationary pressures without dampening economic growth. Various estimates suggest that such a rate ranges between 3 per cent and 5 per cent, implying a midpoint of 4 per cent. Against this backdrop, we assume a scenario in which United States interest rates increase by 2 per cent in four consecutive 50-basis-point increments, reaching the neutral rate of 4 per cent after a year.[16]

To highlight the importance of balance sheet-related vulnerabilities, we consider experiments with and without the financial accelerator present. As shown in figure 6, a prolonged increase in United States interest rates would imply a relatively severe recession in Thailand, which would be further exacerbated with the presence of credit market frictions.

To further highlight the adverse implications of this harsher global interest rate increase, table 4 presents the cumulative declines in key macroeconomic variables. In the case without the financial accelerator, the model implies cumulative decreases for output, consumption, investment and the capital stock of 1.8 per cent, 2.3 per cent, 1.8 per cent and 2.6 per cent respectively. The presence of the financial accelerator adds considerably to the cumulative losses, with output and consumption falling by 2.9 per cent and 3.1 per cent, whereas the losses are even larger for investment and the capital stock, which both drop by 8.1 per cent.

Table 4. Cumulative losses in Thailand from a 2 per cent interest rate hike in the United States

	No financial accelerator	Financial accelerator
Output	-1.80	-2.90
Consumption	-2.31	-3.09
Investment	-1.75	-8.10
Capital stock	-2.60	-8.08

Source: Authors' calculations.

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[16]   Also note that, as mentioned in Section V, the magnitude of the shock is consistent with the parallel increases in the federal funds and long-term interest rates during the global bond market rout of 1994.

Figure 6. Impulse response functions in Thailand to a 2 per cent interest rate shock in the United States lasting for four quarters
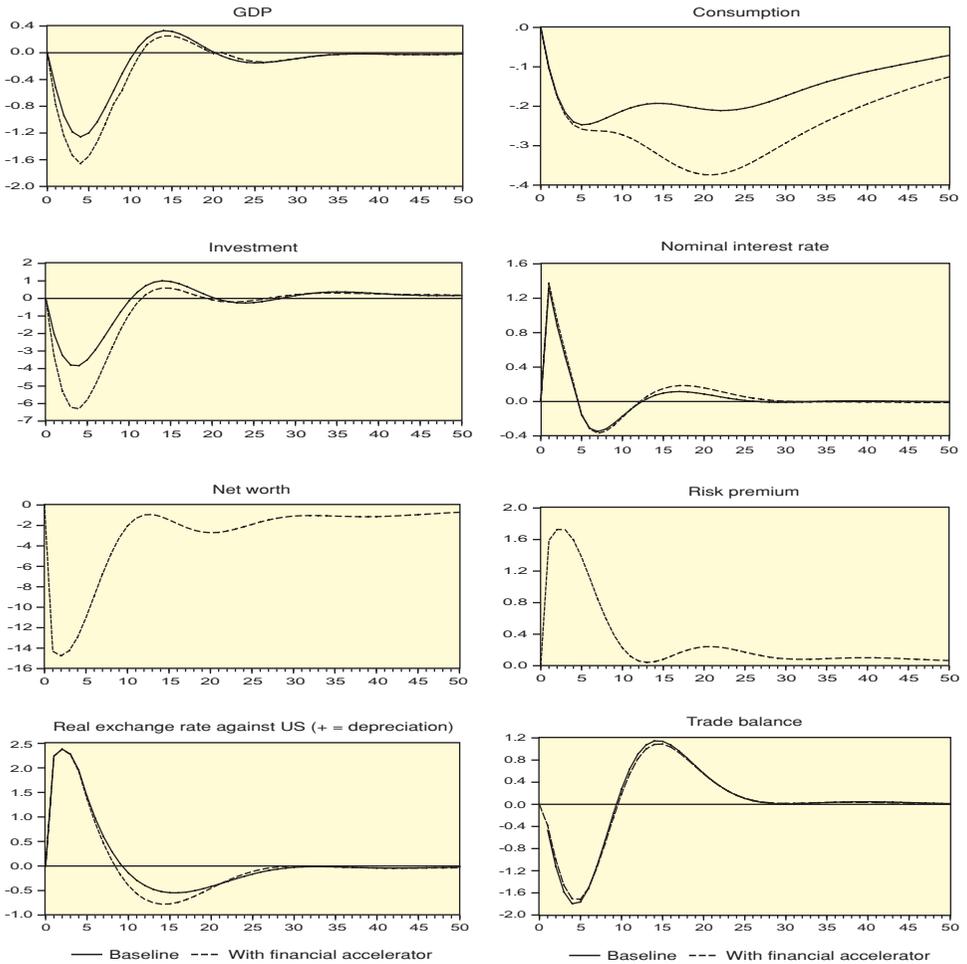
——— Baseline --- With financial accelerator   ——— Baseline --- With financial accelerator

Source: Authors' calculations.

Note: The impulse response functions are computed as percentage deviations from the steady state.

      The impact of higher global interest rates is more severe in the presence of credit market frictions, since the financial accelerator generates a vicious cycle. The external shock causes a decline in asset prices as well as depreciation of the baht currency. The former decreases the value of the firm, whereas the latter inflates the value of foreign currency-denominated liabilities. Both work in parallel to cause a deterioration in Thai balance sheets, which then increases the risk

premium. Coupled with rising international interest rates, the higher premium raises the opportunity cost of investment further, thereby choking off the process of capital accumulation, which in turn decreases output and thus investment demand further.

VI. WHAT ROLE FOR MONETARY POLICY?

As a final experiment, we ask which exchange rate regime can best limit the negative economic impacts of higher United States interest rates. We assume that monetary authorities in Thailand can pursue three different exchange rate regimes via a Taylor-type interest rate rule. The first is a flexible exchange rate policy that targets only inflation and the output gap. The second is a fixed exchange rate policy that targets the baht/dollar exchange rate exclusively.[17] The third is a managed float in which the monetary authority simultaneously targets inflation, the output gap and the baht/dollar exchange rate.[18]

Our simulations indicate that Thailand would minimize the adverse effects of higher United States interest rates if it implemented a flexible exchange rate regime. The stabilization properties of the three regimes are contrasted in figure 7 and in table 5. The tabulated cumulative losses underscore the severity of the economic losses that Thailand could face, especially when a fixed exchange rate regime is implemented. Further reinforcing this finding, figure 7 shows that under the peg, macroeconomic variables are more volatile and their declines longer lasting.

### Table 5. Cumulative losses in Thailand under three different exchange rate Regimes

	Flexible	*Managed float*	*Peg*
Output	-1.60	-2.90	-12.26
Consumption	-1.93	-3.09	-13.40
Investment	-2.63	-8.10	-27.60
Capital stock	-2.81	-8.08	-28.86

Source: Authors' calculations.

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[17] We assume that all regimes, including the peg, are fully credible. Some may consider this a relatively strong presumption, but it facilitates our analysis and is a natural benchmark. See Gertler, Gilchrist and Natalucci (2003) for an example of a peg with a small probability of a collapse. Also note that, from the perspective of Thailand, there are two bilateral exchange rates: the baht/United States dollar rate, and the baht against the local currency unit of RoW.

[18] Under the managed float, the weight on the exchange rate is smaller than that on inflation and the output gap.

Figure 7. Impulse response functions in Thailand to a 2 per cent interest rate shock in the United States under three different exchange rate regimes
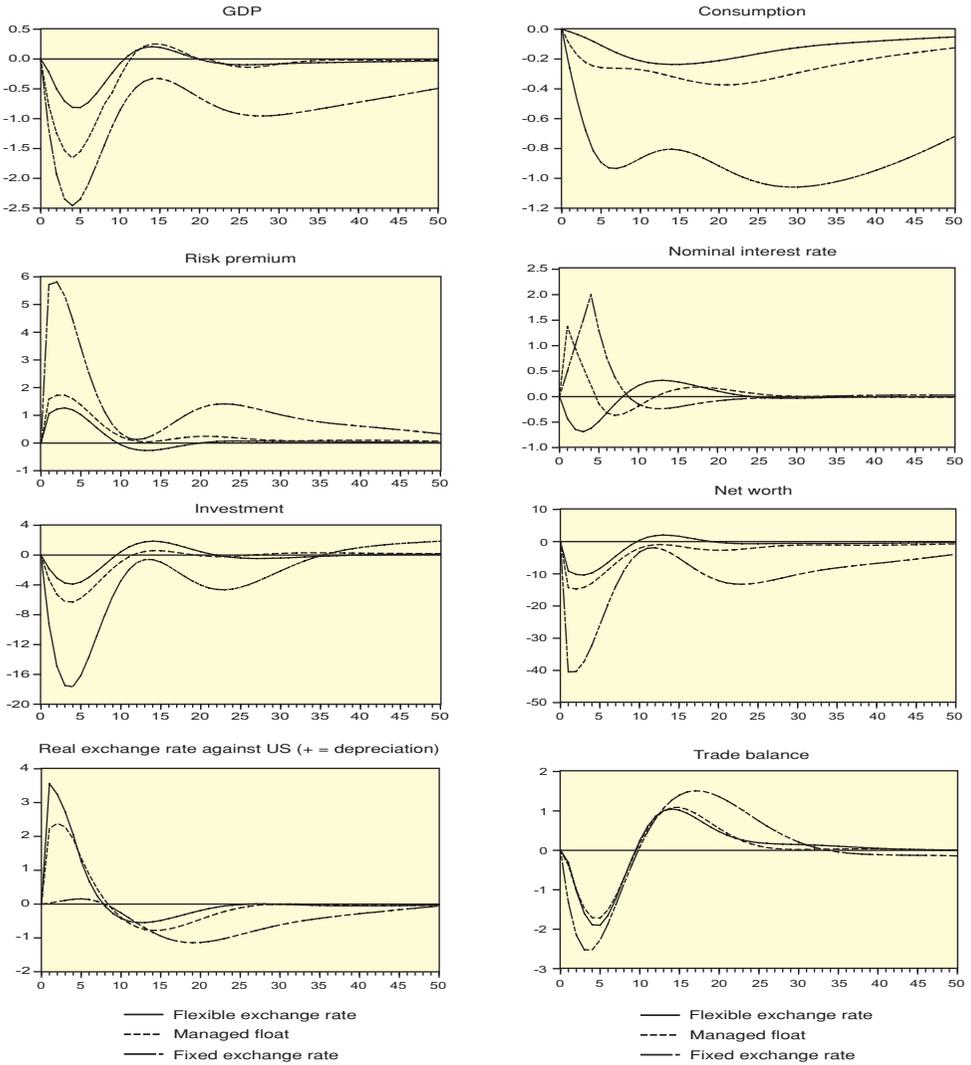
Flexible exchange rate
---- Managed float
-·- Fixed exchange rate

Flexible exchange rate
---- Managed float
-·- Fixed exchange rate

Source: Authors' calculations.

Note: The impulse response functions are computed as percentage deviations from the steady state.

The lack of nominal exchange rate flexibility implies a more severe and protracted adjustment process.

The intuition for the results is as follows. Under the fixed exchange rate, foreign interest rate shocks are transmitted directly to the domestic economy, satisfying the uncovered interest rate parity condition. Because prices adjust sluggishly, higher nominal interest rates imply higher real interest rates, which induce a contraction in output. Once again, the financial accelerator – acting through the balance sheet channel – magnifies the output drop. The rise in the real interest rate causes a contraction in asset prices, which increases the debt-to-equity ratio in Thailand. The rise in the debt-to-equity ratio increases the external finance premium, thereby increasing the opportunity cost of investment further, which in turn, completes the vicious cycle by dampening investment and output yet again.

In contrast, under a flexible exchange rate regime, the domestic nominal interest rate is no longer strictly tied to the foreign interest rate, and is also governed by a standard Taylor rule. Under this regime, a rise in the foreign interest rate triggers a depreciation of the nominal exchange rate, which presents a trade-off. On one hand, the depreciation is beneficial as expenditure-switching promotes demand for Thai exports, thereby stimulating aggregate demand. On the other hand, the depreciation increases the value of foreign currency-denominated liabilities, which through the financial accelerator mechanism would dampen economic activity further. Since Thailand is a very open economy, the gains owing to expenditure-switching dominate the losses stemming from the balance sheet channel. Finally, note that the managed float is an intermediate case.

VII.   CONCLUSION

This paper evaluated quantitatively the impact of rising foreign interest rates on real activity in Thailand. In particular, it uses a version of the IMF Global Economy Model, augmented by balance sheet-related credit market frictions, to investigate how key macroeconomic variables in Thailand would respond to increases in United States interest rates.

Most importantly, the paper studies how the Thai monetary authorities may best respond to foreign interest rate shocks. We compute impulse response functions to a protracted United States interest rate increase under a fully flexible exchange rate regime, a managed float and a fixed exchange rate regime. Our results indicate that the fully flexible exchange rate regime stabilizes real macroeconomic variables the best. The depreciation of the exchange rate creates expenditure-switching effects that dominate the balance sheet effects.

The main policy implication of the paper, therefore, is that the best monetary policy option for the Thai authorities would be to pursue a flexible exchange rate regime in order to better handle the challenges of an external environment characterized by rising global interest rates.

In terms of the requisite legal and institutional framework, Thailand is well equipped to pursue a freely floating exchange rate regime. Thailand introduced an inflation-targeting framework in 2001, which provides for keeping core inflation between 0 and 3.5 per cent. Other commonly cited prerequisites for the proper functioning of a inflation-targeting regime, such as the central bank's operational independence, transparency and accountability, capacity to monitor, model and forecast inflation in the economy, and the availability of effective tools for monetary policy implementation are also in place. In that sense, the de jure exchange rate regime is consistent with the prescribed policy advice. At the same time, the Thai authorities have elected to limit excessive fluctuations in the exchange rate in addition to only following the path of core inflation. The paper argues, therefore, that abiding by the original rules formulated in the setting-up of the inflation-targeting regime may limit volatility in key macroeconomic variables.

While, as argued above, many of the conditions for successful implementation of inflation-targeting consistent with a pure floating exchange rate regime are formally in place, there are a number of areas where further action might be required. In particular, well-developed financial markets in addition to sound and well-developed financial systems may facilitate the conduct of monetary policy and the pursuit of a flexible exchange rate. To this end, the Thai authorities have recently approved the second stage of the Capital Market Master Plan which calls for (a) an increase in the size of equity and debt markets relative to the banking sector; (b) a reduction of the transaction cost of asset market participation; and (c) an increase in the number of available instruments in the financial markets.

The policy implication has a much more general appeal as it should not be construed to be limited only to instances when global interest rates are on the rise. It would be equally important for monetary policy to support a freely floating exchange rate regime provided that there is a change in the global environment. For example, the surge in capital flows to Thailand in the first quarter of 2006 further demonstrates the difficulties that the authorities may face in resisting market-determined exchange rates. If the Federal Reserve slows down the pace of tightening, any additional interest rate hikes in Thailand would lead to a widening of interest rate differentials and upward pressure on the baht. While this would help in containing inflation, it could lead to lower exports and lower economic growth.

In that sense, continued intervention on the foreign exchange market may lead to a conflict between the domestic and external objectives of monetary policy. Market segmentations and relatively interest-inelastic capital flows may have allowed the authorities to smoothen exchange rate appreciation while controlling domestic liquidity through sterilized intervention. However, should the recent surge in capital inflows persist, sizeable continued intervention would lead to problems in controlling domestic liquidity.

The policy implications deriving from the paper are not limited only to Thailand and can be easily extended to a wider set of developing Asian and Pacific economies. For example, one piece of advice often extended to economies in this region is to allow for greater exchange rate flexibility to stimulate domestic demand, support growth, reduce external imbalances and, in this manner, to contribute to the smooth unwinding of the global imbalances. Indeed, over the past two years, a number of economies in the region, including the Republic of Korea and Taiwan Province of China, have allowed greater exchange rate flexibility, which has lead to more balanced and robust economic growth. In that sense, this paper provides a modest, but opportune, contribution and justification for the debate regarding exchange rate flexibility in the region.

REFERENCES

Bayoumi, T. (2004). *GEM: A New International Macroeconomic Model*, IMF Occasional Paper No. 239 (Washington: International Monetary Fund).

Bernanke, B., M. Gertler and S. Gilchrist (1999). "The financial accelerator in a quantitative business cycle, "in *Handbook of Macroeconomics*, John B. Taylor and Michael Woodford, eds.

Cline, W. (1995). *International Debt Reexamined* (Washington, D.C., Institute for International Finance).

Cline, W. and K. Barnes (1997). *Spreads and Risk in Emerging Market Lending*, IIF Working Paper No. 97-1 (Washington, D.C., Institute for International Finance).

Cantor, R. and F. Packer (1996). "Determinants and impact of sovereign credit ratings", *Economic Policy Review*, vol. 2, No. 2, FRB of New York.

Eichengreen, B. and R. Hausman (1999). *Exchange Rates and Financial Fragility*, NBER Working Paper No. 7418 (Cambridge, Massachusetts, National Bureau for Economic Research).

Eichengreen, B. and A. Mody. (1998). *What Explains Changing Spreads on Emerging Market Debt: Fundamentals or Market Sentiment*? NBER Working Paper No. 6408 (Cambridge, Massachusetts, National Bureau for Economic Research).

Elekdag, S., A. Justiniano and I. Tchakarov (2006). "An estimated small open economy model of the financial accelerator", forthcoming, *IMF Staff Papers*.

Elekdag, S. and I. Tchakarov (2004). *Balance Sheets, Exchange Rate Policy, and Welfare*, IMF Working Paper 04/63 (Washington, D.C., International Monetary Fund).

Fernandez-Arias, E. (1996). "The new wave of private capital inflows: push or pull?," *Journal of Development Economics*, vol. 48, pp. 389-418.

Gertler, M., S. Gilchrist and F. Natalucci (2003). *External Constraints on Monetary Policy and the Financial Accelerator*, BIS Working Paper No. 139 (Basel, Switzerland, Bank for International Settlements).

Kaminsky, G. and S. Schmukler (2002). "Emerging market instability: do sovereign ratings affect country risk and stock return?" *World Bank Economic Review*, vol. 16, No. 2, pp. 171-195.

Laxton, D. and P. Pesenti (2003). "Monetary rules for small, open, emerging economies", *Journal of Monetary Economics*, vol. 50, No. 5, pp.1109-46.

Neumeyer, P. and F. Perri (2005). "Business cycles in emerging economies: the role of interest rates", *Journal of Monetary Economics*, vol. 52, Issue 2, pp. 345-380.

Uribe, M. and V. Yue (2003). "*Country Spreads and Emerging Countries: Who Drives Whom*?" NBER Working Paper No. 10018 (Cambridge, Massachusetts, National Bureau for Economic Research).