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Do Capital Flows Improve Macroeconomic Performance in Emerging Markets?

The Turkish Experience

Abstract: This study examines the effects of capital inflows on the macroeconomic performance in an emerging, small open economy—Turkey. Using monthly data from 1992:01 to 2001:06 and a recursive vector autoregression model, we find that positive innovations in capital inflows appreciate the domestic currency, and increase output and money supply, but decrease interest rates and prices in the short run. We also find that the exchange rate regime does not influence the effects of capital flows on macroeconomic performance. Implications of the findings for policymakers are analyzed.

Key words: capital flows, Turkey, vector autoregression.

There is an ongoing debate on the *pros* and *cons* of capital inflows. Neoclassical economists support the view that capital inflows are beneficial because they create new resources for capital accumulation and stimulate growth in developing economies with capital shortages. FitzGerald (1998) theoretically argues that higher capital inflows lower interest rates, which help increase investment and economic growth. On the empirical side, using data for seventeen emerging markets, Bekaert and Harvey (1998) find a positive relationship between equity capital flows and key macroeconomic indicators, including growth and inflation. Evidence from

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Latin America and Far Eastern economies shows that capital inflows tend to appreciate real exchange rates; lower interest rates; and increase consumption, investment, and economic growth (Antzoulatus 1996; Calvo et al. 1994; Corbo and Hernandez 1994; Fernandez-Arias and Montiel 1995; Kamini and Wood 1997; Khan and Reinhart 1995).

In contrast, the recent financial crises in Asia, Russia, and Latin America have created doubts about the benefits of capital inflows and emphasized the necessity of capital controls. There are early studies supporting the premise that capital inflows are used to finance imports and domestic consumption (Agosin 1994; French-Davis et al. 1994; Frenkel et al. 1993). Rodrik (1998) argues that capital flows have no significant impact on economic performance once the impact of other variables, such as the education level, the initial level of income, the quality of government institutions, and regional dummies, are controlled for. Durham (2000) examines the effects of capital flows on growth and savings by employing panel data regressions covering twenty-six countries and finds that capital flows have negative effects on growth only in the short run.

In this paper, we draw attention to the Turkish experience. Turkey is an open economy and is not under heavy government regulations. However, it suffers from high and persistent inflation. Volatile capital inflows and inflation make it easier to capture the impact of capital inflows on the macroeconomic performance. There are scant empirical studies for the Turkish case. Cavusoglu et al. (1997) argue that real exchange rates appreciate following a capital flow shock. Celasun et al. (1999) find that capital flows affect real variables, such as consumption and investment. Berksoy and Saltoglu (1998) report a positive long-run relationship between different types of capital flows and interest rates, whereas Kirmanoglu and Ozcicek (1999), using impulse response analysis, find that a short-term capital inflow causes real appreciation, decreases inflation, and brings about a temporary increase in real wages. Alper (2002) reports the procyclical behavior of the capital flows with the real gross domestic product (GDP). He argues that the capital inflows lead the growth by one-quarter. Moreover, Alper and Saglam (2001) examine the channels through which a sudden capital outflow affected the Turkish economy during the 1990s. In particular, they study the transmission of financial crisis to the economy through changes in asset prices and credit channels, and their results indicate that asset and credit transmission channels are effective.¹

The present study uses a vector autoregression (VAR) methodology to capture the effects of capital inflows on economic performance. Previous studies examine only one specific effect of capital flows, whereas we study many variables. In order to avoid spurious regressions, this study includes a set of macroeconomic variables to better assess the simultaneous effects of capital flows on economic performance. Moreover, our study covers the 2000 and 2001 crises. Finally, to the best of our knowledge, this study offers the most comprehensive robustness tests in the literature. Our empirical results suggest that an increase in capital inflows improves economic activity, leads to lower prices and interest rates, and causes

real appreciation and higher money supply. On the other hand, we find that growing capital outflows could lead to a recession and a large real depreciation that might result in a financial crisis. This result supports the argument that high capital outflows should be prevented. However, whether capital controls would overcome such problems is subject to debate.

An Overview of Capital Flows in Turkey

During the 1980s, Turkey followed an economic policy of openness and liberalization. Following the severe debt crisis during 1978–80, the liberalization experience included lifting quantitative restrictions on trade and moving away from an inward-oriented import substitution to an export-oriented growth strategy. On the financial liberalization side, the first step was the removal of the interest rate ceilings on bank loans in 1981. By 1984, domestic residents were allowed to hold foreign exchange-denominated assets and to engage in foreign exchange transactions. While fiscal balances deteriorated, reforms in the financial and external sectors continued. The Central Bank of the Republic of Turkey (CBRT) took important steps to alter the institutional setting of policymaking and focused increasingly toward using indirect monetary policy instruments. The interbank money and foreign exchange markets were opened in 1986 and 1988, respectively, and open market operations were introduced in 1987. Bank lending and borrowing rates were fully liberalized in 1988.

While the liberalization continued, especially on the macroeconomics policy side, a competitive real exchange rate policy—where the central bank depreciates the domestic currency daily based on a given expected inflation each month—was maintained throughout the 1981–88 period. This policy was further supported by a repressed real wage regime. However, from 1987 onward, the wage regime became politically unsustainable since real wages, which increased in the 1989–90 period, had an adverse impact on public sector finances. Although the policy of maintaining a competitive real exchange rate helped export performance in the mid-1980s, it implied capital losses on foreign debt, causing a deterioration in the terms of trade in the public sector vis-à-vis the private sector. As the government could not achieve the desired external balance, it abandoned the real exchange rate policy in 1989; and since then, the exchange rate appreciated in real terms.

Following these developments, a complete financial liberalization package was adopted in 1989, which removed restrictions on capital controls, thus allowing foreign investors to invest freely. In 1990, Turkey accepted the International Monetary Fund's (IMF) Article VIII, which allowed both residents and nonresidents to conduct foreign exchange operations in Turkey and abroad and permitted commercial banks to engage freely in foreign exchange transactions. Finally, the interest rate ceiling on deposits was also removed in 1991. As a result, capital flows became a significant source of financing for the current account deficit, which reduced the relative importance of the official financing and workers' remittances.

However, as discussed above, in 1989, when a set of liberalization policies was implemented, the government was following populist policies and therefore was not willing to make necessary spending adjustments for political reasons. This did not send the right signals to foreigners to invest in Turkey. At the same time, the government had to finance the high debt payment obligations incurred in the past.

As a consequence of the liberalization of capital movements, the banking sector shifted to short-term borrowing from international markets. The sharp increase in portfolio investment in the Istanbul Stock Exchange contributed to financing of the current account deficit. However, this increased the vulnerability of the financial system due to a higher probability of sudden capital reversals. According to Ekinçi (1996), debt servicing after 1989 was characterized by a short-term external borrowing, which turned into a Ponzi game associated with external speculative finance. When the game came to an end, sudden reversals began as foreign creditors withdrew large-scale funds, which set the stage for the financial crisis in April 1994.

In the post-1994 crises, the same trends in the behavior of capital flows continued. Foreign direct investment stayed at approximately the same levels until 2001. However, there was a substantial increase in 2001 due to awarding a third Global System for Mobile Communications (GSM) license. Regarding short-term capital flows, there were large outflows during the 1994 crisis period. Although there were no substantial inflows and outflows between 1995 and 1999, there were inflows in the first half of 2000 resulting from the standby agreement signed with the IMF. Following the November 2000 crisis, there were still large short-term capital outflows.

In spite of the relatively low volatility of portfolio investment relative to short-term capital, the Russian crisis in 1998 affected returns on the Istanbul Stock Exchange substantially. Although no sizable capital outflows were realized in the portfolio item of capital flows until 1998, including the 1994 crisis, the outflows were near \$7 billion during the Russian crisis. Portfolio investments recovered in 1999; but then the November 2000 financial crisis struck, and there were still outflows observed at the end of October 2001.

Macroeconomic Effects of Capital Flows

Capital inflows provide resources for capital accumulation in developing countries with capital shortages and allow intertemporal smoothing in consumption, which raises welfare. In competitive models with perfect foresight and complete markets, welfare benefits from capital flows are equivalent to those from international trade in goods and services. Furthermore, economic growth may increase through technology and management skills transfer due to foreign direct investment (Helpman 1985).

On the other hand, capital flows may result in a rapid monetary expansion, and excessive rise in domestic demand, which cause inflationary pressures and the

appreciation of real exchange rate, widening current account deficits. As discussed in Akcoraoglu (2000), capital flows may also lead to an increase in domestic absorption. When some of the spending falls on nontraded goods, their relative prices increase and real exchange rate appreciates. This raises the demand for tradable goods, leading to current account deficits. However, if there is a predetermined exchange rate target, that is, a fixed or crawling peg exchange rate regime, then the central bank may adopt either sterilized or nonsterilized intervention policies to deal with exchange rate pressures due to capital flows.

Sterilized intervention involves sales of government bonds by the central bank in exchange for foreign currencies and securities. For this intervention to be effective, domestic and foreign bonds should be imperfect substitutes. However, sterilized intervention causes an increase in interest rate differential between home and foreign currency, which attracts more capital flows. In a nonsterilized intervention, the central bank purchases foreign currency in exchange for domestic currency. This action puts pressure on the central bank to appreciate nominal exchange rate, which causes a decline in the interest rate differential; however, this policy also results in an increase in the monetary base, which intensifies inflationary pressures.

Under a floating exchange rate regime, there is no central bank intervention. Therefore, for a given level change in initial capital inflows, the appreciation of domestic currency and decline in domestic interest rates, and the persistence of capital inflows are smaller compared to one under a fixed (or crawling peg) exchange rate regime.

Methodological Issues

To capture the macroeconomic effects of capital flows on the macroeconomy, the VAR analysis is performed. To do so, we consider the economy as being represented by the following model:

$$\begin{bmatrix} 1 & b_{12} \\ b_{21} & 1 \end{bmatrix} \begin{bmatrix} y_t \\ z_t \end{bmatrix} = \begin{bmatrix} b_{10} \\ b_{20} \end{bmatrix} + \begin{bmatrix} \gamma_{11} & \gamma_{12} \\ \gamma_{21} & \gamma_{22} \end{bmatrix} \begin{bmatrix} y_{t-1} \\ z_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{y,t} \\ \varepsilon_{z,t} \end{bmatrix}, \quad (1)$$

where y_t represents the capital inflow variable, z_t is a vector of other key economic variables of interest, and $\varepsilon_{y,t}$ and $\varepsilon_{z,t}$ are orthogonalized disturbances. The system can be estimated by ordinary least squares (OLS), which yields consistent estimates of the parameters. However, this representation underidentifies the VAR. The model can also be written in matrix form as

$$BX_t = \bar{A}_0 + \bar{A}_1 X_{t-1} + \varepsilon_t. \quad (2)$$

Sims (1980) suggests using a recursive system to identify the model by forming B as a lower triangular, which implies that y_t has a contemporaneous effect on z_t , but not vice versa. Thus, we can write Equation (2) as

$$\begin{aligned} X_t &= A_0 + A_1 X_{t-1} + e_t \\ A_0 &= B^{-1} \bar{A}_0, A_1 = B^{-1} \bar{A}_1 \text{ and } e_t = B^{-1} \varepsilon_t. \end{aligned} \quad (3)$$

Both types of structural shocks can now be identified from the residuals of the recursive VAR model.

This restriction manifests itself such that both $\varepsilon_{y,t}$ (the residual of y_t from Equation (3)) and $\varepsilon_{z,t}$ (the residual vector of z_t from Equation (3)) affect z_t contemporaneously, but $\varepsilon_{y,t}$ affects y_t contemporaneously only.

Identifying the orthogonalized residuals of the VAR in this triangular fashion is called the Choleski decomposition. This restriction brings to the system an asymmetry, which makes the order of the variables important. Turkey is a small open economy with many structural problems and political instability. Foreign direct investment in Turkey is neither sizable nor varies a lot. In addition, foreign portfolio investment may be driven by political risk, not economic performance (see Celasun et al. 1999). Therefore, we assume capital inflows affect the economy contemporaneously, but not vice versa.

The VAR Specification

To observe the effects of capital flows, we specify a VAR model with capital flows, interest rates, real exchange rate, broad money, output, and prices by using monthly data covering the period from 1992:01 to 2001:06. All data are obtained from the CBRT's data delivery system (tcmbf40.tcmb.gov.tr/cbt.html), except the interbank interest rate, which is obtained from the State Planning Organization. CAP_t refers to the logarithm of net international reserves of the central bank, y_t is the logarithm of the industrial production index, p_t is the logarithm of the consumer price index, r_t is the CBRT's overnight interbank interest rate, and $M2_t$ is the logarithm of M2 money. The real exchange rate, rer_t , is calculated by deflating the basket (the Turkish lira value of 1 U.S. dollar plus 1.5 deutsche marks) by the consumer price index. The CBRT openly announced the basket as its target variable. An increase in the exchange rate implies a depreciation. A constant term, eleven monthly dummies to account for seasonality, a (0,1) dummy for controlling the 1994 crisis, a (0,1) dummy for controlling the Russian crisis in 1998:8 and 1998:9, and three dummy variables for controlling the November 2000 financial crisis and February 2001 crisis in 2000:11, 2001:02, and 2001:03 are also added to our model. Based on the Akaike information criterion, the lag order of VAR was set to one.²

In order to observe the effects of capital flows, CAP_t is put first in the ordering. The central bank is expected to respond to capital inflow shocks, using a policy tool such as interbank interest rates. Therefore, r_t is placed second in the ordering. Exchange rates respond to capital inflows because capital inflows increase the amount of foreign exchange reserves and the money supply. Hence, in the ordering, rer_t and

$M2$, follow r_t . Finally, because output and prices would react to changes in interest and real exchange rates, y_t and p_t are included at the end of the ordering.

Empirical Evidence

Impulse Response Functions

The effects of shocks of capital flows are assessed using impulse response functions. Figure 1 reports the impulse response functions for interest rate, real exchange rate, money, output, and prices when there is one standard deviation in capital flows. The 90 percent confidence bands are calculated using the bootstrap method with 500 draws. The middle lines in Figure 1 shows the median of the draws.

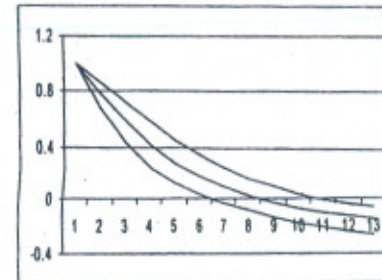
The results confirm our prior expectations. The first diagram of Figure 1 presents the response of capital flows to its own shocks, which indicates that the impact of positive shocks persist about six months. The second diagram indicates that the interest rate responds negatively to a positive capital flow shock. The initial response, which continues for two months, is deeper. After the third month, the interest rate converges to a path below the pre-shock value, but above the initial response of the interest rate. The third diagram indicates that a positive innovation to short-term capital inflows causes a real appreciation of domestic currency in the first month. During the next five months, the response of the real exchange rate to capital flow shock is statistically insignificant. Following the seventh month of the shock to capital flows, the real exchange rate follows a path below its pre-shock value, which indicates real appreciation. The fourth diagram displays a temporary increase in money supply for six months and the response of money to a shock to capital flows becomes statistically insignificant after that. The fifth diagram indicates that a positive innovation to capital flows causes the growth of the economy between the second and fifth months, then the response of output becomes statistically insignificant. This result is parallel to Alper (2002). He argues that capital flows lead the growth by one-quarter, and we observe the effect of capital inflows within two months and lasts for five months. The negative response of the consumer price index continues for the entire horizon, indicating lower prices, as depicted in the last diagram. The results show that a shock to capital flows increases output and money supply, causes real appreciation, and decreases interest rates and prices.

Variance Decompositions

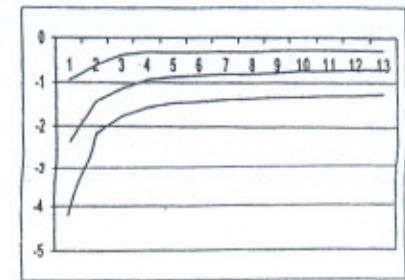
In addition to the assessment of the dynamic effects of capital flow shocks using impulse response functions, which indicate that capital inflows are beneficial for Turkey, the forecast error variance decomposition analysis was also performed to examine how capital flow shocks contribute to the variability of key economic aggregates.

Figure 1. Responses to One Standard Deviation Innovation in Capital Inflows

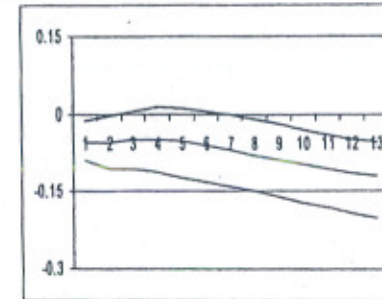
i. Response of CAP_t to own shocks



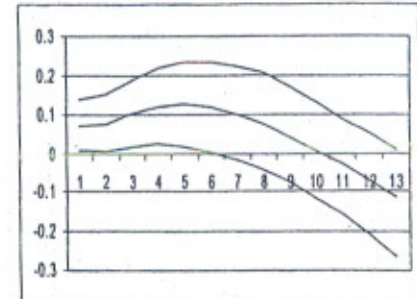
ii. Response of r_t to CAP_t



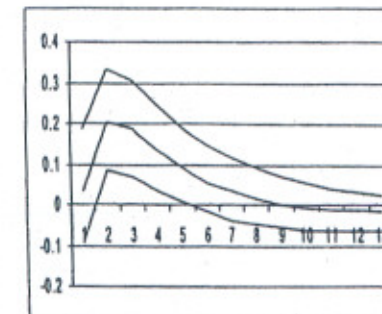
iii. Response of rer_t to CAP_t



iv. Response of $M2_t$ to CAP_t



v. Response of y_t to CAP_t



vi. Response of p_t to CAP_t

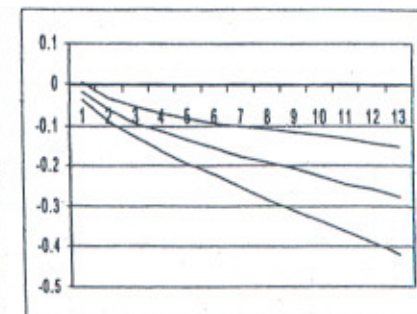


Table 1 reports the forecast error variance decomposition of the macroeconomic variables due to capital flows. At the left of the table, time horizons at which forecast errors are calculated are shown. The numbers in parentheses are standard

Table 1

Forecast Error Variance Decompositions: Contribution of Capital Inflow Shocks to Changes in Key Macroeconomic Variables

Horizon	Own	r_t	rer_t	$M2_t$	y_t	p_t
6 (percent)	97.0 (0.09)	16.0 (0.07)	8.0 (0.04)	7.0 (0.05)	7.0 (0.05)	29.0 (0.11)
12 (percent)	89.0 (0.10)	21.0 (0.08)	17.0 (0.08)	6.0 (0.04)	7.0 (0.05)	40.0 (0.14)
18 (percent)	80.0 (0.08)	26.0 (0.09)	29.0 (0.13)	16.0 (0.07)	7.0 (0.05)	46.0 (0.16)
24 (percent)	73.0 (0.09)	29.0 (0.09)	38.0 (0.15)	32.0 (0.11)	8.0 (0.05)	50.0 (0.17)

Note: Numbers in parentheses report the standard errors.

errors. The results suggest that the shocks contribute significantly to macroeconomic fluctuations, except output. The proportional rate of capital flow shocks in explaining forecast error variance of prices is 29 percent when a six-month period is used and it reaches 50 percent in period 24, making up the largest contribution. Although the contribution of capital flow shocks to interest rates, real exchange rates, and money is small in period 6, it becomes significant in period 24. On the other hand, the contribution of capital flows shocks to output fluctuations is statistically insignificant, which suggests that, although capital flow shocks influence interest rates, real exchange rate, money, and prices, they do not contribute to business cycles, given by output fluctuations.³

Sensitivity Analysis

In order to examine the sensitivity of the results, we estimated our VAR model using different specifications.⁴ However, the results did not change significantly. First, the model is estimated using the wholesale price index, instead of the consumer price index. The major difference in this case was that the interest rate responds negatively to a shock to capital flows only for two months. However, capital flows continue to contribute to price and money fluctuations.

Second, the analysis was performed using a different money definition, M1. The results indicated that M1 responds negatively to a capital flow shock after eight months, whereas M2 responds positively to a capital flow shock for three months. The effects of capital flows on the interest rate disappear where the wholesale price index is used along with M1. In this case, we also observed an appreciation of the local currency, but only for one period. The analysis is repeated with

M2Y (M2 plus foreign exchange deposits held in commercial banks). Although the results were similar to the base case, the only notable change was that the real appreciation of local currency lasted all periods. However, the results of forecast error variance decompositions indicated that capital flow shocks are not the major contributor to any macroeconomic fluctuations when different money measures were used.

Third, the analysis is repeated with three-month nominal and real Treasury bond rates, replacing overnight interbank interest rates. Both Treasury bond rates responded negatively to a shock to capital flows after eight months, whereas our base case results showed that interbank interest rates respond to a shock to capital flows only in the initial period. This result is expected since interbank interest rate is a policy variable and the central bank responds to a shock as soon as it is observed, whereas other market participants do not respond to shocks after they are observed. However, the responses of other variables in the model were the same as in the base case. In addition, variance decompositions that are performed using the Treasury bond rates give parallel estimates to the base case results.

Fourth, the analysis is performed using nominal exchange rates, rather than real rates. A basket currency (denoted in terms of TL/(1 USD + 1.5 DM)) is used. An increase in the rate represents a depreciation of the domestic currency. We found that the nominal exchange rate responds negatively to a shock to capital flows during the whole period, whereas, in the base case, the real exchange rate responds negatively for the first two months and then again after seven months. The other variables in the system respond similarly to those in the base case and forecast error variance decomposition results are similar in both cases.

Fifth, the definition of capital flows in the analysis was changed. The VARs were performed with the ratio of capital flows, as reported in the balance of payments, to M2Y. In this case, we found major differences in the results. The interest rate responds negatively to the shock to capital flows only in the first month and after the sixth month in a statistically significant fashion. Moreover, the response is smaller than the base case. Real exchange rate appreciates as a response to a shock to the capital flows after the second month using this different definition of capital flows. Although in the base case, money does not respond to a shock to capital flows for ten months, in this new case, money responds negatively after the eleventh month. However, output does not respond to capital flow shocks when we use the ratio of capital flows to M2Y, whereas the response of output is positive in the base case. When we perform variance decomposition analyses with this definition of capital flows, we found that capital flow shocks are not the major contributor to any macroeconomic fluctuations.

Finally, as discussed in the third section, the exchange rate regime could alter the effects of capital flows on economic performance. Thus, we performed the analysis by ending the sample period prior to the adaptation of (1) a crawling peg exchange rate regime (1999:11) and (2) a freely floating exchange rate regime (2001:01).⁵ The results suggested that the effects of capital flows on interest rate,

real exchange rate, money supply, and output vary slightly with the exchange rate regime. When we perform the analysis by ending the sample in 1999:11, even if the directional effects of capital flows on economic performance are the same, the real rate, money, and output respond to capital flow slightly less persistently; however, the effect of capital inflows on prices do not change, compared to the results from the full sample. On the other hand, when the sample is ended in 2001:01, the estimates are close to those for the full sample. Thus, the empirical evidence suggests that the exchange rate regime does not matter much regarding the effects of capital inflow on economic performance. However, one must caution that this result is most likely due to the small sample size we used rather than a general conclusion. Future research might give different results. Our results can serve as a benchmark for the future studies.

Policy Implications and Conclusions

This paper examines the effects of capital flows on economic performance by estimating a VAR model for the period from 1992:01 to 2001:06. The results of the impulse response functions suggest that higher capital inflows raise output and money supply, but lower prices and interest rates, and also cause a real appreciation of the lira. Policymakers may design policies to encourage capital inflows, and, at the same time, to ensure that capital inflows are stable. For the latter, authorities should encourage foreign *direct* investment relative to *portfolio* investment, since the foreign direct investment is less volatile than portfolio investment. Policies that promote the stability of portfolio investment could also be adopted through strengthening the existing prudential regulations and supervisory mechanisms while improving the effectiveness of financial disclosures.⁶

Notes

1. See Akcay and Zenginobuz (2001), Keyder (2001), and Yuksel (2002) for further discussion of capital inflows in Turkey.

2. We have tried other lag structures up to 4 lags. Our results were qualitatively similar to those with 1 lag.

3. The mixed evidence from impulse responses and variance decompositions on output can be explained by the finding that an increase in capital inflows does not have an economically significant effect on output or its effect is dominated by other variables.

4. All estimations in this section are not reported for space considerations, but are available from the authors upon request.

5. Due to data limitation, we could not perform the analysis for the periods of crawling peg (1999:12–2001:01) and freely floating exchange rate regime (2001:02–2001:06).

6. For a discussion of these issues, see Blöndal and Christiansen (1999).

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International Transmission of Stock Returns and Volatility

Empirical Comparison Between
Friends and Foes

Abstract: This paper investigates stock market mean returns and volatility spillover between stock markets of political and friendly countries. The potential foes and friends are selected according to the political situations in the past ten years. The three pairs of foes tested are Israel–Jordan, India–Pakistan, and Greece–Turkey. The United States has been historically and traditionally friendly toward these six countries. Spillover between the United States and these countries is also investigated. The empirical tests are conducted by means of a nonlinear GARCH-t model. Results indicate bidirectional mean and volatility spillover between two countries not on friendly terms. Results also provide ample evidence that mean and volatility spillover takes place from a larger distant friendly country (the United States) to these smaller emerging markets, but not much the other way around.

Key words: GARCH-t, meteor shower, spillover, volatility.

Since the stock market crash of October 1987, international transmission of volatility and mean returns between equities has received considerable attention (Ito et al. 1992; Susmel and Engle 1994).¹ A large part of the earlier research has focused on the interdependence and interaction of major stock markets in terms of the conditional first moments (mean) of returns. For example, Koch and Koch (1991),

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