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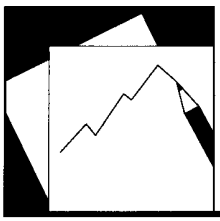

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Capital Inflows and the Real Exchange Rate: Can Financial Development Cure the Dutch Disease?

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Capital Inflows and the Real Exchange Rate: Can Financial Development Cure the Dutch Disease?

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Abstract

This paper argues that, in improving the efficient allocation of resources, financial sector development could dampen the appreciation effect of capital inflows. Using dynamic panel data techniques, the paper finds that the exchange rate appreciation effect of FDI inflows is indeed attenuated when financial and capital markets are larger and more active. The main implication of these results is that one of the main dangers associated with large capital inflows in emerging markets—the destabilization of macroeconomic management due to a sizeable appreciation of the real exchange rate—can be mitigated partly by developing a deep financial sector.

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I. INTRODUCTION

Advocates of capital account liberalization in emerging economies have commonly postulated that the provision of external finance can be an important ingredient to a successful process of economic development if an economy is unable to provide sufficient access to finance on its own (Dornbusch, 1998; Fischer, 1997). This view contrasts with the findings of Kose, Prasad, Rogoff, and Wei (2006), who conclude that cross-country evidence on the growth enhancing effects of capital account openness is inconclusive. Rodrik and Subramanian (2008) point out that inadequate access to finance may well be one of the problems facing emerging economies, but that there are other, possibly more important constraints such as inadequate investment demand. The authors convincingly argue that tackling the external finance problem when the economy's binding constraint is investment demand might not only be ineffective but counterproductive. While capital inflows have a definite consumption enhancing effect, the effect on investment is generally indeterminate and might be exacerbated by the real appreciation typically accompanying large inflows of capital to emerging economies.[2]

The experience of a number of emerging market economies has shown that the real appreciation due to capital inflows may not only deter investment but can severely destabilize macroeconomic management as a whole (Corden, 1994).[3] A large real appreciation of a country's currency following excessive capital inflows will harm export competitiveness and lead to considerable current account deterioration and an increasing vulnerability to crisis.[4] In order to avoid such Dutch Disease effects, emerging market economies have applied a number of different policies. Among these, sterilized foreign exchange intervention, modest capital controls and fiscal tightening are perhaps the most prominent. As these policies have proven effective only in few cases, a satisfactory way of dealing with the exchange rate appreciation effect of capital inflows remains to be discovered.[5]

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[2] The reason is that the real appreciation of the domestic currency brings about a reduction in the profitability of investment in tradable goods.

[3] Under a flexible exchange rate mechanism, both the nominal and the real exchange rate appreciate as a reaction to the increase in the demand for non-traded goods. Under a fixed exchange rate arrangement, the expanding money supply increases inflation, leading to a real appreciation of the currency. Several studies have shown that capital inflows appreciate the real exchange rate in emerging markets. See for instance Edwards (1998).

[4] A perceived over-valuation of the real exchange rate may lead to capital flows drying up abruptly, requiring the current account to adjust and the real exchange to shift downward. Pazarbasioglu and Otker-Robe (1998) show that real currency appreciation indeed augmented speculative pressures during the Mexican Peso crisis.

[5] See Khan and Reinhart (1995), who were among the first to thoroughly discuss this issue.

In this paper, we argue that the development of a deep and active financial sector can serve to weaken the problematic link between capital inflows and real exchange rate appreciation. A key merit of a strong financial sector is its capacity to provide low cost information about investment opportunities and to create additional incentives to extensively investigate their potential. The additional information improves the efficient allocation of resources and allows the investor to better monitor her investment. Moreover, the mere quantity of investment opportunities offered in well-developed financial markets not only enables the economy to use its resources more efficiently, but is also an important factor in the mobilization of savings as well as the facilitation of risk diversification.

Applying this reasoning to international capital flows, we argue that the development of a deep and active financial sector can serve to weaken the link between capital inflows and real exchange rate appreciation (see also Otker-Robe, Polanski, Topf, and Vavra, 2007). By providing a broader range of investment opportunities and directing the inflows towards their most productive use, more efficient financial markets and institutions avoid the flows of capital from being channeled into sectors (e.g., construction and consumption) in which they increase demand without adding to the productive capacity of the economy. And an increase in domestic consumption demand relative to changes in productivity can precisely be a decisive factor in driving a wedge between the relative prices of tradable and non-tradable goods. Hence, the appreciation effect of capital inflows on the real exchange rate—the relative price of non-tradable goods—should be attenuated if financial markets and institutions are well-developed.[6]

Using dynamic panel data techniques and a panel of 84 developing and developed economies for the sample period 1995–2006, we provide strong evidence in favor of this hypothesis. We use a Behavioral Model of the Exchange Rate that additionally includes different types of capital inflows as well as interaction terms between the inflow variables and indicators of financial sector development. We show that the real appreciation effect of foreign direct investment on the exchange rate is significantly attenuated if an economy disposes of a deep financial sector as well as large and active stock markets. In order to ensure that the effect is indeed due to an increase in our indicators of financial development, we additionally interact FDI inflows with indicators of economic development, the type of exchange rate regime, and the degree of financial openness. The results turn out to be robust to the inclusion of these and other control variables. We also ensure that both an extension of the sample period and the exclusion of groups of countries pertaining to particular income groups and world regions

[6] Athukorala and Rajapatirana (2003) show that the exchange rate appreciation effect of capital inflows has been stronger in Latin American emerging markets as compared to their Asian counterparts during the period 1985–2000. In line with our hypothesis, a potential explanation is that capital markets in Latin America—despite intense reform efforts—have remained underdeveloped compared to other regions (De la Torre, Gozzi, and Schmukler, 2007).

do not change the qualitative nature of the results. Surprisingly, we do not find similar evidence for other types of capital inflows. A possible explanation is that the spill-over effects emanating from FDI inflows are particularly strong, making their efficient absorption relatively more urgent. A subsidiary finding is that the exchange rate appreciation effect of FDI inflows appears to be reduced significantly in the presence of a less rigid exchange rate regime.

The results of this study support our hypothesis. The main implication of this finding is that one of the main dangers associated with large capital inflows in developing countries—the destabilization of macroeconomic management due to a sizeable appreciation of the real exchange rate—can be mitigated partly by means of a careful development of a deep and active financial sector. By avoiding a substantial appreciation of its currency, the respective economy can take advantage of the inflows' growth enhancing potential without having to make painful policy choices.[7]

The remainder of the paper is organized as follows: Section II entails a brief review of the relevant literature on the exchange rate appreciation effect of capital inflows and financial market development. Section III describes the data used and presents our empirical approach. In Section IV the econometric methodology is introduced. Issues related to the estimation strategy as well as the estimation results themselves are discussed in Section V. Section VI performs a battery of robustness checks. Section VII concludes.

II. LITERATURE REVIEW

After a period of widespread optimism regarding the growth enhancing effects of capital inflows in the developing world (Dornbusch, 1998; Fischer, 1997), concern has grown that the international mobility of capital may be unfavorable for macroeconomic stability. In particular, large inflows of capital typically enhance consumption spending, appreciate the real exchange rate and may thus have detrimental effects on the external competitiveness of the recipient economies (Corden, 1994; Lartey, 2007). In the theoretical literature, such "Dutch Disease," effects have been thoroughly discussed in Corden and Neary (1982), Agenor (1998), and Lartey (2008), among others. Reinhart and Rogoff (2008) use a novel data set to add to this discussion by showing that throughout history high international mobility of capital has contributed to the recipient economies' vulnerability to financial crises.

On the positive side, capital inflows are widely believed to be associated with investment and productivity growth. Gruben and McLeod (1998) indeed find a positive relationship between capital flows and real GDP growth. Moreover, Bosworth and Collins (1999), Mody and

[7] A desirable side-effect of the attenuation of the appreciation effect is that it gives more degrees of maneuver to the central bank in sterilizing the inflows in order to minimize their inflationary impact.

Murshid (2005), and Mileva (2008) argue along the lines of the neoclassical growth model to provide evidence in favor of a positive relationship between capital inflows and domestic investment. However, Kose et al (2006) carefully survey the literature on the macroeconomic impact of financial account opening and come to a different conclusion. They find that the evidence in favor of a growth enhancing effect of capital inflows is neither robust nor conclusive. Perhaps even more strikingly, Prasad, Rajan, and Subramanian (2007) and Gourinchas and Jeanne (2007) show that countries that grow more strongly are those that rely less on foreign capital.

Whereas some authors (Henry, 2007; Kose et al, 2006) consider reasons for the failure to detect the growth benefits of capital flows, Rodrik and Subramanian (2008) point out that inadequate access to finance may well be one of the problems facing emerging economies, but that there are other, possibly more important constraints such as inadequate investment demand. The authors convincingly argue that tackling the external finance problem when the economy's binding constraint is investment demand might not only be ineffective but counterproductive. While capital inflows have a definite consumption enhancing effect, the effect on investment is generally indeterminate and might be exacerbated by the real appreciation typically accompanying large inflows of capital to emerging economies. In this context, Otker-Robe et al (2007) argue that the development of a deep and active financial sector can serve to provide a broader range of investment opportunities, direct inflows towards their most productive use and thus to mitigate the investment demand constraint.

The importance of large and active financial markets and institutions, as well as the functions that enable them to influence savings and investment decisions, ameliorate market frictions and allocate resources across space and time (Merton and Brodie, 1995), are discussed in Levine (2005). In particular, a crucial market friction that a deep financial sector can help to resolve is the problem that scarce information about investment opportunities and high information costs may keep capital from flowing to its highest value use. A related function is the monitoring of firms and the exertion of corporate governance. The degree to which investors can influence firms not only affects the willingness to invest and to save but also induces managers to improve the efficiency by which resources are handled. Moreover, a well functioning financial sector is involved in the trading, hedging and pooling of different kinds of risk in the economy. By facilitating risk diversification and effectively providing a broader range of investment opportunities, savings rates and the allocation of available resources can be greatly improved.

These arguments are at the core of the idea that financial development should be beneficial for economic growth in general. Using various measures of financial market development, studies such as King and Levine (1993), Levine and Zervos (1998), and Beck, Levine and Loayza (2000) provide strong evidence in favor of this link. Rousseau and Wachtel (2000) and Beck and Levine (2004) use indicators of stock market size and activity to show that not only deep financial markets but also well-developed capital markets are significant determinants of economic growth.

Another strand of the literature that is of interest to this study focuses more closely on the ability of financial markets to reallocate resources. A prominent example of these sector-level analyses is the contribution of Rajan and Zingales (1998). The authors show that industrial sectors with a greater need for external finance develop disproportionately faster in countries with more sophisticated financial markets.[8] The reallocative function of financial markets is also at the core of another influential contribution. Wurgler (2000) computes an investment elasticity that directly measures the degree to which a country increases investment in growing industries and decreases it in declining industries. The author shows that countries with a high level of financial development are indeed able to channel a higher share of investment towards growing as opposed to declining industries. In particular, he finds that the elasticity of industry investment to value added is several times higher in Germany, Japan, the United Kingdom, and the United States, than it is in financially undeveloped countries such as Bangladesh, India, Panama, and Turkey. In a similar spirit, Fisman and Love (2004a, 2004b) and Ciccione and Pappaioannou (2007) focus on the role of financial market development in determining the speed at which resources are directed to industries with growth potential. They provide clear support for the hypothesis that growth in sectors with investment opportunities is stronger when the financial sector is more developed.

The different strands of the literature discussed in this section underline (a) the potentially adverse effects of capital inflows on the recipient economies; and (b) the importance of financial and capital markets for the process of economic growth in general and the efficient allocation of resources in particular. As outlined in the introduction, these findings motivate the main argument of the present study, namely that the real exchange rate appreciation effect due to capital inflows should be attenuated in the presence of deep financial markets and institutions.

III. EMPIRICAL APPROACH

The dataset we use in this study comprises annual information on 84 countries during the period 1990–2006. A list of the countries in the sample is available in Appendix I. We have selected these countries subject to the requirement that information must be available on all of the variables of interest. Throughout most of the analysis we use the time span 1997–2006 as our preferred sample period and expand it only for robustness checks. The reason is that this choice of sample period ensures that most of the economies in our sample—and in particular the economies in emerging Europe—are at least in the process of liberalizing both current and capital account transactions.[9] Furthermore, the choice of this short time span

[8] Similarly, Claessens and Laeven (2005) show that such industries benefit disproportionately more from a competitive banking system.

[9] See Iorgova and Ong (2008).

guarantees that data covering the entire sample period is available for most of the countries in the sample. The entire set of variables used in the analysis is defined in Appendix II. Appendices III and IV comprise information on descriptive statistics and cross-correlations between the core variables of the study as well as information on changes in the composition of capital inflows over time.

The dependent variable in this study is the real effective exchange rate, REER. We are interested in the effect of capital inflows on the real exchange rate given the level of development of the financial sector in the respective economy. We therefore not only include different types of capital inflows in the regression as explanatory variables, but also interaction terms between the inflow variables and the indicators of financial sector development. We distinguish foreign direct investment and other types of capital inflows.[10] We define the variable FDI as foreign direct investment as a share of GDP and OCI as other capital inflows as a share of GDP. According to the main hypothesis of this study—that a higher level of financial development attenuates the exchange rate appreciation effect of capital inflows—we would expect the coefficient on the inflow variables to take a positive sign and the coefficient on the interaction term with the indicator of financial development to take a negative sign.

It is important to notice that the variables FDI and OCI measure net inward investment by non-residents. They do not include net outward investment by residents (we do control for the effect of net outward investment by residents in all of our regressions using the variable ASSETS). The reason is that we are interested in the degree to which financial development matters for the efficient allocation of capital inflows. In order to allow the financial sector to function in this respect, the inflows of capital cannot be bound to a specific use a priori. This is likely to be the case at least in the short run when capital invested abroad by residents returns to the domestic economy. In line with this concern, our results are mostly inconclusive if we use the net of inward investment by non-residents and outward investment by residents as measures of FDI and OCI. This suggests that the two resident and non-resident flows can indeed have differential impacts on the recipient economy, a finding typically neglected in traditional models of the open economy.

As measures of financial sector development, this study uses indicators of financial and capital market size and activity. A commonly used indicator of financial market depth—and in particular the size of financial intermediaries relative to economic activity—is the ratio of liquid liabilities to GDP (LLGDP).[11] An important limitation of this measure is that it might

[10] We chose to only distinguish two different types of capital inflows. However, we have ensured that our main findings do not change qualitatively if we distinguish portfolio investment from other types of capital inflows. The results are available upon request.

[11] Liquid liabilities include currency as well as demand and interest-bearing liabilities of banks and non-bank financial intermediaries. Levine and King (1993) introduce the variable under the name “Financial Depth.”

not be closely related to the provision of financial services such as risk management and information processing (King and Levine, 1993). In particular, the measure contains little information about who is performing the intermediation and where financial flows are going. An indicator that improves upon the latter limitation is private credit, which is defined as credit extended to the private sector divided by GDP (CREDIT). The idea behind this measure is that financial systems that allocate more credit to the private sector are more likely to engage in researching firms, exerting corporate control and providing risk management services than financial systems that are merely used to channel credit to government or state-owned enterprises (Levin 2005). However, the use of CREDIT as a measure of financial development might be slightly misleading in the context of this particular study, which focuses on the ability of the financial sector to efficiently manage large inflows of capital. And a substantial increase in private credit as a response to the inflows could precisely be the result of the economy's inability to generate a broader range of alternative investment opportunities. Nonetheless, we believe that LLGDP and CREDIT are the best indicators of financial market depth and efficiency that are available for the countries in our sample.

As measures of capital market development, we use indicators of stock market size and activity.[12] A commonly used indicator of stock market size is the capitalization ratio, which is defined as stock market capitalization relative to GDP (SIZE). However, the size of stock markets alone does not necessarily signal a high level of market activity and efficiency. In order to measure stock market activity, we use stock market value traded, which is defined as the value of trades of domestic shares on domestic stock exchanges divided by GDP (ACTIVITY). Both of these measures suffer from the limitation that they are defined as the product of quantity and price. This implies that they can be affected by changes in expectations of future economic conditions. An indicator that does not suffer from this limitation is the turnover ratio. It is defined as the ratio of stock market value traded to stock market capitalization and thus measures the trading volume on the stock market relative to its size (TURNOVER).[13] We work with all three indicators as measures of capital market development.

Along with the above mentioned variables of interest, we include a number of other variables, including the variable ASSETS, a measure of net outward investment of residents

[12] Indicators of (private and public) bond market size are available only for a smaller number of countries and have proven to be rather imprecise in a number of contexts.

[13] We constructed indicators of the size of stock markets relative to the banking sector in order to see, whether a bank-based economy would experience stronger appreciation effects relative to a market-based one. The rationale behind the inclusion of these variables is that an economy in which a few major banks channel the majority of the inflows directly into the economy might be less likely to allocate the inflows efficiently. However, the results turned out to be inconclusive.

abroad divided by GDP,[14] and a range of possible determinants of real exchange rates as control variables. Fundamental determinants of real exchange rates have been discussed by a vast number of authors (e.g., Froot and Rogoff, 1995, and Edwards and Savastano, 2000). The growing consensus is that real exchange rate movements can be at least partly explained by fundamentals at the medium or long horizon (Engel, Mark, and West, 2007), although they seem to be unpredictable in the short run (Meese and Rogoff, 1983). Prominent determinants of real exchange rates are an economy's terms of trade (TOT), a measure of trade openness defined as exports plus imports over GDP (TRADEOPEN) and a measure of productivity growth relative to trading partners (RELPROD). Following much of the literature, these three variables are included in all of our regressions as control variables. We also examine the robustness of our results to the inclusion of other potentially important fundamentals such as income per capita (INCOME) and changes in the government balance over GDP (GB).[15]

It is clear that the effect of capital inflows on real exchange rate movements can be influenced by the way in which monetary authorities respond to the inflows. As robustness checks, we therefore add variables to our preferred model specification, which control for the effect of such policy responses. For instance, the above mentioned variable GB controls for fiscal contraction. A reduction in government expenditure can moderate the effect of capital inflows on the real exchange rate by effectively attenuating the rise in demand for domestic goods. Second, under a fixed exchange rate regime, policymakers might intervene in the foreign exchange market while sterilizing the intervention via open market operations. We therefore check for the robustness of our results to the inclusion of the variables total reserves minus gold divided by GDP (TRMG) as well as excess money growth (EXMG). A third potentially important policy instrument that can be used in the presence of a fixed currency is nominal adjustment against the intervention currency. As a proxy for such policy action, we add the domestic exchange rate against the dollar (DOLLAR)—the main intervention currency—to the specification.

We also include interaction terms between capital inflows and variables other than the indicators of financial development in the model. The rationale behind the inclusion of these additional variables is that a possible nonlinearity in the effect of capital inflows on the real

[14] A breakdown into different types of flows does not change the results in any substantial way.

[15] Higher Terms of Trade (TOT) should appreciate the real exchange rate through wealth effects. A similar argument can be made for the variable INCOME. Trade restrictions lead to higher domestic prices (of non-tradables). The variable TRADEOPEN would therefore be expected to have a coefficient with a negative sign. The productivity differential (RELPROD) should appreciate the real exchange rate under standard neoclassical assumptions (Balassa-Samuelson effect). A larger government balance (GB) is typically associated with reduced consumption spending, a negative effect on the relative price of non-tradables and thus a depreciative effect on the real exchange rate. For a more thorough discussion of the expected coefficients for these variables, see for instance Lee, Milesi-Ferretti, and Ricci (2008) or Edwards and Savastano (2000).

exchange rate could be driven by the level of financial development, but might also be the result of variations in the level of economic development, the degree of financial openness or the type of exchange rate regime in use. We use INCOME, defined as GDP per capita, as an indicator of economic development. The variable CAPOPEN is the Ito and Chinn (2007) indicator of financial openness.[16] The variable ERR is an indicator for the rigidity of the type of exchange rate regime in use. It can take the values 1 (hard peg) to 4 (floating regime). Following the reasoning of Otker-Robe et al (2007), we use the interaction term between capital inflows and the indicator for the type of exchange rate regime as one of our core explanatory variables. The interaction terms between capital inflows and INCOME as well as CAPOPEN are included for robustness checks only.

IV. ECONOMETRIC METHODOLOGY

The linear dynamic panel data model estimated is given by the formulation:

$$reer_{it} - reer_{it-1} = (1-\alpha)reer_{it-1} + \beta_1 INFLOW_{it} + \beta_2 (I_{it} * INFLOW_{it}) + \beta_3 Z_{it} + \eta_i + \varepsilon_{it}$$

where, *reer* is the log of the real effective exchange rate, *INFLOW* is a vector containing the variables FDI and OCI, *I* is the respective financial development indicator, *Z* is a vector of control variables, η is the individual specific effect and ε is the error term. The main consideration driving our choice of econometric model is the issue of endogeneity. There is no doubt that current and past realizations of the real exchange rate can be an important factor driving capital inflows. A consistent estimator that does allow for the joint endogeneity of all explanatory variables including the lagged dependent variable is the GMM difference estimator derived by Arellano and Bond (1991). However, the estimator has at least two important shortcomings. First, it requires the model to be differenced, implying that information on cross-country variation is lost. Second, instrument weakness of lags of the explanatory variables can influence the asymptotic and small sample performance of the estimator.

Based on the work of Arellano and Bover (1995), Blundell and Bond (1998) suggest a system estimator that combines the regression in differences with the regression in levels to attenuate these shortcomings. The estimator was explicitly developed for dynamic panels with a high number of cross-sectional units and rather few time periods as is the case in this study. To be precise, the system estimator allows for the weak endogeneity of our key explanatory variables. The concept of weak endogeneity implies that the explanatory variables can be correlated with current and past realizations of the dependent variable. The

[16] The indicator is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). A higher value of the indicator signals a higher degree of openness to financial transactions.

only requirement is that they are not affected by future unexpected changes in the dependent variable. We do not see any reason why this condition should be violated in the context of our study. While it is likely that the real exchange rate affects capital inflows contemporaneously (or through expectations of future exchange rate changes), there is no strong reason to believe that future (unexpected) shocks to the real exchange rate should have a substantial effect on today's realization of FDI or OCI.

Each of the regressions uses the asymptotically efficient two-step estimator. It has been shown that the two-step standard errors can be severely downward biased. We therefore construct robust standard errors following the methodology proposed by Windmeijer (2004) and use them exclusively. The consistency of the estimator crucially depends on whether the internal instruments are valid or not, i.e., whether the moment conditions actually hold. In order to ensure that this is the case in our model, we report the results of two specification tests for each of the specifications estimated. These are the Hansen J- statistic test of over-identifying restrictions and the Arellano-Bond test for second-order serial correlation in the error term.

V. ESTIMATION RESULTS

Table 1 reports the results of regressing the real exchange rate on inflows of foreign direct investment and other types of capital inflows, as well as the controls ASSETS, TOT, RELPROD, and TRADEOPEN. We include both types of capital inflows in Regression I and one inflow at a time in Regressions II and III. The tables show that the coefficient estimates for all variables have the expected sign. However, we also observe that FDI is not significant in Regression I and only significant at the 10 percent level in Regression II. The variable OCI, on the other hand, is highly significant in each of the regressions. Hence, while other types of capital inflows appear to appreciate the real exchange rate significantly, the evidence for FDI is less clear cut. Similar results have been found by, among others, Athukorala and Rajapatirana (2003). An explanation for this finding often brought forward is that FDI inflows are typically concentrated in the traded goods sector and will thus have a weaker impact on the relative prices of traded and non-traded goods.

At this point, it is perhaps worth mentioning that we would not necessarily expect capital inflows to appreciate the real exchange rate in a cross-country panel that includes both economically and financially developed and under-developed economies. In fact, it is precisely the argument of the present study that the effect of capital inflows should be weaker and might even be depreciative in nature if an economy is financially well-developed. In the following, we provide significant evidence for this argument. We find that foreign direct investment significantly appreciates the real exchange rate when a nonlinear effect is allowed for. The magnitude of the effect decreases with the level of financial development.

Strikingly, the results are largely inconclusive for other types of capital inflows.[17] While the signs on both the linear and the interaction terms are often as expected, we find little evidence of significant effects. It appears that financial sector development is relatively more important for the efficient absorption of foreign direct investment in spite of the fact that other types of capital inflows more strongly lead to an appreciation of the real exchange rate (Table 1). In general, it would be desirable to provide similar evidence for other types of inflows. Given that the overheating of economies and the destabilization of macroeconomic management resulting from large inflows are typically associated with highly liquid flows rather than flows of foreign direct investment, the policy recommendation in favor of market development would be even stronger.

A possible reason for the finding that financial development matters less for portfolio and other types of inflows is the differential effect of these types of capital flows on investment in the recipient economy. In particular, Bosworth and Collins (1999), Mody and Murshid (2005), and Mileva (2008) show that FDI has a strong impact on domestic capital formation while the effect emanating from portfolio flows is neglectable. The authors argue that, compared to other types of capital flows, foreign direct investment contributes more strongly to the direct provision of plant and equipment, managerial skills, technology spillovers between firms and, ultimately, productivity growth. Harrison, Love, and McMillan (2004) show that FDI also has a particularly strong effect on the easing of financing constraints. Moreover, Kose et al (2006) argue that foreign direct investment is particularly prone to result in "collateral benefits," i.e., sound macroeconomic policies and institutions that are put in place in order to attract the inflows. The benefit of channeling FDI to the most profitable investment opportunities may hence be high, while it could be rather low in the case of other types of capital. This argument may explain the finding that the attenuation of the exchange rate appreciation effect of portfolio and other types of inflows through financial market development turns out not to be statistically significant.

Given that the results for other types of inflows are inconclusive, in what follows we restrict ourselves to investigating the impact of financial sector development on the effect of net FDI inflows on the real exchange rate. The regressions in Tables 2A, 2B, 2C, and 2D add interaction terms between FDI inflows and indicators of financial development to the specification in Table 1. The preferred model specification also includes the financial development indicator itself and an interaction term between FDI and ERR as controls.[18] Regression I in each of these tables presents the coefficient estimates from our preferred model specification using data for the sample period 1997–2006. Regressions II and III present the results from estimating the same specification using longer time spans of data as a robustness check. A first glance at the results reveals that the control variables OCI,

[17] The results are not listed here but are available upon request.

[18] We also show that the results are robust to the inclusion of the variable ERR itself (Tables 4A to 4C).

ASSETS, TOT, RELPROD, and TRADEOPEN have the expected signs in all of the regressions and are mostly significant at the 5 percent level. Moreover, the interaction term between FDI inflows and ERR is significant at the 5 percent level as well and has a negative sign. This suggests that the exchange rate appreciation effect of capital inflows is lower the less rigid is the exchange rate regime.

A. Financial Market Development

The following discusses the results of interacting FDI inflows with our indicators of financial market development:

Regression I in Table 2A illustrates that a higher level of liquid liabilities per GDP—the first of our two indicators of financial market development—significantly attenuates the real appreciation effect of FDI inflows. The interaction term between FDI inflows and LLGDP has a negative sign and is highly significant at the 5 percent level. In addition, FDI as well as the other core control variables remain statistically significant, mostly at the 5 percent level. The Wald test results reported in the same table show that the variables FDI, FDI * ERR and FDI * LLGDP are also jointly significant. This finding enables us to calculate a threshold value of LLGDP below which, given a particular choice of exchange rate regime, FDI inflows appreciate the real exchange rate and above which they have a depreciating effect.[19] For instance, in an economy with a hard peg policy (ERR = 1), this threshold value lies above 2. As Appendix III illustrates, this is a very high ratio of liquid liabilities to GDP that is typically only attained by financially very well developed economies. We can conclude that FDI inflows appreciate the real exchange rate less strongly if financial markets are well developed and the exchange rate regime is less rigid. In financially highly developed economies with floating exchange rate regimes, the effect of FDI inflows on the real exchange rate might even be depreciative in nature.

Regression I in Table 2B presents the estimation results of including an interaction term between FDI inflows and our alternative indicator of financial market development, CREDIT, in the model. The coefficient values as well as the p-values on most of the variables do not change substantially. Moreover, the coefficient on the newly introduced interaction term has the expected negative sign and the Wald test indicates that the variables FDI, FDI * ERR and FDI * CREDIT are jointly significant. However, the interaction term is only significant in two out of the three regressions. In Regression I, the p-value of 0.146 slightly exceeds the 10 percent level. This is likely to be due to the fact that private credit is a

[19] Given the estimated coefficients, the total effect of one additional unit of FDI can be computed by simply adding up the coefficient on the level term with the product of the coefficient on the financial development interaction term and the indicator value itself as well as with the product of the coefficient on the exchange rate interaction term and the indicator value for the type of exchange rate regime. Assuming that the level of financial development is unknown, it is straightforward to calculate the level of financial development for which the total effect is equal to zero.

slightly misleading indicator of financial market development in this context. The reason is that the indicator is intended to measure the ability of the financial sector to efficiently manage inflows of capital. However, a substantial increase in private credit following large capital inflows could precisely be the result of the economy's inability to generate a broader range of alternative investment opportunities. Another reason might be a sampling error. Regressions II and III show that the relevant coefficients are indeed significant when the sample period is extended.

B. Capital Market Development

Next, we analyze the impact of capital market development on the effect of FDI inflows on the real exchange rate. We first include an interaction term between stock market capitalization and FDI inflows in the model. This yields the results presented in Regression I of Table 2C. We observe that both the interaction term and FDI itself are highly significant and the coefficient estimates have the expected signs. The findings suggest that larger stock markets are associated with a weaker exchange rate appreciation effect of FDI inflows. The Wald test again indicates that FDI and the two interaction terms are jointly significant. We then calculate the threshold values of SIZE below which, given the type of exchange rate regime in use, FDI inflows appreciate the real exchange rate. In the case of a hard peg policy, we find that these values lie well above what is typically attained by financially under-developed economies.

These results suggest that SIZE is indeed a good indicator of a market's efficiency in resource allocation. This is perhaps slightly surprising, as it is typically found in the growth literature (Levin, 2005) that the mere size of capital markets does not proxy very well for their ability to allocate resources efficiently. An indicator that is believed to be more closely associated with the degree of stock market efficiency is stock market activity. Regression I in Table 2D includes the interaction term between FDI and ACTIVITY in the model and illustrates that our hypothesis is confirmed regardless of whether we use stock market size or stock market activity as an indicator of capital market development. In particular, both FDI and the interaction term between FDI and stock market value traded per GDP are highly significant. Calculating the threshold value for ACTIVITY shows that FDI inflows appreciate the real exchange rate in economies with a hard peg if the ratio of stock value traded to GDP is smaller than about 1.5. This is again a level that is attained only by economically and financially very well-developed economies.

As discussed above, there are good reasons to expect that what matters more for the efficient management of capital inflows is trading activity and not market size. While we have found that stock market size is a good predictor of market efficiency, we also tested whether stock market turnover, that is, value traded over market capitalization, is also a good indicator and

found that although the coefficient on the interaction term of FDI and TURNOVER has the correct (negative) sign, it is not significant. [20]

We conclude that the depth of financial markets and the size as well as the activity of stock markets are good indicators of the efficiency of the financial sector in allocating FDI inflows and attenuating their appreciation effect on the real exchange rate. The effects are indeed economically important. In particular, the results suggest that a unit increase in LLGDP reduces the effect of FDI on the real exchange rate by between 0.4 and 0.7 percent. The corresponding reductions for CREDIT, SIZE and ACTIVITY are 0.2-0.4 percent, 0.2 percent, and 0.3 percent. These magnitudes are considerable given historic developments in the financial development indicators in particular countries. For instance, the ratio of liquid liabilities to GDP rose by about 0.5 units since the beginning of the 1970s in Singapore, while the capitalization ratio of Poland's stock markets rose by about 0.35 units since the beginning of the 1990s. An example for a substantial increase in stock market activity is Hong Kong, where the ratio of stock market value traded to GDP rose by more than 2 units since the early 1990s. Taking into consideration these developments, the magnitude of the coefficient values on the interaction terms in all of our regressions are considerable.

VI. ROBUSTNESS

Our findings suggest that estimation results are not subject to a substantial endogeneity bias. The dynamic panel techniques allow us to explicitly control for the likely weak endogeneity of the core regressors in our model via the use of internal instruments. Despite the fact that endogeneity is generally less of an issue with interaction terms (Aghion, Bacchetta, Rancière, and Rogoff, 2007), we test for the validity of these instruments using the Hansen test of over-identification. The Hansen test evaluates the joint validity of the entire set of moment conditions. The test results are reported in each of the tables. In no case do they reject the hypothesis that the moment conditions are valid.[21] Although not reported here, we also use "Difference-in-Sargan" statistics to test for the validity of each subset of instruments and are not able to reject the null hypothesis of their validity. The Arellano-Bond test for autocorrelation in first differences also concludes against the presence of second order autocorrelation in the error terms in all of our main regressions. The results also hold if we use the third instead of the second lag of the endogenous variables as instruments in our

[20] Results for this regression are available upon request.

[21] Notice that the Hansen test has been shown to be weakened by the use of too many instruments (Bowsher, 2002). While the consistency of the coefficient estimates remains unaffected, the Hansen test results for some of the robustness checks might not be very reliable.

regressions.[22] The results of these specification tests therefore provide support for the validity of the internal instruments and the assumption of zero autocorrelation.

In another robustness check, we extend the sample period and estimate our preferred model specification on the augmented datasets. The estimation results are reported in Regressions II and III of Tables 2A to 2C. The coefficient estimates shown suggest that our conclusions are not sensitive to a change in the time window. We also report the test results for the Hansen test for each of the additional regressions. The large test statistics suggests that the increase in the number of instruments due to the larger time dimension renders the Hansen test invalid for these robustness checks (Bowsher, 2002). It is, however, important to notice that this argument does not challenge the consistency of the coefficient estimates.

In an attempt to limit the omitted variable bias in our model, we include additional control variables that have frequently been found to exert a significant influence on real exchange rate movements. Tables 3A to 3C illustrate that the inclusion of neither GB nor INCOME changes the qualitative nature of our results while the signs on the coefficients are as expected. The same is true if we include TRMG, DOLLAR and EXMG, i.e., variables that are intended to control for possible policy responses to capital inflows. Furthermore, we add additional interaction terms to the specification. As discussed above, we do this in order to ensure that the attenuation of the exchange rate appreciation effect is indeed due to the level of financial development and not a result of other factors. The estimation results turn out to be reassuring in the sense that the interaction terms between FDI and the financial development indicators remain highly significant in all cases, while the coefficient estimates are not subject to substantive changes.

Finally, it is particularly important to ensure that the attenuation effect we identify is indeed due to variation in financial and not economic development. We tackle this problem in two ways. First, as discussed previously in the context of Tables 3A to 3C, we include the variable INCOME in the regression as a proxy of economic development. Using the variable both in level terms and as an interaction term with FDI should serve to disentangle the two effects if the proxy is good enough. Second, we experiment with the exclusion of subgroups of countries at different stages of economic development. In particular, we distinguish five different income groups and exclude one group at a time.[23] The estimation results can be found in Tables 4A to 4C. They indicate that our conclusions are not sensitive to this robustness check. In addition, we group the non-high-income countries in our sample

[22] We do this because the presence of autocorrelation in the error term would imply that only higher order lags could be used as instruments.

[23] Regions are distinguished according to the classification used by the World Bank Database on Financial Development and Structure. High income countries are classified as a separate group.

according to the world region they belong to and once again exclude one region at a time from the sample.[24] The results in Tables 5A to 5C suggest that our findings are not sensitive to these exclusions either.

VII. DISCUSSION

It is a well-established belief that a deep financial sector helps to allocate resources efficiently. Extending this line of reasoning to inflows of capital, a key implication of the argument is that the exchange rate appreciation effect of capital inflows should be lower in countries with a higher level of financial development. By ensuring that the inflows add to the productive capacity of the economy and reducing aggregate demand pressures, the upward pressure on the relative price of non-tradable goods should be attenuated.

Using dynamic panel data techniques and a panel of 85 developing and developed economies for the sample period 1997–2006, this study has provided strong evidence for this hypothesis. We used a Behavioral Model of the Exchange Rate that additionally includes different types of capital inflows as well as interaction terms between the inflow variables and indicators of financial sector development. We showed that the real appreciation effect of FDI on the exchange rate is significantly attenuated if an economy disposes of a deep financial sector as well as large and active stock markets. In order to ensure that the effect is indeed due to an increase in our indicators of financial development, we interacted FDI inflows with indicators of economic development, the type of exchange rate regime and the degree of financial openness. The results turn out to be robust to the inclusion of these and other control variables. We also ensured that both an extension of the sample period and the exclusion of groups of countries pertaining to the same income group or the same world region do not change the qualitative nature of the results. However, we did not find similar evidence for other types of capital inflows. A possible explanation is that the spill-over effects emanating from FDI inflows are particularly strong, making their efficient absorption relatively more urgent. A subsidiary finding is that the exchange rate appreciation effect of FDI inflows appears to be reduced significantly in the presence of a less rigid exchange rate regime.

The effects we find are not only statistically but also economically important. In particular, the results suggest that a unit increase in LLGDP reduces the effect of FDI on the real exchange rate by between 0.4 and 0.7 percent. The corresponding reductions for CREDIT, SIZE and ACTIVITY are 0.2–0.4 percent, 0.2 percent and 0.3 percent. These magnitudes are considerable given historic developments in the respective financial development indicators.

[24] Income groups are distinguished according to the classification used by the World Bank Database on Financial Development and Structure.

The main implication of these findings is that a careful development of an efficient and well-regulated financial system, deeper financial and capital markets can mitigate partly one of the main risks associated with large capital inflows in developing countries—the destabilization of macroeconomic management due to a sizeable appreciation of the real exchange rate. By avoiding a substantial appreciation of its currency, the respective economy can take advantage of the inflows' growth enhancing potential without having to make painful policy choices. Finally, the impact of capital inflows on the real exchange rate can be significantly reduced by the use of a more flexible exchange rate regime.

Table 1. The Impact of FDI and OCI on the Real Exchange Rate
The table reports coefficient estimates (p-values)

Dependent Variable:	Real Exchange Rate (in logs)		
Estimation:	2-step system GMM estimation Windmeyer (2004) Small Sample Robust Correction		
Period:	1997-2006		
Unit of Observation:	Annual		
	Regression I	Regression II	Regression III
Lagged Dependent	0.938 (0.000)	0.828 (0.000)	0.930 (0.000)
FDI	0.001 (0.165)	0.001 (0.091)	
OCI	0.001 (0.012)		0.001 (0.016)
Assets	-0.002 (0.241)	-0.001 (0.615)	-0.001 (0.524)
TOT (in logs)	0.062 (0.118)	0.171 (0.003)	0.070 (0.095)
RELPROD (in logs)	0.325 (0.000)	0.253 (0.000)	0.323 (0.000)
TRADEOPEN (in logs)	-0.153 (0.044)	-0.136 (0.060)	-0.150 (0.049)
Number of Countries	80	82	80
Number of Observations	520	528	520
Observations per Group			
min	1	1	1
avg	6.50	6.44	6.50
max	7	7	7
Number of Instruments	80	59	59
No. of Lags of each Endogenous Regressor used as Instrument	2	2	2
Specification Tests (p-values)			
(a) Hansen Test	0.496	0.201	0.161
(b)Second Order Serial Correlation	0.456	0.565	0.462

Source: Author's Estimations.

Table 2A. Liquid Liabilities and the Impact of FDI Inflows on the Real Exchange Rate
The table reports coefficient estimates (p-values)

Dependent Variable:	Real Exchange Rate (in logs)		
Estimation:	2-step system GMM estimation with Windmeyer (2004) Small Sample Robust Correction		
Unit of Observation:	Annual		
	Regression I	Regression II	Regression III
Period:	1997-2006	1995-2006	1990-2006
Lagged Dependent Variable	0.910 (0.000)	0.838 (0.000)	0.866 (0.000)
FDI	1.065 (0.048)	1.900 (0.004)	1.270 (0.001)
LLGDP	0.017 (0.305)	0.007 (0.714)	-0.014 (0.520)
FDI * LLGDP	-0.400 (0.049)	-0.666 (0.009)	-0.357 (0.099)
FDI * ERR	-0.228 (0.024)	-0.371 (0.002)	-0.302 (0.001)
OCI	0.093 (0.029)	0.133 (0.000)	0.197 (0.000)
ASSETS	-0.074 (0.071)	-0.100 (0.007)	-0.176 (0.001)
TOT (in logs)	0.086 (0.066)	0.158 (0.014)	0.134 (0.013)
RELPROD (in logs)	0.303 (0.000)	0.120 (0.195)	0.094 (0.138)
TRADEOPEN (in logs)	-0.170 (0.040)	-0.074 (0.162)	-0.093 (0.005)
Number of Countries	79	79	84
Number of Observations	491	632	902
Observations per Group			
min	1	2	1
avg	6.29	8.00	11.00
max	7	9	13
Number of Instruments	94	120	172
No. of Lags of each Endogenous Regressor used as Instrument	1	1	1
Specification Tests (p-values)			
(a) Sargan Test	0.857	0.994	1.000
(b) Second Order Serial Correlation	0.530	0.681	0.920
Wald Test (p-values)			
Ho: Total effect of capital inflows = 0	0.108	0.025	0.005
Threshold Analysis:			
FDI depreciates REER if STVALTRADED >			
ERR = 1	2.093	2.296	2.711
ERR = 4	0.383	0.625	0.174

Source: Author's Estimations.

Table 2B. Private Credit and the Impact of FDI Inflows on the Real Exchange Rate
The table reports coefficient estimates (p-values)

Dependent Variable:	Real Exchange Rate (in logs)		
Estimation:	2-step system GMM estimation with Windmeyer (2004) Small Sample Robust Correction		
Unit of Observation:	Annual		
Period:	Regression I 1997-2006	Regression II 1995-2006	Regression III 1990-2006
Lagged Dependent	0.933 (0.000)	0.850 (0.000)	0.865 (0.000)
FDI	0.528 (0.058)	0.897 (0.007)	0.877 (0.002)
CREDIT	0.009 (0.506)	-0.015 (0.327)	-0.005 (0.708)
FDI * CREDIT	-0.234 (0.146)	-0.398 (0.023)	-0.371 (0.032)
FDI * ERR	-0.114 (0.098)	-0.140 (0.106)	-0.176 (0.052)
OCI	0.088 (0.087)	0.180 (0.000)	0.120 (0.000)
ASSETS	-0.063 (0.167)	-0.139 (0.003)	-0.169 (0.004)
TOT (in logs)	0.065 (0.115)	0.150 (0.007)	0.134 (0.024)
RELPROD (in logs)	0.307 (0.000)	0.115 (0.193)	0.102 (0.125)
TRADEOPEN (in logs)	-0.170 (0.036)	-0.085 (0.118)	-0.097 (0.012)
Number of Countries	79	79	84
Number of Observations	500	643	910
Observations per Group			
min	1	2	1
avg	6.41	8.14	11.10
max	7	9	13
Number of Instruments	94	120	172
No. of Lags of each Endogenous Regressor used as Instrument	1	1	1
Specification Tests (p-values)			
(a) Hansen Test	0.872	0.996	1.000
(b) Second Order Serial Correlation	0.607	0.762	0.734
Wald Test (p-values)			
Ho: Total effect of capital inflows = 0	0.038	0.0133	0.009
Threshold Analysis:			
FDI depreciates REER if STVALTRADED >			
ERR = 1	1.769	1.902	1.889
ERR = 4	0.308	0.847	0.466

Source: Author's Estimations.

Table 2C. Stock Market Size and the Impact of FDI Inflows on the Real Exchange Rate

The table reports coefficient estimates (p-values)

Dependent Variable:	Real Exchange Rate (in logs)		
Estimation:	2-step system GMM estimation with Windmeyer (2004) Small Sample Robust Correction		
Unit of Observation:	Annual		
Period:	Regression I 1997-2006	Regression II 1995-2006	Regression III 1990-2006
Lagged Dependent	0.941 (0.000)	0.884 (0.000)	0.922 (0.000)
FDI	0.586 (0.029)	0.727 (0.001)	0.699 (0.004)
SIZE	0.012 (0.336)	0.007 (0.534)	0.003 (0.755)
FDI * SIZE	-0.168 (0.038)	-0.188 (0.009)	-0.154 (0.037)
FDI * ERR	-0.160 (0.026)	-0.168 (0.002)	-0.173 (0.004)
OCI	0.112 (0.029)	0.141 (0.006)	0.127 (0.005)
ASSETS	-0.133 (0.016)	-0.159 (0.005)	-0.145 (0.005)
TOT (in logs)	0.058 (0.156)	0.114 (0.048)	0.077 (0.097)
RELPROD (in logs)	0.328 (0.000)	0.199 (0.032)	0.186 (0.006)
TRADEOPEN (in logs)	-0.156 (0.074)	-0.080 (0.194)	-0.010 (0.014)
Number of Countries	79	79	84
Number of Observations	474	614	856
Observations per Group			
min	1	2	1
avg	6	7.77	10.44
max	7	9	13
Number of Instruments	94	120	172
No. of Lags of each Endogenous Regressor used as Instrument	1	1	
Specification Tests (p-values)			
(a) Sargan Test	0.820	0.996	1.000
(b) Second Order Serial Correlation	0.494	0.760	0.883
Wald Test (p-values)			
Ho: Total effect of capital inflows = 0	0.074	0.009	0.029
Threshold Analysis:			
FDI depreciates REER if STVALTRADED >			
ERR = 1	2.536	2.973	3.416
ERR = 4	-0.321	0.293	0.045

Source: Author's Estimations.

Table 2D. Stock Market Activity and the Impact of FDI Inflows on the Real Exchange Rate

The table reports coefficient estimates (p-values)

Dependent Variable:	Real Exchange Rate (in logs)		
Estimation:	2-step system GMM estimation with Windmeyer (2004) Small Sample Robust Correction		
Unit of Observation:	Annual		
	Regression I	Regression II	Regression III
Period:	1997-2006	1995-2006	1990-2006
Lagged Dependent	0.948 (0.000)	0.889 (0.000)	0.895 (0.000)
FDI	0.544 (0.017)	0.669 (0.009)	0.621 (0.022)
ACTIVITY	0.011 (0.339)	0.015 (0.276)	0.015 (0.096)
FDI * ACTIVITY	-0.254 (0.015)	-0.326 (0.004)	-0.288 (0.022)
FDI * ERR	-0.165 (0.007)	-0.170 (0.009)	-0.157 (0.019)
OCI	0.090 (0.076)	0.131 (0.014)	0.158 (0.004)
ASSETS	-0.107 (0.048)	-0.136 (0.017)	-0.165 (0.005)
TOT (in logs)	0.051 (0.228)	0.109 (0.075)	0.103 (0.047)
RELPROD (in logs)	0.319 (0.000)	0.192 (0.045)	0.145 (0.030)
TRADEOPEN (in logs)	-0.152 (0.051)	-0.078 (0.174)	-0.089 (0.032)
Number of Countries	79	79	84
Number of Observations	472	614	866
Observations per Group			
min	1	2	1
avg	5.97	7.77	10.56
max	7	9	13
Number of Instruments	94	120	146
No. of Lags of each Endogenous Regressor used as Instrument	1	1	1
Specification Tests (p-values)			
(a) Hansen Test	0.802	0.996	1.000
(b) Second Order Serial Correlation	0.565	0.810	0.800
Wald Test (p-values)			
Ho: Total effect of capital inflows = 0	0.026	0.018	0.046
Threshold Analysis:			
FDI depreciates REER if STVALTRADED >			
ERR = 1	1.492	1.531	1.611
ERR = 4	-0.457	-0.034	-0.024

Source: Author's Estimations.

Table 3A. Robustness: Additional Variables in Liquid Liabilities Regression

Dependent Variable:	Real Exchange Rate (in logs)						
Estimation:	2-step system GMM estimation with Windmeyer (2004) Small Sample Robust Correction						
Unit of Observation:	Annual						
Period:	1997-2006						
	Regression I	Regression II	Regression III	Regression IV	Regression V	Regression VI	Regression VII
Additional Variable	TRMG	GB	ER	EXMG	ERR	CAPOPEN	INCOME
Lagged Dependent	0.916 (0.000)	0.907 (0.000)	0.909 (0.000)	0.910 (0.000)	0.928 (0.000)	0.913 (0.000)	0.913 (0.000)
FDI	0.798 (0.067)	1.077 (0.083)	1.062 (0.046)	1.021 (0.059)	0.805 (0.079)	0.934 (0.098)	0.934 (0.098)
LLGDP	0.012 (0.442)	0.017 (0.372)	0.017 (0.299)	0.012 (0.423)	0.020 (0.204)	0.022 (0.218)	0.022 (0.218)
FDI * LLGDP	-0.318 (0.063)	-0.410 (0.077)	-0.403 (0.048)	-0.384 (0.062)	-0.288 (0.074)	-0.337 (0.067)	-0.337 (0.067)
FDI * ERR	-0.183 (0.032)	-0.236 (0.048)	-0.227 (0.024)	-0.200 (0.045)	-0.186 (0.043)	-0.192 (0.074)	-0.192 (0.074)
OCI	0.080 (0.048)	0.093 (0.042)	0.093 (0.035)	0.081 (0.093)	0.080 (0.046)	0.090 (0.056)	0.090 (0.056)
ASSETS	-0.055 (0.161)	-0.074 (0.074)	-0.075 (0.081)	-0.054 (0.255)	-0.069 (0.082)	-0.078 (0.078)	-0.078 (0.078)
TOT (in logs)	0.081 (0.054)	0.089 (0.047)	0.087 (0.061)	0.086 (0.062)	0.065 (0.112)	0.082 (0.053)	0.082 (0.053)
RELPROD (in logs)	0.303 (0.000)	0.324 (0.000)	0.300 (0.000)	0.305 (0.000)	0.315 (0.000)	0.310 (0.000)	0.310 (0.000)
TRADEOPEN (in logs)	-0.168 (0.040)	-0.167 (0.053)	-0.171 (0.034)	-0.184 (0.017)	-0.168 (0.040)	-0.163 (0.054)	-0.163 (0.054)
Additional Variable	-0.001 (0.644)	-0.0029 (0.002)	-0.000 (0.965)	0.014 (0.767)	0.014 (0.313)	0.003 (0.558)	0.003 (0.558)
Interaction with FDI						-0.062 (0.357)	-0.062 (0.357)
Number of Countries	79	79	79	79	79	79	79
Number of Observations	490	491	491	485	491	491	491
Observations per Group							
min	1	1	1	1	1	1	1
avg	6.28	6.29	6.29	6.22	6.29	6.29	6.29
max	7	7	7	7	7	7	7
Number of Instruments	95	95	95	95	95	96	96
No. of Lags of each Endogenous Regressor used as Instrument	1	1	1	1	1	1	1
Specification Tests (p-values)							
(a) Hansen Test	0.867	0.773	0.839	0.820	0.849	0.849	0.847
(b) Second Order Serial Correlation	0.521	0.528	0.528	0.527	0.448	0.448	0.507

Source: Author's Estimations.

Table 3B. Robustness: Additional Variables in Stock Market Size Regression

The table reports coefficient estimates (p-values)

Dependent Variable:	Real Exchange Rate (in logs)						
Estimation:	2-step system GMM estimation with Windmeyer (2004) Small Sample Robust Correction						
Unit of Observation:	Annual						
Period:	1997-2006						
	Regression I	Regression II	Regression III	Regression IV	Regression V	Regression VI	Regression VII
Additional Variable	TRMG	GB	ER	EXMG	ERR	CAPOPEN	INCOME
Lagged Dependent	0.940 (0.000)	0.939 (0.000)	0.941 (0.000)	0.934 (0.000)	0.950 (0.000)	0.939 (0.000)	0.954 (0.000)
FDI	0.565 (0.040)	0.617 (0.014)	0.587 (0.037)	0.513 (0.030)	0.438 (0.093)	0.724 (0.021)	0.700 (0.010)
SIZE	0.010 (0.375)	0.012 (0.310)	0.010 (0.419)	0.011 (0.323)	0.010 (0.404)	0.010 (0.348)	-0.002 (0.863)
FDI * SIZE	-0.153 (0.037)	-0.172 (0.023)	-0.163 (0.050)	-0.142 (0.057)	-0.136 (0.059)	-0.150 (0.048)	-0.149 (0.053)
FDI * ERR	-0.157 (0.040)	-0.164 (0.010)	-0.164 (0.026)	-0.133 (0.043)	-0.125 (0.098)	-0.161 (0.031)	-0.232 (0.004)
OCI	0.109 (0.024)	0.112 (0.023)	0.106 (0.048)	0.119 (0.022)	0.097 (0.072)	0.099 (0.055)	0.058 (0.305)
ASSETS	-0.130 (0.015)	-0.133 (0.013)	-0.128 (0.025)	-0.141 (0.014)	-0.118 (0.041)	-0.122 (0.030)	-0.084 (0.166)
TOT (in logs)	0.058 (0.113)	0.059 (0.113)	0.058 (0.139)	0.064 (0.122)	0.048 (0.184)	0.058 (0.139)	0.045 (0.150)
RELPROD (in logs)	0.331 (0.000)	0.361 (0.000)	0.323 (0.000)	0.326 (0.000)	0.329 (0.000)	0.327 (0.000)	0.341 (0.000)
TRADEOPEN (in logs)	-0.153 (0.060)	-0.144 (0.086)	-0.153 (0.080)	-0.159 (0.070)	-0.149 (0.103)	-0.152 (0.071)	-0.140 (0.084)
Additional Variable	-0.000 (0.933)	-0.003 (0.003)	-0.000 (0.687)	0.006 (0.885)	0.005 (0.626)	0.004 (0.305)	0.000 (0.002)
Interaction with FDI						-0.071 (0.298)	0.000 (0.461)
Number of Countries	79	79	79	79	79	79	79
Number of Observations	473	474	474	464	474	474	474
Observations per Group							
min	1	1	1	1	1	1	1
avg	5.99	6.00	6.00	5.87	6.00	6.00	6.00
max	7	7	7	7	7	7	7
Number of Instruments	95	95	95	95	95	96	96
No. of Lags of each Endogenous Regressor used as Instrument	1	1	1	1	1	1	1
Specification Tests (p-values)							
(a) Hansen Test	0.812	0.880	0.812	0.833	0.895	0.908	0.895
(b) Second Order Serial Correlation	0.491	0.466	0.493	0.494	0.443	0.498	0.524

Source: Author's Estimations.

Table 3C. Robustness: Additional Variables in Stock Market Activity Regression

The table reports coefficient estimates (p-values)

Dependent Variable:	Real Exchange Rate (in logs)						
Estimation:	2-step system GMM estimation with Windmeyer (2004) Small Sample Robust Correction						
Unit of Observation:	Annual						
Period:	1997-2006						
Additional Variable	Regression I TRMG	Regression II GB	Regression III ER	Regression IV EXMG	Regression V ERR	Regression VI CAPOPEN	Regression VII INCOME
Lagged Dependent	0.950 (0.000)	0.943 (0.000)	0.951 (0.000)	0.941 (0.000)	0.951 (0.000)	0.943 (0.000)	0.944 (0.000)
FDI	0.527 (0.027)	0.567 (0.010)	0.555 (0.005)	0.587 (0.037)	0.554 (0.027)	0.602 (0.054)	0.607 (0.015)
ACTIVITY	0.010 (0.338)	0.010 (0.380)	0.106 (0.330)	0.010 (0.419)	0.010 (0.391)	0.011 (0.314)	-0.003 (0.844)
FDI * ACTIVITY	-0.248 (0.011)	-0.250 (0.012)	-0.253 (0.011)	-0.163 (0.050)	-0.243 (0.016)	-0.289 (0.021)	-0.278 (0.030)
FDI * ERR	-0.153 (0.016)	-0.169 (0.004)	-0.171 (0.002)	-0.164 (0.026)	-0.167 (0.023)	-0.169 (0.026)	-0.120 (0.009)
OCI	0.092 (0.080)	0.087 (0.080)	0.088 (0.116)	0.106 (0.048)	0.084 (0.140)	0.102 (0.070)	0.075 (0.146)
ASSETS	-0.108 (0.061)	-0.103 (0.052)	-0.106 (0.073)	-0.128 (0.025)	-0.102 (0.095)	-0.121 (0.043)	-0.100 (0.067)
TOT (in logs)	0.049 (0.234)	0.056 (0.208)	0.049 (0.254)	0.058 (0.139)	0.045 (0.275)	0.055 (0.222)	0.054 (0.196)
RELPROD (in logs)	0.309 (0.000)	0.340 (0.000)	0.322 (0.000)	0.323 (0.000)	0.322 (0.000)	0.317 (0.000)	0.316 (0.000)
TRADEOPEN (in logs)	-0.147 (0.060)	-0.149 (0.067)	-0.151 (0.067)	-0.153 (0.080)	-0.151 (0.056)	-0.154 (0.048)	-0.148 (0.050)
Additional Variable	-0.000 (0.797)	-0.002 (0.000)	-0.000 (0.552)	-0.000 (0.687)	0.013 (0.260)	0.001 (0.870)	0.000 (0.024)
Interaction with FDI						0.012 (0.863)	0.000 (0.488)
Number of Countries	79	79	79	79	79	79	79
Number of Observations	471	472	472	474	472	472	472
Observations per Group							
min	1	1	1	1	1	1	1
avg	5.96	5.97	5.97	6.00	5.97	5.97	5.97
max	7	7	7	7	7	7	7
Number of Instruments							
No. of Lags of each Endogenous Regressor	95	95	95	95	95	96	96
used as Instrument	1	1	1	1	1	1	1
Specification Tests (p-values)							
(a) Hansen Test	0.804	0.762	0.800	0.812	0.817	0.803	0.794
(b) Second Order Serial Correlation	0.565	0.539	0.569	0.493	0.491	0.582	0.616

Source: Author's Estimations.

Table 4A: Robustness: Excluding One Income Group at a Time in Liquid Liabilities Regression
The table reports coefficient estimates (p-values)

Dependent Variable:	Real Exchange Rate (in logs)
Estimation:	2-step system GMM estimation with Windmeyer (2004) Small Sample Robust Correction
Unit of Observation:	Annual
Period:	1995-2006

Excluded Income Group	Regression I High Income OECD	Regression II High Income non-OECD	Regression III Low Income	Regression IV Lower Middle Income	Regression V Upper Middle Income
Lagged Dependent	0.804 (0.000)	0.858 (0.000)	0.839 (0.000)	0.788 (0.000)	0.850 (0.000)
FDI	1.225 (0.000)	0.814 (0.018)	0.927 (0.000)	1.027 (0.001)	1.366 (0.000)
LLGDP	0.005 (0.715)	-0.003 (0.792)	0.012 (0.553)	0.017 (0.318)	0.006 (0.628)
FDI * LLGDP	-0.474 (0.001)	-0.214 (0.219)	-0.427 (0.001)	-0.478 (0.055)	-0.501 (0.001)
FDI * ERR	-0.251 (0.000)	-0.226 (0.001)	-0.147 (0.160)	-0.201 (0.004)	-0.268 (0.001)
OCI	0.129 (0.003)	0.080 (0.200)	0.250 (0.084)	0.163 (0.002)	0.151 (0.013)
ASSETS	-0.102 (0.019)	-0.060 (0.359)	-0.216 (0.133)	-0.138 (0.013)	-0.131 (0.030)
TOT (in logs)	0.194 (0.057)	0.143 (0.039)	0.157 (0.038)	0.207 (0.016)	0.147 (0.055)
RELPROD (in logs)	0.052 (0.576)	0.151 (0.198)	0.090 (0.387)	0.125 (0.196)	0.141 (0.173)
TRADEOPEN (in logs)	-0.049 (0.166)	-0.087 (0.174)	-0.119 (0.075)	-0.073 (0.175)	-0.090 (0.109)
Number of Countries	58	61	57	70	70
Number of Observations	452	485	449	560	582
Observations per Group					
min	2	2	2	2	2
avg	7.79	7.95	7.88	8	8.31
max	9	9	9	9	9
Number of Instruments	164	168	167	177	178
No. of Lags of each Endogenous Regressor used as Instrument	1	1	1	1	1
Specification Tests (p-values)					
(a) Sargan Test	1.000	1.000	1.000	1.000	1.000
(b) Second Order Serial Correlation	0.758	0.275	0.993	0.764	0.804

Source: Author's Estimations

Table 4B: Robustness: Excluding One Income Group at a Time in Market Size Regression
The table reports coefficient estimates (p-values)

Dependent Variable:	Real Exchange Rate (in logs)
Estimation:	2-step system GMM estimation with Windmeyer (2004) Small Sample Robust Correction
Unit of Observation:	Annual
Period:	1995-2006

Excluded Income Group	Regression I High Income OECD	Regression II High Income non-OECD	Regression III Low Income	Regression IV Lower Middle Income	Regression V Upper Middle Income
Lagged Dependent	0.797 (0.000)	0.935 (0.000)	0.849 (0.000)	0.815 (0.000)	0.860 (0.000)
FDI	0.438 (0.008)	0.619 (0.009)	0.504 (0.016)	0.785 (0.001)	0.573 (0.002)
SIZE	0.005 (0.497)	-0.002 (0.746)	-0.002 (0.829)	0.003 (0.798)	0.001 (0.897)
FDI * SIZE	-0.156 (0.001)	-0.142 (0.029)	-0.146 (0.071)	-0.260 (0.174)	-0.145 (0.019)
FDI * ERR	-0.083 (0.094)	-0.141 (0.009)	-0.064 (0.422)	-0.151 (0.023)	-0.114 (0.044)
OCI	0.109 (0.021)	0.117 (0.017)	0.206 (0.143)	0.215 (0.001)	0.131 (0.034)
ASSETS	-0.110 (0.025)	-0.138 (0.011)	-0.231 (0.115)	-0.182 (0.014)	-0.149 (0.026)
TOT (in logs)	0.201 (0.115)	0.065 (0.097)	0.150 (0.056)	0.181 (0.037)	0.138 (0.065)
RELPROD (in logs)	0.086 (0.366)	0.203 (0.026)	0.150 (0.191)	0.153 (0.174)	0.164 (0.095)
TRADEOPEN (in logs)	-0.045 (0.243)	-0.109 (0.229)	-0.112 (0.117)	-0.078 (0.212)	-0.084 (0.132)
Number of Countries	58	60	57	70	71
Number of Observations	433	466	439	544	574
Observations per Group					
min	2	2	2	2	4
avg	7.47	7.77	7.70	7.77	8.08
max	9	9	9	9	9
Number of Instruments	162	166	162	176	180
No. of Lags of each Endogenous Regressor used as Instrument	1	1	1	1	1
Specification Tests (p-values)					
(a) Sargan Test	1.000	1.000	1.000	1.000	1.000
(b) Second Order Serial Correlation	0.759	0.329	0.862	0.894	0.812

Source: Author's Estimations

Table 4C: Robustness: Excluding One Income Group at a Time in Market Activity Regression
The table reports coefficient estimates (p-values)

Dependent Variable:	Real Exchange Rate (in logs)
Estimation:	2-step system GMM estimation with Windmeyer (2004) Small Sample Robust Correction
Unit of Observation:	Annual
Period:	1995-2006

Excluded Income Group	Regression I High Income OECD	Regression II High Income non-OECD	Regression III Low Income	Regression IV Lower Middle Income	Regression V Upper Middle Income
Lagged Dependent	0.831 (0.000)	0.936 (0.000)	0.846 (0.000)	0.787 (0.000)	0.870 (0.000)
FDI	0.282 (0.103)	0.473 (0.093)	0.393 (0.173)	0.755 (0.010)	0.574 (0.001)
ACTIVITY	0.007 (0.346)	0.006 (0.437)	0.018 (0.412)	0.017 (0.037)	0.011 (0.173)
FDI * ACTIVITY	-0.187 (0.051)	-0.252 (0.040)	-0.306 (0.032)	-0.354 (0.028)	-0.287 (0.000)
FDI * ERR	-0.064 (0.170)	-0.124 (0.043)	-0.036 (0.675)	-0.169 (0.015)	-0.127 (0.012)
OCI	0.086 (0.300)	0.103 (0.101)	0.238 (0.077)	0.168 (0.007)	0.145 (0.014)
ASSETS	-0.082 (0.332)	-0.110 (0.089)	-0.255 (0.065)	-0.146 (0.029)	-0.149 (0.015)
TOT (in logs)	0.168 (0.167)	0.064 (0.163)	0.151 (0.072)	0.210 (0.015)	0.128 (0.071)
RELPROD (in logs)	0.052 (0.504)	0.170 (0.065)	0.124 (0.264)	0.151 (0.139)	0.172 (0.059)
TRADEOPEN (in logs)	-0.043 (0.227)	-0.105 (0.112)	-0.110 (0.169)	-0.068 (0.260)	-0.088 (0.177)
Number of Countries	58	60	57	70	71
Number of Observations	438	465	439	543	571
Observations per Group					
min	2	2	2	2	4
avg	7.55	7.75	7.70	7.76	8.04
max	9	9	9	9	9
Number of Instruments	164	167	163	176	180
No. of Lags of each Endogenous Regressor used as Instrument	1	1	1	1	1
Specification Tests (p-values)					
(a) Sargan Test	1.000	1.000	1.000	1.000	1.000
(b) Second Order Serial Correlation	0.746	0.385	0.793	0.966	0.890

Source: Author's Estimations

Table 5A. Robustness: Excluding One Region at a Time in Liquid Liabilities Regression

The table reports coefficient estimates (p-values)

Dependent Variable:	Real Exchange Rate (in logs)					
Estimation:	2-step system GMM estimation with Windmeyer (2004) Small Sample Robust Correction					
Unit of Observation:	Annual					
Period:	1995-2006					
Excluded Region	Regression I Latin America and the Caribbean	Regression II Europe and Central Asia	Regression III South Asia	Regression IV Sub-Saharan Africa	Regression V Middle East and North Africa	Regression VI East Asia and Pacific
Lagged Dependent	0.712 (0.000)	0.890 (0.000)	0.829 (0.000)	0.859 (0.000)	0.839 (0.000)	0.913 (0.000)
FDI	1.317 (0.014)	1.970 (0.014)	1.902 (0.002)	1.717 (0.003)	1.732 (0.006)	1.526 (0.002)
LLGDP	0.004 (0.827)	0.008 (0.635)	0.003 (0.887)	0.004 (0.825)	0.006 (0.748)	0.003 (0.852)
FDI * LLGDP	-0.528 (0.024)	-0.693 (0.018)	-0.682 (0.007)	-0.592 (0.013)	-0.603 (0.016)	-0.531 (0.010)
FDI * ERR	-0.528 (0.024)	-0.395 (0.008)	-0.367 (0.002)	-0.340 (0.001)	-0.345 (0.004)	-0.316 (0.001)
OCI	0.122 (0.001)	0.148 (0.010)	0.147 (0.000)	0.121 (0.003)	0.127 (0.001)	0.121 (0.001)
ASSETS	-0.083 (0.025)	-0.119 (0.038)	-0.110 (0.005)	-0.090 (0.035)	-0.091 (0.024)	-0.098 (0.009)
TOT (in logs)	0.286 (0.005)	0.106 (0.097)	0.167 (0.018)	0.137 (0.019)	0.157 (0.016)	0.084 (0.091)
RELPROD (in logs)	0.005 (0.950)	0.151 (0.152)	0.115 (0.204)	0.153 (0.072)	0.172 (0.071)	0.177 (0.047)
TRADEOPEN (in logs)	-0.004 (0.911)	-0.092 (0.206)	-0.079 (0.179)	-0.079 (0.178)	-0.065 (0.265)	-0.108 (0.084)
Number of Countries	65	64	75	73	75	74
Number of Observations	512	508	615	586	599	595
Observations per Group						
min	2	2	2	2	2	2
avg	7.88	7.94	8.20	8.03	7.99	8.04
max	9	9	9	9	9	9
Number of Instruments	120	120	120	120	120	120
No. of Lags of each Endogenous Regressor used as Instrument	1	1	1	1	1	1
Specification Tests (p-values)						
(a) Hansen Test	1.000	1.000	1.000	0.999	0.999	1.000
(b) Second Order Serial Correlation	0.097	0.957	0.671	0.882	0.663	0.452

Source: Author's Estimations

Table 5B. Robustness: Excluding One Region at a Time in Stock Market SIZE Regression

The table reports coefficient estimates (p-values)

Dependent Variable:	Real Exchange Rate (in logs)
Estimation:	2-step system GMM estimation with Windmeyer (2004) Small Sample Robust Correction
Unit of Observation:	Annual
Period:	1995-2006

Excluded Region	Regression I Latin America and the Caribbean	Regression II Europe and Central Asia	Regression III South Asia	Regression IV Sub-Saharan Africa	Regression V Middle East and North Africa	Regression VI East Asia and Pacific
Lagged Dependent	0.752 (0.000)	0.879 (0.000)	0.875 (0.000)	0.915 (0.000)	0.884 (0.000)	0.954 (0.000)
FDI	0.573 (0.005)	0.891 (0.015)	0.644 (0.002)	0.661 (0.006)	0.651 (0.003)	0.609 (0.010)
SIZE	-0.007 (0.440)	0.015 (0.202)	0.005 (0.658)	0.006 (0.568)	0.003 (0.821)	0.004 (0.685)
FDI * SIZE	-0.142 (0.044)	-0.241 (0.009)	-0.161 (0.019)	-0.177 (0.019)	-0.155 (0.030)	-0.144 (0.053)
FDI * ERR	-0.107 (0.033)	-0.193 (0.023)	-0.151 (0.003)	-0.170 (0.004)	-0.158 (0.003)	-0.168 (0.003)
OCI	0.115 (0.008)	0.149 (0.008)	0.136 (0.006)	0.143 (0.003)	0.130 (0.005)	0.091 (0.038)
ASSETS	-0.124 (0.005)	-0.158 (0.010)	-0.152 (0.005)	-0.159 (0.004)	-0.147 (0.004)	-0.108 (0.027)
TOT (in logs)	0.248 (0.016)	0.117 (0.031)	0.124 (0.041)	0.083 (0.103)	0.115 (0.056)	0.045 (0.195)
RELPROD (in logs)	0.073 (0.341)	0.187 (0.104)	0.187 (0.040)	0.243 (0.012)	0.221 (0.029)	0.251 (0.001)
TRADEOPEN (in logs)	-0.003 (0.938)	-0.092 (0.209)	-0.079 (0.208)	-0.093 (0.162)	-0.070 (0.254)	-0.102 (0.145)
Number of Countries	65	64	75	72	75	75
Number of Observations	499	493	597	567	580	579
Observations per Group						
min	2	2	2	2	2	2
avg	7.68	7.70	7.96	7.88	7.73	7.72
max	9	9	9	9	9	9
Number of Instruments	120	120	120	120	120	120
No. of Lags of each Endogenous Regressor used as Instrument	1	1	1	1	1	1
Specification Tests (p-values)						
(a) Hansen Test	1.000	1.000	0.999	1.000	0.999	0.998
(b) Second Order Serial Correlation	0.144	0.844	0.765	0.845	0.759	0.496

Source: Author's Estimations

Table 5C. Robustness: Excluding One Region at a Time in Stock Market Activity Regression

The table reports coefficient estimates (p-values)

Dependent Variable:	Real Exchange Rate (in logs)					
Estimation:	2-step system GMM estimation with Windmeyer (2004) Small Sample Robust Correction					
Unit of Observation:	Annual					
Period:	1995-2006					
Excluded Region	Regression I Latin America and the Caribbean	Regression II Europe and Central Asia	Regression III South Asia	Regression IV Sub-Saharan Africa	Regression V Middle East and North Africa	Regression VI East Asia and Pacific
Lagged Dependent	0.805 (0.000)	0.907 (0.000)	0.882 (0.000)	0.922 (0.000)	0.884 (0.000)	0.969 (0.000)
FDI	0.310 (0.108)	0.709 (0.104)	0.520 (0.027)	0.584 (0.016)	0.579 (0.035)	0.483 (0.006)
ACTIVITY	-0.001 (0.931)	0.019 (0.101)	0.012 (0.324)	0.015 (0.171)	0.012 (0.392)	0.011 (0.248)
FDI * ACTIVITY	-0.207 (0.033)	-0.349 (0.044)	-0.266 (0.015)	-0.305 (0.005)	-0.286 (0.026)	-0.213 (0.014)
FDI * ERR	-0.072 (0.094)	-0.167 (0.083)	-0.145 (0.012)	-0.160 (0.008)	-0.159 (0.018)	-0.163 (0.002)
OCI	0.117 (0.010)	0.105 (0.074)	0.118 (0.026)	0.131 (0.012)	0.118 (0.057)	0.079 (0.138)
ASSETS	-0.119 (0.009)	-0.103 (0.095)	-0.121 (0.031)	-0.136 (0.013)	-0.122 (0.062)	-0.085 (0.130)
TOT (in logs)	0.196 (0.061)	0.090 (0.143)	0.117 (0.078)	0.077 (0.190)	0.114 (0.086)	0.031 (0.436)
RELPROD (in logs)	0.063 (0.417)	0.189 (0.059)	0.170 (0.065)	0.234 (0.008)	0.206 (0.024)	0.252 (0.002)
TRADEOPEN (in logs)	-0.008 (0.812)	-0.089 (0.212)	-0.081 (0.211)	-0.100 (0.114)	-0.075 (0.209)	-0.111 (0.089)
Number of Countries	65	64	75	72	75	75
Number of Observations	503	492	597	565	580	579
Observations per Group						
min	2	2	3	2	2	2
avg	7.74	7.69	7.96	7.85	7.73	7.72
max	9	9	9	9	9	9
Number of Instruments	120	120	120	120	120	120
No. of Lags of each Endogenous Regressor used as Instrument	1	1	1	1	1	1
Specification Tests (p-values)						
(a) Hansen Test	1.000	1.000	1.000	1.000	0.999	1.000
(b) Second Order Serial Correlation	0.112	0.791	0.806	0.914	0.805	0.526

Source: Author's Estimations.

APPENDIX I: LIST OF COUNTRIES

Table 5. List of 84 Countries Used for the Analysis

Argentina	India	Peru
Armenia	Indonesia	Philippines
Australia	Ireland	Poland
Austria	Israel	Portugal
Bahrein	Italy	Romania
Bangladesh	Jamaica	Russian Federation
Bolivia	Japan	Saudi Arabia
Brazil	Jordan	Singapore
Bulgaria	Kazakhstan	Slovak Republic
Canada	Kenya	Slovenia
Chile	Korea	South Africa
Hong Kong	Kuwait	Spain
Colombia	Kyrgyz Republic	Sri Lanka
Costa Rica	Latvia	Sweden
Côte d'Ivoire	Lithuania	Switzerland
Croatia	Malaysia	Tanzania
Cyprus	Malta	Thailand
Czech Republic	Mauritius	Trinidad and Tobago
Denmark	Mexico	Tunisia
Ecuador	Morocco	Turkey
Egypt	Namibia	Uganda
El Salvador	Netherlands	United Kingdom
Estonia	New Zealand	Uruguay
Finland	Nigeria	United States
France	Norway	Venezuela
Germany	Pakistan	Zimbabwe
Greece	Panama	
Hungary	Papua New Guinea	
Iceland	Paraguay	

APPENDIX II: DEFINITIONS AND SOURCES OF VARIABLES

Table 6. Definitions and Sources of Variables

Variable	Definition and Construction	Source
REER	Real Effective Exchange Rate, CPI base	International Monetary Fund, INS
ACTIVITY	Stock Value Traded over GDP	World Bank Database on Financial Development and Structure; for details see Thorsten Beck, Asli Demirgüç-Kunt and Ross Levine, (2000), "A New Database on Financial Development and Structure," World Bank Economic Review 14, 597-605.
SIZE	Stock Market Capitalization over GDP	World Bank Database on Financial Development and Structure; for details see Thorsten Beck, Asli Demirgüç-Kunt and Ross Levine, (2000), "A New Database on Financial Development and Structure," World Bank Economic Review 14, 597-605.
LLGDP	Liquid Liabilities over GDP	World Bank Database on Financial Development and Structure; for details see Thorsten Beck, Asli Demirgüç-Kunt and Ross Levine, (2000), "A New Database on Financial Development and Structure," World Bank Economic Review 14, 597-605.
ERR	Exchange Rate Regime Classification (1 = hard peg; 2 = soft peg; 3 = intermediate regime; 4 =floating	Exchange Arrangements and Exchange Restrictions; updates are published semi-annually at http://www.imf.org/external/np/mfd/er/index.asp.
FDI	Net Foreign Direct Investment (FDI) by non-residents in the reporting economy divided by GDP	Author's calculations using data from International Financial Statistics (IFS)
OCI	Capital Investment other than FDI by non-residents in the reporting economy divided by GDP	Author's calculations using data from International Financial Statistics (IFS)
ASSETS	Aggregate capital investment by residents abroad divided by GDP	Author's calculations using data from International Financial Statistics (IFS)
TOT	Terms of Trade	World Economic Outlook (WEO)
RELPROD	Output per worker / (0.5 * Output per worker in OECD + 0.5 * Output per worker in region)	Penn World Tables and author's calculations using data from IFS and WEO
TRADEOPEN	(Exports + Imports) / GDP	Author's calculations using data from International Financial Statistics (IFS)
CAPOPEN	Measure of the degree of openness in capital account transactions	Ito and Chinn (2007), "A new measure of financial openness", available at http://www.ssc.wisc.edu/~mchinn/research.html
INCOME	GDP per Capita in US Dollars (PPP adjusted)	Penn World Tables and author's calculations using data from IFS and WEO
TRMG	Total Reserves Minus Gold divided by GDP	International Financial Statistics (IFS)
GB	Change in Government Balance divided by GDP	World Economic Outlook (WEO)
EXMG	Growth rate of money supply minus growth rate of GDP	Author's calculations using data from International Financial Statistics (IFS)
DOLLAR	Domestic currency vs. dollar nominal exchange rate	International Financial Statistics (IFS)

APPENDIX III: SUMMARY OF STATISTICS

Table 7A. Summary Statistics (1997–2006)

Variable	Observations	Mean	Std Dev
REER	840	101.674	17.344
FDI	807	0.040	0.046
OCI	792	0.081	0.268
ASSETS	767	0.067	0.254
LLGDP	792	0.617	0.411
CREDIT	804	0.624	0.490
SIZE	772	0.525	0.602
ACTIVITY	774	0.327	0.527
TOT	840	101.529	13.551
RELPROD	805	0.751	0.472
TRADEOPEN	840	0.654	0.479
ERR	840	3.157	1.010
CAPOPEN	827	1.127	1.507

Table 7B. Composition of Capital Inflows (1990–2006)

Investment by Non-Residents as a Share of GDP

Year	FDI	Std Dev	OCI	Std Dev
1990	0.015	0.020	0.028	0.067
1991	0.015	0.019	0.020	0.071
1992	0.014	0.016	0.030	0.042
1993	0.018	0.020	0.045	0.060
1994	0.021	0.022	0.028	0.078
1995	0.024	0.026	0.034	0.050
1996	0.023	0.021	0.043	0.068
1997	0.033	0.033	0.063	0.088
1998	0.040	0.032	0.023	0.142
1999	0.046	0.049	0.048	0.100
2000	0.052	0.056	0.056	0.100
2001	0.037	0.038	0.030	0.086
2002	0.029	0.032	0.022	0.094
2003	0.029	0.031	0.046	0.074
2004	0.032	0.037	0.070	0.102
2005	0.040	0.045	0.102	0.151
2006	0.054	0.060	0.112	0.150

APPENDIX IV: SAMPLE OF CORRELATIONS

Table 8. Sample Correlations (1997–2006)

	REER	FDI	OCI	ASSETS	LLGDP	CREDIT	SIZE	ACTIVITY	TOT	RELPROD	TRADEOPEN	ERR	CAPOPEN
REER	1												
FDI	0.049	1											
OCI	0.1545	0.2113	1										
ASSETS	0.0571	0.1732	0.8669	1									
LLGDP	-0.035	0.1791	0.1299	0.1135	1								
CREDIT	0.0978	0.106	0.2436	0.1572	0.7386	1							
SIZE	-0.033	0.2965	0.1434	0.0974	0.5985	0.6062	1						
ACTIVITY	0.0048	0.1374	0.1321	0.0574	0.4339	0.5946	0.7625	1					
TOT	0.1159	-0.0514	-0.005	0.0075	-0.093	-0.0389	-0.0056	0.0003	1				
RELPROD	0.0691	0.0044	0.2563	0.301	0.257	0.3437	0.2185	0.2213	-0.0087	1			
TRADEOPEN	0.0458	0.4953	0.106	0.1915	0.382	0.2162	0.4227	0.1702	-0.0128	0.1018	1		
ERR	0.0531	-0.201	0.0871	0.0271	-0.0295	0.1763	0.03	0.1575	-0.0321	0.1501	-0.2876	1	
CAPOPEN	0.0477	0.0883	0.2158	0.1205	0.2463	0.2869	0.2502	0.2322	-0.0441	0.2267	0.0847	0.071	1

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