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# Is Real Exchange Rate Hedging Motive Still Important in Determining Equity Home Bias? \*

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## Abstract

The majority of general equilibrium models of international portfolio holdings differ substantially in their modeling procedures but typically feature a term that captures the relationship between real exchange rate changes and relative, i.e. home vs. foreign, equity market returns. However, there is no consensus among the general equilibrium models on the sign of the exchange rate – relative equity return relation. Recent empirical evidence focused on the US vis-à-vis the rest-of-the world has not provided clear guidance in this respect. This paper fills this gap by taking a broader, international perspective. The evidence points to strong and significantly positive relative equity market return – real exchange rate relations for non-EMU developed markets as well as emerging markets. The sign is as expected from standard, partial equilibrium models of home bias in international portfolio holdings. I further show that this evidence is strongly linked to countries' trade and financial openness.

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## 1 Introduction

International equity investors balance their portfolios towards domestic securities. This home bias in equity portfolios is well-known and widely documented. Partial equilibrium models of international portfolio holdings ,e.g. the international CAPM, suggest that home bias reflects the motive of investors to hedge against real exchange rate fluctuations (RER)<sup>1</sup>. Hence, these models feature an “RER hedging term” that captures the relationship between RER changes of two countries(or inflation if there are no nominal exchange rate dynamics) and relative equity market returns of the home and foreign country. Given home bias, positive RER changes should be associated with positive domestic equity returns in excess of foreign equity market returns.

The majority of general equilibrium (GE) models of international portfolio holdings also feature an RER hedging term. Even though the sign of this relation is vital to compute the equilibrium portfolio holdings in these models, there is no consensus about its sign. The sign depends on the nature of underlying shocks and parameter values that differ across models. The clear implications from the international CAPM are typically neglected in the GE models.

The scarce empirical work on this issue has not been helpful to solve this issue as of yet. The only related empirical work attempting to reconcile predictions from the GE models with empirical regularities by van Wincoop and Warnock [2010], henceforth VWW, explicitly calculates the correlations of asset returns with RER fluctuations for the US versus the rest-of-the-

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<sup>1</sup>See e.g. Adler and Dumas [1983], Mussa and Goldstein [1993], Cooper and Kaplanis [1994], Tesar and Werner [1995], Hasan and Simaan [2000].

world. VWW argue that the computed RER hedging term is very low and would in turn imply portfolio home bias close to zero. This finding casts doubt on the presence of the RER hedging motive.

This paper shows that the empirical evidence on the RER hedging motive from the US point of view is not representative for most countries. The first contribution of this empirical paper is the computation of correlations between real exchange rate changes and relative equity returns from a variety of different countries' perspectives. With the exception of EMU countries I find significantly positive correlations between relative equity market returns and RER changes for developed as well as emerging markets. This evidence suggests that RER hedging should be an important determinant of home bias, at least for countries outside the EMU. It thus puts the US-based evidence by VWW into perspective.

This paper makes two further important contributions. First, I ask the question whether these estimated correlations of RER changes and excess returns, that are supposed to be a good measure for RER hedge, are able to explain the observed home equity holdings. The answer to this question is an unambiguous yes: I find a very robust and significant effect of RER hedging motive on domestic equity holdings. On the one hand, positive correlation of excess returns with RER changes increases holdings of domestic equities. The effect of RER hedging on domestic equity holdings is more pronounced among emerging countries in a longer-run perspective. On the other hand, domestic equity holdings of industrial non-EMU countries depends negatively on RER hedging term in the short-run.

According to Obstfeld and Rogoff [2007] and Coeurdacier [2009], trade costs, or trade barriers, in goods market can explain home bias in equity holdings. Consequently, we should expect trade openness, that is an inverse of trade costs, to be one of the determinants for the domestic equity holdings: with higher trade costs in goods markets domestic markets are more sheltered from competition with foreign countries which makes their returns

less volatile and domestic investors are more eager to hold domestic assets. Thus, higher trade openness implies lower domestic equity holdings. I pursue this hypothesis in my work here and find that trade openness is more important in the determination of domestic equity holdings in the short-run than in the longer-run and especially for industrial countries. Furthermore, my results from panel regression analysis reveal that RER hedging motive is more pronounced in the countries that are more open to trade. Thus, we may suggest that when economy becomes more open to trade and competition with other countries increases, risk sharing through terms of trade decreases so that incentive to share risk via foreign ownerships increases and the share of domestic equities in portfolio falls.

Finally, I analyze how important financial openness is in the portfolio formation. My last contribution is to show that there is a substantial heterogeneity in the role of financial openness in explaining the variation in domestic equity holdings: in particular, EMU countries feature to some extent unexpected relation between financial openness and home equity holdings. More financially open economies within the EMU hold *more* domestic equities. This result contradicts the prevailing reasoning line.

The structure of the rest of the paper is as follows. Section 2 lays out the conceptual framework for the study, while Section 3 is addressing empirical issues. So in Section 3.1, I describe the data sources and how the main variables are constructed. The analysis of the computed RER hedging terms is presented in Section 3.2. In Section 3.3, I examine the central empirical question of the paper and ask whether computed RER hedging terms help to explain home bias. This examination is conducted in two ways: cross-sectional and panel estimations. Section 3.4 provides the insight on the impact of trade and financial openness on portfolio determination. Section 4 concludes the work.

## 2 The van Wincoop and Warnock Model

The theoretical motivation for this paper draws heavily on the model proposed by van Wincoop and Warnock [2010] who develop a partial equilibrium portfolio choice model. The distinctive feature of their model is that it could be easily nested within GE models. But the rest of a GE model is not relevant here because RERs and asset returns are observed and taken directly from the data. Therefore they do not need to be determined by market clearing conditions and any other optimality conditions.

Consider a static one-period framework, in which the only assets are equities issued in both countries with nominal gross returns  $R_j$ ,  $j = 1, 2$ . The countries are identical and there is no differentiation between different types of equity within a country. All asset returns, prices and inflation rates are denoted in terms of the currency of country 1. The initial wealth of country  $n$ 's investors  $\bar{W}(n)$  can be invested with a fraction  $\mu_j(n)$  in country  $j$ 's equity. Given inflation rate  $e^{\pi(n)}$ , the real portfolio return in country  $n$  is then

$$R^p(n) = (\mu_1(n)R_1 + (1 - \mu_1(n))R_2)e^{-\pi(n)} .$$

Country  $n$ 's investors maximize the expected CRRA consumption utility from the end of period wealth  $C(n) = R^p(n) \cdot \bar{W}(n)$

$$E \left[ \frac{C(n)^{1-\gamma}}{1-\gamma} \right]$$

with respect to the share of portfolio invested at home,  $\mu_j$ . The first order condition for this optimal portfolio is given by

$$E(R^p(n))^{-\gamma}(R_1 - R_2)e^{-\pi(n)} = 0 .$$

Taking logs and adopting a first-order log-linearization of the real portfolio return yields<sup>2</sup>

$$r^p(n) = \mu_1(n)r_1 + (1 - \mu_1(n))r_2 - \pi(n) .$$

After assuming normality of log returns and inflation and making some rearrangements we obtain the following optimal portfolio:

$$\mu_1(n) = \lambda + \frac{\gamma-1}{\gamma} \frac{\text{cov}(r_1-r_2, \pi(n))}{\text{var}(r_1-r_2)}$$

It is obvious that the share of domestic equities in the optimal portfolio is determined by two terms. The first  $\lambda = \frac{E(r_1-r_2)+0.5(\text{var}(r_1)-\text{var}(r_2))+\gamma\text{cov}(r_2-r_1, r_2)}{\gamma\text{var}(r_1-r_2)}$  is the "world market portfolio" or logarithmic portfolio according to the diversification motive, which depends on first and second moments of asset returns. The second term describes the hedging motive against domestic inflation fluctuations. When  $\gamma = 1$ , investors have logarithmic preferences and are not concerned about domestic inflation, so that the optimal portfolio is given by  $\lambda$ . The share of domestic assets in portfolio would increase only if domestic inflation and the relative domestic returns are positively correlated. That would mean that domestic investors prefer domestic assets since they give higher returns when the domestic inflation is higher and the RER appreciates.

The optimal portfolio derived by VWW in a partial equilibrium framework bears a striking resemblance to the equilibrium equity portfolio originated from general equilibrium model in Coeurdacier [2009]. In his specific model domestic home equity holdings depend on the market portfolio (which is  $\frac{1}{2}$  in his case) and on the "hedging component" due to RER fluctuations:

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<sup>2</sup>Lower-case letters denote log variables.

$$\mu = \frac{1}{2} \left[ 1 + \frac{\gamma-1}{\gamma} \frac{\text{cov}(\hat{R}, R\hat{E}R)}{\text{var}(\hat{R})} \right],$$

where  $\hat{R}$  denotes excess of home returns over foreign ones,  $R\hat{E}R$  is real exchange rate changes.

Both models suggest that covariance of RER changes and excess returns is the key determinant of domestic equity holdings in the absence of PPP. That is why this paper concentrates on the computation of this covariance term for a wide range of countries, and thus provides a basis for the parameterization in GE models. This in turn will allow the GE literature to verify whether their models are consistent with the evidence on the properties of RERs and excess returns. These new insights may point to potential adjustments to be made in order to better explain home bias.

## 3 Empirics

### 3.1 Data

To compute the correlation of RER changes and excess return I use monthly data for the period 1982-2007. Equity indexes converted into dollars include capital gains and dividends as of month end and are from MSCI Barra. Consumption price index (*CPI*) and nominal exchange rate (*NER*) are measured in national currency and national currency per US dollar respectively and are from the IMF's IFS database. Stock market capitalization (*SMC*) for a country is measured as the value of publicly traded equity listed on the stock market exchanges and the data are from Standard & Poor's Global Stock Markets Factbook 1995, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006.

The excess return for country  $k$ ,  $er_k$  is calculated as the difference between the equity return in country  $k$  and the rest of the world (*RoW*) equity return.



Formally,

$$er_k = r_k^{NC_k} - r_{RoW,k}^{NC_k} ,$$

where  $r_k^{NC_k}$  is the return on country  $k$ 's equity expressed in currency of country  $k$ .  $r_{RoW,k}^{NC_k}$  is the *RoW*'s equity return in terms of national currency of country  $k$  and is computed as a weighted sum of returns in the sample except of return of country  $k$ . The weights ( $w_j$ ) are given by the relative stock market capitalization of each country in the total stock market capitalization of the given sample. Finally, to obtain the returns in the national currency of country  $k$ , I multiply the dollar equity indexes ( $P_k^{\$}$ ) of each country by the nominal exchange rate (national currency per US dollar) and then take the first difference of their logs. So that

$$\begin{aligned} r_{RoW,k}^{NC_k} &= \sum_{j \neq k}^N r_j^{NC_k} \cdot w_j , \\ w_j &= \frac{SMC_j}{\sum_{j \neq k}^N SMC_j} , \\ r_j^{NC_k} &= \Delta \log \left( P_j^{\$} \cdot NER^{j,\$} \right). \end{aligned}$$

The RER change of country  $k$  is given by country  $k$ 's relative inflation, i.e. inflation of country  $k$  minus inflation of the *RoW* (i.e. relative inflation), both expressed in currency of country  $k$ ,

$$\Delta q_k = \pi_k^{NC_k} - \pi_{RoW,k}^{NC_k}.$$

Inflation is calculated as a log first difference of *CPI*. To obtain *CPI* in country  $j$  in terms of country  $k$ 's currency I convert it first to US dollar by dividing it by nominal exchange rate of country  $j$  and then multiply it by nominal exchange rate of country  $k$ . The weighting scheme is identical to the scheme used for returns.

$$\begin{aligned}\pi_i^{NC_k} &= \Delta \log(CPI_k^{NC_k}), \\ CPI_j^{NC_k} &= CPI_j^{NC_j} \frac{NER_{k,s}}{NER_{j,s}}, \\ CPI_{RoW,k}^{NC_k} &= \sum_{j \neq k}^N CPI_j^{NC_k} \cdot w_j.\end{aligned}$$

As a measure for the share of domestic assets in portfolio I use the share of domestic equity in portfolio ( $\mu$ ). The data on foreign equity holdings, domestic equity held by foreigners are from Lane and Milesi-Ferretti [2007] that have been updated up to 2007. "World market capitalization" is the sum of the stock market capitalizations of the developed and emerging stock markets. The total equity portfolio of country  $k$  is market capitalization plus foreign equity held minus the amount of country  $k$ 's equity held by foreigners calculated as the sum of country  $k$ 's equity owned by other countries. The share of domestic equity in portfolio ( $\mu$ ) is 1 minus the share of foreign equity in portfolio calculated as a ratio of total foreign equity held by country over the country's total equity portfolio

$$\begin{aligned}\mu^k &= 1 - \frac{\text{foreign equity held by } k}{k' \text{'s total equity in portfolio}}, \\ &= 1 - \frac{\text{foreign equity held by } k}{SMC^k + \text{foreign equity held by } k - k' \text{'s equity held by foreigners}}, \\ &= 1 - \frac{\text{foreign equity held by } k}{SMC^k + k' \text{'s assets} - k' \text{'s liabilities}}.\end{aligned}$$

As an indicator for trade openness I apply two different measures: the first measure is trade shares in GDP (the sum of imports and exports over GDP), that is a traditional and widely used concept in the empirical literature. The crucial shortcoming of this measure is based on the fact that it is an outcome based measure that entails potential biased results. That is why I use as an

alternative a rule-based measure of trade openness, which is Trade Freedom Index provided by the Heritage Foundation. Both measures are denominated as  $TO_o$  and  $TO_r$  respectively.  $TO_o$  is “openness in constant prices” from Penn World Tables 6.3 and ranges from 1982 to 2007.  $TO_r$  is only available for the period 1995-2008. Trade Freedom Index is a composite measure of the absence of tariff and non-tariff barriers that affect imports and exports of goods and services. Trade Freedom (as well as Financial Freedom) is graded using a scale from 0 to 100, where 100 represents the maximum freedom. A score of 100 signifies an economic environment or set of policies that is most conducive to economic freedom.

The measurement of the extent of financial openness is a difficult and challenging enterprise. There is a number of studies that have tried to capture the complexity of real world capital controls with varying degrees of success.<sup>3</sup> While it is ambitious to say anything decisive about the actual degree of financial openness for most countries, these indicators do share some common features. First, all of them show a decreasing trend in financial restrictions over the years, consistent with the belief of increased globalization seen in the surge of cross-border financial flows. They also suggest that more developed countries have been more financially open, consistent with the belief that industrial countries interact more with the rest of the world.

In this paper I focus on two alternative measures  $FO_1$  and  $FO_2$  for financial openness.  $FO_2$  is Heritage Foundation’s Financial Freedom Index,

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<sup>3</sup>Widely available measure of capital restrictions is IMF Annual Report on Exchange Arrangements and Exchange Restrictons (AREAER). Though it is available for a large set of countries since 1966, this is a dummy indicator and does not provide any information about the intensity of the capital controls. Quinn (1997, 2003), Miniane (2004) and Brune et. al. (2001) have modified IMF’s AREAER. But these indices either have limited coverage or are not publicly available. Bekaert, Harvey and Lundblad (2005) have constructed an index based on the data of equity market liberalization that is a 0/1 indicator. Chinn and Ito (2006) have created an index measuring the extensity of capital controls based on the IMF’s AREAER. This index covers the largest available set of countries and years. Kaminsky and Schmukler (2003) have developed an index based on domestic financial sector liberalization, openness of the equity markets to foreign investment and capital account restrictions. It is provided for 28 countries and ranges from 1973 to 2005.

available from 1995 to 2008. Financial freedom is a measure of banking security as well as a measure of independence from government control. Heritage Foundation scores Financial Freedom by determining the extent of government regulation of financial services; the extent of state intervention in banks and other financial services; the difficulty of opening and operating financial services firms (for both domestic and foreign individuals); and government influence on the allocation of credit.

$FO_1$  is Chinn and Ito’s ”KAOPEN” index of ”capital openness”. Chinn and Ito [2006] have standardized principal components of the major categories of AREAER (presence of multiple exchange rates, current account restrictions, capital account restrictions and requirement of the surrender of export proceeds). This index is available for 181 countries from 1970 to 2007. It takes on higher values the more open the country is to cross-border capital transactions. The series has a mean of zero by construction.<sup>4</sup>

### 3.2 Real Exchange Rate Hedging

I define the RER hedging term twofoldly. The first, more easily interpretable, definition is a correlation of RER changes and excess returns. This first measure is scale-invariant. The second one, acquired from GE models of Coeurdacier [2009] and van Wincoop and Warnock [2010], is given by a covariance-variance ratio: the covariance between the RER and the excess return on home relative to foreign equity, divided by the variance of the excess return. I denote this term as *beta* further on. Both terms are computed for every country  $k$  in my sample relative to the rest of the world. The rest of the world is composed of an equity-market-capitalization-weighted combination

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<sup>4</sup> Measures of *de facto* financial openness, like Lane–Milesi-Ferretti data, are deliberately not employed in this analysis in order to avoid any bias in results.

of countries in the sample except of country  $k$ . I conduct these computations for two samples of countries. While the first sample consists only of industrial countries for which the data are available from 1982,<sup>5</sup> the second one comprises industrial and emerging countries.<sup>6</sup> By adopting different country samples I pursue two objectives. First, comparing RER hedging terms for industrial countries in both samples I can appraise if including emerging countries' equities into the portfolio of industrial countries significantly affects the results. Second, I obtain the correlations and *betas* for an extended sample of emerging countries, that - to the best of my knowledge - has not been done before.

Table 1A gives the first insight how RER hedging terms for industrial countries look like. Almost all of the estimated coefficients are positive. Significant *beta*-coefficients vary between 0.05 for Hong Kong and 0.30 for the UK.<sup>7</sup> Only 5 countries out of 17 exhibit negative correlation coefficients, though they are barely different from zero. This result contradicts the suggestion made by Coeurdacier [2009] that this term should be negative in standard cases. Moreover, he argues that, due to his calibration, the RER hedging term could be positive but only for trade costs higher than 142%. Such high trade costs can only be generated by a very high risk aversion or by an elasticity of substitution between domestic and foreign goods that is lower than unity. Thus, given my estimations of the correlation of exchange rate changes and excess returns, we should either assume that prevailing risk

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<sup>5</sup>Industrial countries in the first sample are AUT, BEL, CAN, DNK, FRA, GER, HKG, ITA, JPN, NLD, NOR, SGP, ESP, SWE, CHE, GBR, USA. FIN, GRC and PRT are not included in the first sample because the data for them are only available from 1988.

<sup>6</sup>Industrial countries are those mentioned in footnote 9 plus FIN, GRC and PRT. Emerging countries are ARG, BRA, CHL, COL, CZE, EGY, HUN, IND, IDN, ISR, JOR, KOR, MYS, MEX, MAR, PAK, PER, PHL, POL, RUS, ZAF, THA, TUR, VEN. However the data for COL, CZE, EGY, HUN, IND, ISR, MAR, PAK, PER, POL, RUS, ZAF and VEN are only available for 1995-2006.

<sup>7</sup>These results are consistent with VWW, who calculated the *beta*-coefficient only for the US. Their coefficient is somewhat higher (0.3172) than mine (0.242). The difference in time periods and countries sample(VWW 1988-2005, my 1982-2007) may be the reasons for the discrepancy.

aversion is high and/or elasticity of substitution is very low<sup>8</sup> or make attempt to modify the theoretical models in the way that they are consistent with the empirical evidence.

The first row of Table 1A reveals another striking feature of the estimated RER hedging terms: only non-EMU countries have statistically highly significant correlation coefficients while for EMU countries these coefficients are not significant. This result may be driven by the absence of nominal exchange rate volatility across the EMU.

From Table 1B we obtain a flavor how the correlation of interest evolves over time in five years intervals. For the period 1982-2002 I obtain very similar results: almost all EMU countries have insignificant RER hedging terms with few exceptions like Spain (1982-1987, 1993-1997), Italy (1982-1987, 1993-1997) and France (1982-1987). However, in the period 2002-2007 nearly all countries in this sample have positive and highly significant correlations of RER changes and excess returns. It is noteworthy that in the period 1997-2002 the variance of excess returns is significantly higher for the majority of countries. This result is probably driven by the crisis that hit industrial countries at the beginning of the 2000s.

The data for emerging countries is not complete. For some countries data is available from 1988, for other it starts only with 1995. According to the data availability, there are two samples of countries expanded with emerging market countries. First, I add only countries for which the data is available from 1988. I refer to this sample as "short" sample because it consists of 20 industrial and 11 emerging countries. This sample ranges from 1988 to 2007. The second sample is referred to as "full" sample and consists of 20 industrial and 24 emerging countries for the period 1995-2006. From Tables 2 A-C it is apparent that including emerging countries into the sample does not change the results for industrial countries. It is still true irrespective

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<sup>8</sup>Heathcote and Perri [2004] argue that this elasticity is slightly lower than one in short-run estimates for the United States relative to the rest of the world.

of countries and/or period sample that EMU countries feature insignificant correlation coefficients of RER changes and excess returns. Notably, in the short sample I obtain positive and highly significant results suggesting that emerging countries do care about RER hedging. However, there are some countries in the full sample which exhibit insignificant correlation coefficient. The reason for this result might be due to the nature of shocks that these countries have experienced or due to the quality of available data on equity returns. Quinquennial analysis of the correlations for emerging countries reveals that in the first five-years period only few countries-with only 10% p-value-have statistically significant correlations. Emerging countries have experienced the highest RER hedging term between 1998 and 2002.

In addition, since I use monthly data I also compute RER hedging terms for every year, which will allow further panel data application. The annual computed coefficients are not reported. Instead, I present the summary of descriptive statistics of the results in Table 3. It is obvious that the coefficients of all but two countries could take both negative and positive values. The largest negative values of the correlation lie between -0.8 and -0.7 for HKG, POL, EGY, HUN, RUS and USA and the largest positive - around 0.9 for BRA, PHL, IND, SGP, TUR and COL. The results also reveal that within 12 years between 1995 and 2006 there is no country that has correlation coefficients that were continuously significant at least at the 10% level. Countries whose correlation coefficient has never been statistically significant are Germany and Finland. The volatility of the computed correlations is a little bit higher for emerging markets.<sup>9</sup> All in all, we see a lot of variability in correlations between exchange rate changes and excess returns both across countries and across time.

### **3.3 Home Bias and Real Exchange Rate Hedging**

Given my estimated RER hedging terms, I ask the question whether they

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<sup>9</sup>Two exceptions among industrial countries are the United States and Hong Kong.

can explain observed domestic equity holdings. In so doing, I run a regression of domestic equity holdings on the computed RER hedging terms. Since I have two different measures of RER hedging term -  $\rho(\Delta q, er)$  and  $\beta$  - I apply both of them in separate regressions. In addition, I also run a regression where I include both  $\rho(\Delta q, er)$  and  $\sigma_{er}$ , which are the two components of my second RER hedging term. This allows me to distinguish between these two terms that may differently affect domestic equity holdings. Whereas the first one measures the tendency of exchange rate changes and excess returns to vary in the same direction and is supposed to have a positive impact on domestic equity holdings, the second one captures the degree of risk associated with holding domestic equities which increases with the variances of both domestic and foreign equities and decreases with their covariance.

I conduct my analysis in two steps: first I employ cross-country estimations that will shed light on rather a long-run link between equity holdings and RER hedging. Second, I also use panel estimations that helps underline a short-run perspective of the relationship analyzed in this section.

Due to the data availability on equity holdings, I employ the RER hedging terms computed in the short sample mentioned above - consisting of 20 industrial countries and 10 emerging countries.

### **3.3.1 Cross-country estimations**

Table 4A and 4B provide the results of cross-country regressions of an average of domestic equity holdings on the RER hedging term computed for a particular time period. To see the development of this relationship I also split the sample according to the country type and different sub-periods. While Table 4 contains the results for the whole time period 1988-2007 and two sub-periods 1988-1997 and 1998-2007, Table 5 displays the results for the 5-years-averages – 1988-1992, 1993-1997, 1997-2002, 2003-2007. The regressions run for each particular specification is parametrized as follows



$$\bar{\mu}^k = \alpha_0 + \alpha_1 \rho^k + \epsilon^k ,$$

$$\bar{\mu}^k = \alpha_0 + \alpha_1 \beta^k + \epsilon^k ,$$

or

$$\bar{\mu}^k = \alpha_0 + \alpha_1 \rho^k + \alpha_2 \sigma_{er}^k + \epsilon^k ,$$

where  $\rho^k$  is a correlation of exchange rate changes and excess returns,  $\beta^k$  is a covariance-variance ratio, i.e.  $\frac{cov(\Delta q, er)}{var(er)}$ ,  $\sigma_{er}^k$  is a variance of excess returns,  $\bar{\mu}^k$  is a demeaned average of country  $k$  domestic equity holdings over a specified time range, defined as

$$\bar{\mu}^k = \frac{1}{T} \sum_{t=1}^T \mu_t^k - \frac{1}{K} \frac{1}{T} \sum_{k=1}^K \sum_{t=1}^T \mu_t^k ,$$

with  $K$  and  $T$  number of countries and years in a sample respectively.

Panel A of Table 4A reveals that for all countries in the sample the correlation of relative inflation and excess return seems to be a good determinant of domestic equity holdings: higher correlation, i.e. high inflation in country  $i$  implies high excess returns in this country, leads to higher domestic equity holdings in the long perspective. This result is in line with Adler and Dumas [1983], Cooper and Kaplanis [1994] and Obstfeld and Rogoff [2007] who suggested that RER hedging motive might be one of the potential explanations for home equity bias. Moreover, the higher volatility of excess returns turns out to lead to higher domestic equity holdings, that is a rather unexpected result. However, splitting the sample into sub-periods reveals that in the period 1988-1997 only the riskiness of domestic returns,  $\sigma_{er}$ , plays a significant role in the determination of domestic equity portfolio suggesting that the results for the whole period are mainly driven by the second sub-period.

Panels B and C reveal that the dependence of domestic equity holdings on the volatility of returns is more pronounced in industrial countries, whereas for emerging countries the RER hedging motive plays a much more important

role in domestic holdings determination than the risk of holding domestic equity.

The results presented in Table 4A are illustrated in Figure 1, which displays the corresponding scatter plots.

### 3.3.2 Panel estimations

In this section I exploit the panel dimension of the data. The goal is to better understand the short-run determinants by studying higher-frequency shifts in domestic equity holdings. By controlling for country- and time-fixed effects, I remove unobservable country and time characteristics to see which of the determinants affect within-country shifts in  $\mu$ .<sup>10</sup>

Table 5 provides the results. The panel dimension provides some new insights. The most striking finding is that, the correlation term now exhibits a negative coefficient. Holding fixed other factors, the value of  $\mu$  decreases for those countries that have experienced an increase in the correlation between excess returns and exchange rate changes. Thus, in a short-run, investors do not tend to care about RER hedging. It is also apparent, that for industrial countries, and in particular for industrial non-EMU countries, this effect is the strongest and highly significant. However, for emerging countries, positive  $\rho$  increases domestic equity holdings, even in the short-run. Though, this result is borderline insignificant.

In contrast to cross-sectional analysis, we see here that higher volatility of domestic excess returns is clearly associated with less domestic equity in portfolio. This is very intuitive result: short-run portfolio movements are in fact mainly driven by the volatility of equity returns, i.e. equity's exposure to risk. And again, this effect is more pronounced among industrial non-EMU countries.

In addition, splitting the sample in two sub-periods reveals that, in the

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<sup>10</sup>To control for country- and time-fixed effects I remove cross-country and time means.

all countries sample, the results with respect to  $\rho$  are rather driven by the second sub-period and with respect to  $\sigma_{er}$  in the first sub-period, where these terms exhibits much more significant coefficients.

### **3.4 Introducing Trade Openness and Financial Openness**

#### **3.4.1 Cross-country estimations**

According to the theory, trade openness should negatively affect domestic equity holdings: falling trade barriers, i.e. progressing trade openness, is supposed to reduce domestic equity holdings, because low trade barriers imply higher competition for domestic firms which in turn increases volatility of domestic equities returns. Thus, due to the risk aversion of domestic investors, they would incline to hold more foreign and less home equities.

Table 6 provides the results after introducing trade openness into the regression run above. The coefficient of both trade openness measures are signed as expected: the more open is a country for trade, the less are holdings in domestic equity. It is apparent that only rule based measure of trade openness significantly affects the domestic equity holdings when used as the only determinant. It is true for both measures of trade openness, though the coefficient of the rule-based measure is much more statistically significant. Adding the RER hedging term in form of correlation of RER changes and excess returns into the regression does not change the effect of outcome-based trade openness a lot, but it reduces the effect of rule-based measure of trade openness. The effect of RER hedging terms remains significant throughout all specifications.

The theoretical mechanism of the effect of trade openness on domestic equity holdings works through volatility of cash-flows: since more open countries are less sheltered from competition, they have more volatile cash-flows, and thus their equity returns are also more volatile. This intuition

is supported by the next results where I also include the variance of excess returns into the regression: the impact of trade openness on domestic equity holdings becomes considerably reduced while variance of excess returns still significantly bears on domestic equity in portfolio.

It is beyond dispute that financial openness negatively affects domestic equity holdings. Opening financial markets incites domestic investors to invest abroad due to the enhanced investment possibilities and in search for higher and less risky returns that induces more diversified portfolios.

I have repeated similar regressions for the financial openness measures,  $FO_1$  and  $FO_2$ . Table 7 reproduces all specifications from Table 6 but with  $FO_1$  and  $FO_2$  as the independent variable. The results reveal that both measures of financial openness indeed imply lower holdings of domestic equities in portfolio in a cross-section analysis over the whole period between 1988 and 2007. Again, the inclusion of the measure of financial openness does not change my results with respect to variation of domestic equity holdings as a function of correlation of excess returns and exchange rate changes, though. Moreover, adding volatility of excess returns into regression does not affect significantly the explanatory power of financial openness.

### **3.4.2 Panel estimations**

This section considers the impact of trade and financial openness on domestic equity holdings in the panel estimation scope. To this end, it has to be mentioned that the extent of time variation in the openness measures is very limited. This problem especially affects the Economic Freedom Data provided by Heritage Foundation. Thus, while interpreting the results in this section we should take into account this drawback of the openness data.

Table 8A confirms that also in a shorter-run trade openness negatively affects domestic equity holdings: countries that are more open to trade hold less domestic equities. The results for outcome-based measure are more significant in panel estimation procedure than in cross-section. In contrast to

cross-section, outcome-based measure of trade openness remains still highly significant after introducing the variance of excess returns into regression. However, the RER hedging term is not significant in all specifications. This result may just reflect the fact, that in the panel estimations  $\rho(er, \Delta q)$  and  $\beta$  have never been significant in the full sample of countries.

As presumed before, the rule-based measure of trade openness is likely to be a bad determinant of domestic equity holdings in a shorter-run. Table 8A also displays the results of the panel regression estimates without country fixed-effect. The regressions with country fixed effects are more interpretable as reflecting year-by-year holding of home equities while the results from regressions without country fixed effects are partly supposed to reflect long-run portfolio holdings. Based on the results above, the interpretation is that trade openness plays a much more important role as a determinant of portfolio allocation in a longer run than in the short run.

Table 8B demonstrates the difference of the impact of trade openness on industrial and emerging countries. It is obvious that for industrial countries being more open to trade is much more important than for emerging countries. The effect of trade openness on equity holdings is borderline significant at the conventional 5 percent level and of the same order of magnitude as it was in the cross-section analysis. RER hedging and variance of excess returns remain good predictors for domestic equity holdings only in a specification with an outcome-based measure of trade openness. However, the most striking result concerns emerging countries. There is not any good determinant of equity holdings in emerging countries in the short-run perspective.

To explore further the effect of trade openness on domestic equity holdings, I add an interaction term of trade openness with RER hedging into the panel regressions. The results of these estimations are summarized in Tables 9A, 9B and 9C. The impact of trade openness on domestic equity holdings is amplified in countries where RER changes and excess returns are positively correlated. Moreover, it is apparent from Table 9A that in more

open economies the effect of variance of excess return on the share of domestic equity in portfolio is dampened. Tables 9B and 9C show that regardless the country group the effect of RER hedging on equity holdings is more pronounced in economies that are more open to trade. For industrial countries both coefficients on  $\rho$  and  $\rho * TO$  are positive. After becoming more open, industrial countries, and in particular non-EMU countries, start to take into account fluctuations in the real exchange rate when determining their portfolio holdings. These results may suggest that there are less risk sharing possibilities through terms of trade when countries become more open, so that they are forced to invest into foreign equity in order to achieve a certain degree of risk sharing.

Tables 10A, 10B and 10C consider the impact of financial openness on holdings of domestic equity in portfolio. In the sample with all countries, Table 10A, the estimated impact of  $FO_1$  on domestic equity holdings is negative and significant in all specifications. For  $FO_2$ , I find a significant effect on equity holdings only when country fixed effects are not included. In the specification with  $\sigma_{er}$ , we see some remarkable outcomes: the coefficient on  $\sigma_{er}$  is negative and significant in the regression with  $FO_1$  and country fixed effects, but surprisingly high and positive when country fixed effects are not controlled for and  $FO_2$  is included.

In addition, it is noteworthy to examine if there are any differences in the impact of financial openness on domestic equity holdings in emerging and industrial countries. Table 10B uncovers that only in emerging countries financial openness coherently and significantly determines domestic equity holdings: the more open the country, the less domestic equity it holds. In the industrial countries sample the results are rather odd: the coefficient on  $FO_2$  is barely different from zero and the coefficient on  $FO_1$  is insignificant but it is positively signed. Trying to explain this results, I split the sample of industrial countries into two groups - see Table 10C - depending on the membership in the EMU. Financial openness in these two groups affects domestic

equity holdings in two opposite directions: while in non-EMU countries the effect is consistent with our reasoning, EMU countries exhibit a positive and highly significant coefficient on  $FO_1$  which probably drives the results for the whole sample of industrial countries. This is an interesting and somewhat peculiar result. However, I do not attempt to more systematically trace this question and give any interpretation to it.

Overall, the results for the impact of financial openness in the panel estimations are roughly similar to those found in the cross-section. There seems to be some tendency for financial openness to have quite different effects within the EMU in comparison to other countries. Moreover, financial openness is likely to be the only determinant of domestic equity holdings for emerging countries in the shorter-run perspective.

### 3.5 Home bias and labour income

There is a large literature focusing on the role of uninsurable idiosyncratic risks for the portfolio composition.<sup>11</sup> It emphasizes that in the presence of background risks—from labour income, proprietary income or real estate—individuals hold assets that provide them insurance. Building on this literature, several recent papers have argued that a large degree of observed home bias is generated by non-tradeable income risk. Since labour income seems to be *"the most obvious source of background risk that is large and difficult to insure or diversify"*,<sup>12</sup> it affects the portfolio decision of workers/investors because they seek to hedge it, and thus tend to hold assets that provide high returns, when domestic non-tradeable assets (labour income) yield low returns. Therefore, home bias or portfolio holdings depend on the correlation between returns on domestic assets and payoffs on domestic non-tradeable assets. And again, the sign of this correlation is crucial here: whereas domestic labour earnings that are negatively correlated with domestic returns

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<sup>11</sup>see e.g. Heaton and Lucas [2000], Bottazzi et al. [1996], Palacios-Huerta [2001], Juliard [2003, 2004], Engel and Matsumoto [2006], Coeurdacier et al. [2010].

<sup>12</sup>Heaton and Lucas [2000], p.5.

offer a good hedge against labour income risk and imply *home* bias, positive correlation results in *foreign* bias.<sup>13</sup>

These theoretical predictions have been repeatedly analyzed by diverse studies both at the international and intranational levels. Bottazzi et al. [1996] document negative correlation between wage and profit rates in most OECD countries. Abowd [1989] finds a negative correlation using bargaining unit wage data and NYSE stock returns. Davis and Willen [2000] estimate the correlation between financial asset returns and labour income shocks for various sex-education groups. This correlation ranges from -0.25 for the least educated men to 0.25 for college-educated women. For men with less than a college education and certain educational groups of women, labor income shocks covary negatively with own-industry equity returns. Moreover, Gali [1999], Rotemberg [2003] and Francis and Ramey [2009] also find a negative correlation between labour hours and productivity.

To explore this additional source of home bias emanating from the labour income risk hedging motive, I estimate correlation coefficients between real-time wages and excess returns ( $\rho(\omega, \sigma_{er})$ ). I refer to this correlation as labour income hedging term. The computational procedure is similar to that on inflation hedging term. The relative wage in country  $k$ ,  $\omega_k$  is calculated as the difference between the wage in country  $k$  and the rest of the world (*RoW*) wage  $\omega_k = w_k^{NCk} - w_{RoW,k}^{NCk}$ , where  $w_k^{NCk}$  is the hourly compensation costs of production worker in country  $k$  expressed in currency of country  $k$ .

Using data for 16 industrial countries from 1982 to 2006,<sup>14</sup> I found that

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<sup>13</sup>However, there also exists another line of reasoning that assert exactly converse intuition: if labour income is more correlated with domestic equity returns than with the foreign ones, then foreign equities provide better insurance against labour income risk and negative correlation of domestic returns and domestic wages entails foreign bias. Cole [1988], Brainard and Tobin [1992], Baxter et al. [1998] suggest this mechanism. This financial risk hedging motive becomes more important than the income risk hedging motive only when the ratio of liquid wealth to labour income is sufficiently high. But, this rationale has not found any strong support from the empirical studies on labour income and asset returns. That is why I do not track this intuition.

<sup>14</sup>The same data sample as it was used for the estimation of inflation hedging across



for ten countries this correlation is negative. However, there is no coefficient significant at least at the 10% level.<sup>15</sup> However, it should be mentioned at this point that the data on wages by its nature is much less volatile than the data on equity returns and even the data on prices. Thus, measuring correlation of wages with returns captures long run co-movements.

That is why it is only reasonable to examine the role of labour income hedge on home bias in the cross-sectional analysis. In so doing, I estimate a cross-section OLS regression

$$\bar{\mu}^k = \alpha_0 + \alpha_1 \rho^k(\omega, \sigma_{er}) + \epsilon^k .$$

For the period 1988-2006, I found that  $\alpha_1$  is -0.04 but not statistically significant<sup>16</sup>. This result is consistent with the theory predictions: countries, where labour income negatively co-varies with equity returns, hold more domestic equities, because they potentially provide better hedge against labour income risk.

## 4 Concluding Remarks

This paper computes two alternative RER hedging terms proposed by industrial countries except of Germany. Data on wages for Germany is only available from 1993. The data on wages is comparative hourly compensation costs in national currencies for production workers in manufacturing and is from the International Labor Comparisons.

<sup>15</sup>For the period 1982-2006 the correlation coefficients are -0.01 (AUT) , -0.02 (BEL), -0.00 (CAN), -0.10 (DNK), 0.26 (FRA), -0.03 (HKG), -0.16 (ITA), -0.16 (JPN), -0.06 (NLD), 0.08 (NOR), -0.07 (SGP), 0.00 (ESP), 0.18 (SWE), 0.08 (CHE), 0.19 (GBR), -0.23 (USA). The correlation coefficients are estimated relative to the *RoW*. The correlations computed for the period 1988-2006 and employed in the cross-section analysis are -0.00 (AUT) , 0.27 (BEL), 0.11 (CAN), 0.13 (DNK), -0.39 (FIN), 0.23 (FRA), 0.25 (GRC), -0.24 (HKG), -0.10 (ITA), 0.19 (JPN), 0.36 (NLD), 0.29 (NOR), 0.41 (PRT), -0.47 (SGP), 0.22 (ESP), 0.20 (SWE), 0.29 (CHE), 0.19 (GBR), 0.07 (USA). The amendment of the country sample is made in order to obtain comparable results in the cross-section.

<sup>16</sup>I obtained the results of the same magnitude for the period 1982-2006 and also using correlation coefficients estimated by Bottazzi et al. [1996].

the theoretical literature for an extended sample of countries. Correlation coefficients of exchange rate changes and excess returns seem to be positive and highly significant for the majority of countries in the sample. The only exception are EMU-countries that exhibit correlation coefficients that are not significantly different from nil.

Moreover, estimated RER hedging terms have proven to be a good determinant of domestic equity holdings. This result corroborates Obstfeld and Rogoff's (2006) suggestion, though it is at odds with outcomes of Cooper and Kaplanis [1994] and van Wincoop and Warnock [2010]. Thus, the results point out that the RER hedging motive does matter for investors while building their portfolios.

On the one hand, a higher correlation of RER changes with excess returns implies higher holdings of domestic equity in the long run. Whereas RER hedging is especially important for emerging countries, for industrial countries volatility of returns does matter for equity holdings determination. On the other hand, in the short run RER hedging motive lowers domestic equity holdings, and this effect plays a significant role solely in industrial non-EMU countries.

In addition, I have also examined whether trade openness and financial openness help explain home equity bias. As expected, trade openness decreases holdings of domestic equities in portfolio. Moreover, trade openness amplifies the incentive to hedge against RER fluctuations. Though financial openness lowers domestic equity holdings, it does not affect the impact of RER hedging on portfolio determination.

This paper focuses on macro-level covariations and their role in the portfolio determination. I believe that this contributes to many theoretical papers that aim at identifying the underlying structural determinants of home bias.

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**Table 1A:** Real Exchange Rate Hedging Term: Industrial Countries, 1982-2007

Country	$\rho(\Delta q, er)$	$\beta$	$\sigma_{er}$
AUT	-0.061	-0.141	0.0210
BEL	-0.045	-0.202	0.0425
CAN	0.263***	0.189***	0.0007
DNK	0.166***	0.118***	0.0010
FRA	0.070	0.192	0.0114
GER	0.066	0.062	0.0021
HKG	0.158***	0.048***	0.0006
ITA	-0.060	-0.453	0.1813
JPN	0.489***	0.247***	0.0010
NLD	-0.028	-0.039	0.0026
NOR	0.136**	0.076**	0.0010
SGP	0.241***	0.094***	0.0006
ESP	-0.015	-0.067	0.0822
SWE	0.087	0.053	0.0011
CHE	0.248***	0.224***	0.0012
GBR	0.296***	0.304***	0.0013
USA	0.244***	0.242***	0.0017

*Notes:*  $corr(\Delta q, er)$  and  $\frac{cov(\Delta q, er)}{var(er)}$  denote a correlation and a covariance of real exchange rate changes and excess returns over a variance of excess returns respectively. Both terms are computed for every country  $i$  in the sample relative to the rest of the world. The rest of the world is composed of an equity-market-capitalization-weighted combination of countries in the sample except of country  $i$ .

**Table 1B:** Real Exchange Rate Hedging Term: Industrial Countries, 1982-2007 quinquennial

Country	82-87				87-92				93-97			
	$\rho(\Delta q, er)$	$\beta$	$\sigma_{er}$	$\rho(\Delta q, er)$	$\beta$	$\sigma_{er}$	$\rho(\Delta q, er)$	$\beta$	$\sigma_{er}$	$\rho(\Delta q, er)$	$\beta$	$\sigma_{er}$
AUT	0.080	0.043	0.0017	-0.116	-0.050	0.0014	0.106	0.104	0.0009			
BEL	0.109	0.113	0.0018	0.205	0.163	0.0013	0.192	0.215	0.0009			
CAN	0.156	0.075	0.0007	0.281**	0.242**	0.0013	0.243*	0.203**	0.0005			
DNK	0.220*	0.128	0.0016	0.079	0.051	0.0013	0.163	0.120	0.0010			
FRA	0.398***	0.331***	0.0017	0.046	0.022	0.0013	0.037	0.048	0.0010			
GER	0.097	0.060	0.0017	0.060	0.037	0.0014	0.088	0.070	0.0010			
HKG	0.384***	0.099***	0.0009	-0.033	-0.009	0.0009	0.056	0.015	0.0004			
ITA	0.229*	0.121**	0.0014	0.087	0.065	0.0013	0.268**	0.126**	0.0010			
JPN	0.569***	0.277***	0.0010	0.552***	0.189***	0.0006	0.516***	0.261***	0.0010			
NLD	0.095	0.117	0.0022	0.181	0.189	0.0015	0.237*	0.258	0.0010			
NOR	0.141	0.070	0.0015	-0.126	-0.066	0.0012	0.314**	0.210**	0.0009			
SGP	0.161	0.045	0.0007	-0.090	-0.062	0.0007	0.204	0.102*	0.0005			
ESP	0.401***	0.225***	0.0015	0.069	0.060	0.0013	0.480***	0.352***	0.0013			
SWE	-0.003	0.000	0.0015	-0.217*	-0.169*	0.0014	0.392***	0.289***	0.0014			
CHE	0.080	0.060	0.0017	0.221*	0.191	0.0013	0.397***	0.361***	0.0013			
GBR	0.330***	0.289***	0.0019	0.204	0.223	0.0021	0.287**	0.352***	0.0013			
USA	0.375***	0.286***	0.0018	0.420***	0.398***	0.0029	-0.158	-0.139	0.0008			

Notes:  $corr(\Delta q, er)$  and  $\frac{cov(\Delta q, er)}{var(er)}$  denote a correlation and a covariance of real exchange rate changes and excess returns over a variance of excess returns respectively. Both terms are computed for every country  $i$  in the sample relative to the rest of the world. The rest of the world is composed of an equity-market-capitalization-weighted combination of countries in the sample except of country  $i$ .

Table 1B: continued

Country	97-02			02-07		
	$\rho(\Delta q, er)$	$\beta$	$\sigma_{er}$	$\rho(\Delta q, er)$	$\beta$	$\sigma_{er}$
AUT	-0.1513	-0.809	0.1038	0.1183	0.084	0.0003
BEL	-0.1101	-0.971	0.2146	0.3352***	0.195***	0.0002
CAN	0.1741	0.087	0.0004	0.6587***	0.544***	0.0005
DNK	0.2894**	0.188**	0.0008	0.1564	0.109	0.0003
FRA	0.0450	0.362	0.0544	0.3305***	0.310***	0.0003
GER	0.0531	0.067	0.0059	0.2305*	0.145**	0.0003
HKG	-0.0454	-0.009	0.0003	-0.0250	-0.026	0.0002
ITA	-0.1922	-3.432	0.9298	0.4906***	0.303***	0.0003
JPN	0.3709***	0.278***	0.0017	0.4646***	0.229***	0.0004
NLD	-0.2382*	-0.562*	0.0081	0.1579	0.122	0.0003
NOR	0.2864**	0.133**	0.0006	0.3717***	0.203***	0.0007
SGP	0.5533***	0.174***	0.0007	0.4107***	0.169***	0.0002
ESP	-0.1096	-1.478	0.4187	0.2624**	0.206**	0.0003
SWE	0.1443	0.055	0.0005	0.4465***	0.324***	0.0006
CHE	0.4727***	0.326***	0.0009	0.3240***	0.317**	0.0004
GBR	0.4176***	0.418***	0.0007	0.4551***	0.463***	0.0003
USA	-0.0016	-0.007	0.0021	0.4193***	0.651***	0.0008

Notes:  $corr(\Delta q, er)$  and  $\frac{cov(\Delta q, er)}{var(er)}$  denote a correlation and covariance of real exchange rate changes and excess returns over a variance of excess returns respectively. Both terms are computed for every country  $i$  in the sample relative to the rest of the world. The rest of the world is composed of an equity-market-capitalization-weighted combination of countries in the sample except of country  $i$ .



**Table 2A:** Real Exchange Rate Hedging Term: All Countries

Country	1988-2007			1995-2006		
	$\rho(\Delta q, er)$	$\beta$	$\sigma_{er}$	$\rho(\Delta q, er)$	$\beta$	$\sigma_{er}$
AUT	-0.077	-0.214	0.0035	-0.105	-0.449	0.0023
BEL	-0.054	-0.323	0.0015	-0.080	-0.568	0.0016
CAN	0.306***	0.237***	0.0012	0.293***	0.208***	0.0010
DNK	0.175***	0.126***	0.0016	0.188**	0.134**	0.0013
FIN	0.066	0.098	0.0057	0.078	0.141	0.0067
FRA	0.039	0.127	0.0014	0.066	0.354	0.0009
GER	0.067	0.071	0.0020	0.078	0.108	0.0015
GRC	-0.059	-0.250	0.0079	-0.085	-0.546	0.0052
HKG	0.003	0.001	0.0038	0.014	0.006	0.0037
ITA	-0.078	-0.718	0.0028	-0.131	-1.715	0.0022
JPN	0.457***	0.244***	0.0033	0.436***	0.299***	0.0026
NLD	-0.060	-0.104	0.0009	-0.144*	-0.292*	0.0010
NOR	0.154**	0.086**	0.0027	0.328***	0.187***	0.0022
PRT	0.047	0.293	0.0029	0.045	0.413	0.0024
SGP	0.306***	0.133***	0.0029	0.501***	0.198***	0.0036
ESP	-0.039	-0.306	0.0017	-0.078	-0.706	0.0015
SWE	0.137**	0.089**	0.0024	0.235***	0.129***	0.0024
CHE	0.359***	0.312***	0.0013	0.4566***	0.381***	0.0013
GBR	0.303***	0.340***	0.0009	0.408***	0.479***	0.0006
USA	0.190***	0.209***	0.0013	-0.026	-0.041	0.0008
ARG	0.086	0.086	0.0208	0.348***	0.185***	0.0107
BRA	0.184***	0.0816***	0.0224	0.616***	0.446***	0.0091
CHL	0.233***	0.099***	0.0042	0.312***	0.168***	0.0028
COL				0.222***	0.080***	0.0093
CZE				0.366***	0.155***	0.0060
EGY				-0.032	-0.014	0.0077
HUN				0.206***	0.060**	0.0076
IND				0.071	0.023	0.0060
IDN	0.4863***	0.2880***	0.0182	0.629***	0.466***	0.0187
ISR				0.243***	0.094***	0.0036
JOR	0.1192**	0.0472**	0.0039	0.064	0.021	0.0039
KOR	0.5163***	0.2174***	0.0092	0.599***	0.265***	0.0115
MYS	0.3459***	0.1328***	0.0063	0.467***	0.183***	0.0080
MEX	0.4736***	0.2687***	0.0067	0.466***	0.257***	0.0049
MAR				0.139*	0.050	0.0039
PAK				0.085	0.021	0.0136
PER				0.160*	0.047*	0.0058
PHL	0.3730***	0.1422***	0.0073	0.549***	0.209***	0.0074
POL				0.347***	0.118***	0.0080
RUS				-0.020	-0.015	0.0043
ZAF				0.051	0.024	0.0103
THA	0.2454***	0.0856***	0.0104	0.296***	0.114***	0.0127
TUR	0.2252***	0.2272***	0.0252	0.422***	0.127***	0.0212

**Table 2B:** Real Exchange Rate Hedging Term: All Countries, decennial

Country	1988-1997			1998-2007		
	$\rho(\Delta q, er)$	$\beta$	$\sigma_{er}$	$\rho(\Delta q, er)$	$\beta$	$\sigma_{er}$
AUT	-0.038	-0.016	0.0046	0.138	-0.597	0.0023
BEL	0.218**	0.200**	0.0013	-0.090	-0.657	0.0018
CAN	0.256***	0.226***	0.0012	0.364***	0.243***	0.0011
DNK	0.131	0.092	0.0020	0.262***	0.160***	0.0013
FIN	0.022	0.016	0.0045	0.075	0.155	0.0069
FRA	0.050	0.036	0.0020	0.057	0.385	0.0008
GER	0.084	0.058	0.0024	0.062	0.092	0.0015
GRC	-0.106	-0.037	0.0103	-0.093	-0.624	0.0055
HKG	0.023	0.011	0.0043	-0.045	-0.015	0.0033
ITA	0.175*	0.101**	0.0039	0.163*	-2.633*	0.0017
JPN	0.535***	0.235***	0.0043	0.388***	0.261***	0.0023
NLD	0.229**	0.251**	0.0008	-0.185**	-0.381**	0.0010
NOR	0.040	0.023	0.0030	0.322***	0.164***	0.0023
PRT	0.209**	0.124**	0.0033	0.050	0.475	0.0025
SGP	0.084	0.049	0.0020	0.535***	0.178***	0.0038
ESP	0.290***	0.235***	0.0020	-0.098	-1.061	0.0013
SWE	0.089	0.062	0.0023	0.227**	0.104**	0.0025
CHE	0.323***	0.292***	0.0014	0.443***	0.323***	0.0011
GBR	0.261***	0.305***	0.0012	0.429***	0.416***	0.0006
USA	0.248***	0.218**	0.0019	0.089	0.159	0.0006
ARG	0.032	0.038	0.0299	0.379***	0.211***	0.0116
BRA	-0.140	-0.040	0.0351	0.686***	0.529***	0.0096
CHL	0.178*	0.066*	0.0055	0.316***	0.160***	0.0028
IDN	0.293***	0.080***	0.0184	0.630***	0.502***	0.0180
JOR	0.179**	0.110**	0.0032	0.031	0.006	0.0046
KOR	0.518***	0.263***	0.0082	0.510***	0.178***	0.0098
MYS	0.254***	0.111***	0.0053	0.417***	0.150***	0.0074
MEX	0.490***	0.287***	0.0099	0.422***	0.203***	0.0036
PHL	0.227**	0.094**	0.0078	0.580***	0.199***	0.0068
THA	0.183**	0.072**	0.0094	0.293***	0.098***	0.0115
TUR	0.155*	0.039*	0.0288	0.501***	0.176***	0.0218

Notes: see Notes for Table 1

**Table 2C: Real Exchange Rate Hedging Term: All Countries, quinquennial**

Country	1988-1992			1993-1997		
	$\rho(\Delta q, er)$	$\beta$	$\sigma_{er}$	$\rho(\Delta q, er)$	$\beta$	$\sigma_{er}$
AUT	-0.112	-0.047	0.0077	0.132	0.132	0.0015
BEL	0.228*	0.180*	0.0018	0.210	0.248	0.0007
CAN	0.285**	0.245**	0.0017	0.197	0.185	0.0008
DNK	0.097	0.063	0.0024	0.179	0.140	0.0015
FIN	-0.314**	-0.143**	0.0043	0.350***	0.179**	0.0043
FRA	0.051	0.026	0.0028	0.045	0.060	0.0012
GER	0.070	0.043	0.0034	0.111	0.094	0.0014
GRC	-0.075	-0.021	0.0175	-0.207	-0.120	0.0033
HKG	-0.021	-0.002	0.0034	0.064	0.019	0.0052
ITA	0.098	0.070	0.0034	0.253*	0.125**	0.0044
JPN	0.551***	0.191***	0.0049	0.544***	0.291***	0.0038
NLD	0.205	0.215	0.0010	0.270**	0.317*	0.0005
NOR	-0.113	-0.058	0.0043	0.308**	0.218**	0.0018
PRT	0.297**	0.136**	0.0041	0.163	0.103	0.0024
SGP	-0.070	-0.047	0.0015	0.189	0.107*	0.0025
ESP	0.094	0.078	0.0019	0.487***	0.377***	0.0021
SWE	-0.195	-0.150	0.0024	0.386***	0.298***	0.0021
CHE	0.246*	0.211*	0.0016	0.404***	0.385***	0.0013
GBR	0.233*	0.253*	0.0016	0.311**	0.408**	0.0008
USA	0.413***	0.400***	0.0026	-0.203	-0.185*	0.0012
ARG	0.030	0.042	0.0543	-0.008	-0.002	0.0055
BRA	-0.218*	-0.062*	0.0612	0.314**	0.100**	0.0096
CHL	0.079	0.028	0.0070	0.332***	0.145***	0.0036
IDN	-0.002	-0.003	0.0242	0.590***	0.240***	0.0121
JOR	0.222*	0.139*	0.0041	0.108	0.060	0.0023
KOR	0.244*	0.093*	0.0070	0.654***	0.381***	0.0091
MYS	0.119	0.053	0.0027	0.312**	0.130***	0.0076
MEX	0.214*	0.111**	0.0087	0.643***	0.464***	0.0100
PHL	0.095	0.041	0.0069	0.323**	0.137***	0.0084
THA	0.073	0.019	0.0063	0.199	0.099**	0.0113
TUR	0.014	0.002	0.0345	0.290**	0.091**	0.0236

*Notes: see Notes for Table 1*

Table 2C: continued

Country	1998-2002			2003-2007		
	$\rho(\Delta q, er)$	$\beta$	$\sigma_{er}$	$\rho(\Delta q, er)$	$\beta$	$\sigma_{er}$
AUT	-0.146	-0.780	0.0037	0.121	0.086	0.0009
BEL	-0.102	-0.892	0.0029	0.338***	0.192***	0.0008
CAN	0.146	0.075	0.0015	0.652***	0.558***	0.0008
DNK	0.286**	0.184**	0.0018	0.147	0.104	0.0007
FIN	0.077	0.190	0.0110	0.036	0.013	0.0028
FRA	0.052	0.405	0.0012	0.343***	0.314***	0.0003
GER	0.057	0.072	0.0022	0.226*	0.143**	0.0008
GRC	-0.091	-0.735	0.0092	-0.119	-0.027	0.0016
HKG	-0.055	-0.012	0.0051	-0.041	-0.029	0.0014
ITA	-0.189	-3.399	0.0027	0.487***	0.289***	0.0007
JPN	0.370***	0.276***	0.0030	0.462***	0.234***	0.0017
NLD	-0.228*	-0.542*	0.0016	0.155	0.116	0.0005
NOR	0.280**	0.131**	0.0027	0.378***	0.210***	0.0018
PRT	0.063	0.572	0.0037	0.337***	0.166***	0.0012
SGP	0.559***	0.179***	0.0068	0.392***	0.170***	0.0007
ESP	-0.106	-1.454	0.0021	0.267**	0.213***	0.0006
SWE	0.126	0.050	0.0040	0.439***	0.322***	0.0010
CHE	0.476***	0.323***	0.0019	0.345***	0.327***	0.0004
GBR	0.415***	0.401***	0.0008	0.459***	0.453***	0.0003
USA	-0.015	-0.025	0.0009	0.390***	0.549***	0.0003
ARG	0.404***	0.262***	0.0167	0.167	0.063	0.0058
BRA	0.700***	0.581***	0.0143	0.574***	0.371***	0.0042
CHL	0.248*	0.126**	0.0040	0.383***	0.257***	0.0013
IDN	0.655***	0.550***	0.0312	0.441***	0.177***	0.0043
JOR	-0.099	-0.028	0.0041	0.181	0.035	0.0051
KOR	0.502***	0.174***	0.0169	0.556***	0.205***	0.0024
MYS	0.433***	0.154***	0.0133	0.286**	0.111**	0.0014
MEX	0.420***	0.190***	0.0057	0.468***	0.255***	0.0013
PHL	0.601***	0.211***	0.0099	0.474***	0.163***	0.0033
THA	0.295**	0.102**	0.0196	0.271**	0.074**	0.0033
TUR	0.424***	0.141***	0.0327	0.689***	0.289***	0.0102

Notes: see Notes for Table 1

**Table 3:** Descriptive Statistics Summary of annual estimated  $\rho(\Delta q, er)$ 

country	min	max	std	# PV $\leq$ .1	country	min	max	std	# PV $\leq$ .1
Industrial					Emerging				
AUT	-0.33	0.62	0.33	4	ARG	-0.37	0.71	0.32	1
BEL	-0.30	0.72	0.33	4	BRA	-0.57	0.92	0.43	7
CAN	-0.23	0.82	0.35	3	CHL	-0.19	0.69	0.29	3
DNK	-0.25	0.80	0.31	3	COL	-0.30	0.85	0.37	1
FIN	-0.25	0.46	0.25	0	CZE	-0.06	0.68	0.24	2
FRA	-0.44	0.60	0.30	5	EGY	-0.77	0.80	0.51	6
GER	-0.11	0.47	0.16	0	HUN	-0.75	0.79	0.50	7
GRC	-0.61	0.50	0.33	2	IND	-0.50	0.55	0.35	2
HKG	-0.82	0.53	0.42	3	IDN	-0.38	0.89	0.35	7
ITA	-0.43	0.67	0.37	4	ISR	-0.53	0.76	0.34	3
JPN	-0.37	0.84	0.33	5	JOR	-0.45	0.51	0.29	1
NLD	-0.66	0.76	0.39	4	KOR	-0.04	0.75	0.21	5
NOR	-0.21	0.66	0.28	5	MYS	-0.24	0.72	0.28	1
PRT	-0.11	0.70	0.30	4	MEX	0.04	0.69	0.19	7
SGP	-0.31	0.86	0.30	6	MAR	-0.20	0.58	0.25	1
ESP	-0.38	0.62	0.33	2	PAK	-0.33	0.58	0.31	1
SWE	-0.25	0.79	0.29	3	PER	-0.34	0.70	0.31	2
CHE	0.02	0.79	0.22	4	PHL	-0.15	0.91	0.31	7
GBR	0.15	0.81	0.25	5	POL	-0.80	0.76	0.44	8
USA	-0.73	0.66	0.49	3	RUS	-0.74	0.20	0.27	1
					ZAF	-0.53	0.45	0.26	1
					THA	-0.36	0.74	0.38	5
					TUR	-0.61	0.86	0.55	7
					VEN	-0.50	0.66	0.38	2

The Table reports descriptive statistics of annual correlation of exchange rate changes and excess returns computed from the monthly data for the period 1995-2006.

**Table 4A:** Domestic Equity Holdings and Real Exchange Rate Hedging, Cross-Section

Panel A: All countries									
$\kappa$	88-07			88-97			98-07		
1	-0.06	-0.01	-0.11	-0.01	0.04	-0.06	-0.08	0.00	-0.12
	(-1.98)	(-0.36)	(-3.37)	(-0.27)	(1.30)	(-1.74)	(-1.86)	(0.06)	(-2.99)
$\beta$		0.14			-0.31			0.07	
		(1.28)			(-1.76)			(1.25)	
$\rho(er, \Delta q)$	0.35		0.25	0.05		0.12	0.33		0.14
	(2.79)		(2.19)	(0.37)		(1.04)	(2.72)		(1.14)
$\sigma_{er}$			9.83			5.24			17.70
			(3.12)			(2.46)			(2.86)
$R^2$	0.22	0.06	0.43	0.01	0.10	0.19	0.21	0.05	0.39

  

Panel B: Industrial countries									
	88-07			88-97			98-07		
1	-0.01	-0.00	-0.11	0.02	0.05	-0.11	0.00	0.00	-0.03
	(-0.18)	(-0.03)	(-2.11)	(0.44)	(1.41)	(-1.99)	(0.11)	(0.01)	(-0.44)
$\beta$		0.03			-0.35			0.00	
		(0.29)			(-1.87)			(0.06)	
$\rho(er, \Delta q)$	0.06		0.16	-0.10		0.11	-0.04		-0.02
	(0.32)		(1.00)	(-0.60)		(0.72)	(-0.22)		(-0.15)
$\sigma_{er}$			36.45			30.16			14.80
			(2.41)			(2.72)			(0.64)
$R^2$	0.01	0.01	0.26	0.02	0.16	0.32	0.00	0.00	0.03

  

Panel C: Emerging countries									
	88-07			88-97			98-07		
1	-0.06	-0.02	-0.07	-0.01	-0.01	0.05	-0.10	-0.02	-0.12
	(-1.58)	(-0.46)	(-1.22)	(-0.54)	(-0.36)	(0.79)	(-1.45)	(-0.55)	(-1.58)
$\beta$		0.11			0.09			0.09	
		(0.51)			(0.50)			(0.64)	
$\rho(er, \Delta q)$	0.18		0.20	0.06		-0.03	0.22		0.17
	(1.70)		(1.60)	(0.71)		(-0.28)	(1.50)		(1.08)
$\sigma_{er}$			0.60			-2.37			3.44
			(0.27)			(-1.14)			(1.00)
$R^2$	0.27	0.03	0.27	0.06	0.03	0.21	0.22	0.05	0.32

The Table reports the results of cross-country OLS regression of domestic equity holdings  $\mu^k$  on RER hedging terms for different country samples and for the time period 1988-2007 and two sub-periods 1988-1997 and 1998-2007.

**Table 4B: Domestic Equity Holdings and RER Hedging, Quinquennial, Cross-Section**

	All countries									
$\kappa$	88-92	93-97	98-02	03-07						
1	0.01 (0.33)	-0.01 (-0.21)	-0.03 (-0.93)	0.03 (0.94)	-0.07 (-2.43)	-0.06 (-1.47)	0.01 (0.15)	-0.10 (-1.39)	-0.02 (-0.24)	-0.14 (-2.12)
$\beta$		-0.26 (-1.90)	-0.17 (-1.25)		0.06 (1.40)		0.07 (0.30)		0.07 (0.30)	
$\rho(er, \Delta q)$	-0.08 (-0.77)	-0.05 (-0.46)	0.12 (1.18)	0.01 (0.13)	0.01 (0.13)	0.27 (2.29)	0.09 (0.72)	0.30 (1.59)	0.17 (0.94)	0.17 (0.94)
$\sigma_{er}$		1.02 (0.76)		14.52 (3.89)		10.77 (2.72)		45.27 (2.79)		45.27 (2.79)
$R^2$	0.02	0.11	0.04	0.05	0.05	0.16	0.07	0.08	0.00	0.29
Industrial countries										
	88-92	93-97	98-02	03-07						
1	0.01 (0.29)	-0.03 (-0.76)	0.02 (0.42)	0.05 (1.36)	-0.09 (2.15)	0.01 (0.19)	0.00 (0.09)	0.01 (0.09)	-0.03 (-0.52)	-0.04 (-0.34)
$\beta$		-0.21 (-1.43)	-0.25 (-1.84)		0.01 (0.33)		0.13 (0.61)		0.13 (0.61)	
$\rho(er, \Delta q)$	-0.08 (-0.69)	-0.034 (-0.32)	-0.07 (-0.57)	-0.09 (-0.90)	-0.09 (-0.47)	-0.08 (-0.47)	-0.07 (-0.43)	-0.02 (-0.11)	0.02 (0.10)	0.02 (0.10)
$\sigma_{er}$		8.56 (1.28)		50.15 (3.48)		11.89 (0.82)		33.55 (0.49)		33.55 (0.49)
$R^2$	0.03	0.10	0.11	0.02	0.16	0.01	0.01	0.00	0.02	0.02
Emerging countries										
	88-92	93-97	98-02	03-07						
1	-0.00 (-0.17)	-0.00 (-0.08)	0.08 (1.89)	-0.04 (-1.63)	-0.02 (-0.75)	-0.05 (-1.29)	-0.01 (-0.47)	-0.07 (-1.40)	-0.087 (-1.67)	-0.10 (-1.30)
$\beta$		0.06 (0.14)	0.09 (0.95)		0.06 (0.57)		0.11 (0.42)		0.11 (0.42)	
$\rho(er, \Delta q)$	0.06 (0.37)	-0.33 (-1.45)	0.11 (1.85)	0.11 (1.70)	0.11 (1.35)	0.14 (1.35)	0.10 (0.98)	0.22 (1.48)	0.22 (1.48)	0.22 (1.28)
$\sigma_{er}$		-2.93		1.31		2.19		0.01		0.01

**Table 5:** Domestic Equity Holdings and Real Exchange Rate Hedging, Panel

All countries									
$\kappa$	88-07			88-97			98-07		
1	0.00	-0.00	0.01	0.00	0.00	0.00	0.01	-0.00	0.01
	(0.59)	(-0.10)	(1.74)	(0.35)	(0.25)	(1.50)	(1.21)	(-0.04)	(1.57)
$\beta$		0.00			-0.01			0.00	
		(0.85)			(-0.64)			(0.52)	
$\rho(er, \Delta q)$	-0.01		-0.01	-0.01		-0.01	-0.02		-0.02
	(-1.12)		(-1.22)	(-0.94)		(-1.19)	(-1.88)		(-1.71)
$\sigma_{er}$			-0.87			-0.53			-0.55
			(-3.13)			(-2.86)			(-1.31)
$R^2$	0.00	0.00	0.012	0.00	0.00	0.03	0.01	0.00	0.02

  

Industrial countries									
	88-07			88-97			98-07		
1	0.01	-0.00	0.01	0.00	0.00	0.00	0.00	-0.00	0.01
	(1.23)	(-0.04)	(2.16)	(0.18)	(0.08)	(0.82)	(0.85)	(-0.02)	(0.81)
$\beta$		0.00			-0.00			0.00	
		(0.50)			(-0.19)			(0.88)	
$\rho(er, \Delta q)$	-0.03		-0.03	-0.00		-0.00	-0.02		-0.02
	(-2.44)		(-2.70)	(-0.44)		(-0.57)	(-1.43)		(-1.434)
$\sigma_{er}$			-2.17			-0.84			-0.25
			(-1.99)			(-1.10)			(-0.18)
$R^2$	0.01	0.00	0.02	0.00	0.00	0.01	0.01	0.00	0.01

  

Emerging countries									
	88-07			88-97			98-07		
1	-0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00
	(-0.85)	(-0.66)	(-0.26)	(-0.26)	(-0.46)	(0.55)	(-0.13)	(-0.07)	(-0.43)
$\beta$		0.02			0.04			0.00	
		(1.31)			(1.47)			(0.11)	
$\rho(er, \Delta q)$	0.01		0.01	0.01		0.01	0.00		-0.00
	(1.55)		(1.52)	(0.84)		(0.72)	(0.17)		(-0.04)
$\sigma_{er}$			-0.18			-0.29			0.23
			(-1.06)			(-1.53)			(0.97)
$R^2$	0.01	0.01	0.012	0.01	0.02	0.03	0.00	0.00	0.01



**Table 5:** Domestic Equity Holdings and Real Exchange Rate Hedging, Panel, continued

										EMU countries								
										88-07			88-97			98-07		
$\kappa$																		
1	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01								
	(0.50)	(0.01)	(1.07)	(0.26)	(0.31)	(0.77)	(0.51)	(0.07)	(0.51)									
$\beta$	0.00				-0.01		0.00											
	(0.70)				(-0.72)		(0.92)											
$\rho(er, \Delta q)$	-0.02		-0.02	-0.01		-0.01	-0.02		-0.03									
	(-1.21)		(-1.38)	(-0.74)		(-0.89)	(-1.06)		(-1.07)									
$\sigma_{er}$			-1.58				-0.84		-0.31									
			(-1.12)				(-0.92)		(-0.14)									
$R^2$	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01								

  

										Non-EMU countries									
										88-07			88-97			98-07			
1	0.01	0.00	0.02	0.00	-0.00	0.00	0.00	0.00	0.00	0.00									
	(1.53)	(0.35)	(2.47)	(0.00)	(-0.17)	(0.24)	(0.86)	(0.07)	(0.74)										
$\beta$	-0.01				0.00		-0.00												
	(-0.69)				(0.38)		(-0.11)												
$\rho(er, \Delta q)$	-0.03		-0.03	-0.00		0.00	-0.01		-0.01										
	(-2.64)		(-2.76)	(-0.01)		(0.00)	(-1.25)		(-1.24)										
$\sigma_{er}$			-3.97				-0.62		-0.05										
			(-2.02)				(-0.33)		(-0.04)										
$R^2$	0.03	0.00	0.05	0.00	0.00	0.00	0.02	0.00	0.02	0.02									

**Table 6:** Domestic Equity Holdings, Real Exchange Rate Hedging and Trade Openness, Cross-Section

$\kappa$	All countries, 88-07							
1	0.00	0.00	-0.07	-0.06	-0.01	-0.01	-0.10	-0.10
	(0.00)	(0.00)	(-2.40)	(-2.05)	(-0.41)	(-0.36)	(-3.51)	(-3.18)
$\beta$					0.18	0.15		
					(1.67)	(1.45)		
$\rho(er, \Delta q)$			0.40	0.35			0.31	0.28
			(3.44)	(2.87)			(2.81)	(2.48)
$\sigma_{er}$							7.89	7.87
							(2.58)	(2.52)
$TO_o*100$	-0.05		-0.04		-0.04		-0.03	
	(-1.37)		(-1.48)		(-1.32)		(-1.06)	
$TO_r*100$		-0.43		-0.26		-0.38		-0.15
		(-2.17)		(-1.42)		(-1.93)		(-0.87)
$R^2$	0.07	0.15	0.36	0.35	0.16	0.21	0.49	0.49

$$\mu^k = \alpha + \beta \kappa^k + \epsilon^k, TO_o = \frac{Imp + Exp}{GDP}, TO_r = TradeFreedom, \mu^k = \mu^k - \bar{\mu}$$

**Table 7:** Domestic Equity Holdings, Real Exchange Rate Hedging and Financial Openness, Cross-Section

$\kappa$	All countries (w/o CHE), 88-07							
1	0.00	0.00	0.04	-0.05	-0.01	-0.01	-0.06	-0.08
	(0.00)	(0.00)	(1.16)	(-1.74)	(-0.48)	(-0.33)	(-1.83)	(-2.65)
$\beta$					0.16	0.13		
					(1.95)	(1.34)		
$\rho(er, \Delta q)$			0.28	0.28			0.27	0.24
			(2.75)	(2.39)			(2.63)	(2.18)
$\sigma_{er}$							2.10	6.36
							(0.55)	(2.06)
$FO_1$	-0.08		-0.07		-0.08		-0.06	
	(-4.61)		(-3.97)		(-4.69)		(-2.44)	
$FO_2$		-0.0048		-0.0036		-0.0045		-0.0025
		(-3.71)		(-2.71)		(-3.44)		(-1.89)
$R^2$	0.44	0.34	0.57	0.46	0.51	0.38	0.57	0.54

$\mu^k = \alpha + \beta\kappa^k + \epsilon^k$ ,  $FO_1^k = KAOPEN$  provided by Chinn and Ito,  $FO_2^k = FinancialFreedom$  from Heritage Foundation,  $\mu^k = \mu^k - \bar{\mu}$

**Table 8A: Domestic Equity Holdings, Real Exchange Rate Hedging and Trade Openness, Panel**

$\kappa$	All countries											
	0.00		0.00		0.00		0.01		0.01		0.01	
$\beta$		(0.80)	(0.36)	(0.88)	(0.66)							
$\rho(er, \Delta q)$		-0.01	-0.01	-0.01	-0.02							
		(-1.17)	(-0.71)	(-0.76)	(-0.76)							
$\sigma_{er}$												
$TO_o^{*100}$	-0.05	-0.05	-0.05	-0.05	-0.05							
	(-2.51)	(-5.34)	(-2.53)	(-5.36)	(-2.49)							
$TO_r^{*100}$	-0.02	-0.48	-0.02	-0.48	-0.02	-0.48						
	(-0.26)	(-6.96)	(-0.31)	(-6.99)	(-0.29)	(-6.94)						
$R^2$	0.01	0.05	0.01	0.12	0.01	0.06	0.00	0.12	0.03	0.07	0.01	0.18
$\delta^k$	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no
Obs.	600	600	600	360	600	600	360	600	360	600	360	360

$\mu_t^k = \alpha + \beta \kappa_t^k + \tau_t + \delta^k + \epsilon_t^k$ ,  $TO_o^{k,t} = \frac{Imp^{k,t} + Exp^{k,t}}{GDP^{k,t}}$ ,  $TO_r^{k,t} = TradeFreedom$ . In specifications with  $TO_o^{k,t}$  the data range from 1988 to 2007 and with  $TO_r^{k,t}$  from 1996 to 2007 due to data availability. Constants are not reported. T-statistics are in paranthesis.

**Table 8B:** Domestic Equity Holdings, Real Exchange Rate Hedging and Trade Openness, Panel

$\kappa_t^k$	Industrial countries				Emerging countries			
$\rho(er, \Delta q)$	-0.03 (-2.44)	-0.01 (-1.07)	-0.03 (-2.70)	-0.01 (-1.12)	0.01 (1.49)	0.00 (0.31)	0.01 (1.47)	0.00 (0.06)
$\sigma_{er}$			-2.11 (-1.94)	-0.73 (-0.50)			-0.15 (-0.85)	0.24 (0.95)
$TO_o^*100$	-0.04 (-1.88)	-0.04 (-1.86)	-0.04 (-1.80)	-0.04 (-1.25)	-0.04 (-1.18)	-0.03 (-0.99)		
$TO_r^*100$	-0.40 (-1.89)	-0.42 (-1.95)	-0.41 (-1.93)	-0.41 (-1.93)	-0.01 (-0.21)	-0.01 (-0.16)		-0.01 (-0.24)
$R^2$	0.01	0.02	0.03	0.02	0.01	0.00	0.02	0.01
Obs.	400	400	400	240	200	120	200	120

$\mu_t^k = \alpha + \beta \kappa_t^k + \tau_t + \delta^k + \epsilon_t^k$ ,  $TO_{outcome}^{k,t} = \frac{Imp^{k,t} + Exp^{k,t}}{GDP^{k,t}}$ ,  $TO_{rule}^{k,t} = TradeFreedom$ . In specifications with  $TO_{outcome}^{k,t}$  the data range from 1988 to 2007 and with  $TO_{rule}^{k,t}$  from 1996 to 2007 due to data availability.  $\frac{cov(er, \Delta q)}{\sigma_{er}}$  appears never statistically significant, that is why it is not reported. Constants are not reported. T-statistics are in paranthesis.

**Table 9A:** Domestic Equity Holdings, Real Exchange Rate Hedging and Trade Openness, Panel

	All countries											
$\kappa$												
$\rho(er, \Delta q)$	-0.01 (-1.16)	-0.01 (-0.65)	-0.01 (-0.61)	-0.02 (-0.58)					-0.01 (-1.23)	-0.01 (-0.82)	-0.00 (-0.45)	-0.03 (-1.09)
$\sigma_{er}$					-0.92 (-2.24)	0.54 (1.47)	-0.50 (-1.10)	0.74 (1.37)	-0.90 (-2.18)	3.90 (5.15)	-0.52 (-1.12)	6.39 (5.13)
$TO_o * 100$	-0.06 (-2.37)	-0.04 (-3.75)			-0.05 (-2.19)	-0.29 (-14.73)			-0.05 (-2.05)	-0.05 (-4.63)		
$TO_r * 100$			0.07 (0.70)	-0.38 (-4.05)		0.00 (0.03)	-0.58 (-5.65)				0.09 (0.76)	-0.41 (-4.28)
$TO_o * \rho(er, \Delta q) * 100$	0.02 (0.27)	-0.05 (-2.39)							0.01 (0.14)	-0.06 (-2.91)		
$TO_r * \rho(er, \Delta q) * 100$			-0.37 (-1.39)	-0.38 (-1.72)							-0.38 (-1.41)	-0.33 (-1.53)
$TO_o * \sigma_{er} * 100$					1.48 (0.36)	14.08 (4.44)			1.04 (0.25)	5.11 (3.39)		
$TO_r * \sigma_{er} * 100$							-4.27 (-0.31)	41.67 (2.48)			-1.41 (-0.10)	17.49 (1.37)
$R^2$	0.01	0.06	0.00	0.13	0.02	0.27	0.00	0.09	0.03	0.10	0.01	0.19
$\delta^k$	yes	no	yes	no	yes	no	yes	no	yes	no	no	no
Obs.	600	600	360	360	600	600	360	360	600	600	360	360

$\mu_t^k = \alpha + \beta \kappa_t^k + \tau_t + \delta^k + \epsilon_t^k$ ,  $TO_o^{k,t} = \frac{Imp^{k,t} + Exp^{k,t}}{GDP^{k,t}}$ ,  $TO_r^{k,t} = TradeFreedom$ . In specifications with  $TO_o^{k,t}$  the data range from 1988 to 2007 and with  $TO_r^{k,t}$  from 1996 to 2007 due to data availability.  $\frac{cov(er, \Delta q)}{\sigma_{er}}$  appears never statistically significant, that is why it is not reported. Constants are not reported. T-statistics are in paranthesis.

**Table 9B:** Domestic Equity Holdings, Real Exchange Rate Hedging and Trade Openness, Panel

$\kappa_t^k$	Industrial countries			Emerging countries			
$\rho$	-0.03 (-2.45)	-0.01 (-0.73)	-0.03 (-2.68)	-0.01 (-0.97)	0.01 (1.49)	0.01 (0.07)	-0.00 (-0.35)
$\sigma_{er}$			-2.44 (-2.23)	-0.06 (-0.04)	-0.41 (-0.29)	0.23 (0.81)	0.31 (1.20)
$TO_o * 100$	-0.04 (-1.53)	-0.10 (-3.47)	-0.10 (-3.14)		-0.06 (-1.18)	0.00 (0.02)	-0.01 (-0.23)
$TO_r * 100$		0.21 (0.85)	0.23 (0.61)	1.01 (2.54)	-0.06 (-1.09)	0.00 (0.02)	-0.05 (-0.86)
$TO_o * \rho * 100$	-0.03 (-0.43)		-0.02 (-0.24)		0.05 (0.50)		0.03 (0.25)
$TO_r * \rho * 100$		-2.47 (-4.38)		-2.59 (-4.62)	0.21 (1.37)		0.25 (1.59)
$TO_o * \sigma_{er}$		0.30 (3.19)	0.30 (3.14)		-0.05 (-1.66)	-0.04 (-1.37)	
$TO_r * \sigma_{er}$			-2.84 (-2.02)	-3.44 (-2.54)		-0.02 (-0.35)	-0.05 (-0.81)
$R^2$	0.02	0.09	0.04	0.12	0.02	0.02	0.03
Obs.	400	240	400	240	200	120	200

$\mu_t^k = \alpha + \beta \kappa_t^k + \tau_t + \delta^k + \epsilon_t^k$ ,  $TO_o^{k,t} = \frac{Imp^{k,t} + Exp^{k,t}}{GDP^{k,t}}$ ,  $TO_r^{k,t} = TradeFreedom$ . In specifications with  $TO_{outcome}^{k,t}$  the data range from 1988 to 2007 and with  $TO_{rule}^{k,t}$  - from 1996 to 2007 due to data availability.  $\frac{cov(er, \Delta q)}{\sigma_{er}}$  appears never statistically significant, that is why it is not reported. Constants are not reported. T-statistics are in paranthesis.

**Table 9C: Domestic Equity Holdings, Real Exchange Rate Hedging and Trade Openness, Panel**

	EMU countries			Non-EMU countries			
$\kappa_t^k$							
$\rho$	-0.02 (-1.28)	-0.02 (-0.89)	-0.02 (-1.26)	-0.02 (-1.01)	-0.03 (-2.80)	-0.03 (-3.01)	-0.00 (-0.27)
$\sigma_{er}$		1.01 (0.49)	1.20 (0.54)	0.19 (0.09)		-2.10 (-1.07)	-2.48 (-1.29)
$TO_o * 100$	-0.42 (-3.18)	-0.13 (-0.91)	-0.34 (-2.14)	0.91 (0.43)	-0.03 (-1.29)	-0.10 (-3.59)	-1.42 (-0.79)
$TO_r * 100$		0.29 (0.74)	1.46 (1.87)	2.08 (2.76)	0.05 (0.14)	-0.52 (-1.60)	0.08 (0.19)
$TO_o * \rho * 100$	0.94 (2.73)		0.89 (2.57)		-0.11 (-1.79)	-0.08 (-1.48)	
$TO_r * \rho * 100$		-3.67 (-3.87)		-3.79 (-4.08)	-1.33 (-2.02)		-1.45 (-2.14)
$TO_o * \sigma_{er}$		-0.64 (-1.21)	-0.39 (-0.73)			0.33 (3.86)	
$TO_r * \sigma_{er}$			-7.11 (-2.40)	-7.64 (-2.75)		0.21 (0.17)	0.13 (0.10)
$R^2$	0.06	0.12	0.03	0.07	0.07	0.08	0.16
Obs.	200	120	200	120	200	120	200

$\mu_t^k = \alpha + \beta \kappa_t^k + \tau_t + \delta^k + \epsilon_t^k$ ,  $TO_o^{k,t} = \frac{Imp^{k,t} + Exp^{k,t}}{GDP^{k,t}}$ ,  $TO_r^{k,t} = TradeFreedom$ . In specifications with  $TO_{outcome}^{k,t}$  the data range from 1988 to 2007 and with  $TO_{rule}^{k,t}$  from 1996 to 2007 due to data availability.  $\frac{cov(er, \Delta q)}{\sigma_{er}}$  appears never statistically significant, that is why it is not reported. Constants are not reported. T-statistics are in paranthesis.



**Table 10A:** Domestic Equity Holdings, Real Exchange Rate Hedging and Financial Openness, Panel

	All countries									
$\kappa_t^k$										
$\rho(er, \Delta q)$	-0.01 (-1.15)	-0.00 (-0.12)	-0.01 (-0.77)	-0.02 (-0.69)	-0.01 (-1.26)	-0.00 (-0.13)	-0.01 (-1.11)	-0.03 (-1.18)		
$\sigma_{er}$										
$FO_1$	-0.01 (-2.82)	-0.06 (-14.43)	-0.01 (-2.83)	-0.06 (-14.42)	-0.01 (-3.47)	-0.06 (-3.47)	-0.01 (-1.11)	-0.06 (3.89)		
$FO_2^{*100}$	-0.04 (-0.98)	-0.49 (-10.91)	-0.04 (-1.00)	-0.49 (-10.92)	-0.01 (-3.23)	-0.06 (-13.79)	-0.04 (-0.98)	-0.45 (-9.96)		
$R^2$	0.01	0.27	0.00	0.25	0.02	0.27	0.00	0.25	0.04	0.27
$\delta^k$	yes	no	yes	no	yes	no	yes	no	yes	no
Obs.	580	580	360	360	580	580	360	360	580	360

$\mu_t^k = \alpha + \beta \kappa_t^k + \tau_t + \delta^k + \epsilon_t^k$ ,  $FO_1^{k,t} = KAOPEN$ ,  $FO_2^{k,t} = FinancialFreedom$ . In specifications with  $FO_1^{k,t}$  the data range from 1988 to 2007 and CHE is excluded and in specifications with  $FO_2^{k,t}$  - from 1996 to 2007 due to data availability.  $\frac{cov(er, \Delta q)}{\sigma_{er}}$  appears never statistically significant, that is why it is not reported. Constants are not reported. T-statistics are in paranthesis.

**Table 10B:** Domestic Equity Holdings, Real Exchange Rate Hedging and Financial Openness, Panel

$\kappa_t^k$	Industrial countries							
1	-0.00	-0.00	0.01	0.00	-0.00	-0.00	0.01	0.00
	(-0.00)	(-0.00)	(1.29)	(0.55)	(-0.03)	(-0.04)	(2.16)	(0.75)
$\beta$					0.00	0.00		
					(0.45)	(0.99)		
$\rho(er, \Delta q)$			-0.03	-0.01			-0.03	-0.01
			(-2.64)	(-0.96)			(-2.87)	(-1.01)
$\sigma_{er}$							-2.09	-0.77
							(-1.88)	(-0.52)
$FO_1^*100$	1.01		1.12		1.01		0.94	
	(1.36)		(1.51)		(1.36)		(1.26)	
$FO_2^*100$		0.01		0.01		0.02		0.01
		(0.23)		(0.22)		(0.29)		(0.16)
$R^2$	0.01	0.00	0.02	0.00	0.01	0.00	0.03	0.01
Obs.	380	240	380	240	380	240	380	240

$\kappa_t^k$	Emerging countries							
1	0.00	-0.00	-0.00	-0.00	-0.00	0.00	0.00	-0.00
	(0.00)	(-0.00)	(-0.72)	(-0.29)	(-0.82)	(0.10)	(0.25)	(-0.60)
$\beta$					0.02	-0.00		
					(1.61)	(-0.16)		
$\rho(er, \Delta q)$			0.01	0.00			0.01	0.00
			(1.31)	(0.43)			(1.24)	(0.19)
$\sigma_{er}$							-0.31	0.23
							(-1.89)	(0.92)
$FO_1^*100$	-1.43		-1.41		-1.46		-1.50	
	(-4.8)		(-4.72)		(-4.90)		(-4.99)	
$FO_2^*100$		0.03		0.03		0.03		0.03
		(1.31)		(1.33)		(1.31)		(1.32)
$R^2$	0.10	0.01	0.11	0.02	0.12	0.01	0.13	0.02
Obs.	200	120	200	120	200	120	200	120

$\mu_t^k = \alpha + \beta \kappa_t^k + \tau_t + \delta^k + \epsilon_t^k$ ,  $FO_1^{k,t} = KAOPEN$ ,  $FO_2^{k,t} = FinancialFreedom$ .  
 In specifications with  $FO_1^{k,t}$  the data range from 1988 to 2007 and CHE is excluded and in specifications with  $FO_2^{k,t}$  - from 1996 to 2007 due to data availability.

**Table 10C:** Domestic Equity Holdings, Real Exchange Rate Hedging and Financial Openness, Panel

$\kappa_t^k$	EMU countries							
1	0.00	-0.00	0.00	0.00	0.00	0.00	0.01	0.00
	(0.00)	(-0.00)	(0.46)	(0.34)	(0.01)	(0.06)	(0.82)	(0.40)
$\beta$					0.00	0.00		
					(0.74)	(1.01)		
$\rho(er, \Delta q)$			-0.02	-0.02			-0.02	-0.02
			(-1.10)	(-0.71)			(-1.22)	(-0.73)
$\sigma_{er}$							-1.07	-0.45
							(-0.77)	(-0.20)
$FO_1^*100$	3.61		3.56		3.62		3.46	
	(3.31)		(3.27)		(3.31)		(3.15)	
$FO_2^*100$		0.08		0.07		0.09		0.06
		(0.68)		(0.59)		(0.80)		(0.53)
$R^2$	0.05	0.00	0.06	0.01	0.06	0.01	0.06	0.01
Obs.	200	120	200	120	200	120	380	120

$\kappa_t^k$	Industrial non-EMU countries							
1	0.00	-0.00	0.01	0.00	0.00	-0.00	0.02	0.00
	(0.00)	(-0.00)	(1.29)	(0.37)	(0.17)	(-0.44)	(2.61)	(0.58)
$\beta$					-0.01	0.01		
					(-0.35)	(0.78)		
$\rho(er, \Delta q)$			-0.03	-0.01			-0.03	-0.01
			(-2.28)	(-0.57)			(-2.41)	(-0.59)
$\sigma_{er}$							-4.90	-0.85
							(-2.51)	(-0.50)
$FO_1^*100$	-4.30		-3.86		-4.25		-4.13	
	(-3.75)		(-3.35)		(-3.66)		(-3.63)	
$FO_2^*100$		-0.06		-0.06		-0.07		-0.06
		(-1.03)		(-0.96)		(-1.13)		(-0.93)
$R^2$	0.07	0.01	0.10	0.01	0.07	0.01	0.13	0.01
Obs.	180	120	180	120	180	120	180	120

$\mu_t^k = \alpha + \beta \kappa_t^k + \tau_t + \delta^k + \epsilon_t^k$ ,  $FO_1^{k,t} = KAOPEN$ ,  $FO_2^{k,t} = FinancialFreedom$ . In specifications with  $FO_1^{k,t}$  the data range from 1988 to 2007 and CHE is excluded and in specifications with  $FO_2^{k,t}$  - from 1996 to 2007 due to data availability.