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Cross-Boarder Diversification in Bank Asset Portfolios

by

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Cross-Border Diversification in Bank Asset Portfolios

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Abstract

Taking the mean-variance portfolio model as a benchmark, we compute the optimally diversified portfolio for banks located in France, Germany, the U.K., and the U.S. under different assumptions about currency hedging. We compare these optimal portfolios to the actual cross-border assets of banks from 1995-1999 and try to explain the deviations. We find that banks over-invest domestically to a considerable extent and that cross-border diversification entails considerable gain. Banks underweight countries which are culturally less similar or have capital controls in place. Capital controls have a strong impact on the degree of underinvestment whereas less political risk increases the degree of over-investment.

Keywords: International banking, portfolio diversification, international integration.
JEL-classification: G21, G11, E44, F40.

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1 Introduction

The international activities of commercial banks have expanded rapidly over the past few decades, although banks in most countries still hold only a small fraction of their portfolios in foreign claims. This paper focuses on the driving forces behind and the possible barriers to the internationalization of banks.

International diversification may help banks decrease their exposure to systematic risks. Through their transformation of assets, banks carry a considerably degree of non-diversifiable economic risks on their books. Given high costs of financial distress, international extensions of credit may improve the diversification of these systematic risks. To the extent that international lending is associated with higher returns, banks' risk-return trade-off may also be improved overall.[1]

An assessment of potential barriers necessarily requires a benchmark. The main contribution of this paper is to study the issue of banks' internationalization against a well-defined, *computable*, one: the mean-variance portfolio model (Markowitz 1952, 1959) and its international extension (Solnik 1973, Sercu 1980), in which investors reap benefits from diversification.

We use data on the bilateral cross-border assets of banks located in four major reporting economies (France, Germany, the U.K., and the U.S.) provided by the Bank of International Settlement (BIS), covering the period 1995-1999. Hence we study the diversification gains from international banking related to counter-party location or country risks. These risks consist primarily of transfer, political, and currency risk.

Our empirical analysis proceeds in three steps. First, we compute a set of optimally diversified portfolios for banks in each of the four reporting countries using standard mean-variance optimization under different assumptions about the hedging of foreign currency risk. Second, we compare these benchmark portfolios to banks' actual portfolios. Third, we run regressions to explain the differences between actual and benchmark portfolios.

We find that banks in the four reporting countries may improve their risk-return trade-off considerably by investing more internationally relative to investing purely in (risky) domestic assets. Furthermore, we find that banks over-invest domestically relative to the benchmark portfolios. In particular, banks appear to have preferences (overweight relative to benchmark) for certain markets (countries) and these preferences are associated with the presence of capital controls and cultural homogeneity. Thus, banks in the reporting countries tend to underweight countries with which they are less similar or which have capital controls in

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[1] Alternatively, banks may take risks off balance sheet through the use of derivatives. Hellwig (1998) discusses the asset transformation function of banks and their exposure to non-diversifiable risks.

place. Regressing the deviation between our benchmark and actual portfolio weight on variables proxying for capital controls, information costs, political risk, and credit risk, we find strong evidence that the *degree* of underweighting is larger when capital controls are in place. Given banks' preferences for lending to certain countries, we also find strong evidence that political risk systematically affects the degree of overinvestment, such that an improvement in risk conditions is associated with *increased* over-investment. We do not, however, find systematic evidence that the degree of underweighting co-varies with proxies for informational barriers related to cultural differences or geographical distance.

Our paper is linked to three strands of literature:

First, other work studies the internationalization of the banking industry. However, most of this work focuses on banks' establishment of foreign offices (see, e.g., Goldberg and Saunders 1980, 1981, Hultman and McGee 1989, Focarelli and Pozzolo 2001) or on the importance of nationality in the bank relationships of non-financial multinational firms (Berger et al. 2002). The internationalization of the banking industry generally occurs along two dimensions: through direct cross-border lending to a foreign counter-party, (*international* banking), and through the ownership of foreign branches or subsidiaries (*multi-national,* or global, banking). Few empirical studies have looked at the cross-border lending of banks[2], and none consider the portfolio aspects of banks' international lending.

There is currently considerable interest in assessing the integration of bank markets. Relative to the approach taken in the present paper, it is worth noting that the establishment of foreign banking offices is not a necessary condition for integration. Perhaps when country risks are less costly and/or can more easily be controlled, credit can flow freely, in the form of direct cross-border lending, to locations that offer the best risk-return tradeoff in line with the mean-variance benchmark. Hence, understanding the factors limiting direct cross-border lending is an important part to understanding financial integration.

Second, our approach is related to the literature on the international integration of equity markets and the home bias puzzle (Levy and Sarnat 1970, French and Poterba 1991, Tesar and Werner 1995).[3] Burger and Warnock (2003) study diversification of international bond portfolios. We do not, however, use the capital market equilibrium of the international asset pricing model, namely the global market portfolio, as our benchmark. Rather, we take the return on banks' international investment opportunities as given, and "calibrate" the demand functions, hence computing banks' optimally diversified portfolios. Hence, we do not assume that the return on banks' cross-border assets is generated by the international CAPM.

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[2] Exceptions are Buch (2002), and Goldberg (2001) who considers both of the above dimensions.

[3] Stulz (1994), Lewis (1999) and Karolyi and Stulz (2001) survey this literature.

A recent strand of the international finance literature uses gravity-type models to estimate the determinants of international investment choices.[4] One variable that has been used to proxy information costs is the geographical distance between two markets. Empirical studies find a negative link between international asset holdings or international capital flows, on the one hand, and distance, on the other hand (Buch 2003, Burger and Warnock 2002, Focarelli and Pozzolo 2001, Portes and Rey 1999 and 2001, Wei and Wu 2002). [5] In contrast to the findings of the above papers, we do not find strong evidence that geographical distance can explain the deviation from our benchmark portfolios.

Finally, our paper is related to the portfolio approach of banking. The early papers by Pyle (1971) and Hart and Jaffee (1974) explain the existence of financial intermediaries within the mean-variance framework. Later applications of the portfolio model are Koehn and Santomero (1980) and Kim and Santomero (1988) which analyze the impact of capital regulation on banks' portfolio and choice of risk.

The rest of the paper is organized as follows: Section 2 describes our methodological approach and discusses risks and returns in international banking. Section 3 presents the data and the construction of the benchmark portfolio weights. The empirical results are presented in Section 4 and 5, and Section 6 concludes.

2 Methodological Approach

Our benchmark mean-variance approach used to determine the composition of the optimal international portfolio requires measurement of the risks of and returns to international lending. We discuss below the assumptions that we make in deriving these return, including the hedging of exchange rate risks.

2.1 Risk and Return in International Banking

Standard portfolio theory asserts that international diversification benefits investors because it expands the choice set of assets. Low correlations between domestic and foreign assets lower the risk of an international portfolio and improve the risk-return trade-off of the investment opportunity set.[6] Banks may therefore benefit from holding foreign assets either because they gain access to activities with higher net present value than those available in domestic

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[4] Martin and Rey (2001) provide a theoretical underpinning of the gravity model of international finance.

[5] In the banking literature, distance has been used as a proxy for banks' ability to monitor (see e.g. Petersen and Rajan 2000), although Degryse and Ongena (2002) find that distance proxies for effects of price-discrimination.

[6] See, e.g., Solnik (1974). However, the risk-return gain is hard to determine empirically on the basis of ex-post data, in part because of measurement error; see Jorion (1985).

markets or because they can diversify location-specific risks. Since the costs of financial distress are high in banking, improved diversification would be value-enhancing.[7]

As Table 3 shows, however, in banks' actual portfolios domestic holdings far exceed foreign claims. Hence, it appears that banks may not be taking advantage of gains from international diversification. To quantify that proposition, we need to know the benchmark portfolio under optimal diversification.

We study what the optimal risk-return trade-off implies for banks' cross-border allocation of assets using bilateral observations on banks' foreign assets. We compute a benchmark portfolio against which we compare banks' actual cross-border holdings, and we run regressions of the difference between the two on variables which may capture *barriers* to banks' cross-border extension of credit. If risks associated with cross-border lending cannot be controlled at reasonable costs due to asymmetries of information, regulations or the like, banks will abstain from direct cross-border transactions. For example, costs of obtaining information may limit banks' ability to monitor foreign borrowers and the ability to monitor may be closely related to the cultural ties between the location of the lender and borrower.[8]

When lending internationally, banks are also exposed to currency risk and various country risks.[9] The expected return and risks on assets held against a counter-party residing in country *i* will generally have a country-component that may not be fully diversified away in an international portfolio:

- The currency denomination of assets will expose the lender to *currency risk*. If a country has a high interest rate differential vis-à-vis the world average, this may indicate the presence of a premium for currency risk equal to the expected devaluation of the foreign currency (cf. uncovered interest rate parity).
- Foreign positions may be subjected to *transfer risk* to the extent there are either restrictions on capital movements or even some probability that currency controls may be imposed by the foreign government to limit capital outflows, as occurred, for example, in Malaysia in 1997 in the wake of the Asian crisis.

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[7] There is generally little quantitative evidence of the gain from "going international" in banking. Whalen (1988) provides some evidence that the size of gains from international diversification may be significant. Acharya, Hasan and Saunders (2002) consider gains from geographical diversification and test the model of Winton (1999) on a sample of Italian banks. They find support that regional diversification improves the risk-return tradeoff for banks that have low to moderate levels of downside risk.

[8] Even within countries, investment patterns have been found to be guided by regional and cultural proximity (Coval and Moskowitz 1999, Grinblatt and Keloharju 2000).

[9] See Stigum (1990) for an extensive discussion of country risks involved in international banking.

- Other country risks include *regulatory, legal* and *political risks*. Examples are the Mexican and Russian debt moratoriums of 1994 and 1998, or the imposition of minimum reserve requirements on cross-border credits of the type imposed in Chile in the 1990s.

The above types of risk have a direct effect on the expected rate of return on banks' cross-border assets. Currency risk affects the rate of return on banking assets directly if assets are denominated in the foreign currency. Any factor that potentially lowers the ability of borrowers to repay their debt – such as the imposition of currency controls or other regulatory factors – affect the expected rate of return on banking assets. The benchmark portfolio that we calculate thus reflects risks which are material to international banking.

2.2 Assumptions of the Benchmark Portfolio

The empirical approach of this paper follows three steps. In the first step, we compute "optimal" portfolios for banks international assets. In the second step, we compare actual and benchmark portfolios and, in the third step, we try to explain these deviations.

We use the mean-variance portfolio model (Markowitz 1952, 1959) and its international extension (Solnik 1973, Sercu 1980) as our benchmark model for the optimal diversification of banks' cross-border asset portfolio. Using the mean-variance model to evaluate the gains from international banking is equivalent to the following standard model of the bank decision problem:

- There is a representative risk-averse bank in each country.
- Banks face a menu choice of N composite risky assets corresponding to N different locations (countries), including the domestic market. Furthermore, there is a risk-free domestic asset. Our focus is the allocation of the risky portfolio of assets, not the split between risky and riskless assets.
- Banks take interest rates on the risky assets as given and choose the international allocation that maximizes the risk-return tradeoff (Sharpe ratio) subject to a no-short-sales constraint.[10]

We impose the short-sales constraint because we view banks' assets and liabilities as fundamentally different kinds of contracts; otherwise, when computing the benchmark portfolio, we would be forced to make the unpalatable assumption that a short-sale of a loan to a particular country was equivalent to issuing a new deposit in that country. The benchmark portfolio of risky assets is determined as the portfolio on the efficient

[10] If returns on bank claims are normally distributed, this is consistent with any utility function in a one-period model. Alternatively, for non-normal returns, restrictions must be placed on the utility function.

(constrained) frontier with the highest Sharpe ratio (i.e. the ratio of the excess return of the portfolio to its standard deviation), which we calculate by mapping out the constrained frontier.[11] Hence, we focus on banks' holdings of risky assets and ignore the weight on the domestic riskfree portfolio. Of course, in the portfolio model, a bank's optimal *total* portfolio is a linear combination of the riskfree domestic asset and the risky portfolio, with the relative weights depending on banks' degree of risk aversion. In our analysis we are interested in banks' preferences for investing domestically versus abroad and less in banks' preferences for safe and risky assets. Since the relative weights on the domestic and foreign assets in the risky portfolio are unaffected by the degree of risk aversion, we ignore the safe part of the portfolio.[12]

Applying a mean-variance optimization framework to study banks' cross-border asset allocation implies that we are making two additional simplifying assumptions:

First, the decomposition of the asset and liability side implicit in this setup is equivalent to a view of a bank that faces a menu of exogenously given investment opportunities and that will attempt to raising funding for any nonnegative net present value project. The large banks that are behind most of international lending fund most of their activities with borrowed fund, raised in the money market as opposed to a branching network, which lends support to the above view. Banks' ability to expand their balance sheet is of course subject to various constraints, such as reserve and capital ratio requirements which work to pin down the overall size of the asset portfolio. Such constraints are abstracted from in this paper. We simply derive the composition of the Sharpe-ratio maximizing portfolio and compare it to banks' actual composition, treating portfolio size as exogenous.[13] While a simultaneous treatment of banks' assets and liabilities is essential in an analysis of the risks that banks carry *on* their books, in this paper, our perspective is rather to as ask how much risk banks can *take off* their books by means of cross-border diversification.

Second, the mean-variance benchmark treats banks as price-takers. This assumption differs in an important aspect from the modern theory of financial intermediation which rationalizes the existence of banks by the asymmetry of information in credit markets.[14] The return to

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[11] We compute each point on the frontier by finding the set of weights which, for a given mean return, minimizes the standard deviation of the portfolio, subject to the non-negativity constraint.

[12] When we compare the benchmark portfolio with banks' actual portfolios we use data on banks' holdings of risky domestic assets only.

[13] That binding capital constraints may affect the extent of banks' international lending at an aggregate level has recently been showed by Peek and Rosengren (1997, 2000).

[14] Seminal references are Leland and Pyle (1977), Diamond and Dybvig (1983) and Diamond (1984). Freixas and Rochet (1998) gives a comprehensive exposition of the theory of financial intermediation.

monitoring and the connection between credit risk and asymmetries of information are central elements in the theory of financial intermediation which are abstracted from in the mean-variance model. Hence, information costs are a potential source of deviation between our benchmark portfolios and banks' actual portfolios. We consider this possibility explicitly in the analysis below by including regressors that proxy for information costs when we look for explanations for the deviation between the benchmark and actual portfolios.

Summing up, banks should not be, and indeed do not appear to be, indifferent about the risk-return trade-off on their asset portfolios. International cross-border lending is likely to entail gains from diversification although benefits may be reduced if barriers such as asymmetric information or regulatory restrictions raise the relative cost of international lending. The value of the portfolio model is that it serves as an explicit and computable benchmark focusing on banks' exposures to the various country risks that are inherent to international loan markets. Note that this choice of benchmark does not imply an assumption that banks' cross-border lending returns are generated by the CAPM. Rather, we take the return on cross-border lending as given and compute banks' corresponding asset demands (or, equivalently, supply of funds). The portfolio model is clearly not a model of the fundamental asset transformation process performed by banks, but its usefulness lies in the provision of an explicit benchmark, which, through a deviation-from-benchmark measure, may help us pin down some of the forces that underlie international banking.

2.3 Hedged Returns

When banks invest internationally, they are exposed to currency risk: changes in exchange rates imply that banks located in different countries face different investment opportunity sets when they convert the return on foreign assets into their domestic currency. Therefore, we calculate three alternative sets of benchmark portfolio weights differing in the assumptions they make about how banks choose to hedge their exposure for currency risk. We do not actually observe the currency-denomination of the bilateral positions in our data. However, we assume that the currency denomination coincides with the location of the counter-party as long as that counter party is a OECD-member. Liquid derivatives markets for foreign exchange exist for all OECD-countries in our sample, so this assumption does not seem inappropriate. For emerging market, however, liquid forward markets do not necessarily exist, hence returns against emerging market counter parties are measured in USD and can be hedged with the USD-forward rate.

Using these assumptions, we compute the following hedging portfolios:

- In Case 1, we assume that banks do not hedge their currency exposures and hence choose to carry that risk on their books. This may correspond to a situation where it is optimal for banks to leave their foreign investments unhedged, either because the costs of hedging are too high or because hedging involves the assumption of other

costly risks. Alternatively, it may be the case that the cost of bearing the risks is low for banks, for example because currency risk may be diversified in a large portfolio.

- In Case 2, we assume banks hedge their principal investment fully ("unit hedge"), locking in the future sales price of the foreign currency through the sale of a forward or futures contract. This case may be seen as capturing the situation where banks choose to hedge currency risk on-balance sheet through matching liabilities. On-balance sheet hedging works to lower the volatility of returns.
- In Case 3, we assume banks hedge optimally according to the international asset pricing model (Sercu 1980).[15] The hedge ratio minimizes volatility of the hedged position by taking into account the correlations between the risky assets and currencies. This case may be interpreted as a situation where banks actively manage their currency risks and are willing to take open positions to benefit from the structure of covariances.

3 Data

3.1 Banks' Cross-Border Assets

To compute the geographical dispersion of banks' portfolios, we use the locational data published by the Bank for International Settlements (BIS) in its *Quarterly Review* (also known as the *BIS Territorial Data*). For each reporting country, the BIS reports the assets held vis-á-vis recipient countries from both the developed and the developing world. Supplementing the BIS Quarterly Review with historical unpublished data obtained from the BIS, we are able to construct a panel data set of annual bilateral assets positions for the following four reporting countries; France, Germany, United Kingdom, and the United States. The data sample used in this study covers the period from 1995 to 1999.

The data provide information on the total value of assets of banks located in the reporting countries against counter-parties located abroad (recipient countries). Only the total dollar value of the claims against counter-parties located abroad is collected. Hence, determining the benefit from investing abroad, the assets on any recipient country are best thought of as a *composite asset* with a return that is subjected to various country risks. This composite asset spans various types of assets against various types of counter-parties. In particular, besides location of counter-party, the maturity, cash flow, and currency denomination are characteristics that may differ across the contracts that make up the composite asset. In addition, asset positions include trade-related credit, holdings and own issues of international securities (except the US), and permanent financial interests in other undertakings such as

[15] The international asset-pricing model implies that, in the presence of exchange rate risk, the benchmark portfolio involves taking positions in both foreign assets and currencies.

equity positions (participations). Off-balance sheet items are generally excluded. The types of counter-parties contained in the cross-border position in our data include other banks, nonbanks, and own subsidiaries located abroad (by the locational nature of the data).[16] At the aggregate level, about two-thirds of international assets are interbank assets, and most of these are denominated in the major currencies. The distinguishing feature of our data set is the location of counter-party, whereas the other contractual dimensions (such as currency, maturity, type of counterparty) are not available to us at the bilateral level.

The BIS locational data do not quite allow us to construct a perfect picture of the *international* (as opposed to cross-border) diversification of banks' portfolios, as the location and ownership of counter-party do not necessarily coincide. In particular, the locational data do not consolidate assets vis-à-vis foreign branches and subsidiaries of the banks in the reporting country.[17] Bilateral consolidated data were not collected by the BIS prior to 1999. Hence, we cannot distinguish loans made by UK-chartered banks to (say) Japan from funds channeled to Japan by Japanese subsidiaries located in London. Because interoffice positions are not netted out, our measured cross-border diversification may be a noisy measure of the international diversification of banks' actual portfolios. While the locational data may lead us to overstate international diversification by not netting out interoffice claims, they may also lead us to understate diversification by not considering the foreign positions of foreign offices located abroad. The direction of the bias also depends on the interoffice accounting practices of banks. To get a sense of the extent of this noise, we compare for the one overlapping year of 1999 the regional structure of actual portfolio weights measured by the locational data with the BIS bilateral consolidated data. We find fairly small differences for Germany, France and the U.S.: the deviation between the two portfolio weight measures is in the order of five percentage points for any individual recipient country, and typically much lower than that, and the sign of the difference varies in an unsystematic fashion across recipient countries. For the U.K., due to London's position as a financial center, the size of the unconsolidated portfolio is rather larger than the consolidated portfolio, hence we underestimate the portfolio share of the domestic risky asset by 30 percentage points, making U.K. banks look overly diversified. Also, cross-border investment against counter-parties in the U.S. is overestimated by about six percent (these are most likely interoffice positions of U.S. subsidiaries/offices in London). We comment on this latter observation in section 4.3, but in general the results appear not to be seriously affected by the noise in the locational data.

Our computation of the benchmark portfolio also requires information about assets held domestically. We obtain data on the domestic bank assets for the four reporting countries

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[16] Our data cover several different types of on-balance sheet contracts, including interbank deposits, syndicated lending, revolving credit, securities, and participations.

[17] That is, any office, branch or subsidiary of foreign banks residing in, say, the U.S. are registered as "banks in the U.S.".

from the IMF publication *International Financial Statistics* (domestic assets are not collected by the BIS). We subtract out domestic claims on the government sector. Notice that because the domestic data are taken from a different source, the measurement of the relative size of domestic and foreign positions may be affected by measurement error. The domestic risk-free asset is proxied by the 3-month Tbill contract for each of the reporting countries.

3.2 Estimating Returns on Banks' Cross-Border Assets

In order to determine the opportunity set that banks face in an international context, we need to estimate the expected returns and risks of the foreign composite assets. Banks typically lend at LIBOR plus a spread to each individual counter party depending on the credit rating of that counter party. The mark-up also contains a premium for transfer and political risk. We want our benchmark portfolio to be based on returns that price transfer and political risk which is an integral part of international banking.

Note that we cannot treat the return at date t as a *known* rate of interest earned on an investment maturing in a given period of time, i.e as a standard fixed-income security, as the expected return will be stochastic, even if the promised return is not. Also, given that we are working with a composite asset observed annually, to the extent that assets are of shorter maturity or that the interest is reset at intermediary dates, the future return earned on the composite claim will be random. For example, a bank that lends under a line of credit is exposed to both interest and quantity risk.

Based on these two considerations, we use total returns on sovereign bond indices to measure banks' expected return on cross-border assets: for the OECD-countries in our sample, which all have liquid and liberalized capital markets during the sample period, we compute returns measured in the domestic currency from the MSCI-sovereign bond indices. For emerging markets, we use the JP Morgan EMBI+ indices, which are USD-denominated bonds, to calculate total returns. The EMBI+ indices are available from 1994, thus determining the starting year of our sample. Hence, we are (realistically) assuming that lending to emerging markets takes place in USD (see, e.g. Claessens et al. 2003). Ideally, we would have preferred to work with corporate debt indices but such are available for only few of the countries in our sample.[18] We estimate the means and variance-covariance matrix of each national index from monthly observations of 3-months returns, using the entire time-series of observations (we do not use a rolling-window to allow for changes in expected

[18] Alternatively, one could in principle adjust the promised return, LIBOR, for a measure of expected losses from information of banks' actual loan losses on a country-basis. To the best of our knowledge, bilateral data on loan losses are not collected by the regulatory authorities in any of the four reporting countries of our data set and hence such measures are impossible to construct.

returns over time, and hence time-varying benchmark weights, because our time-dimension is relatively short which in a few instances produces unrealistically unstable weights).

The essential feature of the benchmark portfolio thus is that it is calculated from returns that price the country risks faced by banks engaged in cross-border lending. Our benchmark returns, however, may not capture individual counter-party credit risk to the extent such risk is priced at the aggregate level. But if any required premium for credit risk is approximately the same across recipient countries, our estimated benchmark weights will be valid. This approximation will hold to the extent international transactions mostly take place between banks with an investment-grade credit-ratings. To account for the possibility that the approximation does not hold well, we include a proxy for credit risk of counter-parties in our regressions.

We construct a sample of the recipient countries based on the main criteria that data exist that allow us to construct times series of returns for the largest possible subset of countries in the BIS locational statistics, including both OECD and emerging markets using data from the *Datastream* data base. That leaves us with 21 countries: 12 OECD countries (Australia, Belgium, Canada, France, UK, Germany, Italy, Japan, Netherlands, Norway, Sweden, and the US), and 9 non-OECD emerging markets (Argentina, Mexico, Morocco, Panama, Peru, Philippines, Poland, Venezuela, and Russia). These 21 countries cover between 80-90% of total cross-border assets of banks in the four reporting countries.

4 Actual versus Benchmark Portfolios: Empirical Results

In this section, we first look at the actual regional structure of banks' international asset portfolios. We then describe the estimated benchmark portfolios and the deviation from the benchmark.

4.1 Regional Structure of International Banking Assets

Figure 1 provides a breakdown of banks' external assets by region of the recipient countries for the years 1995 and 1999. Foreign assets of the reporting countries are highly concentrated in other developed countries. For Germany, France, and the U.K., these countries accounted for around 80–90 percent of total foreign assets. U.S. banks had the smallest exposure to other developed countries (55 percent of the total). The main reason for this difference between the U.S. and the other reporting countries is the relatively large exposure of U.S. banks to developing countries in Latin America and to offshore financial centers.

During the 1980s and 90s, lending to other developed countries has increased in importance. This can be seen both in the portfolio shares of EU and of OECD countries. Two interpretations of this restructuring of portfolios are conceivable. On the one hand, the re-structuring of portfolios may be the result of the financial crises of the late 1990s. Due to the

increase in risks associated with these crises, banks have tended to move away from emerging markets. On the other hand, regulatory changes such as the creation of the EU's Single Market or the Basle capital accord, which sets standards for the risk weighted assets of commercial banks and puts a lower weight on OECD countries, could be behind these patterns. We account for these two alternative explanations in our regressions below by using proxies for country risks as well as for regulatory changes at the EU level to explain differences in portfolio shares across countries.

4.2 Gains from an International Portfolio

Table 1 summarizes the benchmark portfolio characteristics for the three international benchmark portfolios under the assumption of unit-hedged, optimally hedged, and unhedged returns respectively for each of the reporting countries. The figures in the table are the average values over the five-year sample period. We also report the average return and volatility on the purely (risky) domestic portfolio.[19] A comparison of Sharpe ratios suggests the existence of considerable gains from international diversification. The Sharpe ratios are reported on an annualized basis; hence for, say, the U.S. an annualized ratio of 1.88 corresponds to a monthly ratio of 0.54. The optimally hedged portfolio tends to have the lowest volatility as expected, the highest return, and therefore the highest Sharpe ratio. The unhedged portfolio has the highest volatility among the international portfolios due to added volatility from exchange rates, but, interestingly, even the unhedged benchmark has lower volatility than the domestic portfolio suggesting diversification of currency returns.

4.3 Optimal Geographical Allocation and Deviation from Benchmark

In Table 2, we show the estimated average return on foreign assets for the three methods of hedging and for each reporting country.[20] In general, the estimated returns of the OECD-countries have lower means and smaller standard deviation than those for the emerging markets. The emerging markets with the highest volatilities are Russia, Panama, Peru and Venezuela.

Considering the unit-hedged returns, there is a clear tendency for the core-countries in the European Monetary System (EMS), France, Germany, Belgium and the Netherlands, to have

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[19] The excess return of the risky domestic portfolio is not zero in our calculations as the risky domestic asset is proxied by the total return on the MSCI sovereign debt index and the risk-free return by the domestic 3-month t-bill rate. The return of the former is necessarily higher and differs by index composition, gains from diversification and reinvestment.

[20] We report nominal returns. Converting to real returns affects the benchmark weights only to the extent that the inflation rate of the reporting country is correlated with changes in the exchange rate.

rather similar means and standard deviations vis-à-vis the reporting countries France and Germany. This clearly reflects the convergence of interest rates experienced up to the introduction of the EMU. Domestic returns generally tend to have the lowest standard deviation, suggesting that exchange rate fluctuations matter even when hedged (the exception is the U.K for which the volatilities of the assets of the core-EU countries are even lower). The volatility of unhedged returns is always lowest for the domestic asset, obviously reflecting the added currency risk.

In Table 3, we compare the actual and benchmark portfolio shares derived under the three different hedging assumptions. Generally, the reporting countries are considerably overweighted domestically. This tendency is less marked for the unhedged benchmark, where the added volatility from exchange rates makes the domestic asset more attractive (in fact, in the unhedged case, the U.K. is underweighted domestically). The European reporting banks also overweight North America but underweight Japan. Indeed, the pattern of benchmark weights appear to be determined by relatively volatilities, rather than expected returns. Therefore, the weight on European countries is high which is much in line with actual weights.

Note that the emerging markets generally is assigned zero weights in the benchmarks, except Poland and Russia (and occasionally Peru and Morocco). From a mean-variance point of view, the higher expected returns are outweighed by the cost of added volatility. In the case of Poland, which is the country with the most persistent pattern of non-zero weights, the reporting countries are all underweighted. The same holds, albeit less systematically, for Russia. Also notice that reporting country banks' overweight Latin America relative to the benchmarks.

The variation in actual and benchmark portfolio composition over the sample period is depicted in Figures 2-5 which plot the difference between actual and benchmark portfolio weights for the four reporting countries and for five regions (domestic, Asia (including Australia), E.U., North America, Latin America and East Europe (incl. Russia). Africa, represented by Morocco only, is left out). Generally, the domestic asset is overweighted and the assets of European countries are underweighted. This pattern is consistent across all reporting countries, although it appears that domestic overweighting is less in the U.K. Recalling the discussion from section 3.1 however, we know that the unconsolidated locational data in fact overestimates the domestic portfolio share by about 30 percentage points and overestimates the weight on the U.S. by 6 percent. Taking that into account we see that the U.K. is in fact overweighted domestically to an equal extent as the three other reporting countries. Finally, its worth noticing that visually one can make out a small tendency towards the benchmarks, that is, larger internationalization, over time.

The variation in the difference between actual and benchmark weights over time tend to stay within the order of five percent, reflecting changes in the actual portfolio share (the

benchmark shares are constant over time). Considering that the actual domestic portfolio weights are between 70-90 percent, this variation is far from negligible. We address the determinants of this variation in the next section.

5 Explaining Deviations from the Benchmark

How should we interpret the observed differences between the benchmark and actual portfolio compositions? We look for explanations by regressing the differences between the benchmark and actual portfolios weights on variables that proxy for regulations, information costs, and risks. Our motivation for this choice of regressors is discussed below.

5.1 Explanatory Variables

One explanation for the observed differences in actual and benchmark portfolios is that these simply result from estimation or measurement error. Using *ex post* data, it is unlikely that the benchmark and actual portfolios will turn out to be identical and the variance-covariance matrix of returns may be estimated with error. However, the over-investment in the domestic economy relative to the investment implied by the optimal risk-return tradeoff appears to be too large to be the result of measurement error, even if we take into account that the domestic data are taken from a different source. Furthermore, if the observed deviation in weights is caused by such errors alone, we should not observe a systematic relationship between the deviation and the regressors. Yet the results in Table 5 and 6, discussed below, indicate the presence of systematic covariations.

The alternative explanation is that our benchmark portfolios neglect elements that are important to international banking. In particular, the mean-variance benchmark ignores the potential importance of asymmetric information or barriers resulting from regulations, as discussed in Section 2. We investigate this possibility by choosing regressors that are likely to capture such factors. In particular, for each of the three hedging scenarios we first run probit regressions to establish the characteristics of recipient countries that are overweighted. We then run panel regressions of the difference between the benchmark and actual weights (benchmark minus actual) for country *i* and the actual weight on country *i* on proxies for regulations, information costs, and risk. That is, we look to determine explanation for the deviation from benchmark, conditional on a recipient country being overweighted (underweighting respectively). We denote these regressions the conditional panel regressions. For the regressions presented below we ran with both a pooled sample and for each of the reporting countries separately, both of which yielded similar results. For space considerations, we report the pooled regressions only.

To capture barriers to foreign investment that are related to culture and asymmetry of information, we use a *similarity* measure which is an index that equals one if a recipient

country either shares the language or legal system with the reporting country (the latter may also proxy for legal risk). The index takes a value of two if both are shared. In addition, we include a variable measuring the distance between the partner countries. *Distance* measures the shortest line between two countries' commercial centers according to the degrees of latitude and longitude (in thousands of kilometers).[21] In addition, we include two variables which are intended to capture regulatory restrictions to foreign lending. The first is a dummy variable which equals one when the recipient country is an *EU*-member taking into account the impact of the EU's Single Market program. Second, we include a dummy for the presence of *capital controls* on cross-border financial credits. This variable equals one if countries impose controls and zero otherwise.[22]

Because costs of financial distress in the business of banking may be extreme, and because bankruptcy therefore is associated with large deadweight costs, we also include as regressors variables that proxies for credit risk at the country level. We use the *Euromoney* score for *political risk* of nonpayment of government debt and the *Euromoney* score for *forfaiting premium* and tenure available.[23] While the first measure likely captures the strength of government finances, the second measure captures credit and legal risks for claims on other banks and non-bank firms in connection with trade finance, we think of this index as proxying for private sector credit risk.

5.2 Summary Statistics and Probit Regressions

Table 4 presents summary statistics of the variables in the over- and underweighted group (values are averages across hedging subcases) for each of the four reporting countries. Recipient countries in the underweighted groups tend to be less similar to the reporting country, and more have capital controls imposed. Hence, the division into over- versus underweighted groups is correlated with the existence of two types of barriers: cultural and legal similarity, and capital controls.

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[21] Kindly provided by Dieter Schumacher from the German Institute for Economic Research (DIW).

[22] Source: IMF Annual Reports on Exchange Arrangements and Exchange Restrictions.

[23] The Euromoney political risk index is constructed from a poll of risk analysts, risk insurance brokers, and bank credit officers. They were asked to give each country a score between zero and 25 (25 indicated no risk of nonpayment, zero indicates that there is no change of payments being made). The index of "access to and discount on forfeiting" reflects the average maximum maturity (tenor) available and the forfaiting spread over riskless countries, such as the United States. The maximum (best) score is 10. Countries for which forfaiting is not available score zero. Both variables vary over both the time and cross-sectional dimension. Data are supplied by Morgan Grenfell Trade Finance, West Merchant Bank, the London Forfaiting Company, Standard Bank, and ING Capital.

These statistics are confirmed by the probit regressions reported in Table 5. Countries have a significantly higher probability of being underweighted when they impose capital controls and when they are more similar to the reporting country. In contrast to the gravity literature, we find that geographical distance does not appear to impact the probability of a recipient country being underweighted and hence does not appear to be proxying for information or transaction costs in our context. Indeed, the impact of distance is insignificant for both the optimal and unit hedge cases and has a counterintuitive sign in the unhedged case.

A higher index-value of the forfaiting premium also increases the probability of being overweighted, suggesting that countries with a premium for credit risk are less likely to attract direct cross-border bank finance in line with our discussions above. Surprisingly, the political risk index enters significantly with a negative sign, which is contrary to economic intuition.[24]

In sum, we find that barriers in the form of cultural and legal similarity and capital controls increase the probability of being underweighted. We also find strong evidence that banks' overweight countries when the forfeiting premium, which likely proxies for private sector credit risk, is low.

5.3 Conditional panel regressions of deviation from benchmark

In a second set of regressions, we attempt to explain the magnitude of the 'bias', i.e. of the difference between benchmark and actual portfolio weights. Results are reported in Table 6. Because we use the nominal deviation from benchmark weights as the dependent variable, we need to distinguish between two cases when interpreting the coefficient signs: the case where the benchmark weight exceeds the actual weight for country *i* and the deviation is positive (*under-investment* relative to benchmark) and the opposite case where the deviation is negative (*over-investment)*. For the under-investment case, a negative coefficient is interpreted as a movement *towards* the benchmark (less under-investment), while a positive sign indicates a movement *away from* the benchmark (more under-investment). For the over-investment case, the coefficient signs have the opposite interpretation. The following Table summarizes these effects (where w_{opt} (w_{act}) = optimal (actual) portfolio shares):

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[24] We experimented by leaving out the forfeiting premium index from the regressions, but this did not affect the sign on the political risk (or other) variable(s) as the two indices are not highly correlated.

	Over-investment $w_{opt} - w_{act} < 0$	Under-investment $w_{opt} - w_{act} > 0$
Negative coefficient	Away from benchmark → more over-investment	towards benchmark → less under-investment
Positive coefficient	towards benchmark → less over-investment	away from benchmark → more under-investment

In the regressions presented in Table 6, each of the explanatory variables is interacted with a dummy variable that equals zero if the benchmark portfolio weight exceeds the actual weight for a recipient country (the *underweighted* group) and one otherwise (the *overweighted* group), allowing for the coefficients to differ between the two groups. We use the FGLS estimator allowing the error terms to differ in variance across countries, correcting both for heteroscedasticity and autocorrelation in the data. Time fixed effects and fixed effects for the reporting countries are included in all regressions but are not reported.

In Table 6, the first thing to note is that the sign patterns do not differ markedly across assumptions about currency hedging (i.e. benchmarks). We run the regressions with and without a dummy for EU-membership because we hypothesize that the Single European Market may encourage cross-border lending, at least between the EU-member countries. This is certainly consistent with the observation discussed above that the bulk of cross-border lending is among EU-countries (with the exception of the U.S.). However, this fact may also be caused by other characteristics of the EU countries. In the regressions first notice that the sign of the other coefficients are generally unaffected by whether we control for this Single Market-effect or not. The sign on the EU coefficient is generally positive. Hence if, say, Germany is over-invested in certain countries, it over-invests less if that country is an EU member. Given its under-investing in certain countries, it under-invests even further if that country is an EU member.

Considering the dummy for *capital controls*, the results are very strong. The dummy attains the value of one when controls are in place, and we observe that the sign of the underweighted coefficient is positive, implying that underinvestment is larger in magnitude for countries in this group when controls are imposed. Notably, the overweighted coefficient is insignificant as it should be ; overinvestment in itself implies that barriers are non-binding. The size of the coefficient is large, ranging from 2-11%, that is, the difference between the benchmark and actual weights is up to 11% larger for the countries in the underweighted group that imposes capital controls. As the average 'value' of capital controls for the underweighted group is 12.79% (Table 4), this coefficient is economically extremely significant.

Consider next the cultural and informational proxy-variables. If informational barriers are mitigating gains to international diversification and such barriers are captured by the similarity and distance variables, we would expect for the underweighted group a negative sign on similarity (higher score associated with less under-investment) and a positive sign on distance (further apart, more under-investment).

For *distance*, we tend to find a positive sign for the underweighted group, and a positive sign for the overweighted group. That is, the more geographically remote is the recipient country the more one would under-invest. This sign would correspond to an interpretation of distance as a proxy for information costs. The positive sign on the overweighted group implies a movement toward the benchmark when recipient countries are further away, which cannot be interpreted as a result of barriers but may be influenced by the fact that the weights on the over and underweighted countries must sum to one.

For the *similarity dummy*, we get somewhat mixed results. For the overweighted group, the coefficients tend to be small and are sometimes negative. For the underweighted group, they are large and negative assuming optimal hedging, but small and positive assuming no hedging is done, hence again, the unhedged subcase is not quite consistent with our ex ante expections. The negative coefficients are consistent with an informational barriers story whereas the positive signs are inconsistent with this story. Therefore, the *degree* of overinvestment is not substantially explained by similarity: it is not the case that recipient countries more similar to the reporting country are weighted relative more within the group of overweighted countries. In sum, we do not find strong evidence that neither of our proxies for information and cultural costs are a barrier to cross-border banking relative to the mean-variance benchmark.

In addition to proxies for information costs and regulations, we include measures of political and credit risk. Consider first the *political risk index*. We find a negative sign for the overweighted group and a positive for the underweighted group. If banks overweight, they do so more when political risk decreases (higher index value). Given that over-investment cannot be a result of barriers and that the weights for the over- and under-investment groups must sum to one, this pattern is consistent with banks having preferences for certain countries for reasons unrelated to the optimal risk-return tradeoff; when political risk lessens, further resources move to those locations. Since the domestic market is always part of the over-investment group, this would also be consistent with banks focusing on conditions in the domestic market, leaving foreign investment to non-preferred countries is a residual (cf. Goldberg 2001). The coefficients are uniformly below one percent (.94 at the highest) While this effect is statistically significant, it is economically much less important than the effect of capital controls – though a reallocation of a few percent of banks' portfolio is by no means negligible.

The systematic co-variation of the deviations from the benchmark portfolio with the political risk variable has an interesting implication in the mean-variance framework, as political risk is likely priced into sovereign debt returns. The political index has a component that is idiosyncratic relative to the benchmark portfolio which nevertheless affect banks' actual portfolio shares. That is, *under* the benchmark model of bank behavior, idiosyncratic political risk appears to matter for foreign investments over and above the risk premia incorporated into total returns on the indices.

The *forfaiting index* is included in the regressions to proxy for private sector credit risk, a risk-factor which we suspect a priori may not be well-captured by our benchmark returns. The sign pattern is rather less systematic than for the political index but, where significant, the interpretation is the same as for political risk.

6 Conclusion

In this paper, we study the cross-border asset positions of banks located in four major economies (reporting countries): France, Germany, the U.K., and the U.S. We argue that banks are likely to benefit from diversifying risks on their balance sheet by lending internationally through an improvement in the risk-return tradeoff due to the diversification of location (country)-specific risks. We use the portfolio with the highest estimated Sharpe ratio (optimal risk-return trade-off) in the mean-variance portfolio model as the benchmark international portfolio allocation, and we compare this benchmark to the composition of banks' actual international portfolios. We also compute this benchmark under different assumptions about the hedging of foreign currency risks

The estimated gains from cross-border diversification appear considerable, increasing the domestic Sharpe ratio by a factor of 1.5 or more. We find that, from a mean-variance point of view, the effect of exchange rate risk involved in cross-border lending affects the composition of the benchmark portfolio considerably. Hence, our estimated benchmark portfolios all attach a high weight to European recipient countries. Our findings may be interpreted as suggesting that exchange rate risk may be an important consideration when assessing the return from international lending.

Considering banks' actual portfolios, we find a pattern of over-investment in the domestic economy of the reporting country relative to the mean-variance benchmark. This pattern is persistent over the sample period considered. Banks' international assets, hence, do not appear to be consistent with the optimal risk-return tradeoff. This may suggest that there are barriers to international diversification.

Our regression analysis has proceeded in two steps. In a first step, we have explained which countries are over-and underweighted. Bank in the reporting countries of our sample tend to underweight countries with which they are less similar or which have capital controls in

place. High credit risk likewise lowers international bank lending, while we, surprisingly, find a preference for countries with high political risk. Using alternative proxies for political risk would be an interesting extension of this research.

In a second step, we have explained the degree of over- and underweighting. Regressing the deviation between our benchmark and actual portfolio weight on variables proxying for country-level political, credit risk, information costs (cultural and geographical distance), we find strong evidence that the degree of underweighting is larger when capital controls are in place, whereas similarity and geography cannot explain the degree of over- or underweighting within the groups respectively. Also, the degree of under-investment increase in the distance between the reporting and the recipient country, this effect being due only to the over-investment in the domestic economy.

Interestingly, while the degree of political risk does not appear associated with the split into over- and underweighted groups, our results suggest that the degree of over(under)-investment varies with the degree of political risk; namely, *given* banks' preferences for certain countries, lending increases even further when risk-conditions improve, apparently pulling away funds from underweighted countries. This implies that idiosyncratic political risk affects banks' portfolio composition. Our findings are consistent with an interpretation where banks have preferences for domestic lending and increased domestic lending takes place at the expense of lending to overseas markets.

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Table 1 — Benchmark Portfolios. Summary Statistics: 1995-1999.

	International Unit Hedge	International Optimal Hedge	International Unhedged	Domestic
	Average Annual Excess Return (%)			
France	3.56	4.68	3.36	2.98
Germany	3.68	4.32	4.04	3.74
UK	5.12	5.92	4.40	4.43
US	4.76	5.60	4.28	3.55
	Average Annual Standard Deviation (%)			
France	1.49	1.63	1.51	1.61
Germany	1.21	1.21	1.44	1.62
UK	1.31	1.24	2.04	2.05
US	1.38	1.36	2.13	2.04
	Sharpe Ratios			
France	2.40	2.88	2.26	2.02
Germany	3.04	3.58	2.78	2.53
UK	3.90	4.78	2.16	2.20
US	3.44	4.12	2.00	1.88

Table 2 — Estimated Total Rate of Return on Cross-Border Claims, by Reporting Country and Type of Hedge. Average values (percent), 1995-1999

A. OECD-countries

Country	Hedge		AUS	BEL	CAN	FRA	UK	GER	ITA	JAP	NET	NOR	SWE	USA
France	Unit	Mean	6.34	6.76	6.04	6.08	5.57	6.54	6.54	6.50	6.26	3.66	6.84	5.11
		Std. Dev.	2.53	2.15	2.77	1.61	1.96	1.82	2.46	2.12	1.63	2.54	2.30	1.92
	Optimal	Mean	6.78	7.01	6.04	6.00	6.11	6.90	5.46	6.86	6.33	3.47	6.32	5.29
		Std. Dev.	2.15	1.96	2.18	1.44	1.63	1.60	1.92	1.89	1.52	1.66	1.88	1.63
	None	Mean	6.67	6.05	5.46	6.08	9.98	5.66	9.37	1.78	4.23	3.92	8.42	6.87
		Std. Dev.	12.53	2.61	10.99	1.61	7.77	2.66	8.54	14.11	2.52	7.08	9.08	8.72
Germany	Unit	Mean	5.65	6.07	5.36	5.40	4.89	5.84	5.88	5.79	5.57	2.96	6.17	4.42
		Std. Dev.	2.39	1.92	2.59	1.37	1.78	1.62	2.30	1.99	1.49	2.57	2.18	1.77
	Optimal	Mean	6.13	6.35	5.39	5.35	5.47	6.33	4.82	6.20	5.68	2.83	5.67	4.64
		Std. Dev.	1.99	1.75	2.02	1.22	1.47	1.39	1.75	1.71	1.37	1.58	1.75	1.44
	None	Mean	6.97	6.24	5.73	6.31	10.24	5.84	9.69	1.92	5.41	4.13	8.70	7.13
		Std. Dev.	13.27	2.02	11.65	2.87	8.43	1.62	9.74	13.62	1.56	7.23	9.81	9.34
UK	Unit	Mean	8.16	8.64	7.87	7.93	7.43	8.42	8.30	8.41	8.12	5.42	8.62	6.97
		Std. Dev.	2.59	2.07	2.69	1.60	2.05	1.74	2.50	2.00	1.65	2.58	2.46	1.98
	Optimal	Mean	8.85	9.07	8.12	8.05	8.12	9.05	7.51	8.90	8.37	5.48	8.40	7.33
		Std. Dev.	2.12	1.86	2.16	1.34	1.68	1.46	1.95	1.77	1.51	1.76	2.04	1.53
	None	Mean	4.14	4.16	2.90	4.13	7.43	3.77	7.14	-0.21	3.32	1.74	6.18	4.39
		Std. Dev.	10.18	9.15	7.71	8.20	2.05	9.19	9.21	15.98	8.88	7.99	9.44	5.61
US	Unit	Mean	7.15	7.59	6.87	6.89	6.39	7.38	7.30	7.37	7.07	4.38	7.58	5.95
		Std. Dev.	2.69	2.09	2.88	1.60	2.08	1.78	2.53	2.09	1.63	2.61	2.51	2.04
	Optimal	Mean	7.69	7.91	6.96	6.89	6.96	7.89	6.35	7.76	7.22	4.32	7.23	6.16
		Std. Dev.	2.24	1.93	2.29	1.39	1.73	1.53	2.00	1.84	1.52	1.75	2.09	1.63
	None	Mean	5.67	5.94	4.49	5.90	9.27	5.56	8.86	1.48	5.10	3.46	7.84	5.95
		Std. Dev.	8.42	10.25	6.46	9.20	5.65	10.31	9.39	16.19	9.94	8.52	9.01	2.04

B. Emerging markets

Country	Hedge		ARG	MEX	MOR	PAN	PER	PHI	POL	VEN	RUS
France	Unit	Mean	11.33	9.74	12.16	23.35	21.43	5.47	20.38	12.31	9.89
		Std. Dev.	18.15	16.39	17.20	28.35	27.25	12.57	21.93	24.62	51.04
	Optimal	Mean	13.15	10.91	15.66	24.34	28.71	7.99	27.47	18.76	14.81
		Std. Dev.	13.12	8.43	11.59	19.17	18.88	8.82	16.43	16.25	34.11
	None	Mean	13.09	11.50	13.92	25.11	23.19	7.23	22.14	17.08	11.65
		Std. Dev.	22.58	21.37	22.74	32.18	30.41	17.52	23.17	28.64	53.65
Germany	Unit	Mean	10.77	9.21	11.56	22.91	20.92	4.85	19.80	14.75	9.37
		Std. Dev.	17.99	16.17	17.11	28.09	27.05	12.38	21.70	24.49	50.86
	Optimal	Mean	12.49	10.29	14.99	23.65	28.05	7.31	26.82	17.98	14.05
		Std. Dev.	13.09	8.34	11.60	19.11	18.85	8.70	16.31	16.18	34.07
	None	Mean	13.48	11.92	14.27	25.62	23.63	7.56	22.51	17.46	12.09
		Std. Dev.	23.32	22.25	23.33	32.98	31.07	18.22	23.75	29.27	54.03
UK	Unit	Mean	12.80	11.17	13.45	24.50	22.75	7.02	22.17	16.51	10.42
		Std. Dev.	18.38	16.58	17.33	28.52	27.45	12.51	22.08	24.66	51.61
	Optimal	Mean	15.49	13.01	17.84	26.70	30.97	10.10	29.56	21.18	16.72
		Std. Dev.	13.21	8.38	11.78	19.26	19.05	8.63	16.45	16.35	34.21
	None	Mean	10.22	8.59	10.87	21.92	20.17	4.45	19.59	13.93	7.84
		Std. Dev.	20.10	18.45	19.29	29.73	28.46	14.56	22.71	25.73	51.68
US	Unit	Mean	11.63	9.99	12.25	23.38	21.69	5.89	21.23	15.44	9.60
		Std. Dev.	18.45	16.61	17.48	28.72	27.79	12.78	22.35	25.03	52.54
	Optimal	Mean	14.26	11.81	16.67	25.52	29.74	8.95	28.36	19.98	15.94
		Std. Dev.	13.20	8.42	11.74	19.29	19.12	8.78	16.67	16.48	34.63
	None	Mean	11.63	9.99	12.25	23.38	21.69	5.89	21.23	15.44	9.60
		Std. Dev.	18.45	16.61	17.48	28.72	27.79	12.78	22.35	25.03	52.54

Table 3 — Benchmark and Average Actual Weights 1995-1999

a. OECD

Country	Hedge	AUS	BEL	CAN	FRA	UK	GER	ITA	JAP	NET	NOR	SWE	USA
France	Unit	0	0	0	0	0	0	.043	.291	.451	0	.201	0
	Optimal	0	0	0	0	0	.389	0	.224	.227	0	.108	0
	None	0	0	0	.585	.081	.223	.023	.079	0	0	0	0
	Actual	.001	.016	.004	.737	.075	.030	.027	.036	.012	.001	.003	.045
Germany	Unit	0	0	0	.120	0	0	.071	.267	.379	.030	.121	0
	Optimal	0	0	0	0	.111	.096	0	.254	.400	.007	.103	0
	None	0	0	0	0	.067	.683	.022	.214	.011	.01	0	0
	Actual	.001	.005	.003	.015	.048	.855	.016	.011	.011	.001	.003	.017
UK	Unit	0	0	0	.108	0	0	.0052	.300	.434	.091	0	0
	Optimal	0	0	0	.090	.032	.254	.202	.387	.100	.10	0	0
	None	0	0	0	0	.993	0	0	0	0	0	0	0
	Actual	.004	.015	.012	.040	.594	.069	.045	.069	.021	.004	.010	.106
US	Unit	0	0	0	.074	0	0	.078	.274	.490	.068	.02	0
	Optimal	0	0	0	0	.02	.272	0	.217	.382	.069	0	0
	None	.021	0	0	0	.126	0	.005	0	0	0	.031	.773
	Actual	.001	.001	.008	.005	.027	.005	.002	.016	.002	0	.001	.920

b. Emerging Markets

Country	Hedge	ARG	MEX	MOR	PAN	PER	PHI	POL	VEN	RUS
France	Unit	0	0	0	0	0	0	.014	0	0
	Optimal	0	0	.005	0	.017	0	.030	0	0
	None	0	0	0	0	.02	0	.009	0	0
	Actual	.002	.003	.002	.001	0	.001	.001	.001	.003
Germany	Unit	0	0	0	0	0	0	.012	0	0
	Optimal	0	0	0	0	.001	0	.026	0	.003
	None	0	0	0	0	0	0	.003	0	0
	Actual	.001	.001	0	.001	0	0	.001	0	.010
UK	Unit	0	0	0	0	0	0	.015	0	.001
	Optimal	0	0	0	0	0	0	.027	0	.008
	None	0	0	0	0	0	0	0	0	0
	Actual	.002	.003	0	.001	0	.001	.001	.001	.002
US	Unit	0	0	0	0	0	0	.016	0	0
	Optimal	0	0	0	0	0	0	.032	0	.004
	None	0	0	.002	0	0	0	0	0	.004
	Actual	.002	.005	0	.001	.001	0	0	.001	.000

c. Regions

Country	Hedge	Europe	East Asia	North America	Pacific	Eastern Europe	Latin America	Africa
France	Unit	.695	.291	0	0	.014	0	0
	Optimal	.724	.224	0	0	.030	.017	.005
	None	.991	0	0	0	.009	0	0
	Actual	.901	.037	.049	.001	.004	.007	.002
Germany	Unit	.721	.267	0	0	.012	0	0
	Optimal	.717	.254	0	0	.029	.001	0
	None	.997	0	0	0	.003	0	0
	Actual	.954	.011	.020	.001	.011	.003	0
UK	Unit	.685	.300	0	0	.016	0	0
	Optimal	.763	.202	0	0	.035	0	0
	None	.993	0	0	0	.004	0	.002
	Actual	.798	.070	.118	.004	.003	.007	0
US	Unit	.710	.274	0	0	.016	0	0
	Optimal	.746	.217	0	0	.036	0	0
	None	.162	0	.713	.021	0	0	.044
	Actual	.043	.016	.928	.001	0	.001	0

Table 4 — Descriptive Statistics for Over- and Underweighted Recipient Countries

This table reports the average values for the recipient countries in the over- and underweighted groups respectively. Values are also averaged over the three hedge subcases. Deviation from benchmark weight is the percentage point difference between the benchmark and the actual weight on a recipient country.

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	France		Germany		United Kingdom		United States	
	Overweighted	Underweighted	Overweighted	Underweighted	Overweighted	Underweighted	Overweighted	Underweighted
Deviation from benchmark weight	-4.73	12.66	-4.78	10.13	-4.16	16.34	-4.72	12.79
Log distance	7.78	6.72	7.96	6.62	7.79	6.80	8.20	8.53
Capital controls	0.17	0.31	0.21	0.23	0.17	0.41	0.18	0.31
Similarity	0.63	0.35	0.17	0.10	0.49	0.33	0.45	0.29
Forfeiting	3.85	3.95	3.75	4.09	3.81	3.88	3.79	4.05
Political Risk	18.25	18.36	17.69	19.18	17.88	18.05	17.80	19.14

Table 5 — Probit Regression Results

This table reports the results from a probit regression explaining which countries are overweighted and using three alternatives for hedging exchange rate risk: optimal hedging, a unit hedges and no hedging. The dependent variable is a dummy variable which equals one if a given recipient country is overweighted and zero otherwise. Distance is the geographical distance between reporting and recipient country. Similarity is the sum of dummy variables for common language and common legal system. Risk indicators were taken from *Euromoney*. Political Risk is an index from 0 to 25 of risk on nonpayment. Forfaiting is an index of 0 to 10 reflecting the maximum tenure available and forfaiting spread relative to safest country. EU is a dummy variable equal to one when recipient country is an EU member. Capital controls is a dummy variable indicating whether countries impose restrictions on cross-border financial credits. Standard errors are corrected for heteroskedasticity and autocorrelation. ** (*) = significant at the 1% (5%)-level.

	optimal	unit hedge	unhedged
Log distance	–0.03	–0.03	0.16**
	(0.03)	(0.03)	(0.04)
Capital controls	–0.91**	–0.82**	–0.49**
	(0.17)	(0.16)	(0.16)
Similarity	0.65**	0.66**	–0.18
	(0.13)	(0.11)	(0.12)
Forfaiting	0.02**	0.03	0.02*
	(0.01)	(0.02)	(0.01)
Political risk	–0.05**	–0.07**	0.01
	(0.01)	(0.01)	(0.01)
Constant	1.71**	1.91**	–0.84
	(0.43)	(0.44)	(0.46)
Observations	420	420	420

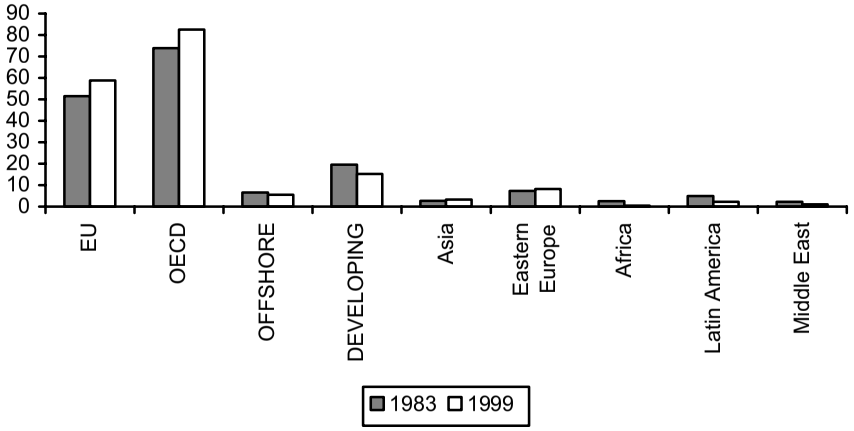
Table 6 — Regression Results: Deviation from Benchmark Portfolio Shares

Table reports the results from a panel regression of the deviation from the benchmark portfolio share, using three alternatives for hedging exchange rate risk: optimal hedging, a unit hedges and no hedging. The dependent variable is multiplied by 100 for scaling of coefficients. Each regression reports separate coefficients on countries which are overweighted (underweighted) relative to the benchmark portfolio. Distance is the geographical distance between reporting and recipient country. Similarity is the sum of dummy variables for common language and common legal system. Risk indicators were taken from *Euromoney*. Political Risk is an index from 0 to 25 of risk on nonpayment. Forfaiting is an index of 0 to 10 reflecting the maximum tenure available and forfeiting spread relative to safest country. EU is a dummy variable equal to one when recipient country is an EU member. Capital controls is a dummy variable indicating whether countries impose restrictions on cross-border financial credits. Standard errors are corrected for heteroskedasticity and autocorrelations. ** (*) = significant at the 1% (5%)-level. Time and reporting country fixed effects are included in all regressions but are not reported.

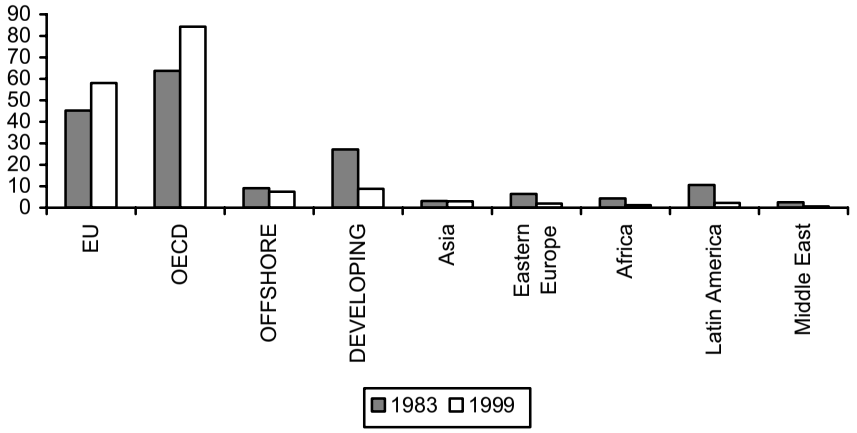
	Not including EU dummy			Including EU dummy		
	Optimal	unit hedge	unhedged	optimal	unit hedge	unhedged
Overweighted countries						
Log distance	4.01**	4.15**	0.38***	4.98**	5.08**	0.58**
	(0.31)	(0.32)	(0.06)	(0.32)	(0.33)	(0.09)
Capital controls	0.23	0.18	–0.07	0.00	0.07	–0.06
	(0.24)	(0.20)	(0.08)	(0.29)	(0.27)	(0.07)
Similarity	0.33	–0.61**	–0.08	1.25**	0.38	0.10
	(0.43)	(0.22)	(0.08)	(0.37)	(0.33)	(0.13)
Forfaiting	–0.00	–0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Political risk	0.02	0.03	–0.03**	–0.17**	–0.15**	–0.07**
	(0.03)	(0.02)	(0.01)	(0.05)	(0.05)	(0.01)
EU				8.08**	7.38**	1.38**
				(0.89)	(1.02)	(0.29)
Total N*T in group	274	280	319	274	280	319
Underweighted countries						
Log distance	2.86**	2.94**	–1.32**	4.58**	4.57**	–1.33**
	(0.40)	(0.55)	(0.40)	(0.42)	(0.52)	(0.41)
Capital controls	1.28	6.74*	6.63**	2.24*	11.10**	7.48**
	(1.08)	(3.14)	(2.31)	(1.07)	(2.48)	(2.38)
Similarity	–7.94**	5.16	1.89*	–8.30**	3.23	1.76*
	(1.10)	(4.39)	(0.86)	(1.39)	(3.57)	(0.86)
Forfaiting	1.33**	2.01**	0.87	0.90**	1.34**	0.90*
	(0.38)	(0.55)	(0.48)	(0.34)	(0.45)	(0.51)
Political risk	0.94**	0.73**	0.45**	0.44**	0.37**	0.49**
	(0.10)	(0.12)	(0.12)	(0.09)	(0.10)	(0.15)
EU				16.22**	11.54**	1.03
				(1.61)	(1.47)	(1.59)
Constant	–34.62**	–36.21**	–2.61**	–42.67**	–43.63**	–3.97**
	(2.73)	(2.82)	(0.53)	(2.97)	(3.00)	(0.75)
Total N*T in group	126	120	81	126	120	81
Observations (N * T)	400	400	400	400	400	400

Figure 1 — Regional Structure of Foreign Assets, Locational Data

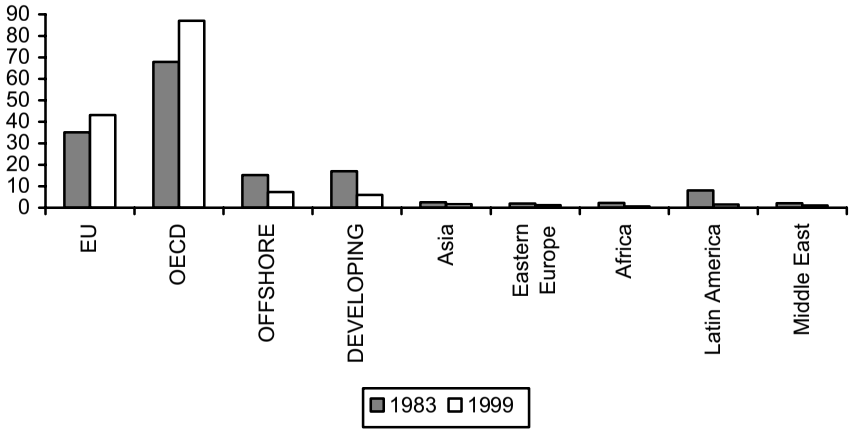
a) Germany



b) France



c) United Kingdom



d) United States

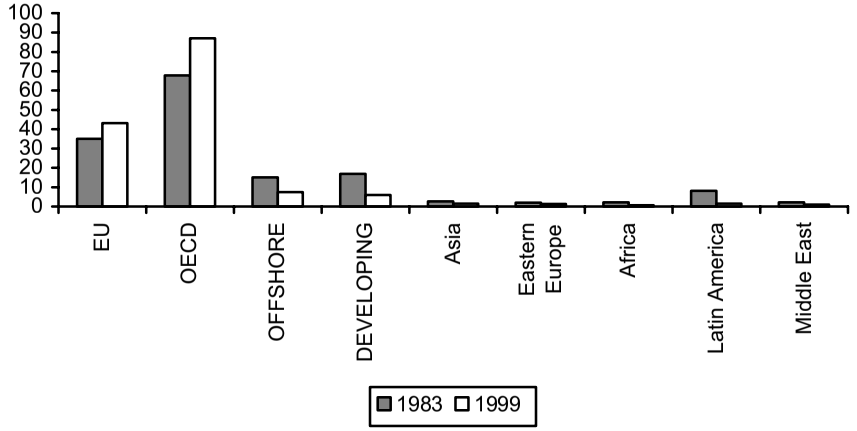


Figure 2: Difference between actual and benchmark portfolio weight: unit hedged returns

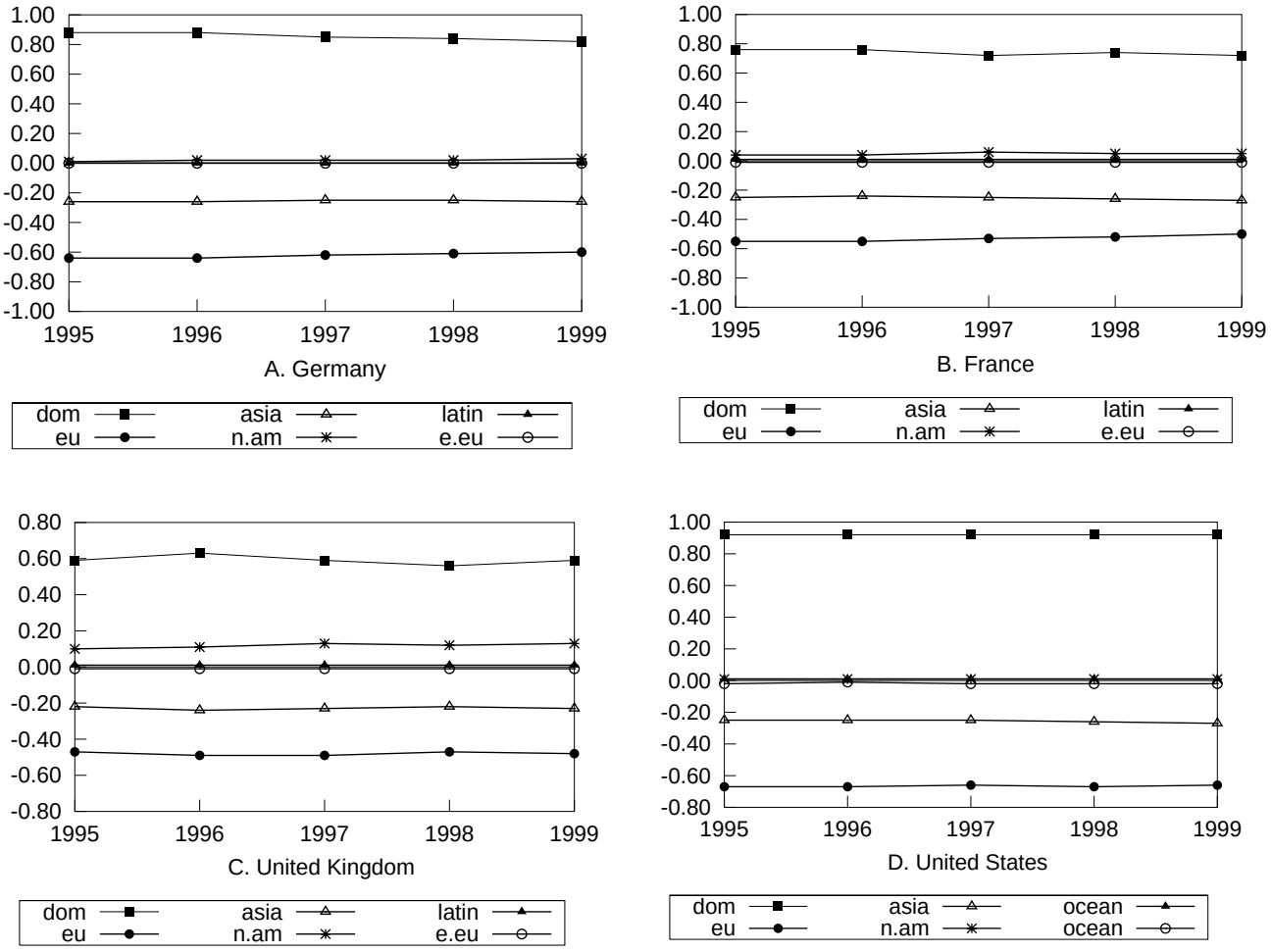


Figure 3: Difference between actual and benchmark portfolio weight: optimally hedged returns

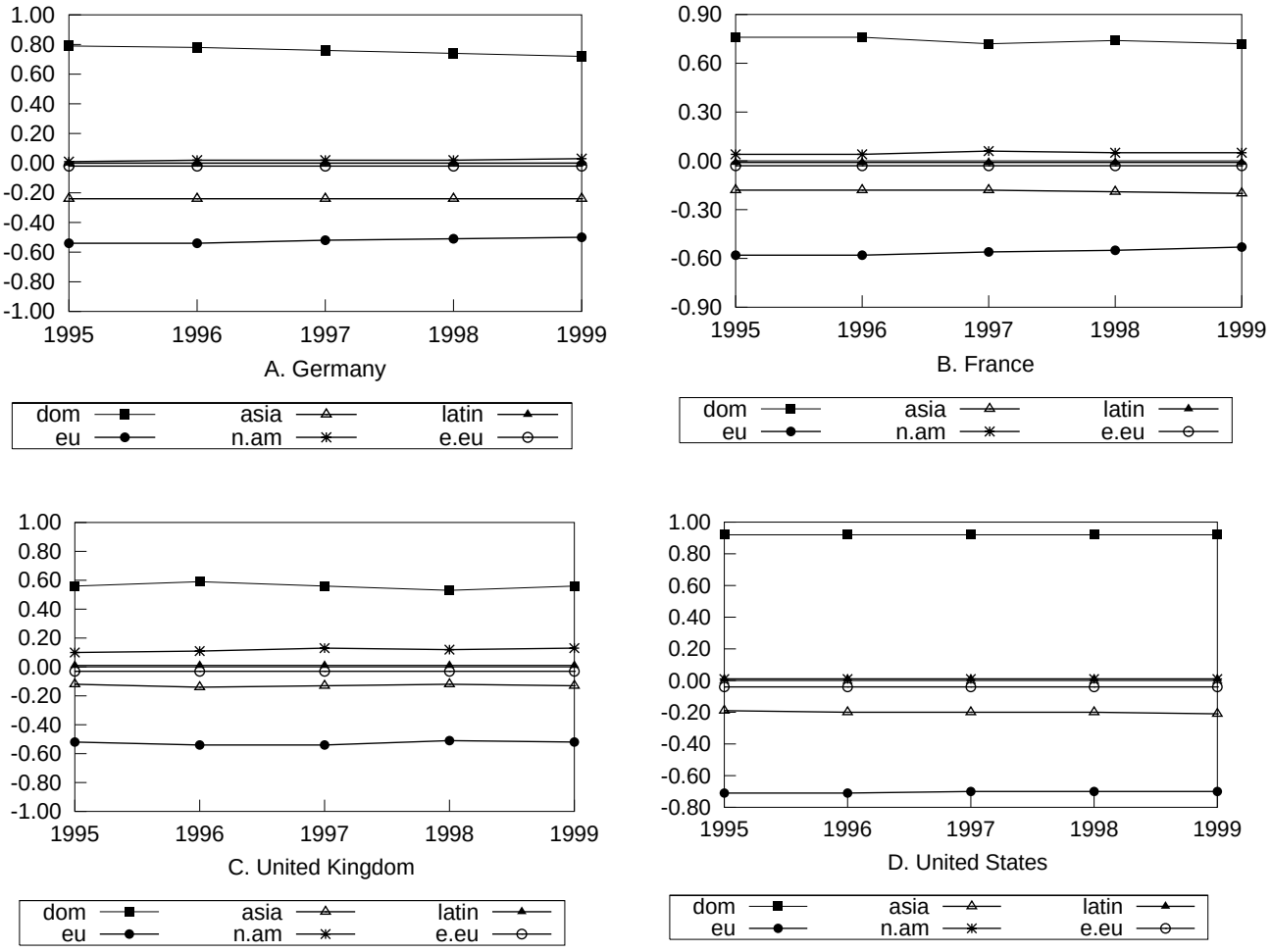
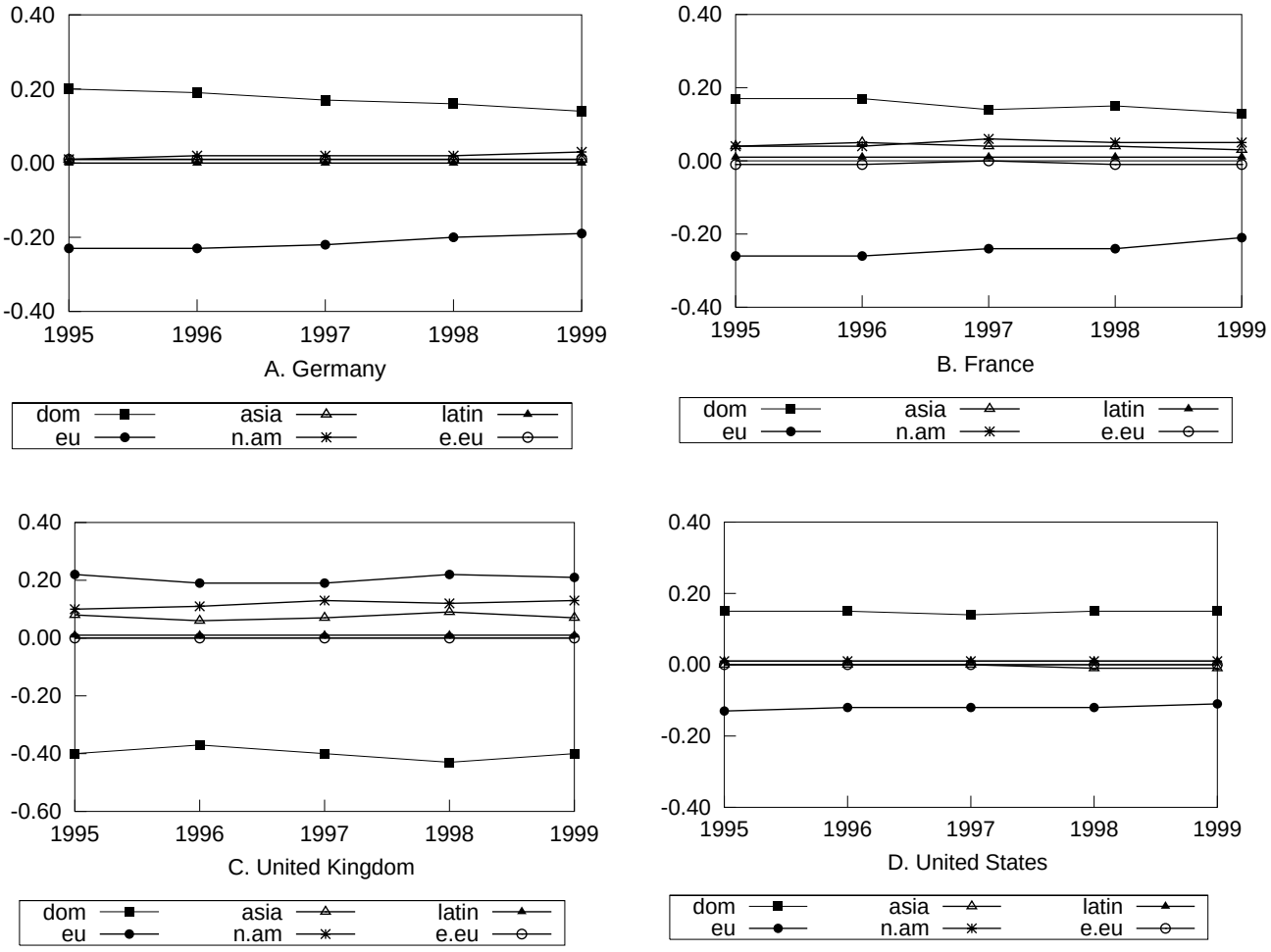


Figure 4: Difference between actual and benchmark portfolio weight: nonhedged returns



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