

## Overview of Ongoing Research: Hisham Foad

This document describes my ongoing research in international economics focusing in on the cross-country effects of monetary unions and international asset markets. The first three papers represent work from my dissertation, while the fourth is a joint work with Robert Chirinko. The first paper looks at the effect of the European Monetary Union on market convergence across borders both within and outside the EMU. The second paper examines the issue of exchange rate volatility on flows of foreign direct investment using an option value approach. The third paper examines the equity home bias puzzle in the context of the EMU. The fourth paper utilizes a natural experiment to examine the role of noise in pricing equities, specifically the behavior of country closed end funds traded on US and UK holidays during foreign holidays. The papers are mainly empirical in their approach, employing a wide variety of estimation techniques.

### **The Effect of the EMU on Cross-Border Relative Price Volatility**

Proponents of the European Monetary Union argue that establishing a single currency area will reduce transactions costs, eliminate exchange rate risk within the union, and increased trade within the union should lead to market convergence. If this is indeed the case, then relative price volatility between markets separated by a national border should be reduced in the post-EMU era. Following Engel and Rogers (AER, 1996) the excess price volatility of cross-border markets over same country markets can be estimated by regressing relative price volatility on a set of control variables and an indicator variable for the presence of a national border. The coefficient on this border dummy provides an estimate of excess cross-border price volatility.

This paper extends the Engel and Rogers analysis to cities across Western Europe and subjects their original methodology to a variety of potential explanations for the border effect such as uneven sampling bias, idiosyncratic vs. common price shocks, and incomplete exchange rate pass through. Prices are measured as daily per diem rates published by the US State Department for employees working abroad on a monthly basis for the period January 1995 through June 2002 across 201 cities. This price variable measures the daily cost of food and lodging in a particular city. Thus, the price series refers to goods that are highly non-tradable. Since we would expect a greater degree of price convergence for more tradable goods, any estimates of the border effect from these goods is likely to be an upper bound. However, estimates of increased convergence due to monetary union will be a lower bound of the true

degree of convergence. Thus, using non-tradable goods increases our confidence about any evidence that the EMU has lowered the significance of national borders in segmenting markets.

Over the entire sample period, national borders are a significant determinant of relative price volatility, indicating that markets in different countries tend to have more volatile relative prices than markets within the same country. When comparing the results in the pre and post euro period, an interesting pattern emerges: the effect of the EMU on cross border price volatility varies by country size. Within the euro-zone countries, cross-border price volatility does not change between the “small” countries, but has fallen significantly the large EMU countries. Turning our attention to borders between the UK and the EMU countries, the reverse pattern holds. There has been a reduction in excess cross border price volatility between the UK and the small EMU countries, while there has not been a significant change between the UK and the large EMU countries.

This result makes intuitive sense, as exchange rates between small countries are more likely to adjust to price differentials than between large countries. As exchange rate pass through tends to be greater in small countries, the elimination of multiple currencies will have a smaller effect between small countries. The fact that the larger EMU countries play a larger role in determining the value of the euro on the foreign exchange market may provide an explanation for the results between the UK and the EMU.

### **Export-Oriented FDI and the Introduction of the Euro**

A multinational deciding on where to locate a foreign production facility will need to weigh several factors in its choice of location. Numerous variables such as production costs, market access, and local tax treatments will influence the decision as to where the plant is located. Another key variable in this decision is uncertainty. Following the work of Dixit, a firm has an option to make a risky investment; if this investment is at least partially irreversible, the option has some positive value. As the uncertainty in the investment project increases, so too does the value of the option. When comparing two investment projects that are identical in all respects except their underlying profit volatility, the one with the greater degree of uncertainty will require a higher trigger level of profits to be exercised. This paper examines the impact of uncertainty in exchange rates on a multinational’s decision to locate within or outside a currency union. The existing literature has focused on the first stage decision of exports vs. FDI, while this paper argues that we need to consider the export behavior of foreign affiliates. Thus, we need to consider both uncertainty between a firm’s headquarters and the FDI host country as well as uncertainty between the host country and any local markets served from that host country. A

theoretical model is derived in which the option values and trigger levels of investment within and outside the union are derived as a function of transport costs, host country market size, and export market access from a host country, itself a decreasing function of currency risk.

The model's predictions are then tested empirically with detailed data on the operations of foreign affiliates of US multinationals across seventeen European countries from 1983 – 2002. We approach this issue in two stages. In the first stage, we obtain a measure of exports from foreign affiliates adjusted for bilateral exchange rate volatility between the host and local export markets. In the second stage, the export series is included in a dynamic panel with US to host market exchange rate volatility and a host of other FDI determinants to explain inflows of FDI from the US to European countries. Potential endogeneity issues are addressed using the Arellano and Bond (1991) GMM procedure. We find that the ability to export has a positive and significant effect on inflows of FDI. However, unobserved features of EMU membership dominate this effect. Finally, we run a counterfactual experiment in which we assume that the non-EMU countries had individually adopted the euro in 1999. Re-estimating the trade and FDI relations, we estimate that by not joining the EMU, the UK, for example, has “lost” approximately \$33 billion (2% of GDP) worth of FDI from the US. Similar results hold for the other “non-euro” Western European Countries (Denmark, Norway, Sweden, and Switzerland). These results indicate that with regard to FDI, the formation of the EMU has benefited the euro-zone countries at the expense of those outside the EMU.

### **Equity Home Bias Puzzle and the Adoption of the Euro**

This paper examines some of the potential explanations for the equity home bias puzzle by utilizing the introduction of the euro in 1999 as a natural experiment. Home bias in equity holdings has been widely documented since French and Poterba's (1991) widely cited paper. The risk aversion parameters necessary to explain the observed bias toward domestic equity are well above any reasonable assumptions or empirical observations. As such, why do domestic investors hold such a large share of domestic equity in their wealth portfolios? Ex-post return data has indicated that in many cases, investors do not hold efficient portfolios, tending to be overweight in domestic equity. Explanations for this puzzle include currency risk, informational asymmetries, transaction costs, domestic equity's role as an inflation hedge, and persistent optimism about domestic equity.

The introduction of the euro allows us to study several of these potential explanations in greater detail. The IMF's *Coordinated Portfolio Investment Survey* provides detailed data on the foreign equity holdings of 23 countries in this sample for the years 1997, 2001, 2002, and 2003.

The optimal share of foreign equity is derived from a version of the CAP-M and then fit to the data. For example, the optimal share of foreign equity is increasing in expected foreign excess returns, but decreasing in exchange rate volatility. We then estimate this relation across all countries for the four years in our sample. The main result is that equity home bias has significantly declined for intra-EMU foreign holdings. We estimate that equity home bias across the euro-zone falls from 66.2% to 11.4% (with 0% indicating no home bias) between 1997 and the post-euro period. While home bias falls for other regional classifications of foreign equity (such as the holdings of non-EMU foreign equity by non-EMU countries) over this time period, the decrease is nowhere near as striking. The formation of the EMU has greatly reduced the barriers to intra-EMU portfolio diversification. A variety of explanations for why the EMU reduces home bias are presented with limited success. In the end, the most likely explanation is asymmetric information, a result supported by the existing literature on this topic.

### **News vs. Noise? Evidence from Country Closed End Funds**

What role does noise play in pricing equities? Answering this question leads immediately to specifying a model of fundamentals and hence the pervasive joint hypothesis quagmire. We avoid this dilemma by measuring noise volatility directly by focusing on the behavior of country closed-end funds (CCEF's) during foreign (i.e., non-U.S.) holidays – for example, the last days of Ramadan in Islamic countries. These holiday periods are times when the flow of fundamental information relevant to foreign equity markets is very close to zero and hence trading of CCEF's in U.S. markets can be responding only weakly, if at all, to fundamental information. We find that there is a substantial amount of noise in the equity returns of U.S. CCEF's. In the absence of noise, the noise ratio statistic would be near zero. However, our results indicate statistically significant departures from zero, with values averaged over all U.S. CCEF's ranging from 73-84% depending on assumptions about the leakage of information during holiday periods and kurtosis. For CCEF's traded in the US, noise does not appear to be related to characteristics of the countries the funds cover. Institutional ownership of these funds is important, with a 10% increase in the institutional ownership share of a fund associated with a 1.5% decrease in noise, implying that institutional investors are less prone to the irrationalities driving noise traders. Noise is less important for U.K CCEF's. The lower levels of noise for matched U.K. and U.S. CCEF's suggests that the securities transaction tax imposed in the United Kingdom is effective in reducing stock market noise.