

Persistent Puzzles in International Finance and Economics

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I INTRODUCTION

It is a great honor to present the 2004 Edgeworth Lecture sponsored by the Central Bank of Ireland. I am very grateful to the organisers of this annual meeting of the Irish Economic Association for inviting me here to present my thoughts.

As the title of this lecture suggests, I plan to talk about selected puzzles in international finance and economics. These puzzles include deviations from theoretical values that are observed in spot and forward markets in foreign exchange. Also, observed currency values persistently deviate from purchasing power and interest rate parities. Further, there is also an unexplained large home bias against international portfolio diversification, and there are frequent unexpected crashes and crises in international financial markets.

These puzzles are interesting because they have not been eliminated by traders nor explained away satisfactorily by economists – indeed their persistence challenge and intrigue us.

It seems that while our current research strategies for solving these persistent puzzles in international finance have yielded valuable insights and continue to advance our understanding of the behaviour of exchange rates,

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these research strategies may be approaching at least a temporary period of diminishing returns. I would like to take this opportunity to suggest that a somewhat different research strategy, adapted from financial economics, has the potential of making faster progress towards understanding these persistent puzzles in international finance. In other words, can we learn anything from recent research in equity markets that may be useful in understanding currency values? Please indulge me a bit while I explore this possibility with you.

II PERSISTENT PUZZLES IN INTERNATIONAL FINANCE

Why did I select these puzzles in international finance and economics?

First, candidly speaking, I am more comfortable discussing international financial issues than other topics in economics.

Second, the area of international finance is of growing importance even though it is quite old – indeed many of the instruments of modern international payments have been around for many centuries. While international trade is probably as old as human commerce, in recent decades the importance of international financial mechanisms has grown rapidly along with increasing trade and the advent of ever more powerful computers and telecommunication systems. Indeed, the markets for currencies have a wide range of instruments, are global, operate around the clock, and have trading volumes many multiples of trading volumes in the markets for equity or other assets.

However, in spite of their extraordinarily high liquidity and near completeness, currency markets are far from being as efficient or rational as our models expect them to be. Let me just give a few examples.

Purchasing power parity is an elegant concept that, in theory, seems to make perfect sense. After all, what could be more rational than the expectation that exchange rates should reflect differential inflation rates or that similar goods should cost the same in different markets. Not only are there major deviations from these simple principles, but these deviations seem to persist for long periods. Further, if there is reversion to the mean, it seems to be very slow (e.g., Rogoff, 1996; Taylor, 2003).

Similarly, our rational economic models expect that comparable investments denominated in different currencies should provide the same rate of return. In other words, interest rate parity leads us to expect that any differences in nominal interest rates should be offset by exchange rate changes to result in net returns that are comparable across currencies. However, while forward rates often reflect such interest rate differences reasonably closely,

forward rates are very poor estimates of future exchange rates and have been found to be persistently and predictably biased. Thus, such anomalies in currency values can provide many opportunities for trading profit (Cavaglia *et al.*, 1994; Froot and Thaler, 1990; Isaac and Mel, 2001). Indeed, these anomalous deviations of currency prices from theoretically correct levels puzzlingly persist even though many currency traders have known about them and regularly generate profits based on these deviations (e.g., Kritzman, 1993 and Perold and Schulman, 1988).

Another puzzle involves the persistent home bias in international portfolio investment. Investors do not diversify enough internationally. The great degree to which investors favour their home country has not yet been explained satisfactorily by our profession (e.g., Baxter and Jermann, 1997; Lewis, 1999; Uppal, 2001). Finally, there seems to be persistent excess volatility in international financial markets and we seem to be constantly surprised by the many periodic crises in financial and currency markets (e.g., Neal and Weidenmeir, 2002; Kaminsky *et al.*, 1998).

There are other examples. But, I think it is clear that many of our basic assumptions and theories in international finance, while certainly elegant and rational, do not stand up too well to empirical examination. While this makes for an uncomfortable situation that is quite distressing to many in our profession, it makes international finance a challenging and interesting field for study. These anomalies are especially important since these basic foreign exchange theories are the foundations for many other theories in international economics and finance.

While we continue to make incremental progress in explaining these and other puzzles using ever newer and more powerful econometric techniques and research designs, we are nowhere close to solving these puzzles. Indeed, sometimes it seems as if our efforts mimic the Herculean Ptolemaic attempts to explain the movements of the stars and planets in the sky without giving up the notion that all heavenly bodies revolve around the earth. Are we international economists also sticking too long to an outdated paradigm? In order to arrive at an answer, let us examine the foundations of our belief in efficient markets – the basis of our elegant theories of exchange rate determination.

III DOMINANT ASSUMPTIONS OF THE EFFICIENT MARKETS PARADIGM

Our dominant assumptions underlying the paradigms explaining financial and economic market behaviour seem to rest on three major pillars.

- (1) Trading costs and frictions are negligible.
- (2) Arbitrage and negative feedbacks in market mechanisms lead to equilibrium; and
- (3) Market participants behave rationally.

While each of these assumptions may be reasonable in many situations, it seems more likely that all three assumptions often cannot and do not hold completely. Indeed, it is likely that a deviation from any of one of these assumptions may reinforce other deviations so that the compounded effect may be large deviations from our elegant efficient market theories (Akerlof and Yellen, 1985). In fact, there are good reasons to suspect that the deviations from our assumptions are not only significant in most situations, but also matter a great deal in practice.

Indeed, recent work in financial markets and asset pricing has begun both to acknowledge the impact of significant deviations from these assumptions which underlie efficient markets and to utilise the impact of these deviations in explaining anomalous behaviour of the prices of equities and other assets. In fact, there are now a number of books that summarise this new literature on asset pricing which emphasise less than efficient markets (e.g., Lo and MacKinlay, 1999; Shleifer, 2000). Surprisingly, the literature on currency markets and foreign exchange reflects such developments only very sparsely.

It is likely that currency markets share limitations similar to those faced by markets for equities and other assets. It is possible that some of the persistent puzzles in international finance and economics mentioned earlier can be explained at least partially if we accept that currency values are determined in markets that are less than perfectly efficient. What are some of the more important characteristics of recent research on equity prices in less than perfectly efficient markets?

IV DEVIATIONS FROM EFFICIENT EQUITY MARKETS

A number of deviations from efficient markets have been documented in equity markets. For example, there are many calendar (temporal) regularities in returns, and equity returns have also been found to depend on size, market to book ratio, and other firm characteristics (e.g., Fama, 1991). Returns are not normally distributed with significant asymmetry in returns and extreme values of returns more common than expected (Aggarwal and Aggarwal, 1993; Christy-David and Chaudhry, 2001). Also, winners sell too early and losers hold on too long and there is documented herding behaviour among investors and analysts (e.g., Shefrin and Statman, 1985; Avery and Zemesky, 1998;

Odean, 1998). Clearly, equity markets are less than perfectly efficient. A number of reasons for these deviations from efficiency have been investigated and documented.

First, trading costs and frictions are not negligible. The largest trading cost seems to be information costs – costs of acquiring and analysing information necessary for assessing the risks and returns (value) of a traded asset. Risk and uncertainty may be particularly difficult to assess and expectations may often be very fragile. There is much information asymmetry and many incentives for not sharing valuable information (e.g., Akerlof, 1970).

One very important aspect of trading frictions is that arbitrage, a function vital for market efficiency, is demonstrably limited in practice by the need and cost of capital and information, and limited risk appetite (e.g., Shleifer and Vishny, 1997; Abreu and Brunnermeier, 2002; Mitchell *et al.*, 2002). Another important aspect of trading frictions is that bankruptcy costs are non-trivial (e.g., Branch, 2002; Claessens *et al.*, 2003). Since the risk of ruin is non-zero in practice, unlike the situation in efficient and perfect markets, unsystematic and idiosyncratic risks are priced. Also, as Edgeworth would have no doubt recognised, taxes and accounting treatment may differ according to the type and timing of transactions creating other frictions.

Second, market equilibrium needs negative feedbacks between demand and price. In practice, partially due to costly information, there are often significant deviations from market equilibrium with path dependence in prices due to the many types of positive feedback trading (e.g., Arthur, 1996; Aggarwal, 1996; Cohen and Shin, 2002; DeLong *et al.*, 1990). One aspect of a positive feedback effect, that is particularly important as a deviation from market efficiency, is herding behaviour among traders, fund managers, and analysts (e.g., Avery and Zemesky, 1998; Chang *et al.*, 2000; Kim and Pantzalis, 2003).

Third, unlike the efficient market assumption of rational behaviour by economic agents, it has been demonstrated that in practice there are systematic deviations from rationality among market participants with systematic effects on asset prices. There are a number of reasons for these deviations from rationality, deviations that lead to lack of rationality in forecasts and significant market inefficiencies (e.g., Aggarwal *et al.*, 1995; Conlisk, 1996; Hirshleifer, 2001).

Instead of the theoretical assumption of perfect rationality and complete information, in practice investors make investment decisions under uncertainty and risk, limited by bounded rationality, and with systematic behavioural and psychological biases (Arrow, 1982; Daniel *et al.*, 2002). Examples of systematic behavioural biases in investor decisions include

framing, mental accounting, a history of past losses or gains, round number prices, and other non-rational behaviour (Tversky and Kahneman, 1986; Machina, 1987; Rabin and Thaler, 2001; DeCuester *et al.*, 1998). Research in the psychology of decision-making has documented the systematic nature of these biases. Further, financial research has documented that these systematic non-rational influences on investor behaviour lead to significant deviations from efficient market prices.

As this very brief review of recent equity markets research indicates, the three important assumptions about efficient markets listed earlier are all violated systematically and significantly in practice. The literature on pricing in the equity markets has been systematically assessing the impact of these violations and relating them to deviations from efficient market prices.

While economics provides the intellectual roots, perhaps due to the richness of the data in financial markets, equity market research has made great strides in understanding the determinants of asset prices – advances that may now provide useful insights in other areas of economics. Even though floating exchange rate regimes are becoming very popular and currency values are increasingly determined in competitive markets, research on currency values does not seem to reflect a focus on market mechanisms and does not build adequately on the insights developed in the study of the markets for equities and other financial assets.

V CONCLUSIONS

It is contended here that it would be useful to treat currency values as prices in less than perfectly efficient markets. While this is starting to happen, this process is still in its infancy and there is much opportunity (e.g., Lyons, 2001). By drawing from the work on equity markets, research on currency prices is likely to contribute towards new insights regarding the puzzles in international finance noted earlier – puzzles that seem to have persisted in spite of profitable trading activity and our attempts to develop satisfactory explanations.

Of course, in making such attempts, it may be useful to account for any additional influences associated with cross-border transactions including appropriate international differences in legal, social, cultural, and institutional structures (e.g., Granovetter, 1985; Eun and Janakiramanan, 1986; LaPorta *et al.*, 1998; Foester and Karolyi, 1999; DeSoto, 2000; Khanna and Palepu, 2000). In addition, currency markets are often influenced by national governments that are unlikely to exhibit profit maximising behaviour when intervening in currency markets (e.g., Sarno and Taylor, 2002). Cross-

border inefficiencies can indeed be large – Mancur Olson, a noted sociologist turned economist, titled one of his papers, “Big Bills Left on the Sidewalk” (Olson, 1996).

It seems that when it concerns currency prices, there is much opportunity for commercial and intellectual profit.

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