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Economic Integration and Monetary Union

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TREASURY WORKING PAPER

99/6

Economic Integration and Monetary Union

Andrew Coleman

ABSTRACT

Recent research shows that trade of goods and financial products is much greater within countries than it is between countries, even allowing for factors such as transport costs. This lack of economic integration is likely to be costly for small nations, as internal trade is much less diverse than internal trade in large nations. European countries have long argued that the adoption of a single currency is a primary means to enhance economic and social integration, and with the adoption of the euro most European countries have given up monetary independence in order to gain these benefits. This paper examines the modern literature analysing the costs and benefits of forming a monetary union. It contends that New Zealand should reassess the merits of these arguments, although it does not perform a cost benefit analysis for New Zealand, or even recommend whose currency should be preferred. It appears that the benefits of monetary independence are lower than previously thought. This is because most countries have attained low inflation, and because of new evidence that the volatility of exchange rates inherent with monetary independence may be the cause of economic shocks rather than the means of adjusting to economic shocks.

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The consideration of monetary union is not on the Government's agenda. Rather, in accordance with our responsibility to be at the forefront of economic thinking, and to anticipate and examine new issues, the Treasury has reviewed key academic articles on the topic. The paper is a background paper and does not provide advice, nor does it propose any particular course of action. The Treasury have chosen to publish the review given the general interest in the topic, and in order to ensure that the analysis is top quality. The views expressed are those of the author and do not necessarily reflect the views of the New Zealand Treasury. The Treasury takes no responsibility for any errors or omissions in, or for the correctness of, the information contained in these working papers.

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(1) INTRODUCTION

The Maastricht Treaty and the subsequent European Monetary Union are highly visible manifestations of the European drive to intensify economic and social ties across the continent. While these measures have struck many observers as excessive, they have come at a time when academic research is showing that economic activity within countries is considerably more integrated than economic activity between countries. Borders still matter, relentless globalisation notwithstanding; or as, Helliwell (1998; p118) elegantly writes,

“...the global economy of the 1990s is really a patchwork of national economies stitched together by threads of trade and investment that are much weaker than the economic fabric of nations.”

The evidence that external economic links are imperfect substitutes for internal economic links raises uncomfortable questions for small economies, for the scope for internal specialisation is relatively small. Even though most small countries have greater international trade than large countries, a bias towards domestic trade means that people living in small countries trade less overall than people living in small regions within large countries. This difference has spurred most small countries to adopt policies explicitly aimed at enhancing international linkages. Many small countries have joined customs unions with other countries, for instance, and have taken steps to harmonise business law. Others have pegged the value of their currency to that of a larger country, deciding that the benefits of enhanced economic integration are sufficient to offset the loss of monetary independence.

The adoption of a single currency by eleven European nations has re-ignited interest in the economics of monetary unions, and it is natural to ask whether there is a case for New Zealand forming a currency union with another country, possibly Australia. In drawing this parallel, however, it is wrong to exclusively focus on the monetary aspects of the European single currency, for monetary union is seen not as an end in itself but as part of the process of forming a Europe-wide economic union – the European Community – predicated on the promotion of “economic and social cohesion and solidarity among Member States”¹. For this reason, section 2 of this paper begins by comparing the intensity of international economic links to the intensity of internal economic links, with a particular emphasis on the extent to which currency factors explain the difference. Given the evidence on this issue, the paper proceeds to ask how much a monetary union is likely to enhance economic integration, and what the costs of such a policy are likely to be. Section 3 discusses the traditional literature on the topic, including a brief analysis of the factors considered most important by the European Commission, while section 4 discusses two recent influential ideas. The final section summarises the paper, and discusses the relevance of the literature to New Zealand. It concludes that the arguments and

¹ The Maastricht Treaty, Article 2.

evidence in favour of New Zealand forming a monetary union are stronger than they have previously been.

It must be stressed that the paper is a review of the modern international literature examining economic integration and monetary union rather than an assessment of the costs and benefits of New Zealand forming a monetary union with another country. Nonetheless, the paper argues that a new assessment is in order, for the benefits of a monetary union seem greater than previously considered, and the costs much less. This conclusion is not an endorsement of a monetary union. It is not even clear whose currency should be preferred, although Australia and the United States are the most obvious choices. Nor is it clear that the formation of a monetary union is the most important policy option for a government wishing to enhance economic integration with the rest of the world. That said, the intellectual arguments favouring New Zealand forming a monetary union are stronger than before, and any new debate should be conducted cogniscent of them.

(2) ECONOMIC INTEGRATION

During the last decade, several authors have explored how the degree of regional economic integration depends on whether different regions are in the same country or in different countries. This research has been undertaken in response to several different factors including Europe's commitment to the Maastricht Treaty, increased academic interest in economic geography, large falls in transport and communication costs, and the availability of new data sets. The research has yet to reach definitive conclusions, but most of it suggests that national borders are considerably greater impediments to economic integration than had been previously imagined.

"Economic integration" does not have a single, straightforward definition, and two variants should be distinguished. The simplest case concerns commodities such as wheat which are sold in international auction markets and for which sales transactions are largely unaffected by the identity or characteristics of the producing firm. For such commodities, markets are integrated if people in different regions have access to the same goods at similar prices. A notable feature of these commodity markets is that they can be integrated without inter-regional trade being extensive, for a producer who usually sells into one region can substitute sales into another region very rapidly if necessary. The second case concerns producers who have limited ability to substitute sales between regions because sales are affected by such characteristics of the firm as its marketing strategy and its distribution chain. In this case, a second component needs to be added to the concept of spatial integration: in addition to prices being similar, products produced in one region must be routinely sold and used in other regions. Because most products and services are not sold anonymously through auctions, the second case is most important. For this reason, it is not generally sufficient to consider that regions are integrated because they have similar products at similar prices; rather, trade in these products is also necessary.

This section begins with a discussion of several issues pertaining to the integration of goods markets, before examining financial market integration. It ends with a short discussion of how economic integration can affect the location of output across space.

(a) Goods Market Integration

(i) Trade Volumes, Prices, and Exchange Rate Volatility.

Trade Volumes

Until recently it has not been possible to examine how economic trade between different regions is affected by political borders because data on trade volumes within countries have not been collected. However, Statistics Canada now collects data measuring trade flows between each of the Canadian provinces, and also between the Canadian provinces and the different U.S. states. This data was first analysed by McCallum (1995), and subsequently by Helliwell (1996, 1998). Using 1988 data, McCallum found inter-provincial trade between any two Canadian provinces was approximately twenty times as great as trade between Canadian provinces and U.S. states, once distance and economic size are taken into account.^{2 3} The analysis of provincial “exports” shows that Canadian firms do not find U.S. destinations to be close substitutes for Canadian destinations; similar analysis for “import” flows shows that U.S. products are not close substitutes for Canadian products in Canadian provinces.

Helliwell (1998) confirmed McCallum’s result for 1988, 1989 and 1990. He also extended the analysis in three directions. First, he analysed the impact of the North American Free Trade Agreement on Canada-U.S. trade by estimating how the home bias changed between 1990 and 1996. After the implementation of the agreement, the home bias fell steadily from a factor of twenty to a factor of twelve, where it remained from 1993 to 1996. While the decline shows the extent to which customs barriers deterred trade prior to 1990, the fact that it remains at such high levels shows that other aspects of the “border” — separate national institutions — are important.

Secondly, he analysed the border effects by industry. While the estimates were considerably less accurate, home bias was evident for all sectors, including the transport sector, although smaller for natural resource sectors than for others. The extent of the home bias in the transport sector is strange, for the 1965 Auto

² McCallum estimated a “gravity” model in which trade flows between regions are regressed against the size of each region’s GDP and the distance between them. They are known as gravity models because of the parallel with gravitation attraction between two objects.

³ An example helps to make this “home bias” concrete: Washington State and British Columbia are the same distance from Ontario, but exports from Ontario to British Columbia were twelve times those to Washington despite the gross domestic product of Washington being a third larger than that of British Columbia.

Pact between the U.S. and Canada instituted free trade in automobiles and automobile parts and all evidence suggests that trade in automobile parts between Michigan, Ontario and Quebec (the main producing regions) is now unaffected by the border. Further analysis showed that the home bias is only a factor in the other nine provinces, suggesting that the bias is a consequence of retail activity in the transport sector, perhaps because the distribution chains are organised along national lines.

Thirdly, Helliwell calculated the border effects by province. They were significantly higher in Eastern provinces than Western provinces; or as Helliwell (1998; p27) noted,

“ The ranking in border effects follows the ranking in terms of resource dependence, with the lowest border effects in the three western provinces with the largest concentration in the production and export of natural resource commodities.”

In conjunction with the analysis of sectors, Helliwell uses this data to suggest that home bias is more pronounced for regions where intra-industry trade, not inter-industry trade, is important.

This literature is still in its formative stages, and it is important not to generalise from the results of one country as to the relative size of intra-national and international trade. As Bayoumi (1997; pp104 – 108) notes, intra-provincial trade in Canada is only the same fraction of GDP as inter-European Community trade. Nonetheless, other evidence is broadly consistent with this result. Wei (1996) estimated a gravity model for OECD nations using a similar methodology as McCallum, and found that on average a country's internal goods trade is ten times as large as its external trade, taking distance and economic size into account. A more sophisticated estimation procedure suggested that this ten-fold home-bias factor reduced to 2.5 once additional allowance was made for the fact that countries typically have much greater trade with countries which share a common land border and which speak the same language. Helliwell (1998) used similar methodology and found similar results, although his estimates of home bias taking language and land border effects into account are higher. He also explored the sensitivity of these estimates, and showed that they were sensitive to how authors estimated the average distance separating trading agents within countries. This raises some questions as to the reliability of Wei's results as these distances are much less precisely known than the distances between major North American cities. Consequently, while the results of Wei, McCallum, and Helliwell point to the same phenomena — that there is a large home bias which means that trade within a country is several times as large as trade between countries — until there is more data it is premature to conclude exactly how large this bias is.

Prices

A substantial body of evidence shows there are large price wedges between the prices of the same good in different countries, and that these price wedges are greater than those within countries. This evidence has taken two forms. First, there is a vast empirical literature examining the behaviour of real exchange

rates between countries which shows that real exchange rate movements tend to be large and persistent. A recent consensus suggests that the average half life of deviations from relative purchasing price parity between OECD countries is 4 - 5 years (see the reviews by Froot and Rogoff (1995) and Rogoff (1996)). The literature also shows that these slow rates of convergence are not just an aggregate phenomena but that prices for individuals goods and services vary widely between countries, and are slow to respond to each other.

Secondly, several recent papers analysing disaggregated price data in the United States and Canada show that price differences between these two countries tend to be larger than price differences within them (Engel (1993), Rogers and Jenkins (1995), Engel and Rogers (1995), Engel and Rogers (1996); and Parsley and Wei (1996)⁴). The paper by Engel and Rogers (1996) is a good example. They calculated "disaggregated real exchange rate indices" using price index data disaggregated into seven sub-indices for fourteen US and eight Canadian cities. They found that the quarterly volatility of these relative price indices was higher on average for a pairing of one Canadian and one US city than for city pairs which were either both Canadian or both from the United States. They also found that the quarterly volatility of the relative price indices increased with the distance between the cities. The distance between Canadian and United States cities could not explain this additional volatility, however; rather, the additional volatility caused by the border was equivalent to a distance of at least 1800 miles.⁵ In line with their more general study (Engel and Rogers (1995)), they argue that the price volatility was in part due to exchange rate volatility, in part due to distance, and in part due to different distribution networks in different countries.

Exchange Rates

Since most countries have their own currency, it is natural to estimate the extent to which separate currency zones hamper economic integration. Two mechanisms are usually postulated: lower trade can occur because of the higher costs associated with the need to make currency transactions or because of the greater uncertainty associated with the possibility of future exchange rate changes. Despite business surveys which frequently suggest that exchange rate uncertainty has an adverse effect on trade and investment, it has proved difficult to quantify the importance of exchange rate uncertainty because there are few data sets available which allow a direct estimate of its effects. These difficulties have prevented the European Commission from reliably estimating the effect of exchange rate uncertainty on trade⁶.

⁴ See the discussion in Coleman and Dalglish (1998)

⁵ This figure represents the minimum distance equivalent, using 95 percent confidence intervals. If the mean estimate is used, the distance equivalent of the border is 75000 miles; in other words, crossing a border seems to introduce a qualitatively different amount of volatility into inter city price volatility. If this estimate were applied to Australia and New Zealand, it would suggest, at a minimum, that it is as if New Zealand were twice as far from Australia as it actually is.

⁶ Dell'Ariccia (1998) has recently estimated the effect of exchange rate uncertainty on inter-European trade. He suggests that the elimination of exchange rate uncertainty from 1994 levels

Nonetheless, they have convincingly estimated that the elimination of currency transactions costs would save approximately 0.4% of European GDP (Emerson et al 1992).

There is a small, intermittent literature examining the effect of exchange rate volatility on trade volumes, but to date it has been inconclusive. Part of the problem has been that different authors have used different measurements of exchange rate volatility, with a consensus as to the best method yet to emerge.⁷ In particular, it has proved difficult to test whether long term exchange rate uncertainty has an adverse effect on trade.⁸

Two studies have addressed this issue in a manner that is directly relevant to this paper. First, de Grauwe (1988) related the change in trade growth rates between the 1960s and the 1970s in a cross section of countries to a variety of variables including exchange rate volatility.⁹ He found that higher long term exchange rate volatility associated with flexible exchange rate regimes was a cause of lower trade growth in the latter period, adjusting for other factors. Secondly, Pozo (1992) found that trade volumes between the United Kingdom and the United States between 1900 and 1940 were lower in flexible exchange rate regimes than in fixed exchange rate regimes, and that these declines could be linked statistically to the greater exchange rate volatility in flexible exchange rate regimes. While both of these papers find that exchange rate uncertainty has a small negative effect on trade, this evidence is still far from conclusive. It may be the case that evidence of this kind is not capable of answering the qualitatively different question 'what is the effect of freeing economic agents from the need to worry about the exchange rate at all?' The adoption of the Euro will provide more evidence in due course. Until then, however, it seems unlikely that economists will be able to make convincing estimates of the extent to which currency unification enhances goods market integration.

(ii) Goods Market Integration and New Zealand.

The effects of home bias are more important for small countries than they are for large countries as small countries have a smaller number of internal producers and therefore fewer gains from internal trade. For this reason, small countries should have a much larger fraction of external trade than large

would increase trade by 3 – 4 percent, which he considers a small amount. His paper is notable for using panel data estimation techniques and for taking simultaneity bias into account.

⁷ Several recent authors have argued that modelling exchange rate volatility using a GARCH process is inherently more sensible than calculating a rolling standard deviation. See Arize (1997), Caporale and Doroodian (1994), and Pozo (1992). All of these authors have found that exchange rate volatility, measured by a GARCH process, reduces trade flows.

⁸ Most empirical studies have examined the effect of short term exchange rate volatility on trade flows, not the effect of long term exchange rate volatility on trade flows.

⁹ The two periods were 1960 – 1969 and 1973 – 1984.

countries, a result confirmed by statistical analysis (Helliwell 1998).¹⁰ Unfortunately, there are no international statistics indicating the fraction of a country's economic activity which is exported, although it is generally true that small countries have gross exports which are a larger fraction of GDP than large countries.¹¹ By the standards of small wealthy countries, New Zealand has a low level of goods trade, and therefore appears to use trade to compensate for its small size less than other small countries. In fact, the median level of goods trade by small wealthy countries is 30 percent higher than in New Zealand.

Table 1 — Gross Trade Openness

Country	Population	$\frac{1}{2}(X+M)/GDP$	Country	Population	$\frac{1}{2}(X+M)/GDP$
Singapore	3.0m	1.36	Switzerland	7.0m	0.27
Ireland	3.6m	0.59	Austria	8.1m	0.27
New Zealand	3.6m	0.22	Sweden	8.9m	0.29
Norway	4.4m	0.26	Portugal	9.9m	0.29
Denmark	5.0m	0.27	Greece	10.0m	0.21
Finland	5.1m	0.28	Belgium	10.0m	0.61
Israel	5.8m	0.37	Netherlands	15.0m	0.47

Gross trade openness, $\frac{1}{2}(X+M)/GDP$ is the ratio of exports plus imports to GDP. This is not the theoretically best measure of openness, as it does not indicate the measure of value added traded as a fraction of GDP. These figures are not available, however. Data is from OECD for countries other than Singapore and Israel; the latter data comes from the IMF.

Much of New Zealand's low trade ratio is presumably a function of its distance from trade partners, although there is weak evidence that New Zealand still trades little for its size even accounting for distance (Wei, 1995). Whatever the explanation, the combination of low levels of international trade and a small domestic market means that New Zealand is likely to be obtaining relatively few of the benefits of specialisation and trade.

Australia is New Zealand's largest trading partner, especially for non-commodity goods. It is not possible to ascertain whether New Zealand is as economically integrated with Australia as the separate Australian states are integrated with each other, for inter-state trade data does not exist. Nonetheless, there is evidence that pricing behaviour in New Zealand is quite different to pricing behaviour in the different states: while price changes typically occur simultaneously in the different states, there is little relationship between New

¹⁰ Helliwell notes that the extent to which small countries export more than large countries is even greater than would be predicted by simple linear gravity models, and suggests that this additional trade is to take advantage of economies of scale not available domestically.

¹¹ The fraction of a country's economic activity which is exported is equal to gross exports minus the imported component of exports.

Zealand and Australian prices for many retail goods (Coleman and Daghish, 1998). This is true even for goods which are only produced in Australia but also sold in New Zealand. Much of the difference in pricing behaviour is caused by exchange rate changes being slow to be passed through into prices. While this evidence does not show that trade between New Zealand and Australia is less than trade within Australia, it is consistent with the international price evidence that shows that national borders have a large effect on pricing decisions. The different pricing behaviour means that during the last 30 years real exchange rate volatility between Australia and New Zealand has been ten times as large as real exchange rate volatility between the different states.¹² In the last 5 years real exchange rate volatility between Australia and New Zealand has diminished substantially, but is still greater than between the separate Australian states.

(b) Financial Market Integration

Financial markets are also more integrated within countries than they are between countries. While the reasons for the different degree of integration are not entirely clear, currency issues are an important factor. Given that low financial market integration can be quite costly for agents living in small currency zones, economists have identified enhanced financial market integration as one of the main benefits of a monetary union.

Economists have identified three consequences of financial market integration:

- (a) when finance markets are fully integrated, prices for similar assets in different regions are the same (except for trivial transactions costs);
- (b) when finance markets are fully integrated, agents in different regions have access to and use financial assets from different regions to save, borrow, invest, and insure; and
- (c) when both finance markets and goods markets are integrated, local saving and local investment decisions should be independent, and the capital account position should smoothly adjust to offset desired current account positions.

It should be stressed that both goods market and financial market integration are necessary for full economic integration, as any desired current account position entails the simultaneous exchange of financial assets. Consequently, if local people prefer to exchange financial instruments with other local people rather than with outsiders, goods market flows will be impeded.

(i) Microeconomic Issues in Financial Market Integration.

Bayoumi (1997) provides a thorough review of the literature on financial market integration, splitting the topic into its microeconomic and macroeconomic aspects. He argues that international financial markets are now highly

¹² The real exchange rate between states is measured as the ratio of the state consumer price indices. See Coleman and Daghish (1998).

integrated in the sense that prices for the same wholesale instruments are similar around the world. There is little difference in the price of US bonds in Chicago, New York, London, or Tokyo, for instance, although this has not always been the case.¹³

While the price of identical financial assets is similar in different countries, agents in different countries purchase and use quite different assets. This contrasts the behaviour of agents in different locations in the same country, who appear to purchase and use similar assets. In part, this is because not all financial assets are available to people in different countries; in particular, poor agents may not be able to borrow in foreign currencies, as the local banking systems will not typically issue small value foreign currency loans.¹⁴ ¹⁵ These asymmetries contribute to people having a pronounced home bias in the assets they hold. This is true in both debt-type instruments, which are overwhelmingly denominated in the home currency, and equity-type instruments.

A home bias in debt instruments means that people predominantly borrow and lend in their own currencies. This behaviour has the natural “insurance” advantage that variations in the value of the currency are offset with changes in the value of labour earnings and the cost of consumption, and consequently this home bias is likely to reflect risk aversion. This bias may have two disadvantages for people living in small currency zones. First, borrowers and lenders are limited to diversify over a smaller number of people, and thus are exposed to a greater amount of credit risk. Most New Zealanders currently lend to other New Zealanders, for instance, because there are few other people in the world who want to borrow New Zealand dollars. Secondly, since real interest rates differ across currency zones, people living in a small currency zone which is a capital importing region may face a high risk premium and thus high interest rates compared to the situation that they had a monetary union with a larger country.

The second issue warrants further comment. If people located outside the currency zone demand a *currency* risk premium in addition to a *geographic* risk

¹³ When markets have capital controls, asset prices are different in different locations. Bayoumi (1997, p13–15) demonstrates the effect of the abolition of exchange controls in Japan and the UK in 1978/1979; interest rate differentials for the same instrument fell from 2 – 3 percent to close to zero.

¹⁴ It is not possible to get a residential house mortgage in Australian dollars (or other foreign currencies) in New Zealand, for instance, even though most banks in New Zealand are Australian owned. The parent banks located in Australia will not provide an Australian dollar mortgage for a house located in New Zealand either. While it possible to borrow New Zealand dollars in New Zealand and take an offsetting forward position on the futures market, this process involves considerable expense in terms of the need to provide a margin deposit, and pay a fee every so often to roll over the contract. In addition, the contracts tend to be issued in large units, and the purchaser always needs to have sufficient liquidity to meet margin requirements if necessary. In situations such as these, the implicit price of a foreign currency loan is very different in different locations.

¹⁵ Agents in different locations can typically hold positive quantities of the same assets, however.

premium to lend to people located inside the currency zone, the residents of the currency zone will be required to pay an additional premium to borrow if they are net debtors to the rest of the world (for a formal model investigating currency premiums see Carlson and Osler 1996). Because most currencies are national, there is little direct empirical evidence of differences in currency risk premiums and geographic risk premiums.¹⁶ However, geographic risk premiums in common currency zones are typically very small, whereas risk premiums between currency zones are typically large, suggesting that most of the risk is currency risk.¹⁷ Moreover, in small countries such as Austria or Netherlands which have fixed their currency to larger countries (Germany), interest rates in the smaller currency have converged to interest rates in the large country, often despite quite disparate economic indicators such as government deficit levels (Genberg 1990; Emerson et al 1992; Tatom and Proske 1994). If New Zealand borrowers are primarily facing a currency risk premium rather than a country risk premium, adopting another currency will lower the risk premium they pay. Given the high real interest rates New Zealanders have been required to pay over the last decade, this could be a substantial benefit to the economy.^{18,19}

Because equity price volatility is greater than currency volatility, it seems less plausible to attribute a home bias in equities to currency risk than it does to attribute home bias in debt instruments. Nonetheless, home bias in equities is pronounced, and is a facet of the lack of integration between countries (French and Poterba 1991).

It is clear that the degree of home bias is falling over time, as people in most countries hold an increasingly large fraction of their portfolios in foreign instruments. Still, the degree to which most portfolios are home biased is enormous, and if this bias partly reflects currency concerns an enlargement of a nation's currency zone will improve welfare by reducing the degree of home bias.

(ii) Macroeconomic Issues in Financial Market Integration.

The basis of the macroeconomic literature examining financial market integration is the Feldstein-Horioka result (Feldstein and Horioka, 1980). They

¹⁶ The European Monetary Union will provide this evidence.

¹⁷ This is a suggestion, not proof. An alternative explanation is that between country risk premiums are due to the power of national governments to undertake policies which either mess up the economy or prevent the repatriation of capital.

¹⁸ From 1990 to 1997, real short term interest rates in New Zealand have been 1.1 per cent higher than in Australia, 1.9 per cent higher than the UK, 3 per cent higher than Germany, 4.3 per cent higher than the USA and 4.5 per cent higher than Japan despite having the second lowest inflation rate of this group.

¹⁹ Of course, it may be the case that this benefit partly involves transferring some of the country risk premium to other members of the new currency zone. If so, it would not necessarily be the case that the residents of the incumbent currency zone would be in favour of New Zealand's entry.

found that domestic savings rates are typically highly correlated with domestic investment rates, suggesting that there is not a large degree of international financial market integration, for if there were savings decisions in one location would be independent of investment decisions in that location. This result was of considerable surprise, as most economists had thought that international capital markets were substantially integrated. While the degree to which national savings and national investment are correlated is declining over time, the result still largely stands: in aggregate, countries do not seem to use financial markets to fully separate savings and investment decisions. (See Bayoumi (1997), or Lewis (1995) for a discussion.) One implication is that countries do not use international financial markets as much as they could to diversify risk and smooth consumption shocks. Another implication is that capital account issues provide some constraints on the current account positions that countries can run.²⁰

There are two types of evidence indicating that geographic borders and separate currencies limit international financial market integration. First, personal savings and investment decisions are basically uncorrelated in separate regions within countries, in contrast to the high degree of correlation between countries, implying a high degree of capital market integration within countries. (See the summary in Bayoumi 1997 (chapter 3) for this literature; also Helliwell and McKittrick (1998) and Helliwell (1998) for a more recent analysis of the Canadian provincial data.) This evidence is supported by an analysis of cross-country savings and investment flows during the Gold Standard era prior to 1914. During this period exchange rates were fixed and capital was highly mobile, and the correlation between savings and investment in different countries was considerably smaller than it is now (Bayoumi 1990)²¹. This evidence is interesting as it suggests that the issue is not only one of international borders, but of exchange rate regimes as well.²² The current

²⁰ Despite the evidence that in most countries national savings and investment are correlated, it may be the case that the level of saving does not influence the level of investment in New Zealand. Karacaoglu and Roseveare (1987) found no correlation between investment and domestic savings in New Zealand between 1951 and 1986. In the subsequent decade New Zealand current account deficits have been large and variable, also consistent with the idea that domestic savings may not constrain New Zealand investment.

²¹ However, see Irwin (1996) for a slightly different interpretation. Irwin acknowledges that capital market integration was high during the Gold Standard era, but notes there were only a few varieties of securities which were heavily traded. In contrast, there are a much greater range and number of securities traded internationally currently.

²² However, it is not possible to conclude that the issue is only about exchange rate regimes. The role of Government in economies was much smaller during the Gold Standard era than it is now, and it is not clear that Governments considered that they had a legitimate role to intervene in the international gold market for domestic policy reasons. In contrast, Governments of modern economies do worry about the current account position, and can find an intellectual history to justify intervention if they wish. If there is some risk that Governments will impose capital controls in the future, even within a common currency zone, it may be the case that financial markets treat international financial transactions differently to internal financial transactions because of the risk of future Government intervention. See Bayoumi 1997 for a discussion of this point.

relatively low degree of international capital mobility corresponds to the relative importance placed on international current account imbalances. Internal current account positions are not measured or cared about; and during the Gold Standard era countries maintained large current account deficits or surpluses for extended periods of time.²³

The second body of evidence concerns the extent of risk sharing between countries and risk sharing within countries. In theory, people should be able to use capital markets to both borrow and lend in the face of income shocks, and to insure against income fluctuation. Either way, consumption should be less volatile than income. The international data shows that there is not much international risk sharing of this sort: local consumption tends to be highly correlated with local GDP, and little correlated with consumption in other countries. This appears to be a major anomaly, if we assume a world of risk averse agents, for there appear to be significant welfare gains from wider risk sharing (van Wincoop, 1994). There is growing evidence that risk sharing between countries is considerably smaller than risk sharing between regions within countries, suggesting that borders matter. (Bayoumi and Klein, 1997, analysing Canada; Asdrubali, Sorensen, and Yosha (1996) analysing the United States). This data also suggests that risk sharing of capital income is much more affected by the border than risk sharing of labour income, for the simple fact that little labour income risk tends to be shared using capital markets within countries or between countries.²⁴ This data is clearly consistent with the other evidence that savings is less correlated with investment within countries than it is between countries.

The extent to which the differences in intra-national capital flows and international capital flows are caused by border issues rather than currency zone issues is not clear. However, there are reasonable grounds for believing that currency zones are a major part of the story. Certainly the evidence of the high degree of capital market integration during the Gold Standard era supports this interpretation. Moreover, it seems reasonable to suppose that capital flows within countries are mobile because transfers within the banking system of a single currency zone are more or less automatic. Consequently, it seems likely that a country that chooses to have its own currency chooses to limit the extent to which it enjoys capital market integration and risk sharing - and that these costs are likely to be higher for small countries than for large countries because of the low degree of risk diversification available in a small country.²⁵

²³ Bayoumi (1990) notes that the average current account position of the UK for the period 1880 – 1913 was +4.5 % of GDP, while in Australia it was –3.7% of GDP, and in Canada it was –7.7% of GDP.

²⁴ Fiscal transfers seem to be a more important means of smoothing fluctuations in labour income.

²⁵ Bayoumi (1997 p70) summarises similarly :

“The results, in at least my reading, indicate that the original intuition was correct, namely that capital flows between countries are indeed significantly lower than might be expected if international capital markets were as highly integrated as those across regions within a country.... The overall conclusion would appear to be that national and currency boundaries are

(c) Economic Integration and the Location of Economic Activity

In the last decade, a large literature has emerged analysing the effects of increased economic integration on the spatial distribution of employment and output. This literature has demonstrated that even if a country promotes greater international integration to reduce home bias, increase trade, and increase specialisation, the benefits of integration will not necessarily flow to residents remaining in the country. Rather, a region can decline following increased integration with another region either because of a migration of resources from one region to another, or because of the detrimental effect of increased competition on local firms.²⁶ For this reason, while policy makers have generally viewed measures taken to enhance integration as a “good thing”, some caveats should be noted.

Most of the literature examining this issue has been based upon models of industries with increasing returns to scale operating under conditions of imperfect competition. These models suggest that such industries will limit production to a few locations, because of economies of scale, and that these locations will be in regions with the best market access such as large cities. Wages in these regions will be high, and these regions will become net exporters of goods subject to increasing returns. When transaction costs fall, new and existing firms may choose a new location. There are two countervailing forces affecting where firms choose to locate. As transactions costs fall from high levels to intermediate levels, the benefits of increasing returns to scale dominate, leading to a shift to regions with better market access (the core). As they fall further, these costs cease to matter as much and the disadvantages of high wages in the centre offset the returns to scale and some firms relocate back to the periphery. Consequently, at some stages of a decline in transaction costs it is possible that the periphery region will lose high paying jobs to the core region.

The evidence on these theories is mixed. Krugman (1993) argues that the lower transaction costs and higher labour mobility in the USA compared to Europe is reflected in the greater regional concentration and specialisation of manufacturing industries. Other authors analysing the manufacturing and agriculture sectors have supported this observation, but it does not appear to be true for all industries. Labour market mobility appears to be a crucial factor, because if people are mobile they are more likely to migrate out of a region with low employment than companies and jobs are likely to migrate in, speeding up forces favouring large agglomerations.

an important impediment to the free flow of both capital and goods between individuals. The global economy appears to have some troubles at border crossings.”

²⁶ Krugman 1991; Rivera-Batiz and Xie (1993); Krugman and Venables 1995; Venables 1996; and the review essays Venables 1998 and Kohno, Nijkamp and Poot (1998)

The New Zealand economy is more integrated with the Australian economy than any other, and it is reasonable to consider cities such as Sydney or Melbourne as the local “core”, and smaller cities such as Brisbane, Auckland or New Plymouth as the periphery, particularly as international evidence suggests that large cities tend to be more productive than small cities (Ciccone and Hall, 1996).²⁷ Decreases in transactions costs already cause a relocation of economic activity around New Zealand, and between New Zealand and the rest of the world, and there is no reason to believe that increasing economic integration further would be any different. Some New Zealand industries would move overseas, and some overseas industries would move to New Zealand. In general, policy makers in New Zealand have proceeded as if falling transaction costs and lower barriers to trade will be good for New Zealand residents, not bad.²⁸ ²⁹ In the absence of research demonstrating that closer integration will be detrimental to New Zealand, the assumption that closer integration is beneficial to New Zealand has been maintained in this paper.

(3) OPTIMAL CURRENCY AREAS: THE TRADITIONAL LITERATURE.

“I would suggest that the issue of optimum currency areas, or, more broadly, that of choosing an exchange rate regime, should be regarded as the central intellectual question of international monetary economics. We have formulated this question well enough to agree that it is a matter of trading off macroeconomic flexibility against microeconomic efficiency. Unfortunately, we are not completely happy with the way we model the macroeconomic side, and we have no way at all at present to model the microeconomics.” Krugman (1995)³⁰

²⁷ This issue can presumably be pursued further by examining the effect that clustering in Sydney and Melbourne has on rest of Australia. Neri (1998) tentatively suggests that such effects may be an explanation of the out-performance of the Victorian and New South Wales economies relative to those of the other states in the last decade.

²⁸ The distinction between residents and citizens is important. Even if people remaining in New Zealand were worse off after closer integration, it would not necessarily be a disadvantage to all New Zealanders, as some will migrate to take advantage of the higher wages in the benefiting regions.

²⁹ European policymakers have also been conscious of this issue. They have largely concluded that while some regions will suffer from greater integration across Europe, these regions would have suffered from greater integration within the separate countries in any case. Put more concretely, the decline of Huddersfield is mainly due to dynamics within England which promote the expansion of London, not to the greater integration between England and the rest of Europe.

³⁰ Krugman, Paul R. (1995) What Do We Need to Know about the International Monetary System? pp 509 – 529 in

Kenen, Peter B. ed (1995) *Understanding interdependence: The macroeconomics of the open economy*. (Princeton: Princeton University Press).

This book was not available to the author. The quote was taken secondhand from Méltiz (1995 p497)

While forming a monetary union with another country is likely to enhance economic integration between the two countries, there are costs and benefits from such a decision. The relative sizes of these costs and benefits have been explored in the optimal currency literature. This literature began in the 1960s, and has had a second flowering in the 1990s. While there have been some new theoretical insights, unfortunately these have been limited and still have not tackled the most important question, namely the microeconomic benefits of joining a different currency zone. These questions remain tied up in issues of transactions costs and bounded rationality, which economists have found difficult to tackle in a convincing manner. Nonetheless, any decision to adopt a monetary union in order to promote economic integration, as the Europeans have taken, must address the monetary policy issue of substituting a permanently fixed exchange rate for a flexible one.

New Zealand officials have spent relatively little time grappling with this “central intellectual question” since the New Zealand dollar was floated in 1985. There was a brief flourish of articles examining the desirability of New Zealand forming a currency link with Australia in the early 1990s (Lloyd 1990; Vandersyp 1990; Wheeler 1990, Grimmond 1991), but none of the authors saw much benefit from abandoning the current flexible exchange rate arrangements and interest in the subject waned.

(a) The Traditional Literature

The optimal currency literature had its first flush in the 1960s (Mundell (1961), MacKinnon (1963)). The basic framework of the literature has changed little since then, and the key question can be posed as follows:

What are the key economic factors that would lead a geographic region to issue its own currency rather than adopt the currency and monetary policy of another region?

It is widely acknowledged that the optimal size of a currency area depends on the trade-off of microeconomic efficiency against macroeconomic flexibility. The efficiency costs of a region issuing its own currency include the increase in transactions costs associated with a greater number of foreign exchange transactions and an increase in price uncertainty associated with the use of a separate unit of account. To the extent that these transactions costs and price uncertainties reduce trade, there will be fewer gains from economic specialisation. The macroeconomic flexibility gains of a separate currency are twofold. First, monetary independence allows the region to choose its own inflation rate. Secondly, monetary independence enables a region to stabilise output in the face of regionally specific economic shocks by revaluing its currency and altering relative wages and prices.

In practice, the question has not been answered on geographical grounds at all as until recently most nations have had their own currencies. This has meant

that most people in the world have lived in a large currency zone, as most people live in large countries. Being a small country, New Zealand is both usual as a country in having its own currency, and unusual as a geographical region which is not part of a larger currency zone. This would suggest that New Zealand is unlikely to be an optimal currency zone unless country specific factors dominate geographic factors. It is worth noting that many other small countries have responded to this tension by fixing their currency to a larger currency, either to the U.S. dollar (Hong Kong and Saudi Arabia) or to the mark (Austria, the Netherlands, Belgium and Denmark, and less tightly, Ireland, Finland, and Portugal.)³¹ A flexible exchange rate is not a dominant choice for small economies.

(i) Benefits of Monetary Independence

The first main benefit of a country maintaining its monetary independence is the ability to choose its own inflation rate. Although this was important in the past, it is probably of secondary importance now, as most countries have low inflation due to improvements in central bank technology. It may be important if a country has an extreme aversion to price increases, and is unwilling to accept the inflation rate implicit in adopting a different currency. It is to be noted that low productivity countries entering a monetary union with a high productivity country will experience higher inflation rates as their productivity levels converge, as has happened in Hong Kong and Ireland recently (Balassa 1964).³²

³¹ With the exception of Denmark, these countries have now joined the European Monetary Union and thus given up monetary independence. Denmark has reserved the right to enter the monetary union.

³² Ordinarily, choosing the currency of a different region would mean choosing the same inflation rate, although this need not be the case if the region starts with a quite different productivity *level*. A good example is that of Hong Kong, which has had a fixed exchange rate with the United States since 1983. During this time its GDP deflator has increased by an average of 8.3 percent per year, compared to a 3.5 per cent increase in the US. The difference is largely attributable to the much faster annual per capita GDP growth rate of 5.1 per cent rather than 1.8 per cent in the U.S., as Hong Kong productivity levels have caught up with those in the U.S. It is worth contrasting this experience with that of Singapore, which had a managed exchange rate through the period. Annual GDP inflation in Singapore was 2.8 percent during this period, while per capita growth rates were 6.2 per cent. In contrast to the fixed Hong Kong exchange rate, the Singapore dollar appreciated against the US dollar by an average of 3.4 per cent per year.

The experience of other countries permanently fixing their exchange rates to a larger, more prosperous country is less extreme than that of Hong Kong, as their catch up has been less extreme. For instance, between 1950 and 1978 there was only a 10 percent cumulative difference in the inflation rates of Ireland and the United Kingdom, while during the same period there was a 15 percent cumulative difference in the inflation rates of Belgium and Luxembourg. (Emerson et al, 1992). These inflation differentials are not dissimilar to those across Canada or Australia.

Secondly, monetary independence potentially enables a region to stabilise output in the face of regionally specific economic shocks by revaluing its currency and altering relative wages and prices. The benefit of a currency revaluation depends on prices and wages being sticky, for if prices are sticky a negative demand shock to exports will result in a reduction of output and employment in the rest of the economy. Under these circumstances, a currency depreciation will engineer a decline in local wages relative to the foreign wages, increasing price competitiveness and reducing the output effects of the economic shock. For this reason, currency flexibility is potentially useful in three categories of situations:

- a) where shocks are regionally specific;
- b) where alternative mechanisms for adjusting to shocks are weak; and
- c) where exchange rate changes are effective as a means of alleviating idiosyncratic shocks.

Most of the traditional debate about currency zones has tended to be fractured along these lines. It is worth elaborating some of the issues that have arisen. In the first category, the major issue has concerned the extent to which a regional economy has a narrow industrial structure, and the extent to which shocks are sector specific. This issue has been surprisingly contentious, for although increased economic integration tends to lead to increased localised specialisation, this does not necessarily mean that shocks become more regionally idiosyncratic. For example, a region which used to make tyres and engines but which now just makes tyres is still equally exposed to the vehicle market.

The second category has been the prime focus of the debate. The extent to which an economic shock will affect income and output in a fixed exchange rate regime depends on wage and price flexibility, factor mobility (particularly labour mobility) across sectors and regions, and the degree to which there is income smoothing from private capital markets and from government transfers. Clearly these mechanisms work in quite different ways. The first mechanism induces compensating output changes through changes in relative prices, while the second induces compensating output changes through inward or outward migration of people or firms. The third mechanism does not ameliorate the employment and output effects on the affected sector, but by providing alternative sources of income mitigates the extent to which income shocks flow through to other sectors. If these mechanisms do not work effectively, the case for using exchange rate movements to stabilise output increases, assuming output stabilisation is a goal of the government or the central bank.

The final category is also important because under some circumstances an exchange rate will not be an effective means of adjusting to shocks. For a depreciation to work, workers in unaffected sectors must suffer money illusion or be willing to take real wage reductions; this is less likely the more open an economy is, for then a given depreciation will be converted to a greater cut in real wages. More generally, the effectiveness of an exchange rate change in alleviating an economic shock will depend on the industrial structure of the

economy, and whether the shocks are industry specific or regional. If countries receive a similar shock, for instance, a collective exchange rate depreciation is not possible.

(ii) The Benefits of Monetary Union.

The major benefits of a monetary union are the decrease in transactions costs associated with a fewer number of foreign exchange transactions and a decrease in price uncertainty associated with the use of a more widely used unit of account. As discussed in Section 2, the value of the latter benefit in both goods markets and financial markets has proved very difficult to pin down empirically; in essence it is the value of providing unlimited foreign exchange hedging across all maturities free of charge.

(b) The European Assessment

Obviously, most European countries have decided that the benefits of a monetary union outweigh the costs. It may have been the case that economic arguments were not the deciding factor in Europe's decision to adopt a single currency, for the political drive for unification has been very strong: memories of the depressions and wars of the first half of this century have been a vital factor in the drive for political, economic, and social union. For these reasons, European decision makers may have placed a much greater weight on the benefits of integration that stem from monetary union than they did on any associated costs. Nonetheless, while their decision may not be completely relevant to other countries, many aspects of the decision are of interest.

First, the separate countries were comfortable with a pan-European inflation target, and with the monetary institutions set up to ensure the target is met (the European Central Banking System)³³. While it is acknowledged that individual countries may have rates of price change different from the European average, this is not seen as a problem.

A second anticipated benefit from the adoption of the euro was the perceived cost reduction stemming from the elimination of currency transactions costs, and the additional indirect benefits associated with the elimination of exchange rate comparisons and exchange rate uncertainty. The direct costs were estimated to be 0.4 percent of GDP per year; in addition, it was estimated that the European economy would grow by an additional 7 percent over ten years as

³³ The European System of Central Banks comprises the new European Central Bank and the existing national central banks. The governing body of the European Central Bank will decide the stance of monetary policy, while the other central banks will implement it. The governing body of the European Central Bank comprises six executives of the European Central Bank and the governors of the other eleven central banks, with decisions decided by majority vote. The president of the European Central Bank has the casting vote. The Bank is designed to be independent from political directives. The Maastricht Treaty stipulated the primary objective of the European Central Bank to be the maintenance of price stability.

a result of increased competition resulting from enhanced economic integration and more transparent pricing behaviour across Europe.

Thirdly, most European countries discounted the costs of losing exchange rate flexibility, arguing that the potential for stabilisation is offset in practice by destabilising movements in the exchange rate. This argument was forcefully put in Emerson et al (1992), and has several components. First, it was argued that exchange rate flexibility within Europe is only useful if shocks are regionally specific, and that exchange rate flexibility in the face of European wide shocks is likely to lead to “beggar thy neighbour” depreciation attempts. Secondly, it was argued that economic integration will make regionally specific shocks less likely, because increased specialisation through product differentiation will make sectoral shocks less regionally specific rather than more regionally specific.³⁴ Thirdly, it is argued that other adjustment means, particularly wage and price flexibility, will become more important as firms respond to new competitive pressures. In addition, greater capital mobility will enable the easy financing of temporary external imbalances. Fourthly, there is considerable scepticism that monetary independence stabilises economies, for while flexible exchange rates enable countries to adjust to shocks, they are also seen as a cause of shocks in themselves. Finally, it was observed that since in practice most European countries had already given up exchange rate flexibility within the European Monetary System, there was little additional cost to forming a full monetary union.³⁵

(c) Unsolved Issues in the Literature

The literature is still rather informal by modern economics standards. There are two major reasons for this:

- (a) the literature revolves around monetary issues concerning transactions costs and bounded rationality which are poorly understood even within a single economy setting; and
- (b) the advantages and disadvantages of flexible exchange rates are very difficult to model. Under many circumstances, exchange rate flexibility is precisely the appropriate response to an underlying economic shock. Under other circumstances, excessive exchange rate volatility is the cause of economic problems. It is difficult to model the process by which exchange rates and other prices may be excessively volatile as explanations rely on a mixture of bounded rationality and costly information gathering and processing.

³⁴ This contention has been debated by Krugman (1993), who argues that economic integration will lead to greater regional concentration in Europe, as it has in the USA. Subsequent analysis suggests that manufacturing and agriculture will become more regionally specialised, but not other sectors. See Bayoumi 1997.

³⁵ A distrust of exchange rate variability has long been a hallmark of European exchange rate policy, being, for example, the primary principle behind the European Monetary System (1979).

These difficulties of the literature should not be underestimated. Monetary economics does not fit well into a neo-classical economic framework precisely because it is about economic frictions and the institutions used to overcome them. For instance, a medium of exchange is used to minimise transactions costs (including the cost of determining someone else's credit worthiness), and a unit of account is used to minimise the difficulties of comparing relative prices due to limited rationality. Because the economics of these issues are not well understood within a traditional framework — a closed economy with a government issued fiat currency — it is difficult to model their importance within a wider framework that tries to analyse the costs and benefits of having different currencies in different regions. Consequently, it is very difficult to specify the integration benefits of enlarging a currency zone, because there is little formal understanding of why money is so useful. Adopting another currency has a cost (the increased difficulty of adjusting relative prices) and a benefit (the decreased uncertainty of the value of the national currency), both of which depend on the unit of account role of money and thus which involve bounded rationality. Without better ways to model these phenomena, economists have struggled to estimate the costs and benefits of a monetary union (Krugman, 1992).

These modelling difficulties have tended to bias the debate, for while the literature has a relatively good idea of the costs of currency union, it has little idea of the benefits of a currency union, which concern the specialisation benefits from greater monetary integration. In addition, it is much easier to point out how an exchange rate may help adjustment to an exogenous real shock than it is to argue that seemingly random exchange rate movements are a cause of economic shocks. These characteristics of the problem have meant that most of the literature has focussed on the costs of monetary union rather than the benefits of monetary union. Nonetheless, in the last decade there have been several developments that have undermined the traditional arguments that flexible exchange rates help stabilise the economy. Two of the most important of these arguments are outlined below.

(4) OPTIMAL CURRENCY AREAS: NEW ASPECTS OF THE LITERATURE

(a) Harmonisation of Business Cycles

One of the supposed major advantages of maintaining a separate currency is the ability to smooth business cycle fluctuations through independent and counter-cyclical monetary policy. For this reason it is often argued that a necessary criteria for entering into a monetary union is that there is a high degree of correlation of business cycles between the partner countries. This question is obviously empirical, and there have been several estimates of the degree to which business cycles in different countries are correlated. As Frankel and Rose (1998) point out, however, these exercises are potentially rather uninformative as the extent to which business cycles across regions are correlated will depend on the extent to which they trade, and the extent to which they have synchronised monetary policy. Again this is an empirical question, but if monetary union leads to greater trade, and greater trade leads to a greater

correlation of business activity, entering a monetary union will enhance the harmonisation of the two regions' business cycles.

Frankel and Rose estimate the degree to which business cycle harmonisation depends on trade using cross-country data between 1959 and 1993. They find a clear positive relationship: countries that trade more have more highly correlated business cycles. From this they make the following observations:

“Some countries may appear, on the basis of historical data, to be poor candidates for EMU entry. But EMU entry per se, for whatever reason, may provide a substantial impetus for trade expansion; this in turn may result in more highly correlated business cycles. That is, a country is more likely to satisfy the criteria for entry into a currency union ex post than ex ante.” (Frankel and Rose, 1998, p1024)

In short, a country forming a monetary union with another country will have a reduced need for a separate monetary policy. It should be stressed that this argument is presented in the context of countries using monetary policy to offset real economic shocks. The principle has wider ramifications, however, because if monetary policy is a cause of economic shocks, forming a monetary union will eliminate this cause of asynchronous cyclical fluctuations.

(b) Flexible Exchange Rates as a Cause of Shocks

The major theoretical development in this literature in the last decade has concerned the working of asset markets when financial markets are incomplete. This issue is important for the optimal currency area literature because it suggests and formalises reasons why a separate currency can be welfare reducing. The main insight is that if the value of a currency is determined by factors unrelated to economic fundamentals, the use of the currency distorts the ability of agents to enter contracts aimed at reducing the fundamental risk they face. If the “noisiness” of the currency is sufficiently great, agents forced to use the currency will be worse off than if they were able to use a different currency. This idea, expressed as a concern that flexible exchange rates are a cause of economic shocks as well as a means of adjusting to economic shocks, is one of the main reasons forwarded by the European Commission for forming a monetary union.

There are four components to this literature:

- (a) reasons why financial markets are incomplete;
- (b) reasons why financial asset values can deviate from fundamentals;
- (c) reasons why noisily priced assets can be welfare reducing;
- (d) reasons why such assets would continue to be used even when they are welfare reducing in the aggregate.

Each step relies on some combination of transaction costs, information asymmetry, or bounded rationality, and thus involves some reasonably complex arguments and modelling techniques.

(i) Incomplete Markets.³⁶

It is quite obvious that financial markets are incomplete — that there do not exist financial assets that agents can use to contract for the delivery of different types of goods in all possible different states of the world in all future time periods. It is also somewhat obvious that the incompleteness of these markets is the result of people's limited ability to deal with uncertainty, their limited ability to process information, and the expense of writing and enforcing contracts. Market incompleteness means that people can not perfectly insure themselves against future random events, but they can enter some financial contracts, and accumulate different types of monetary assets, to provide themselves with limited insurance. The combination of limited rationality and information and the potential difficulty of enforcing contracts with others means that agents tend to use only those assets which are the easiest to use, about which they can most confidently predict the future state contingent values, and whose consequence for the parties involved can be predicted with relative accuracy.³⁷ In practice this means using a small number of financial contracts to provide nominal purchasing power in the future, and then using spot commodity markets to convert purchasing power into goods.

One of the prime contracts that agents use to allocate income into the future are simple monetary contracts that deliver one nominal unit at a specified time. The real value of these contracts in different locations will of course depend on prices in different locations in the future. These prices will depend on various aspects of the state of the world, including the geographic distribution of the contracts entered into by other people. For this reason, the relative value of different currencies in different states of the world will clearly have a major effect on agent's welfare. Consequently, forward planning agents who are trying to choose the mix of contracts that best suits their risk preferences in the face of different types of shocks will be best served if the values of different currencies in different circumstances are reasonably predictable. Put differently, the usefulness of different currencies will be enhanced if their actual value in different states of the world is as close as possible to their predicted values in these states. Consequently, a desirable quality for a currency is that its value can be predicted as a function of various fundamental macroeconomic variables.

(ii) Noisy Asset Values.

In the last two decades there has been considerable debate among economists as to whether the values of a variety of types of assets can be adequately explained by fundamental considerations, or whether asset values are in some

³⁶ For an outstanding analysis and exposition of this issue, see Magill and Quinzii (1996). The introduction of the book in particular is to be recommended to the general reader.

³⁷ Note that bounded rationality does not mean that the markets agents use are necessarily subject to limited rationality. Rather, agents response to limited rationality is to use the markets which are most rational, and not use all others.

sense excessively volatile. While it is not possible to prove one way or the other, there is a growing consensus among economists that exchange rates are excessively volatile, and that there is little short term relationship between exchange rates and economic fundamentals even if exchange rates eventually reflect fundamental factors in the longer term. Three types of evidence are presented:

- (a) there is almost no useful relationship between fundamentals such as relative inflation rates or interest rate differentials in the short and medium terms even though in the long term — a period five years or more — some fundamentals appear to explain long term exchange rate movements;³⁸
- (b) macroeconomic models appear incapable of out-forecasting a random walk model at short and medium term horizons, even when actual future values of the macroeconomic variables are used in the forecasts³⁹;
- (c) the volatility of all real variables except the real exchange rate seem to be unaffected by the exchange regime.⁴⁰

These points are amplified in Appendix 1.

If macroeconomic models cannot be used to forecast the exchange rate, except in the longer term, and if the volatility of observed real macroeconomic variables except the real exchange rate are unaffected by the exchange rate regime, it is difficult to believe that observed macroeconomic variables are the cause of most exchange rate movements. Frankel and Rose (1995) deduce from these two observations that either unobserved macroeconomic shocks cause exchange rate volatility, or that exchange rate movements are unrelated to macroeconomic fundamentals. Dismissing the former explanation, they seek a solution in the microstructure of the foreign exchange market, including the factors that explain participants' heterogeneous expectations.

The heterogeneity of exchange rate expectations is a further fault with macroeconomic models of the exchange rate, as is the huge volume of foreign exchange rate trade that occurs in practice. In a standard rational expectations model, all participants have the same expectations and there is little trade because prices adjust to the level where there are few non-fundamental gains from trade. Survey evidence suggests convincingly that participants have a wide range of expectations about the future values of exchange rates, and that there is extensive trade based on these beliefs. The diversity of expectations about the exchange rate tends to be larger than the diversity of beliefs about macroeconomic variables.

³⁸ Flood and Taylor (1996); also the discussion on purchasing power parity by Rogoff (1996).

³⁹ This point was first made in the celebrated paper by Meese and Rogoff (1983). "Medium term" generally encompasses periods of up to five years.

⁴⁰ Baxter and Stockman (1989), Flood and Rose (1995).

A model of flexible exchange rates parameterised to empirical facts about the world should be able to explain the observed diversity of exchange rate expectations, the volume of trade, the high short term volatility, and the role played by macroeconomic fundamentals in the long term. For a model to be able to do this successfully, Frankel and Rose (1995) argue it will need to:

- a) have short term dynamics arising from the trading process which generate volatility which swamps fundamentals;
- b) explain why market participants have limited “rational expectations” arbitrage; and
- c) provide a role for fundamentals which limits the extent to which the exchange rate can deviate from fundamentals in the short and medium terms.

Fortunately, several models of the microstructure of asset markets have been developed over the last decade which provide general foundations for this work. These models were largely developed to explain why the share market is so volatile, but are being transformed to incorporate institutional details of the foreign exchange market to see if they are relevant to explain the process by which exchange rates are determined. These models have concentrated on three features of the market – the process of expectations formation; the dissemination of information through the market; and the role of risk aversion. Some fairly general results have emerged. Of these, possibly the most important is the demonstration that an asset price can deviate from fundamentals for long periods of time without there being a strong incentive for “fundamentals speculators” to drive the asset price back to its fundamental value. Moreover, it can be shown that price speculation can be destabilising without impoverishing those agents who do the destabilising, a result counter to normal economic intuition. Two classes of these models are briefly discussed in Appendix 2.

This large literature provides both an empirical and a theoretical basis for believing that exchange rates can deviate from their fundamental values in the short to medium term. This potentially reduces the usefulness of having a separate local currency as a unit of account in which to denominate contracts, for the real value of this currency may not be particularly predictable.

(iii) Conditions when a Separate Currency can be Welfare Reducing.

It is usually argued that a separate and flexible currency is a useful tool for macroeconomic stabilisation, because it enables relative prices to change in response to adverse economic shocks when wages and prices are sticky. This is correct as stated. However, it can also be argued that excessive volatility in the exchange rate can be a cause of economic shocks to the rest of the economy. This argument has recently been formalised within an incomplete markets setting by Neumeyer (1998). The basis of the argument is that when there are incomplete markets, an additional currency should increase the insurance possibilities open to agents through trade in nominal assets, because the different assets will have different state-contingent values. Ordinarily this would mean ...

“the loss of monetary independence entailed by fixed exchange rate regimes, or monetary unions, is socially costly because it makes the real payoff of assets denominated in different currencies equivalent, effectively reducing the number of financial instruments with which economic agents can share risks.” (Neumeier, p 247)

However, when the value of an additional currency is not closely related to economic fundamentals, this result is not true. The noise associated with the asset means that its value will not be highly predictable in different economic states of the world. This is not just problematic for those undertaking contracts in the particular asset; because the random outcomes of the value of this asset affect income distribution among all who use it, prices and therefore the real values of all other assets will be affected as well. In this case the value of insurance possibilities available from all other assets is reduced, because their real value will be contaminated by the randomness of the additional currency. Eliminating the asset will increase the insurance value of all remaining assets, as the predictability of their real value in the face of economic shocks increases.

This result is rather important. An excessively volatile currency is not just bad for those forced to use it, but it can be bad for others as well, because it can disrupt the working of the entire financial system.

(iv) So Why Use Bad Currencies?

Dowd and Greenaway (1993) forward a simple argument why people use a bad currency. It involves a prisoner’s dilemma situation when there are network externalities associated with the use of currency, that is, when a currency is more useful to an individual the greater the number of other people using it. If most people in person i ’s region are using an inherently bad currency, it is not worthwhile person i changing to an inherently better currency because he or she will not be able to use it much. Rather, he or she will switch only if sufficient numbers of others also switch. Dowd and Greenaway derive formally the conditions under which everyone will simultaneously switch to better currency. These prove quite restrictive; the dead hand of history can mean that a bad currency is used even when everyone agrees that there is a better alternative, because nobody has an incentive to be amongst the first to change.

(v) Summary

These theoretical developments are important because they suggest reasons why an excessively volatile currency can be problematic. Monetary variability – in this case exchange rate variability unrelated to economic fundamentals – can be welfare reducing because it undermines the reliability of financial contracts. Rather than be a useful means of adjusting to real shocks, an exchange rate can be a cause of real shocks to the rest of the economy by altering the relative value of prices and wages across space in random fashion.

There is quite strong evidence that exchange rates deviate from values implied by economic fundamentals for lengthy periods of times. These deviations are likely to be the cause of economic shocks; in fact one of the arguments behind Europe's adoption of a single currency is the desire to reduce the shifts of industry across countries induced by exchange rate changes. Such deviations increase the desirability of living in a large currency zone, for this increases the fraction of transactions one conducts whose future value can be assessed with reasonable confidence. If exchange rates are quite volatile, it may prove that the optimal currency area is quite large rather than quite small.

(5) DISCUSSION AND SUMMARY

The evidence that external economic links are imperfect substitutes for internal economic links raises a variety of questions for a small economy like New Zealand, for it is likely that New Zealand residents obtain fewer of the benefits of both specialisation and diversity that most people gain from internal trade. These effects of home bias are compounded by New Zealand's remoteness, for international trade is an expensive alternative. Indeed, New Zealand has relatively little trade for a small country; consequently, compared to other geographic regions, New Zealand is rather insular.

The imperfect substitutability of external and internal links has spurred many small countries to adopt policies aimed explicitly at enhancing international linkages. New Zealand is no stranger to this process, as is evident from the Closer Economic Relations agreement with Australia and a more general strategy of reducing protection. Nonetheless, it is probable that more needs to be done if New Zealanders consider that there are benefits from more intensive trade in goods, services, and financial products. Such steps could include the pursuit of less restrictive multilateral migration regulations, widening the CER agreement to include other countries, taking further steps to harmonise business law, or forming a monetary union with another country. The Maastricht Treaty (1992) and the subsequent European Monetary Union are highly visible statements of a group of countries adopting several of these policy options in order to intensify economic and social ties.

While the evidence is clear that economic integration is much greater within countries than it is between countries, the extent to which adopting another country's currency will enhance economic integration is much less obvious. The evidence does indicate that pricing in a single currency reduces price differences across space. For instance, from 1966 to 1996 the standard deviation of the real exchange rate movements between New Zealand and Australia was a factor of ten higher than the average standard deviation of real exchange rate movements between different Australian states. Distinct currency zones may also have a more subtle effect on prices, by demarcating the areas where different marketing operations prevail. This effect is harder to disentangle from straight border effects, as currency zones and national borders ordinarily coincide. Nonetheless, if firms have different marketing and distribution

strategies in different regions because of different currency zones (which is plausible if firms find that exchange rate volatility drives a wedge between actual prices and desired prices in different regions), the use of a single currency will enhance goods market integration.

While it is becoming increasingly clear from trade volume data that goods markets within countries are considerably more integrated than goods markets between countries, the effect of currency zones on trade volumes is not so apparent. To date the literature examining the effect of exchange rate volatility on inter-country trade flows has been inconclusive, although by and large it has not addressed the most relevant question which is whether long term exchange rate uncertainty has a detrimental effect on trade. The extent of this home trade bias is sufficiently large that even if only a small fraction of home bias is caused by exchange rate issues, the costs for a small country like New Zealand could be non-trivial. To date, however, it has not proved easy to make estimates of these benefits.

There is somewhat stronger evidence that capital market integration is affected by the choice of exchange rate regime as well as national borders. In most countries, internal capital markets are much more integrated than external capital markets; capital markets also appear to have been more integrated under the pre-1914 Gold Standard than they are now. This makes sense if agents are risk averse, for they will want to hold a large quantity of their debt instruments in local currency since most of their financial contracts will be denominated in local currencies. It is also true that financial intermediaries offer lower cost contracts denominated in local currencies, reinforcing the bias towards capital market integration within a currency zone.

The greater extent of capital market integration within currency zones rather than between currency zones means that maintaining a separate currency may have quite high welfare costs, as it limits the extent to which risk sharing occurs across regions. These costs are likely to be higher for small countries than for large countries because of the low degree of risk diversification available in a small country. As related phenomena, investment and saving decisions are also more highly correlated within currency zones than between currency zones.

There will also be a cost for a small net debt country if lenders impose a currency risk premium rather than a geographic risk premium as part of the cost of loans. This is quite plausible, as geographic risk premiums (within currency zones) seem to be smaller than currency risk premiums. New Zealand dollar interest rates are usually higher than those prevailing in other currencies, and if part of this premium is due to currency risk rather than country risk, forming a monetary union with another country could lead to a substantial reduction in the cost of capital.

These benefits of forming a monetary union have become better quantified in the last decade, and will become more so in the next as the effects of European countries forming a monetary union are observed. Nonetheless, there are

potential costs to forming a monetary union, and these need to be taken into account before a decision to form a monetary union is made. The relative size of the costs and benefits of New Zealand forming a monetary union with another country is an empirical matter, with the calculus depending on the choice of the other country. The traditional literature analysing the optimal currency area provides some guidance on how some elements of the equation should be calculated, although there still remains considerable debate. Previous authors considering the costs and benefits of New Zealand forming a monetary union with Australia decided that the costs were too high. Recent developments in theory suggest that these costs have been overstated, however.

There are two potential advantages of New Zealand maintaining a separate currency and independent monetary policy. First, it allows New Zealand politicians and officials to choose their own inflation rate. This is most likely to be an advantage when the inflation rate implicit in choosing the currency of another country is considered to be too high for internal objectives. Recent developments in central bank technology have resulted in low inflation around the world, however, with many central banks increasing their political independence and adopting inflation targets, similar to the changes undertaken at the Reserve Bank of New Zealand in 1990. Inflation has fallen in most such countries since this time, and consequently inflation outcomes in New Zealand have been comparable to those in the rest of the world (including Australia). Average annual consumer price inflation in New Zealand was 2.1 per cent from 1990 – 1997, compared with 3.1 per cent in the United States, 2.4 per cent in Australia, 1.4 per cent in Japan, 2.9 per cent in Germany, and 3.8 per cent in the United Kingdom. In addition, most of these countries have a better long term inflation record than New Zealand.⁴¹

A second potential cause of high inflation would occur if productivity levels in New Zealand increased much faster than in the rest of a monetary union. This has been the Hong Kong experience since 1983 due to exceptional productivity growth. Where relative productivity increase has been gradual, however, the higher rate of price increase has not been particularly large, as demonstrated by the Irish experience. In this situation it is not the case that inflation is a problem because it causes low income growth. Rather, inflation is a problem because of its effect on income distribution, in particular disadvantaging those who like to hold their wealth in debt instruments. If this is the prime reason for choosing an independent monetary policy, the Government should ensure that other aspects of its fiscal and monetary policies are consistent with this distribution objective.

⁴¹ These developments diminish the force of some of the arguments made previously; for example Lloyd (1990) *"In contrast to the firm anti-inflation stance and single price stability objective of New Zealand monetary policy (cemented in by the Reserve Bank of New Zealand Act of 1989), Australian monetary policy has been targeted at an array of economic objectives and has achieved only limited success at controlling inflation. Until such time as convergence occurs in this key component of macroeconomic policy, enthusiasm for a rapid movement to a full currency union must be tempered."* (pp 11 –12)

The second reason for choosing an independent monetary policy is that it is a useful tool for macroeconomic stabilisation. This is clearly the focus of most of the theoretical and empirical literature, and would appear to be the reason offered by many of the world's policy makers. Two comments can be made on the basis of the recent literature.

First, recent theoretical developments, discussed in section 4, show that is not necessarily the case that maintaining a separate currency will help stabilise an economy. An independent exchange rate assists the process of stabilisation in response to real economic shocks if local wages and price are sticky, for then exchange rate changes can assist with the rapid adjustment of prices and wages relative to those in other countries. However, if exchange rates are excessively volatile, in that their value deviates from fundamentals in the short and medium term, the exchange rate will be a cause of shocks which destabilises the economy. Whether or not a flexible exchange rate is stabilising is an empirical matter; there should be no presumption that it is stabilising given the international evidence that exchange rates (and other asset prices) seem to be more volatile than justified by movements in macroeconomic fundamentals.

Secondly, the need for macroeconomic stabilisation is an empirical matter that depends on the nature of the shocks affecting a geographic region. For New Zealand not to join a currency union on this basis would require that New Zealand is buffeted by quite different shocks than regions within the other country. This is an empirical matter – but as Frankel and Rose (1998) make clear, one subject to the Lucas critique, as the shocks are likely to be endogenous to the exchange regime. Joining a monetary union would most likely cause an expansion of trade with that currency bloc; if so, the nature of the real shocks affecting New Zealand will change, as will the nominal shocks affecting New Zealand. In short, forming a monetary union with another country may reduce the need to have a separate monetary policy.

New Zealand is the smallest OECD country to have a fully independent monetary policy. To continue to justify this stance on an economic basis, there should be evidence that monetary independence has been beneficial — or, at least, of little cost. Over the last eight years, New Zealand has enjoyed very low rates of inflation, although its record is not dissimilar to that of most other OECD countries. Despite this low inflation, however, real short term interest rates have been higher than in our main trading partners; the New Zealand economy has not been noticeably more stable than other OECD economies; and trade volumes have grown only slowly despite having a trade share substantially below that of almost all other small OECD economies. While the counterfactual is not available, there should be no presumption from these outcomes that monetary independence should be the natural option for the New Zealand economy.

Other Issues

A smorgasbord of issues remain to be discussed. First, it is quite apparent that many of the recent advances in the literature stem from an analysis of intra-regional economics, not international economics. There is a growing literature examining the behaviour of regional economies within countries, and regional economies within larger regional groupings. This research examines amongst other things the behaviour of labour markets and goods markets within and between regions, inter-regional migration, the different types of shocks buffeting different regions, and the extent of trade between regions. To date there is little knowledge of the performance of the different sub-regions of the New Zealand economy, or how New Zealand-Australia interactions compare to the interactions of different Australian states with each other.⁴² More research on this topic is likely to be useful in understanding the performance of the New Zealand economy less as an independent entity and more as a part of a wider regional group; it also may shed some light on the effects of one region having a different currency from the other regions.

Secondly, even if there are few good reasons for New Zealand having an independent currency, there is still likely to be a demand for New Zealand specific financial products that help New Zealanders save, invest, and risk-share. If New Zealand were to join a currency union, the Reserve Bank could consider introducing financial instruments or even currencies whose payment structure would be tied to the performance of various New Zealand financial statistics, but which would not be used as a unit of account or medium of account for every day transactions.⁴³ This would provide an additional avenue for New Zealanders to diversify their risk given a world of incomplete financial markets.

Thirdly, this paper has not discussed the difference between forming a monetary union with another country, and simply adopting the currency of another country. If the former path were adopted, New Zealand economic conditions would be taken into account when setting monetary conditions across the union; if another currency were adopted, the monetary policy of the partner country would be determined by its domestic considerations alone. In practice, New Zealand is such a small economy that the difference is likely to be of little economic consequence, because New Zealand considerations would have little weight in a monetary union. There could be a substantially different treatment of seignorage revenue, however, and this would be of economic significance.

⁴² There are some exceptions, for example Poot (1993) on internal Australasian migration.

⁴³ See the discussion in Shiller (1993) concerning the introduction of different financial products to manage society risk. For instance, the Reserve Bank could introduce a contract tied to New Zealand's nominal GDP for people wanting to hedge against the possibility of price rises associated with extremely high productivity growth.

Fourthly, this paper has not discussed transition issues. Joining a monetary union involves various costs, and it could be the case that these transitional costs outweigh any positive effects once the transition is over. These costs not only involve the direct costs involved with switching monetary units, but involve the risk that a bad shock hits the country while economic integration is only partial.

Finally, if New Zealand were to seriously consider adopting the currency of another country and giving up its monetary policy, the most obvious question concerns the choice of country. The choice is vital, as the benefits of greater goods market and capital market integration would primarily stem from greater integration with that country. The two most obvious choices are Australia and the United States, for these countries are relatively close and impose relatively few border or linguistic barriers to an expansion of trade. The former is New Zealand's closest neighbour and main trading partner, particularly for manufactured goods and for services; given that New Zealand also has open capital and labour markets with Australia it would be the leading choice. There are already very close links between many New Zealand and Australian firms, particularly in the financial sector, reducing the transaction costs of any link. The United States has the advantage of being the world's largest economy, and thus a considerably larger economy from which to gain the benefits of greater integration than Australia, as well as the currency partner of other countries such as Hong Kong. While goods market integration and labour market access are substantially less than with Australia, the benefits from greater capital market integration would be much greater. Unless Australia were to simultaneously adopt the U.S. dollar with New Zealand, it is a choice that will not be easy to make.

APPENDIX 1: EMPIRICAL EVIDENCE ABOUT EXCHANGE RATES

(See Section 3 (a) (ii) Noisy Asset Values.)

There has been considerable concern within the economics profession about the high volatility of nominal exchange rates, the close relationship between real and nominal exchange rate changes, and the failure of macroeconomic models to perform better than a random walk model of the exchange rate. For example:

“Existing structural models have little in their favour beyond theoretical coherence. Positive results, when they are found, are often either fragile, or unconvincing in that they rely on implausible theoretical or empirical models. For these reasons, we, like much of the profession, are doubtful of the value of further time-series modelling of the exchange rate at high or medium frequencies using macroeconomic models.

...the Meese and Rogoff analysis at short horizons has never been convincingly overturned or explained. It continues to exert a pessimistic effect on the field of empirical exchange rate modelling in particular and international finance in general.”

(Frankel and Rose, 1995, pp1704-5)

In this appendix I briefly discuss three aspects of this literature.

(a) Meese and Rogoff (1983), and short term exchange rate forecasts.

Meese and Rogoff examined the forecasting performance of several different macroeconomic models, including explicitly structural models and time-series vector autoregressions. They compared the forecasting performance of these models with the forecasting performance of a simple random walk model over 1 month, 3 month, 6 month and 12 month horizons for the three major exchange rates. They also compared the random walk with the appropriate forward rates, thus implicitly comparing the forecast with that of uncovered interest parity. They summarise their findings as follows:

“We find that a random walk model would have predicted major-country exchange rates during the recent floating rate period as well as any of our candidate models. Significantly, the structural models fail to improve on the random walk model in spite of the fact that we base their forecasts on actual realise values of future explanatory variables.” Meese and Rogoff (1983 p3)

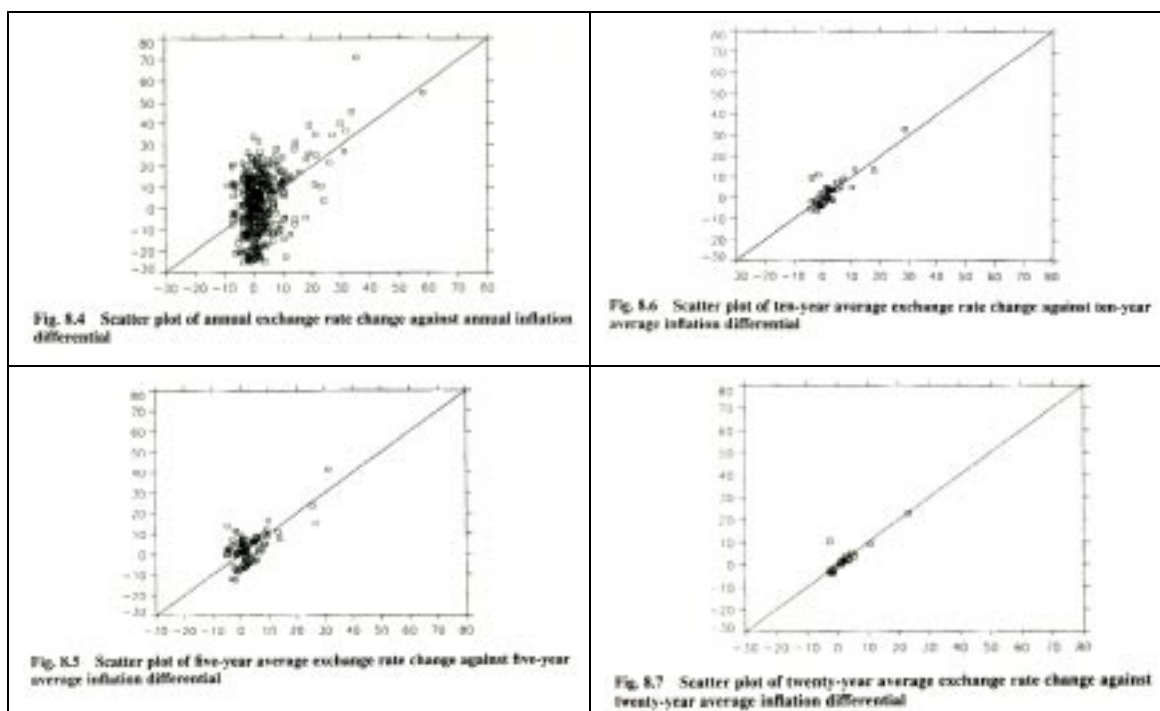
This result is clearly a severe set back to exchange rate models: quite simply, macroeconomic phenomena are hard-pressed to explain short term movements in exchange rates.

The short term failure is perhaps best seen in two firmly held “beliefs” of many economists: that purchasing power parity should hold, and that uncovered

interest rate parity should hold. The former theory says that physical good arbitrage should result in prices in different countries being equal, up to differences in taxes and transactions costs. There is evidence that price levels in different countries eventually do converge, but the length of time this takes is extraordinarily slow — on average it takes four years for half of the difference in price levels to be eliminated (Rogoff 1996). The latter theory suggests that when interest rates are high in one country compared to another, the exchange rate should depreciate over time so that expected returns are equal. This relationship does not hold at short horizons either, with evidence suggesting that exchange rates appreciate rather than depreciate over short horizons. (Froot and Thaler 1990, Lewis 1995).

(b) Long Term Exchange Rate Movements and Macroeconomic Fundamentals.

Despite the poor relationship between macroeconomic fundamentals and the exchange rate in the short term, in the longer term there does seem to be a stronger link. Flood and Taylor (1996) present the results of the cross-sectional relationship between changes in prices and changes in the exchange rate relative to the US over time for 21 industrial countries, 1973 – 1992. They estimate the relationship when the change in each variable is calculated over 1 year (420 observations), 5 years (84 observations), 10 years (42 observations), and 20 years (21 observations). Scatter-plots of the data are reproduced below. As is clear from the scatter-plots, there is little apparent relationship at annual horizons and only a weak relationship at 5 year horizons; not until 10 and 20 year horizons is it apparent that exchange rates move to offset price movements. At short horizons, noise dominates signal.



Graphs of exchange rate movements versus relative price movements, 21 industrialised countries versus the US, 1973 – 1992. (Flood and Taylor, 1996, p278)

The authors conduct a similar exercise examining the relationship between exchange rate movements and uncovered interest parity, using 3 year bond rates. Again they find that the fundamental relationship is much stronger over longer periods than shorter periods, that is currencies with high nominal interest rates tend to depreciate over time.

(c) Real Variable Volatility by Exchange Rate Regime.

It has long been realised — in fact it is almost definitional — that nominal exchange rate volatility is higher under flexible exchange rate regimes than fixed exchange rate regimes. What has been surprising in the post-Bretton Woods era is that nominal exchange rates have been so volatile, and that this volatility has passed through almost one for one to real exchange rate volatility⁴⁴. Perhaps even more surprising is that there has been no systematic change in the volatility of any other real variables. Flexible exchange rates just seem to increase the volatility of real exchange rates.

Baxter and Stockman (1989) were amongst the first to document the lack of differences in real variable volatility between exchange rate regimes by comparing the volatility of real variables in the pre and post Bretton Wood's era.

"We have been unable to find evidence that the cyclic behaviour of real macroeconomic aggregates depends systematically on the exchange-rate regime. The only exception is the well-known case of the real exchange rate.

....

We found that the volatility of exports, imports, and the real exchange rate increased in the post-1973 period for most of the countries in our sample. However, these increases were no more common in countries on a floating exchange rate regime after 1973 than in countries which chose to fix their exchange rate." Baxter and Stockman (1989, p399)

They also compared the volatility of real variables in countries that changed their exchange rate regimes at other times, notably Canada in the 1950s and Ireland in 1979. Again, they found that the real exchange rate was the only variable that had a significant change in volatility.

Flood and Rose (1995) followed up this idea by modelling the exchange rate as follows

$$e_t - \alpha(i_t - i_t^*) = f(\text{macroeconomic variables}) + \varepsilon_t$$

where e_t is the exchange rate and i_t and i_t^* are domestic and foreign interest rates. They compared the volatility of the left hand side and the volatility of the two terms on the right hand side across exchange rate regimes. When moving from fixed exchange rate regimes to flexible exchange rate regimes, the volatility of the left hand side increases by a much greater factor than the volatility of the function on the right; consequently they reject the idea that it is possible to express the exchange rate as a simple function of macroeconomic variables.⁴⁵ From this they concluded that the critical determinants of exchange

⁴⁴ This is a corollary of short term price stickiness and the failure of PPP to hold in the short term.

⁴⁵ Note that this means it is not possible to express the exchange rate in the form $e - f(x) = 0$, but it may still be possible to have a complicated macroeconomic relationship $g(e,x) = 0$.

rate volatility are not macroeconomic, because no macroeconomic variables have volatility dependent on the exchange rate regime.

APPENDIX 2: MODELS OF ASSET PRICE DETERMINATION

(See Section 3 (a) (ii) Noisy Asset Values.)

(a) Market Structure and the Dissemination of Information.

There is a large and diverse literature analysing how information is processed in financial markets. The modern literature has its antecedents in a series of articles beginning with Grossman and Stiglitz (1980), Hellwig (1980), and Diamond and Verrecchia (1981), which developed rational expectations models of how traders with diverse information about the value of an asset trade, and how this information is reflected in the price of the asset. In these models prices have two roles: they clear markets, by equilibrating supply and demand, and they provide information which agents use to formulate their beliefs and hence their demands. Consequently, agents form demand schedules which are conditioned on price; if prices are high, for instance, they increase their demand because they interpret a high price as evidence that other agents have information which means the asset is worth more than they expected unconditionally.

Two key points emerged out of this work. First, Grossman and Stiglitz famously pointed out that an equilibrium could not be perfectly efficient, for if it were there would be no incentive to collect information. For an equilibrium to exist there had to be a certain amount of noise, generated by “liquidity” traders who are assumed to trade for reasons independent of any information about the value of the asset. This independent demand masks some of the demands of information traders. In turn, this means that the equilibrium price will be different to that which informed traders believe should prevail, so they will trade and make expected profits sufficient to cover the cost of information. Secondly, it became apparent that the model’s lack of market micro-structure was not innocuous. These initial models assumed that there was a walrasian auctioneer taking orders and working out the equilibrium prices, and that agents were price taking, not price making. Neither assumption seems particularly realistic.

Both of these assumptions have been tackled in subsequent work, in a variety of different ways that is intended to reflect the actual structure of different markets. For instance, many models of share or bond markets have followed Kyle (1985) in postulating a specialist trader or market maker who accepts orders from informed and uninformed traders, and who holds some of the asset to clear the market. Informed traders submit different sized bids according to their information, taking into account the influence on price they expect their bid to have. Models such as these are aimed at representing the actual institutions of the markets, and are increasingly being tailored to the institutions prevailing in exchange rate markets.

Different streams of the literature have analysed how agents use current prices to update their beliefs about future prices. Agents do this because information gathering is costly, so even those agents who gather some information will not

have full confidence in their own views and will wish to incorporate “information” from prices into their information set. One theme that has emerged in the literature is how price crashes and herding behaviour can occur (see the review by Bikchandani, Hirshleifer and Welch (1998)). For instance, Genotte and Leland (1990) show that if some agents have *unobserved* hedging instruments (such as stop-loss positions or portfolio insurance), huge swings in prices can occur because uninformed agents mistake a hedge sale for an informed sale and falsely revise their opinions as to the underlying value of an asset on this basis. In this case, the volatility of the asset price will be much greater than the volatility of the underlying fundamentals.

A different approach is that by Romer (1993). He develops a model in which agents gain information and make inferences about the precision of other agent’s information over time. Random liquidity trades will move prices around by a small amount, and traders deduce from the response of prices how confident others are in their beliefs. This process can lead to big changes in asset prices at times when no new information is otherwise released into the market. As he writes:

“ Uncertainty about the quality of other’s information can cause investors who in fact possess the best available information to place some weight incorrectly (but rationally) on the market price and little weight on their own information in attempting to estimate value; alternately, it can cause investors who have inferior information to place excessive weight on that information. As market developments (e.g. market responses to buy and sell orders arising from liquidity needs) reveal information about others’ uncertainty, it becomes clearer whose information is superior. The best available information therefore becomes reflected more fully in asset prices.”

(Romer 1993 p 113)

(b) Exchange Rate Models

In the last decade, there has been considerable interest in applying some of these models to the foreign exchange market. This work has two distinct aspects. One set of research has investigated and documented the actual workings of foreign exchange dealers and markets. The leading example is Lyons (1995, 1996) who examined the dealings of a single and large New York bank trader in the deutsche mark/dollar market in a single week in 1992.⁴⁶ This example is very informative because of the exceptionally high quality of the data, including both the time, quote quantity, bid and offer quotes, and the value and volume of trade if a transaction was made.⁴⁷ Lyons shows that the dealer had a very short horizon, typically closing out all positions at the end of the day; that he was risk averse in the sense of changing prices in response to the private position (or inventory of holdings) he built up during the day; that he changed his prices in response to order flows that might contain private

⁴⁶ The dealer averaged a billion dollars worth of transactions per day.

⁴⁷ Data this good is sufficiently rare that it is possible to make a career out of it.

information; and that there was a “hot potato” quality of many trades, as parts of a large order were rapidly unloaded to other dealers.

The second aspect of the work is the adaptation of asset price models to foreign exchange markets; for example Osler (1998) and Carlson and Osler (1996). Osler (1998) develops a model in which there are liquidity traders and risk averse speculators. The liquidity traders buy and sell foreign exchange in order to settle current account transactions. The size of the net current account transactions depends on the exchange rate, but also contains a random component. In each period the exchange rate adjusts to match the liquidity trader demand with the speculator supply and thus clear the market. The price the speculators quote is such that the expected gain they make from the speculation compensates them for the risk they undertake. This price is fully rational, taking into account how the exchange rate affects the non-random component of the current account position and the effect of their subsequent unloading of the position on the evolution of the price. Speculation is stabilising in the face of current account shocks — the variance of the exchange rate is reduced — although in the process the exchange rate deviates from the fundamental value.

The deviation of the exchange rate from the risk neutral position is in effect the cost of requiring the speculators to hold large net foreign exchange positions. This cost is related to the accumulated stock of the position, not just the current flow, even though this model equates foreign exchange rate flows in each period. As the number of speculators increases the responsiveness of the exchange rate to a shock decreases and the exchange rate appears to follow a random walk in response to purely random innovations.

The model developed in Carlson and Osler is similar but more interesting. In this model there are the same liquidity traders, but the speculators also take into account the short term interest differential between currencies. As previously, speculation is stabilising in the face of current account shocks. Speculation is destabilising in the face of interest rate shocks, however. Consider the effect of an interest rate increase in one country. Investors chasing the higher returns bid up the price of the currency, obtaining a return comprised of the higher interest rate minus the expected depreciation as the currency is expected to return to its long term value. (As the exchange rate increases, the current account position turns temporarily negative, becoming less negative as the exchange rate returns to its long term value.) The larger the number of speculators — or the less risk averse each speculator is — the greater the total demand for the high yielding currency, and consequently the larger the change in the exchange rate necessary to provide the current-account exchange rate flows. Consequently, the exchange rate becomes more volatile not less volatile as the number of currency speculators increases.

This story is similar but subtly different from the standard risk neutral arbitrage story. In the standard risk neutral story, the exchange rate will immediately rise by the accumulated difference in the two countries' yield curves, and then start

depreciating⁴⁸. The total quantity of currency purchases is not clearly apparent, however. There is a similar mechanism in the risk averse story, but in this case the speculators are compensated for the risk they undertake. A 1 percent increase in interest rates will not lead to an immediate 1 percent increase in the exchange rate followed by a steady 1 percent depreciation; rather, the exchange rate will fall more slowly so that the expected return from holding the high yielding currency is greater than the expected return from holding the low yielding currency. These higher returns reward the speculator for the additional risk undertaken from holding a larger foreign exchange position. The exchange rate will eventually return to its long run equilibrium value (so that the expected depreciation is zero), but interest rates will have to remain high to keep it at this level, compensating the speculators for the risk they undertake holding a large position in the high yielding currency.

A notable feature of this model is that the risk premium is determined endogenously. In particular, the required compensation is a function of the holding that each speculator is required to take, so that countries which have large *accumulated* current account debt will be required to pay an interest rate premium⁴⁹. A country running a tight monetary policy for an extended period, incurring a large accumulated current account position in the process, will have difficulty lowering interest to world levels (without causing a large exchange rate depreciation) because speculators demand high real returns in order to hold the accumulated position.

(c) Keynes, and the Noisy Traders of De Long, Shleifer, Summers and Waldmann

A different approach to asset price volatility has been taken by De Long, Shleifer, Summers and Waldmann in a series of articles that have modelled how misinformed agents can affect asset prices. They sought to model an insight of Keynes that well informed investment professionals spent relatively little time seeking and trading upon fundamental information but rather spent most of their time estimating the future demand for the assets.

De Long et al formulate a model in which there are “noise traders” as well as fully informed traders, and explore the limits of arbitrage designed to exploit noise trader’s misperceptions when arbitrageurs are risk averse and have short horizons. In these models a noise trader is someone who *believes* he or she has special information about the future value of an asset, or someone who has excessive certainty about their beliefs. Noise traders would include people who believe in and act upon broker’s tips, or who listen to investment gurus. While rational arbitrageurs take positions to exploit the beliefs of noise traders, they only take limited positions because of the risk that they will lose money because of a change in the fundamentals or because of a change in the beliefs of the

⁴⁸ This is the theoretical position. As is well known, the empirical evidence suggests that this model does fit the data in the short and medium terms.

⁴⁹ Strictly speaking, the relationship is between currencies and debt, not countries and debt.

noisy traders. This lack of arbitrage means that asset prices become much more volatile than they would have been in the absence of the noisy traders. When noisy traders are optimistic, they hold more of the asset and the price rises; rational traders lower their holdings but do not take extremely large short positions because of the chance that the noisy traders will become even more optimistic in the subsequent period. Conversely, when noisy traders receive a bad signal, they sell down the asset and its price falls. This additional volatility in the price of the second asset means that the average price of the second asset is lower than the price of the first asset, providing the average excess returns.

The results they derive are much stronger than this, however. Because noise traders induce greater volatility into asset prices, they reduce the desirability of holding the assets unless their average returns increase. This means that noise traders, who hold greater quantities of these assets than rational arbitrageurs, can make greater expected profits than rational arbitrageurs.⁵⁰ In equilibrium they are not driven out of the market even though they destabilise prices, because they make more profits than the stabilising speculators. This result is quite extraordinary, as the authors note (De Long et al, (1990), p 706)

“This result is more interesting than the point that if noise traders bear more fundamental risk they earn higher returns: our point is that noise traders can earn higher expected returns solely by bearing more of the risk that they themselves create. Noise traders can earn higher returns from their own destabilising influence, not because they perform the useful social function of bearing fundamental risk.”

The importance of this work is that the authors show that the process by which markets aggregate information will not necessarily cause good information to dominate bad information, and that merely the existence of bad information (rather than its particular content) will affect markets. They also derive some strong empirical predictions, and claim reasonable empirical support for their model. This evidence gives additional grounds for believing that something about the microstructure of asset markets generates additional short term volatility, and leads to prices that can deviate from fundamentals for reasonably long periods.

This idea has recently been incorporated into theoretical microeconomic models of exchange rate determination by Jeanne and Rose (1998). They develop a model with rational traders and noise traders in which there are multiple equilibria in the foreign exchange market, with one equilibrium associated with a large number of noise traders and excessively volatile exchange rates. The existence of these multiple equilibria enables them to argue that monetary policy can be used to lower exchange rate volatility without altering macroeconomic fundamentals.

⁵⁰ They expected utility is less, however, because they underestimate the riskiness of holding these assets.

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