A Perspective

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1.   Introduction

Three distinctive themes ran through the Conference. Essentially, these were:

- What determines the exchange rate?
- What determines trade flows?
- What should policy be towards the exchange rate and what is its role in the current recessionary environment?

2.   The Exchange Rate

A persistent issue surfacing throughout the Conference was whether or not economic research had supplied any useful guide to the factors determining the exchange rate. Paul Krugman was very pessimistic on this score, whereas Blundell-Wignall, Fahrer and Heath (BWFH) were optimistic. From the nature of the discussion it was clear that such a relationship is desirable, as it can serve both as an anchor for markets and a signal to central banks when an exchange rate is 'getting out of line'. This idea surfaced under many guises - Ken Clements felt that purchasing power parity (PPP) fitted the bill, while Mike Artis emphasised the fundamental equilibrium exchange rate (FEER), or the desirable equilibrium exchange rate (DEER), using these latter concepts to explain some of the adjustments occurring in the European Monetary System (EMS) in September 1992.

Time Period	y_t	x_t
Very long run	Nominal exchange rate	Domestic and foreign prices
Medium run	Real exchange rate	Terms of trade, capital productivity and stock/flow effects
Short run	Medium-run adjusted exchange rate	Short-run foreign and domestic interest rates
Very short run	Medium-run exchange rate adjusted for short-run interest differentials	Noise trading/ chartist fundamentalist dynamics

Table 1: Determinants of Exchange Rates

The discussion is summarised via the tree depicted in Table 1, which illustrates both the time periods and the variables that were examined. At each level of the tree, we conceive of a relationship of the form $y_t = x_t\beta + u_t$ where y_t is the variable being explained, x_t are the explanatory variables (with weights β) and u_t is the residual. At each level, y_t changes so that the 'new' y_t is an 'adjusted exchange rate' defined as $y_t - x_t\beta$ of the previous level. Thus, at the top, y_t is the log of the nominal exchange rate, the x_t's are the logs of domestic and foreign price levels and the vector of weights β takes the value $\beta' = [1, -1]$, while the y_t at the next level down is the log of the real exchange rate.

In the table, PPP is taken to be a description of exchange rates in the very long run. During the medium term, the relation is disturbed by fluctuations in the terms of trade and the marginal productivity of capital, as well as exhibiting complex dynamic behaviour due to stock/flow effects stemming from imbalances caused by the cumulation of external debt. In the short run, say at monthly intervals, the exchange rate, adjusted for these medium-run effects, is unlikely to be constant, as economic agents react to short-run interest differentials. Finally, in very short periods, one observes the potential for great volatility in the adjusted rate, owing to the interaction of chartists and fundamentalists in the market.

All of these views and time periods were represented in discussion at the Conference, leading to many definitions of what a fundamental rate was. Krugman argued that the search for a relationship was an important one, particularly as these were used to close economic models. Clements pointed to the fact that Figures 1 and 2 of BWFH seemed to support PPP as a good assumption; in the case of the $US/$A, the real exchange rates in 1969 and 1992 were effectively the same. Artis essentially adopted the same device in highlighting the relative inflation differentials between the United Kingdom and Germany as a source of the September 1992 crisis. BWFH presented a medium-run relation of the form described in the paragraph above. Krugman also mentioned that the short-run connection distinguished in the table - effectively short-run uncovered interest parity if the medium and long-term x_t variables are taken to represent an expected exchange rate - had been rejected many times by the data. Finally, at very short time horizons, there is likely to be very complex dynamic behaviour in exchange rates from noise traders, and it may be that the residual at this level is of greater importance than the other determinants further up the tree.

The main empirical work on this topic presented at the Conference - BWFH - related to the prospects for determining a medium-term relationship. Implicit in the tree is the assumption that the law of large numbers can be applied to the residual at all levels, i.e., the noise trader effects, when averaged over, say, days and weeks, should 'disappear' in the sense that their variance becomes smaller relative to the factors causing deviations from fundamentals in the longer term. Effectively, such a postulate implies that there are neither bubbles which fail to

burst in a reasonable period of time nor 'peso problems' that persist indefinitely. Successful modelling of the medium term can be interpreted as evidence of this effect. Cast in more formal econometric terms, and recognising that variables such as the exchange rate and prices can be regarded as possessing stochastic trends, the issue becomes whether such variables are cointegrated. Hence, the tests for this feature provided by BWFH can be regarded as shedding some light on the importance of speculative bubbles. Their presence or absence is a key question for policy; if the concept of a fundamental exchange rate is to be credible, deviations from it must not be too persistent.

How successful are BWFH in nailing down a representation of the real exchange rate? Krugman highlighted the fact that empirical studies of exchange rate behaviour had convinced many researchers of the lack of utility of exchange rate models. Of all the evidence, he cited the Meese and Rogoff (1983) results as particularly damaging. In that study, predictions from exchange rate models were not as good as those from a random walk. Applying a similar test to BWFH over the forecast period of 1990/91 to 1992/93 gives the result that the root-mean-squared error (RMSE) of prediction for the real TWI from a random walk is roughly the same as that from the BWFH model if the error-correction model (ECM) term is in the latter, but only around one-half of it if the ECM term is deleted. If the ECM term is included, the BWFH model actually has a much lower bias in forecasts than the random walk model, although it exhibits a slightly larger standard deviation. Hence, on this criterion, the model does quite well. Even if one adopts the non-ECM equation, it is important to ask whether or not this is the right criterion to use anyway. In this regard, it is instructive to think of Hall's (1978) argument that consumption should follow a random walk. This outcome reflects the inter-temporal optimising conditions of a consumer with a quadratic utility function, but the underlying model can also be expressed as the permanent income theory of consumption. In most instances, it is more useful to think of the latter relationship rather than the former when analysing consumption. Indeed, most stochastic general equilibrium researchers do think that way when considering the impact of, say, a supply-side shock. Moreover, even though these two models are isomorphic at an abstract level, given the difficulties of measurement of economic concepts, it may well be that an empirical model relating consumption to permanent income might be dominated by a pure time series model such as a random walk. My belief is that it is better to search for fundamentals that are not just yesterday's rate.

BWFH's paper is also useful for shedding light on the top of the tree. They mention that the real exchange rate is an integrated variable so that PPP is not a sufficient story for exchange rates. Previously, Blundell-Wignall and Gregory (1990) had made the argument that the missing variable was the terms of trade and that when this was introduced there was cointegration between the real

exchange rate and the terms of trade. A quick check of the BWFH data shows that this is no longer true; hence, the addition of the cumulated current account variable. It is important to realise that the visual impression of PPP holding, which prompted Clements' remark, is not inconsistent with the real exchange rate being an integrated process, i.e., it has no long-run equilibrium level, as any integrated variable starting from a fixed point will essentially cross that point again, but infrequently. Such behaviour is in evidence in Figures 1 and 2 of BWFH.

One might query a few aspects of BWFH's work. Pitchford's paper makes the point that there are many relative prices that might be used in the definition of a real exchange rate, and that it makes a difference which one is chosen (see his Figure 5). Moreover, as an exchange rate is an endogenous variable in a complete system, whatever drives the system must have an impact upon it. Having been lectured on the importance of supply-side or total factor productivity (TFP) shocks during my six years in Rochester, I looked for something like TFP terms in the fundamentals equation. Such terms do not seem to be there: in BWFH, capital (marginal) productivity enters via real long-run interest rates, while labour productivity appears in the New Zealand equilibrium rate - see Pitchford's discussion of this. Nevertheless, on balance, the BWFH paper is a valuable contribution to exchange rate research and is likely to provide a useful framework upon which to build future Australian work on the topic.

3.   Inspecting the Mechanism

Quantitative research into the determination of trade flows revived in the 1980s as data sets from floating exchange rate regimes became of reasonable length. Much of this research focused upon two related questions. Firstly, how important are exchange rate effects relative to income effects. Secondly, how large is the residual and what can it be ascribed to? In particular, do cultural, linguistic and institutional arrangements such as trading blocs cause increases in trade over and above what might be expected on purely economic grounds? Information on these questions is an important input into determining whether policies should be devoted to furthering cultural links or concentrating upon delivering more competitive products. Of course, these queries may not be separable. Indeed, one might well argue that import elasticities are changed by cultural contacts as consumers become aware of a bigger range of products than those seen on the domestic market. Such links were only tangentially addressed by the Conference, mainly arising in Bullock, Grenville and Heenan's (BGH) speculation about whether the high export-price elasticities they discovered are realistic.

BGH provided an account of price and income elasticities for imports and exports. Of greatest concern to them was the high income elasticity found for imports, a concern that induced them to seek modifications to their basic equation

that might force it closer to their desired target of unity. In doing so, they reflect the 'modern' elasticity pessimism that income elasticities for imports are so high as to cut short any putative expansion. Two comments might be made on this work. One revolves around a measurement issue. From their Figure 9, it is clear that imports run up very strongly in expansions, suggestive of a strong non-linear effect; such a 'demand dissipation effect' was studied by Cameron (1966) some years ago. The log-linear relations estimated by BGH are unlikely to be able to capture such a regularity. How one should model this effect is a moot point. Pesaran suggested 'ratchet effects'. Another possibility would be to introduce a non-linear function of the lagged ECM term into the equation.[1] A second comment relates to the interpretation of such elasticities. Ignoring dynamics, the import equation has the form $\log M_t = b\log Y_t + c\log R_t$, with Y_t being an activity variable and R_t the real exchange rate. It is not clear what information an estimate of b provides. Mathematically, it reveals what happens to $\log M_t$ as $\log Y_t$ changes by one unit, *holding R_t constant*. However, that experiment is not feasible. Inevitably, there is another relation embedded in the remainder of the system linking Y_t to R_t in a negative way, and that serves to dampen the system-wide response of imports. The problem should be familiar from Sims' (1980) work with vector autoregressions. It is only useful to analyse the impact of shocks that are uncorrelated and that necessitates isolating that part of an income shock that is invariant to feedback from the real exchange rate.

Perhaps the most interesting work in the BGH paper pertains to exports for manufactures. Here, very high price elasticities are recorded, leading to the possibility that the measure might be influenced by an 'export culture' that was perceived as developing in the late 1980s. It is hard to disentangle these effects from competitiveness and one might even doubt if the former can exist without the latter. Nevertheless, anecdotal evidence of an export culture abounds and the most interesting issue is what its impact might be. To measure this effect one needs to extract some idea of what is 'normal'. Frankel's paper proposes that the gravity model of trade assume that mantle. This model provides the following description of bilateral trade:

$$\log(M_{ij} + X_{ij}) = b(\log Y_i + \log Y_j) + c\log D_{ij} \tag{1}$$

where M_{ij} and X_{ij} are imports and exports from country i to country j, Y_i and Y_j are the gross domestic products of the two countries and D_{ij} is the distance between the principal cities in each of the countries.

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1 . Other non-linearity effects were mentioned at various times throughout the conference, generally via the belief that threshold effects were important. For example, Okabe mentioned that he thought this was very important in explaining the recent performance of Japanese exports.

Two lines of investigation now come to mind. Firstly, if the gravity model is correct, what does that mean for the specification adopted by BGH? Secondly, if the trade equations in BGH are valid, what then are the implications for research with the gravity model? Regarding the first, there is difficulty in 'reverse engineering' separate import and export equations that can be aggregated up to the gravity equation for total trade. It seems as if the only consistent representation for both imports and exports would be to have the same format:

$$\log(M_{ij} \text{ or } X_{ij}) = b'(\log Y_i + \log Y_j) + c' \log D_{ij} \tag{2}$$

which implies that a variable capturing foreign activity should appear in Australian import demand equations. The absence of such a variable could easily account for estimated own-income elasticities that exceed unity. As the gravity model is sometimes rationalised as compatible with modern trade theory emphasising differentiated products, the introduction of such a variable into BGH's equations is an interesting possibility. Turning to exports, the central implication is that the export income elasticity, b', is the same for all countries. Such an assertion seems contrary to the stylised fact, mentioned by BGH, that the growth in exports to Asia during 1985-1991 was the same as to North America, despite the fact that the former's growth was significantly greater than the latter.

Changing the focus to what implications the BGH equation has for the gravity model, one immediately notices the lack of any real exchange rate effects in the latter. Some of these could conceivably be captured by the distance variable, but there seems to be no reason to expect a strong relationship. Moreover, if the real exchange rate differentials between countries were highly correlated with distance in some years in the sample, the fixity of D_{ij} means that this correlation cannot remain for other years if the real exchange rates are changing. Instability in the estimated c' would therefore be expected in Frankel's equations. Frankel recognises that important variables may have been omitted from the gravity equation, but this fact must call into question the robustness of his conclusions about the significance of linguistic and institutional factors, as the magnitude of the latter are simply measured by what the gravity model does not explain.

4. Policy Issues

In the 1960s and 1970s the choice between a fixed or flexible exchange rate regime would have been guaranteed to surface at a conference like this, but the topic received only a small amount of attention in this instance. John Pitchford dealt with the question of whether or not a flexible rate regime is good from the perspective of insulating an economy against foreign inflation, concluding that (empirically) it is. He also considered the responses to real shocks, such as the terms of trade and investment shocks sustained by the Australian economy in the

1980s and the real shock of German unification. Artis made the excellent point that the latter was an internal shock to Europe and that the experience of 1992 demonstrated the difficulties that a fixed exchange rate system faces when adjustments to real shocks are called for.

Of course Australia has not had a 'clean' float, raising the spectre of intervention and what it has achieved. Pitchford made some good points about this topic, but his analysis generated little discussion of what the costs and benefits of intervention are. Illustrations offered for the belief that intervention works were the exchange rate behaviour after the Plaza and Louvre agreements, and the idea that it has been important in preventing 'free fall' in the Australian dollar ($A) at various times in the past 10 years. Still, intervention in the $A market has been very active and seemingly not just aimed at pricking speculative bubbles, and that fact would suggest that its role in policy deserves more discussion than it has received. Because the logic of intervention carries with it some idea of a fundamental exchange rate, there is a sense in which a central bank that has an active interventionist stance is effectively adopting an exchange rate target and this, in turn, raises the issue of whether it is productive to keep such a target secret.

At various junctures in the Conference, authors referred to the empirical regularity with which (across many time periods and countries) nominal exchange rate changes translate into real exchange rate movements for substantial periods of time. Such a correspondence holds the promise of a 'quick fix' for a small economy with underemployed resources but a current account deficit. An expansionary monetary policy could drive down the nominal exchange rate, thereby raising the prospect of simultaneously increasing aggregate demand and stabilising the current account. As Artis reminded us, whether such a policy works depends upon the transmission mechanism. Even if it did, the question has to be whether such action changes the dynamics of the system; in the long run, the real exchange rate will revert to its fundamental level, so that any policy of this type is simply aimed at trying to force a faster convergence to equilibrium than the normal adjustment processes would allow. One expects and needs to hear more detail and justification about any such proposal.

References

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Discussion

The discussion following Pagan's summary of the Conference began by revisiting, with a wider perspective, a number of important issues discussed in the preceding papers. It then turned to a discussion of current Australian monetary policy and its links with the exchange rate and the macroeconomy.

1.   Exchange Rate Issues

It was observed that very few countries were prepared to engage in benign neglect of their exchange rate; most countries want to have some form of exchange rate policy. It was suggested that this desire for an exchange rate policy reflects two considerations. The first is a concern about misalignment of the exchange rate. The experience of the US dollar in the mid-1980s and perhaps the Australian dollar in 1986 suggests that exchange rates can sometimes move too far, given movements in the fundamentals. The resulting misalignments have adverse effects on resource allocation. Secondly, for some countries, exchange rate policy provides an element of discipline for monetary policy (e.g. within the ERM).

On the other hand, the point was made that having too strong an exchange rate policy has its own dangers. It is not possible to know exactly what the equilibrium exchange rate is. It was argued that it was often the case that central banks get caught defending inappropriate exchange rates and incur huge losses for the taxpayer. Having too strong an exchange rate policy may also force more of the adjustment of real exchange rates through the domestic price level, and thus output, rather than through the nominal exchange rate.

In this respect it was noted that the United States was able to succeed as a large monetary union because it has a high level of labour market flexibility. Labour mobility is high and wages are relatively flexible. Ironically, these conditions are not a characteristic of European countries attempting to move towards monetary union.

While these costs and benefits of an exchange rate policy were widely acknowledged, there was no universal agreement as to the extent to which the authorities should explicitly consider the exchange rate in the formulation of

macroeconomic policy. Using a variant of Dornbusch's terminology, Frankel put forward the notion that exchange rate dynamics could be characterised as 'overshooting the overshooting equilibrium'. That is, in response to some shock, exchange rates do not move instantly, but take time to adjust. When they do start adjusting, they eventually move too far (even after accounting for sticky goods prices) and, later, some of the movement must be reversed. This phenomenon may reflect the behaviour of noise traders or other market inefficiencies, and give good reason for the authorities to be concerned with the behaviour of the exchange rate.

One participant expressed caution at interpreting the empirical tests as definitely rejecting the efficient markets model. He argued that the tests were of very low power and that more work needed to be done in this area. He also saw it as important to conduct microeconomic studies of the impact of exchange rate changes on the individual decisions of households and firms.

There was some discussion of the relationship between the current account and savings-investment imbalances. It was generally accepted that changes in the real exchange rate do, in fact, change the trade balance (with an uncertain lag). But most participants saw the causation as running from a change in the savings-investment imbalance to the current account which, in turn, required a change in the real exchange rate. The current account, the real exchange rate and the savings-investment imbalance are determined simultaneously, as the outcome of a variety of forces acting on the macroeconomy. The point was made that Australia has run current account deficits for decades, not because the exchange rate is overvalued, but because there has been an imbalance between savings and investment. This made it difficult to make normative judgements about whether or not current account deficits are 'bad' because foreign debt rises or 'good' because the world views Australia as a reasonable place in which to invest.

2.   Current Policy Issues in Australia

When discussing current policy issues, participants generally agreed that the most pressing problem facing Australia is the current high level of unemployment. It was argued that high unemployment not only causes social distress, but it also has hysteretic effects; once people are unemployed for a long period of time, the likelihood that they will ever find employment again falls significantly. This increases the unemployment rate that is consistent with a constant level of inflation.

A number of speakers argued that the high level of unemployment in Australia implies that there is still room for a considerable cut in interest rates. Proponents of this view argued that this would stimulate economic activity by reducing the cost of intermediated funds and causing a depreciation of the currency. In the current environment, further nominal depreciation would be associated with

sustained real depreciation, and would give a substantial stimulus to the traded goods sector.

This notion was, however, questioned by several others. They doubted whether a large fall in the exchange rate would lead to a sustained real depreciation. Given the already large depreciation of the $A over the past year, further substantial depreciation could have severe inflationary consequences. In this respect it was noted that the very large depreciation in 1985/86 threw Australia 'off-track' in its adjustment to low inflation. Any significant increase in inflation could lead to a deterioration in the central bank's hard-won credibility, and thus increase inflationary expectations. This, in turn, could set off undesirable wage-price dynamics. It was also argued by some that the current high level of unemployment partly has its roots in technological change, internationalisation of the economy and structural rigidities in the labour market. The speakers in support of this view argued that policies other than monetary policies should be directed towards the unemployment problem. A counterargument was put that high unemployment had less to do with the internationalisation of the economy than with straightforward demand deflation.

One speaker pointed out that it was not possible for all countries to adopt 'beggar-thy-neighbour' nominal depreciations to improve employment in the current environment. But others argued that a major characteristic of current weak activity in the world economy was the lack of demand. If all countries simultaneously eased monetary policy, there would be a substantial stimulus to world economic activity without depreciations of exchange rates in individual countries. This view was based on the notion that confidence is a major obstacle to business investment, consumption and economic growth at present. The stimulus would come from the general easing of monetary policy and its effects on confidence rather than through a depreciation of the exchange rate. A number of speakers argued that if other countries reduced their interest rates, there would be more room for Australia to reduce its interest rates.

There was relatively little discussion of the role of fiscal policy solutions to unemployment. The discussion that did take place centred on the dangers of winding back Australia's fiscal deficit too slowly. If this occurred, the economy would be left with a considerable increase in the ratio of debt to GDP, reducing the flexibility of fiscal policy in the next business cycle. The implications of the fiscal deficit for the balance of payments were also mentioned as an area of concern. A number of speakers felt that cumulating current account deficits were a concern over the medium term, and this had implications for fiscal policy and other measures to influence national saving.