Economic and Financial Research in the Reserve Bank

This article summarises the main findings of the research papers published by the Reserve Bank in 1993. The Bank's research is directed at issues of relevance for monetary and financial policy-making in Australia. Over the past year, the Bank's published research focussed on five broad topics: (i) the determinants of the exchange rate and the links between the exchange rate and trade flows, (ii) employment and unemployment, (iii) the changing nature of the business cycle, (iv) monetary aggregates and (v) the behaviour and evolution of financial markets and institutions. Research activities are made available to the public through the Bank's annual conference volume, Research Discussion Papers, Occasional Papers and *Bulletin* articles.

EXCHANGE RATES AND TRADE

Over the past year, issues of what determines the exchange rate, and how trade flows react to changes in the exchange rate, have been active areas of research within the Bank. These issues were examined in papers prepared for the Bank's conference in July, titled *The Exchange Rate, International Trade and the Balance of Payments*, and in Research Discussion Papers. Of the six papers presented at the conference, two were prepared by Bank staff. The paper by Adrian Blundell-Wignall, Jerome Fahrer and Alexandra Heath reviewed Australia's experience with different exchange rate arrangements over the past two decades, and examined various explanations for movements in the value of the currency. The authors argued that, in the long run, the value of the Australian dollar tends to be driven by the terms of trade, the interest differential on long-term bonds and the level of net foreign liabilities. While these 'fundamental' factors determine the basic value of the currency, it was argued that the exchange rate can depart from its fundamental value for relatively long periods of time. Such departures suggest that the textbook model of efficient markets cannot be applied directly to the foreign exchange market. The authors suggested that inefficiencies observed in foreign exchange markets were related to the presence of 'feedback' and 'noise' traders, and to lags in recognising changes in fundamentals.

David Gruen and Marianne Gizycki explored another possible reason for the deviation of the exchange rate from its fundamental value. They suggested that such deviations may be a consequence of 'anchoring' – a well-documented behavioural pattern that occurs when people form their expectations of the future value of a variable by only partially adjusting from a given starting point (the 'anchor'). The authors presented a model incorporating this idea and showed that it can help explain the enduring puzzle of the bias in the forward discount as an estimate of the future spot exchange rate. They showed also that even if there were some participants in the foreign exchange market who formed expectations on the basis of 'fundamentals', the anchored agents would probably not be driven from the market.

The issue of the measurement of the real exchange rate was examined up in a paper by Jacqueline Dwyer and Philip Lowe. Theory suggests two measures – one based on deviations from Purchasing Power Parity (PPP) and the other based on the price of non-traded goods relative to traded goods. The authors showed that the two measures will only be equal under a set of highly restrictive assumptions. In almost every country, there has been a trend rise in the relative price of non-traded goods. This occurs because measured productivity growth tends to be faster in the traded goods sector than in the non-traded sector. Obviously, however, this does not mean that all currencies have been appreciating simultaneously. Even if the domestic relative price of non-traded goods has increased, the PPP based measure of the real exchange rate will show a depreciation of the currency if the increase in domestic relative prices was less than that which occurred overseas. In broad terms, this is the position that Australia has been in over the past two decades. The authors also showed that changes in the terms of trade caused by changes in export prices are also likely to lead to divergent movements in the two measures.

The role of the exchange rate in balance of payments adjustment was examined by Michele Bullock, Stephen Grenville and Geoffrey Heenan in the second paper prepared within the Bank for its annual conference. The authors examined the role that the exchange rate has played in external adjustment following the terms of trade declines in 1985/86 and 1990/91, and the investment booms in 1980/81 and 1988/89. Their investigation of these episodes led the authors to conclude that the exchange rate plays an important role in changing net export volumes – spilling excess demand onto the foreign sector and attracting incremental savings to finance investment. This conclusion was supported by econometric work which showed significant relative price elasticities in equations for imports and manufactured exports. The authors noted that much of the relatively fast growth in manufactured exports since the mid-1980s can be attributed to improved competitiveness occasioned by a lower real exchange rate and reductions in protection. The growth of incomes in the Asian region has also helped increase Australia's exports of manufactured goods.

The issue of the responsiveness of exports to changes in the exchange rate was also studied by Gordon Menzies and Geoffrey Heenan. They argued that there is some threshold exchange rate change that will trigger firms to commence exporting. Once having entered the export market, firms are unlikely to leave even if the exchange rate change is reversed. Such 'beachhead' effects are the result of sunk costs of entering foreign markets: having paid the sunk cost, firms find it profitable to export at an exchange rate that previously would have been unprofitable. The paper by Menzies and Heenan also presented survey evidence to suggest that the depreciation of the Australian dollar in 1985/86 helped permit the establishment of such a 'beachhead'. Many firms commenced exporting around this time, and continued to export, despite quite large upward movements in the exchange rate in the late 1980s.

The response of imports to changes in income, relative prices and protection was studied in a paper by Jacqueline Dwyer and Christopher Kent. They found, consistent with other work, that increases in domestic income increase imports, as do reductions in the relative price of foreign goods. While no econometric evidence was found to support the idea that the reduction in protection had increased *aggregate* imports, the results indicated that declines in protection had increased imports of both consumption and intermediate goods. The authors suggested that approximately 40 per cent of the increase in imports of consumption goods since 1984 was attributable to the reduction in protection. The equivalent figure for intermediate goods was 33 per cent. While the process of trade liberalisation appears to have led to an increase in *imports* of certain types of goods, the conference paper by Bullock, Grenville and Heenan argued that the reduction in protection had also significantly increased *exports* of manufactured goods. They attributed this largely to efficiency gains and changes in attitudes that have been associated with Australia's increased integration into the world economy.

While changes in exchange rates appear to be effective in changing the trade balance, they also have implications for the path of the domestic price level. The degree of pass-through of exchange rate changes to Australian dollar prices of imports and manufactured exports was examined in a paper by Jacqueline Dwyer, Christopher Kent and Andrew Pease. They found that, in the long run, pass-through over the docks is complete for both classes of goods. The pass-through, however, is not instantaneous, with the lags in the case of manufactured export prices being much longer than those for import prices. In examining the issue of whether changes in prices 'over the docks' are fully reflected in changes in retail prices, the authors argued that Australia's general low inflation environment over recent years has limited this 'second stage' pass-through. In turn, this has helped reduce the inflationary consequences of the recent depreciation of the Australian dollar.

EMPLOYMENT AND UNEMPLOYMENT

With unemployment being the most serious economic problem currently facing Australia, the Bank has devoted considerable research effort to examining its causes and possible solutions. This research formed the basis of the Bank's submission, which was published as Occasional Paper 12, to the Federal Government's Committee on Employment Opportunities. This paper laid considerable stress on the need for strong economic growth if unemployment is to be reduced significantly. However, it was argued also that growth alone would not solve the unemployment problem, given that much unemployment is structural in nature. Reducing structural unemployment required a broad policy response, including maintaining the trend towards a greater enterprise focus for bargaining over wages and conditions, allowing lower level entry-wages for the unemployed and fashioning the social security system in ways that keep workers in touch with the labour market, rather than encouraging long-term dependency. The need to minimise regulatory and other impediments to hiring workers, and to maintain a competitive tax regime and competitive goods markets were also stressed.

The level of structural unemployment was the topic of a paper by Jerome Fahrer and Andrew Pease. They examined the relationship (commonly known as the 'Beveridge Curve') between unemployment and job vacancies in Australia over the period 1966 to 1992. They noted that the mid-1970s saw a sharp increase in the unemployment rate for any given vacancy rate. This shift in the Beveridge Curve coincided with an increase in the equilibrium rate of unemployment. Over the 1980s there was little movement in the position of the curve. On the one hand, declining job search effectiveness by the unemployed tended to increase the unemployment rate associated with a given level of the vacancy rate. Offsetting this influence has been a decline in male labour force participation, and a large increase in female employment.

THE BUSINESS CYCLE

The most recent business cycle has been associated with unusually large changes in the structure of corporate balance sheets. These changes have had an important impact on the way in which the business cycle has evolved. As a consequence, the Bank's research efforts have focussed on a number of aspects of the determinants of corporate financial structure and its effect on investment.

Philip Lowe and Thomas Rohling prepared a paper examining the factors linking the structure of corporate balance sheets and the evolution of the business cycle. They argued that an increase in debt-asset ratios, or a fall in asset prices, can reduce both the demand for and supply of external finance. Lower corporate net wealth, and thus lower corporate collateral, is likely to lead to finance becoming more difficult and more expensive to obtain. At the same time, risk-averse management is less likely to undertake risky investment, preferring instead to repair the balance sheets of firms through the retention of earnings. Using survey data, the paper presented empirical evidence which suggested that increases in asset prices and equity-to-debt ratios lead to finance being easier to obtain, even if there is no change in the outlook for the economy. As a result, an asset price cycle, even if driven by non-fundamental factors, can itself help generate a business cycle.

A detailed examination of the evolution of corporate balance sheets and investment over recent years was undertaken in a paper by Karen Mills, Steven Morling and Warren Tease. After growing rapidly for much of the 1980s, corporate balance sheets have shown little growth since 1988/89, and recourse to debt finance fell sharply between 1989/90 and 1991/92. Given the rapid increases in debt in the 1980s, this restructuring was necessary for some firms, while others responded to the incentives provided by changes in the cost of external funding. This process exacerbated the effects of the other factors holding back investment. The end result was that investment fell to around its lowest level (relative to GDP) in the past 40 years. The research presented in the paper suggested that the process of balance sheet repair was now well advanced and that balance sheet considerations were unlikely to be a constraint on investment, which could grow strongly as economic conditions improved.

In another paper, Geoffrey Shuetrim, Philip Lowe and Steven Morling stepped back from the implications of the changes in balance sheet structure and looked at the determinants of corporate gearing, using a sample of up to 209 firms over the period 1973 to 1991. Their results suggested that the dominant factor driving variation in leverage across firms was the size of the firm. Other factors included the extent of free cash flow, the rate of growth of the balance sheet and the share of total assets accounted for by tangible assets. In explaining increases in leverage through time, the authors highlighted the role played by financial liberalisation. One of the consequences of liberalisation was an increase in asset prices, which created collateral against which firms could borrow. Prior to liberalisation, controls on banks made it much more difficult for increases in asset prices to be used to back additional borrowing. Liberalisation led to an easing of the conditions under which credit was extended and to a much stronger link between asset prices and corporate borrowings.

Historically, another important factor influencing the evolution of the business cycle has been the behaviour of inventory investment. Over the past decade, however, the importance of this factor has declined. A paper by Darren Flood and Philip Lowe explored the reasons for this changing role and examined the implications for our understanding of the business cycle. The authors argued that firms are increasingly able to align production with demand. As a result, unexpected declines in demand do not generate the same large accumulation of stocks that occurred previously. In turn, because stocks are not built up to the same extent, subsequent production need not be cut back so sharply to reduce stock levels. The end result is a smoother path for both stocks and output. Using survey data, the authors also showed that when demand is expected to increase, firms expect to increase their inventories, not reduce them. This suggests that firms are not excessively concerned with smoothing production. The results from the survey data also pointed to unexpected changes in demand having a more important role in driving the business cycle than unexpected changes in production costs.

MONETARY AGGREGATES

The relationship between monetary aggregates and national income is a continuing area of research within the Bank. Work previously published indicated that, in general, the relationship between various monetary aggregates and income had broken down over recent decades. A paper by Gordon de Brouwer, Irene Ng and Robert Subbaraman re-examined the issue using recently developed econometric techniques. The authors conducted an exhaustive battery of tests to assess whether there is any long-run stable relationship between money, income and interest rates. They examined 13 definitions of money, 3 definitions of economic activity and 6 different interest rates. Using various combinations of these variables and various statistical tests, a stable long-run relationship between money, economic activity and interest rates was found in only relatively few instances, and in a number of these cases, the estimates seemed implausible. Further, where a long-run relationship could be established, the authors showed that the deviation of the actual money stock from that predicted by the long-run relationship, could be substantial and long lasting. In summary, the authors noted that claims that there is a stable long-run relationship between money, income and interest rates are extremely sensitive to small changes in the definition of the variables. As a result, monetary aggregates were not considered a suitable intermediate target for monetary policy.

A piece of research conducted by Professor David Merrett, of the University of Melbourne, on the behaviour of monetary aggregates around the turn of the century was of considerable historical interest and was published by the Bank in its Research Discussion Paper series. This paper challenged conventional calculations of the size of the money stock between 1893 and the First World War. Merrett argued that existing measures of narrow and broad money seriously underestimated the contraction in the money stock which occurred following the banking crises of the early 1890s, as they failed to account adequately for the reconstruction schemes of the Australian banks in 1893. These schemes changed term deposit liabilities into debentures and preference shares. Conventional measures include some of these reconstructed liabilities in the money stock when they should be excluded. Making the appropriate adjustment, Merrett's estimates suggested that M3 fell by over 40 per cent in 1893.

FINANCIAL MARKETS AND INSTITUTIONS

Understanding the changes taking place in the Australian financial system remains an active area of research within the Bank. Over the past year, the Bank published three papers in this general area.

Warren Tease and Jenny Wilkinson examined recent trends in the provision of finance and the factors likely to influence its provision in future. They predicted that over the 1990s, banks will face increased competition on both sides of the balance sheet. Banks will, however, maintain an integral role in the financial system as they offer depositors a safe and highly liquid depository for their funds. More importantly, banks are well suited to the provision of intermediated finance to small and medium-sized business. The reason for this lies in the costly acquisition and monitoring of information concerning the performance of the borrower. For small and medium-sized loans, these costs can be large relative to the size of the loan but banks should be better equipped to do this monitoring than, say, bond and equity markets. The authors argued that the efficiency with which banks can exploit their comparative advantage in the area of acquiring and monitoring information will be an important determinant of their future role in the financial system.

The relationship between the volatility of the rates of return in Australia's stock, bond and foreign exchange markets and the volatility in foreign markets was studied in a paper by Professor Paul McNelis of Georgetown University, who was a visitor to the Bank in 1992. Using a variety of statistical techniques, McNelis argued that the volatility in the Australian stock market is linked most closely to the volatility in the UK stock market, while the volatility in the exchange rate against the US dollar is most linked closely to volatility in the Canadian dollar – US dollar exchange rate. The correlations between the volatility in the Australian and foreign markets were explained in terms of 'contagion' effects; that is, since information is incomplete, price movements in foreign markets provide some direction for movements in Australian markets.

Finally, Marianne Gizycki and Mark Levonian used a contingent claim model to examine the volatility of the rate of return on bank assets, bank capital ratios and the potential public sector liability which might arise as a result of claims by depositors of a failed bank. They found that the estimated capital ratio for the Australian banking sector rose over the past decade while there was no significant increase in the riskiness of banks. As a result, estimates of the public sector's contingent liability were extremely small. Results presented in the paper also suggested that there is a general positive relationship between asset volatility and capital ratios through time and that banks with relatively high volatility in their rates of return tend to have relatively high capital ratios.

APPENDIX: RESEARCH MATERIAL RELEASED IN 1993

Conference Volume

The Exchange Rate, International Trade and the Balance of Payments, edited by Adrian Blundell-Wignall, contains the papers prepared by Bank and non-Bank staff for a conference held in July 1993. The volume also includes an introduction by the editor, summaries of the discussion of each paper and a perspective by Adrian Pagan of the Australian National University. The papers by Bank staff were:

Blundell-Wignall, A., J. Fahrer, and A. Heath, 'Major Influences on the Australian Dollar Exchange Rate'.

Bullock, M., S. Grenville and G. Heenan, 'The Exchange Rate and the Current Account'.

Four additional papers were also commissioned. Three of these papers were written by overseas authors (Paul Krugman of the Massachusetts Institute of Technology, Mike Artis of Manchester University and Jeffrey Frankel of the University of California, Berkeley). The fourth paper was written by John Pitchford of the Australian National University.

Research Discussion Papers

9301 McNelis, P., 'The Response of Australian Stock, Foreign Exchange and Bond Markets to Foreign Asset Returns and Volatilities'.

9302 Gizycki, M. and M. Levonian, 'A Decade of Australian Banking Risk: Evidence from Share Prices'.

9303 Merrett, D., 'The 1893 Bank Crashes and Monetary Aggregates'.

9304 Dwyer, J., C. Kent and A. Pease, 'Exchange Rate Pass-Through: the Different Responses of Importers and Exporters'.

9305 Fahrer J. and A. Pease, 'The Unemployment/Vacancy Relationship in Australia'.

9306 Flood D. and P. Lowe, 'Inventories and the Business Cycle'.

9307 Gruen D. and M. Gizycki, 'Explaining Forward Discount Bias: Is it Anchoring?'

9308 Mills, K., S. Morling and W. Tease, 'Balance Sheet Restructuring and Investment'.

9309 Dwyer J. and P. Lowe, 'Alternative Concepts of the Real Exchange Rate: A Reconciliation'.

9310 Menzies G. and G. Heenan, 'Explaining the Recent Performance of Australia's Manufactured Exports'.

9311 Lowe P. and T. Rohling, 'Agency Costs, Balance Sheets and the Business Cycle'.

9312 Dwyer J. and C. Kent, 'A Re-examination of the Determinants of Australia's Imports'.

9313 Shuetrim, G., P. Lowe and S. Morling, 'The Determinants of Corporate Leverage: A Panel Data Analysis'.

9314 de Brouwer, G., I. Ng, and R. Subbaraman, 'The Demand for Money In Australia: New Tests on an Old Topic'.

9315 Tease W. and J. Wilkinson, 'The Provision of Financial Services – Trends, Prospects and Implications'.

Occasional Paper

Reserve Bank of Australia, 'Towards Full Employment: Submission to The Committee on Employment Opportunities', Occasional Paper No. 12.

Articles of General Interest in the Reserve Bank Bulletin

'Reserve Bank of Australia Index of Commodity Prices', Reserve Bank of Australia, *Bulletin*, April.

'The Australian Foreign Exchange Market', Reserve Bank of Australia, *Bulletin*, May.

'Devaluation and Inflation', Reserve Bank of Australia, *Bulletin*, May.

'Balance Sheet Restructuring and Investment', Reserve Bank of Australia, *Bulletin*, June.

'The Changing Stock Cycle in Australia', Reserve Bank of Australia, *Bulletin*, September.