

Introduction

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Fluctuations in economic activity over the course of the business cycle imply significant welfare costs. Most obvious are the costs associated with periods of relatively weak activity, when productive resources are under-utilised, and consumption is below par.¹ Periods of relatively strong activity can also be costly since they imply an inefficient bunching of activity, consumption and investment at particular points in time, and are often associated with inflationary pressures. It is not surprising, therefore, that the nature of the business cycle, including the magnitude of fluctuations and the degree of synchronisation of cycles across countries is closely studied by academic economists and policy-makers alike.

The widespread decline in the magnitude of business cycle fluctuations across developed economies over the past two decades or so has received much attention, but remains the subject of considerable debate. On the one hand, there are studies which suggest that most of the decline in volatility is due to good fortune (that is, smaller and less frequent global shocks); for example, Stock and Watson (2002) and Ahmed, Levin and Wilson (2004). On the other hand, there are studies that imply a more persistent decline in volatility, attributing much of it to structural changes and economic reforms, particularly with regards to monetary policy regimes (for example, Clarida, Galí and Gertler 2000). Others have emphasised the role of deeper financial markets in allowing households and firms to better smooth expenditures in the face of fluctuating incomes (for example, Dynan, Elmendorf and Sichel 2005). Of course, it is also possible that deeper financial markets will increase the role played by financial sector imbalances in generating and/or amplifying business cycle fluctuations in the future.

The degree of synchronisation across countries is of interest because it summarises the extent to which business cycles are jointly determined. Ultimately this depends on the relative size of common shocks versus country-specific or idiosyncratic shocks, and the way in which these shocks are transmitted within countries. For example, the trend towards liberalisation of international trade flows suggests that there is greater potential for the transmission of business cycle fluctuations across borders, thereby increasing the relative importance of common shocks and driving up synchronisation. At the same time, however, trade liberalisation might lead economies to become more specialised in production, increasing the importance of idiosyncratic shocks and resulting in less synchronised cycles. Similarly, the opening of capital markets globally might increase the potential for financial disturbances to be transmitted across borders, thereby raising synchronisation. Offsetting this, more open capital

1. There is a strand of literature which acknowledges the possibility that recessions are periods of 'creative destruction', whereby some older and less efficient enterprises fail, freeing up resources to be used by newer, more dynamic enterprises (see, for example, Schumpeter 1942 and Caballero and Hammour 1994).

markets would encourage diversification, allowing domestic incomes to become less dependent on the strength of domestic economic activity.

These issues were addressed at this year's Reserve Bank of Australia conference on the changing nature of the business cycle. This introduction presents a brief overview of the main results to emerge from the papers presented at the conference.

Some Stylised Facts

The first paper, by Jean-Philippe Cotis and Jonathan Coppel, provides a useful introduction to the themes of the conference by highlighting a range of ways in which the business cycles of OECD countries have, and have not, changed over the past two decades. They begin by noting that the amplitude of business cycle fluctuations has declined across almost all OECD countries over the past 30 years, with the standard deviation of the output gap falling on average by around 30 per cent. Looking at a number of different measures, they also document the high degree of synchronicity across OECD economies, and the fact that the euro-area economies are more closely correlated with each other, with the English-speaking OECD economies more closely correlated with the United States. However, they suggest that once account has been taken of the decline in output volatility, the extent of synchronisation has not changed very much over the past 35 years.

Cotis and Coppel provide some accounting for the sources of the general reduction in output volatility, finding that it stems mainly from more stable domestic demand, with only a modest contribution due to decreased volatility in external trade. It appears that the reduction in volatility is more evident in a group of 'successful' countries – including Australia, Canada, Ireland, New Zealand, the Nordic countries and the United Kingdom – than in the large continental European economies. These 'successful' countries experienced a relatively muted cycle earlier this decade, particularly when compared with their weaker performance in the early 1990s. Importantly, Cotis and Coppel find that this difference in performance during the recent cycle cannot be explained by more stimulatory policy settings, which were broadly consistent across both groups of countries. Instead, they present evidence which suggests that this difference is due in part to more flexible product and labour markets in the 'successful' countries, which has helped to reduce the 'sacrifice ratio' (the cost, in terms of reduced output, typically associated with disinflation). In addition, they argue that more highly developed mortgage markets have had a role in increasing the effectiveness of monetary policy. These findings are consistent with ongoing work at the OECD, which finds that economies that respond more rapidly to shocks – due to more flexible product and labour markets, and more developed mortgage markets – experience smaller reductions in output following adverse shocks. In this way, greater responsiveness ultimately leads to a reduction in output volatility. Cotis and Coppel conclude with a few remarks about the potential for the expansion of financial markets to increase the potency and speed with which monetary policy can affect economic activity, and the risk of macroeconomic instability arising from asset price misalignments.

Changes in the Volatility of the Business Cycle

Robert Gordon's paper takes a close look at the decline in the volatility of US output. He provides a detailed accounting of the behaviour of GDP by its component parts, showing that the reduction in domestic demand volatility highlighted by Cotis and Coppel can largely be explained by greater stability in residential investment and federal government spending – with some contribution to the decline in output volatility from reduced volatility of inventory investment. Gordon examines the reasons underlying the decline in macroeconomic volatility by means of a parsimonious structural model. His approach is similar to that of Stock and Watson (2002), but with explicit specification of supply shocks, rather than treating these as residuals in an inflation equation. He finds that the reduction in inflation volatility since the 1970s can primarily be attributed to smaller and generally 'beneficial' supply shocks. In contrast, he finds that the reduction in output volatility is primarily due to a reduction in the size of output errors in his model, reflecting greater stability of the 'IS' curve, with supply shocks playing only a relatively small role. Gordon appeals to his earlier finding to attribute this apparent increase in the stability of the 'IS' curve to reduced volatility in residential and inventory investment and federal government spending.

A second, and more contentious, finding of Gordon's paper relates to the role of monetary policy in accounting for the greater macroeconomic stability of the US. Gordon argues that previous estimates of Taylor rule reaction functions do not properly account for serial correlation in the residuals, and that applying such a correction makes a marked difference to results. In particular, Gordon argues that the (corrected) coefficients of the Taylor rule reaction function during the era of Chairman Greenspan suggest that he fails to abide by the 'Taylor Principle' – that increases in inflation above target should be met with a greater increase in nominal interest rates. Consequently, Gordon argues that the performance of the Federal Reserve under Greenspan – as judged by his model – is no better than that of the Federal Reserve under Arthur Burns.

Stephen Cecchetti, Alfonso Flores-Lagunes and Stefan Krause examine changes in the volatility of output across 25 countries in their paper. At a quarterly frequency, they find that more stable inventory investment can explain much of the decline in volatility across a range of countries. However, they note that this outcome may reflect deeper structural determinants; they focus primarily on the respective roles of improved monetary policy and financial innovation, and argue in favour of the latter being most important. With regards to monetary policy, they use a model to construct an 'output-inflation variability efficiency frontier', describing the optimal balance between output and inflation volatility, to examine the impact that improved monetary policy has had on output volatility. Their estimates suggest that monetary policy has contributed to a reduction in output volatility over recent decades in less than half the economies they study. Furthermore, in later panel regression models, they find that various measures of monetary policy are generally insignificant in explaining the reduction in output volatility from the first part of their sample period to the last. In contrast, Cecchetti *et al* observe that reduced volatility in consumption has been associated with an increase in debt-to-income ratios across the countries

in their sample, and use this to argue (in support of Cotis and Coppel) that financial innovation over recent decades has allowed households to better smooth their consumption in the face of income shocks. They support this with evidence from their panel regressions, which attribute a prominent role to financial innovation in explaining reduced output volatility.

Christopher Kent, Kylie Smith and James Holloway take a somewhat similar approach to explaining the deeper determinants of reduced output volatility, using a panel regression across 20 OECD countries. However, their model differs from Cecchetti *et al* by controlling for trends in common (unexplained) innovations to output volatility, including a possible decline in the magnitude of global shocks. Kent *et al* argue in favour of two factors in explaining reduced output volatility. The first is less rigid regulation of markets, especially significant in the case of product market deregulation, but also true of labour market deregulation, in keeping with the earlier findings of Cotis and Coppel. The second factor is the role of improved monetary policy; they find that a dummy variable indicating a move to stricter monetary policy regimes is a statistically significant explanator for the reduction in output volatility across a number of alternative model specifications. In contrast to Cecchetti *et al*, they find that financial liberalisation is generally insignificant in explaining reduced output volatility.

Business Cycle Synchronisation

While Cotis and Coppel suggest that the synchronicity of business cycles has not changed much over time across OECD countries overall, Dan Andrews and Marion Kohler argue that this is not the case for Australia. They present evidence that the Australian business cycle has become increasingly synchronised with that of Canada, the UK and the US, but less synchronised with that of the euro area and Japan. Their paper examines the possible explanations for these changes over time, focusing on factors identified in the cross-section literature as being important for the level of business cycle correlations across countries. They find that the change in trade integration between two countries is the most robust explanator of changes in synchronicity over time, with a reduced share of trade between countries contributing, in general, to a decrease in synchronicity. Changes in the similarity of industrial structure are also found to be important in explaining changes in synchronicity over time, with increasingly similar economies tending to experience more correlated business cycles. However, Andrews and Kohler also emphasise that no single model is able to explain movements in bilateral correlations over time, and that idiosyncratic factors (proxied by divergences in fiscal and monetary policy) are often significant explanators. Finally, Andrews and Kohler discuss the possible role of international financial market integration in affecting synchronicity – noting that the theoretical sign of this is ambiguous – but cannot estimate this effect due to data constraints.

The paper by Mark Crosby and Philip Bodman provides an interesting counterpoint to the findings of both Cotis and Coppel and Andrews and Kohler. Crosby and Bodman use an historical dataset to look at business cycle synchronicity between Australia and the US over a sample extending as far back as 1870. They find that

these countries' business cycles were essentially un-synchronised prior to World War I, despite very similar industrial structures and a reliance on the UK and a single commodity (wool for Australia and cotton for the US) for export earnings in the very early part of their sample. Crosby and Bodman argue that the high correlation between Australian and US cycles found in many papers (such as Otto, Voss and Willard 2001) is a much more recent phenomenon, only evident since the 1970s.

The second important thesis of Crosby and Bodman's paper is that business cycle correlations have historically tended to increase during recessions. Indeed, they argue that prior to WWII, business cycles were correlated across various economies only during the 1890s and 1930s downturns. Similarly, after WWII, the correlations between business cycles are much lower once recessionary periods are excluded from the sample. Furthermore, Crosby and Bodman assert that the global recessions of the early 1980s and 1990s can be largely attributed to monetary policy. Since policy-makers have learnt the lessons from these episodes, the implication is that there is unlikely to be much synchronicity between business cycles of these countries in the future.

Measuring the Business Cycle

The paper by Christian Gillitzer, Jonathan Kearns and Anthony Richards takes a close look at the Australian business cycle. Motivated by the possibility that GDP may not be the best measure of the state of the business cycle because of measurement error and the fact it may not adequately reflect developments in different parts of the economy, they construct coincident indicators using factor models. These measures attempt to extract the 'business cycle' from a wide range of economic indicators (using techniques pioneered by Stock and Watson 1999 and Forni *et al* 2000). They find that the resultant series are more persistent and less noisy than GDP, which they argue are features that make them better indicators of the business cycle.

The authors use these indices to examine several features of the Australian business cycle. In dating business cycle phases, they argue that there have only been three recessions since the early 1960s – in 1974–1975, 1982–1983, and 1990–1991 – in contrast to the six implied by the behaviour of GDP. They demonstrate that there has not been a clear decline in the volatility of their indices, in contrast to that which is evident in quarterly GDP, suggesting that a reduction in the extent of measurement error over time may have played some role in the decline in output volatility recorded in Australia. They also show that the increase in the correlation of their index with a comparable index for the US mirrors the correlation based on GDP, implying that the increase in the synchronicity of these two economies' business cycles is robust to alternative measurement.

Financial System Stability and the Business Cycle

The final paper, by Hyun Shin, stands in contrast to a number of others in this volume, by emphasising the potential for financial system developments to amplify business cycle fluctuations. He outlines a stylised, theoretical model linking asset

prices (particularly house prices) to the health of bank balance sheets, which influences the availability of credit, and in turn can affect asset prices. A key feature of his model is the assumption that banks mark-to-market their mortgage portfolio, and will respond to any rise in their net worth by increasing lending. Shin argues that the circular relationship linking asset prices and credit can generate an amplified response to an easing of monetary policy. Furthermore, ultimately this response cannot be unwound without risking insolvency in the household and banking sectors and, therefore, a significant downturn in economic activity. With regards to the theme of the conference, Shin argues that the scope for this type of amplification of the business cycle is only likely to increase in the future. This follows from three trends. The first is greater accountability of management to shareholders, who will increasingly tend to focus on returns relative to the value of marked-to-market equity. The second is more sophisticated financial markets that make it increasingly easy to re-price banks' loan books on a regular basis. The third is an accounting framework that is encouraging the principle of marking-to-market to be applied across a greater part of banks' balance sheets. In combination, these trends imply that a rise in property prices will be more likely to push up the equity value of banks, encouraging them to lend more, thereby supporting further property price gains, and so on. In conclusion, Shin suggests that policy-makers need to pay close attention to the possible links between monetary policy and balance-sheet effects, echoing a point made in the first paper by Cotis and Coppel.

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