V. ONGOING CHANGES IN THE BUSINESS CYCLE

Introduction and summary

The recent period of widespread economic weakness has brought to the forefront questions about how closely economic activity is synchronised across national borders and what transmission channels serve to foster synchronisation. This chapter provides an historical context for the discussion of these issues, reviewing the general evidence on the evolution of the business cycle and synchronisation among OECD economies and selected factors affecting international transmission in the recent past.[1]

The business cycle has changed over recent decades

The general evidence on the evolution of the business cycle suggests that its amplitude has significantly declined for most OECD countries over the past decade or more. Evidence on the length of the cycle is, however, more mixed. For most economies the length does not appear to have changed to any significant degree, while for several economies it appears to have increased towards the norm seen in other economies.

The amplitude of the cycle has declined…

In explaining the reduction in the amplitude of the business cycle, it is important to distinguish between changes in impulses (or shocks) and changes in factors that affect their transmission through the economy. It seems likely that part of the reduction in volatility stems from the fact that the size and nature of shocks have changed over time. In particular, the 1970s and early 1980s were marked by large negative supply shocks such as the unprecedented oil price increases, while, in contrast, the 1990s have been affected by relatively smaller and benign supply-side developments.[2] In terms of factors affecting transmission, which is the main focus of this chapter, the most important elements in explaining the reduction in volatility may be the increasing role of services in the economy, the related reduction in the importance of inventories, and the adoption of macroeconomic frameworks that have increasingly focused upon medium-term stability objectives.[3] In contrast, although international trade has markedly increased across the OECD over the past few decades, and net exports in general reduce the amplitude of the business cycle, the contribution this has made in explaining the overall reduction in volatility appears limited. Financial market deregulation in the 1980s and the arrival of the so-called New Economy may also be important factors shaping the cycle; however, this chapter provides only a partial assessment of their net impacts.

… due to smaller shocks, changed transmission and better policies

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1. This chapter draws on a recent study of business cycles: see Dalsgaard, T., J. Elmeskov and C-Y. Park, "Ongoing changes in the business cycle – evidence and causes", *OECD Economics Department Working Papers* No. 315, 2002, available at *www.oecd.org/eco/Working Papers/*.
2. A recent discussion on the role of shocks in shaping the business cycle can be found in the *IMF World Economic Outlook* (2001) and the *OECD Economic Outlook* (2001).
3. The role of inventories in the recent US slowdown, however, is a sobering reminder that this element of the cycle has not been entirely eliminated.

International divergences have diminished

As the amplitude of the business cycle has fallen for individual countries, international divergences in activity have also diminished. However, available evidence on international business cycle correlations suggests that, apart from the euro area, this has not led to a significant increase in the synchronisation of activity.[4]

Some international linkages are increasingly important

In contrast to the general experience over the past few decades, recent experience suggests that some aspects of synchronisation may have increased. In part this may have been driven by emerging new channels of international transmission that affect domestic demand directly across countries, for example, increasing financial and product market linkages. The main challenge for policy makers that these aspects of economic integration present is that significant shocks emanating in one country, sector, or industry may now more quickly spread across national borders.

Stylised facts about the domestic business cycle and international synchronisation

Measuring the business cycle

Separating output and expenditures into trend and cycle…

A basic premise adopted here is that for any economy there is such a thing as a "typical" business cycle, describing the movements of macroeconomic variables around their long-term trends. In practice, there is no neat separation between trend and cycle; rather, the two interact as exemplified in the phenomenon of unemployment persistence. However, for the purpose of constructing cyclical indicators that can be readily compared across countries, it is assumed that trend and cycle are separable. The extensive literature on detrending methodologies offers a wide range of techniques, where the preference of one methodology over another generally hinges on the objectives of the analysis and the specific characteristics of the time series in question.[5] Results presented in this chapter employ the Hodrick-Prescott (HP) filter, which provides a mechanical decomposition of the cycle into the contributions from individual expenditure components. This contrasts with the production function approach, used more generally at the OECD to measure potential output and the output gap, which offers an assessment of the sources of growth, thereby providing a more useful starting point for examining cyclical pressures, inflation and fiscal developments.[6]

The domestic cycle has become smaller over time

… the output cycle has diminished over time

Visual inspection of the output gaps presented in Figure V.1 suggests that, in general, there has been a decline in their amplitude over time, and this is confirmed in Figure V.2, Panels A and B, which plots the standard deviation and average absolute

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4. The lack of evidence of increased synchronisation in general is likely to be influenced, however, by the fact that two relatively large country-specific events occurred in the early 1990s; German re-unification and the bursting of the Japanese asset price bubble.
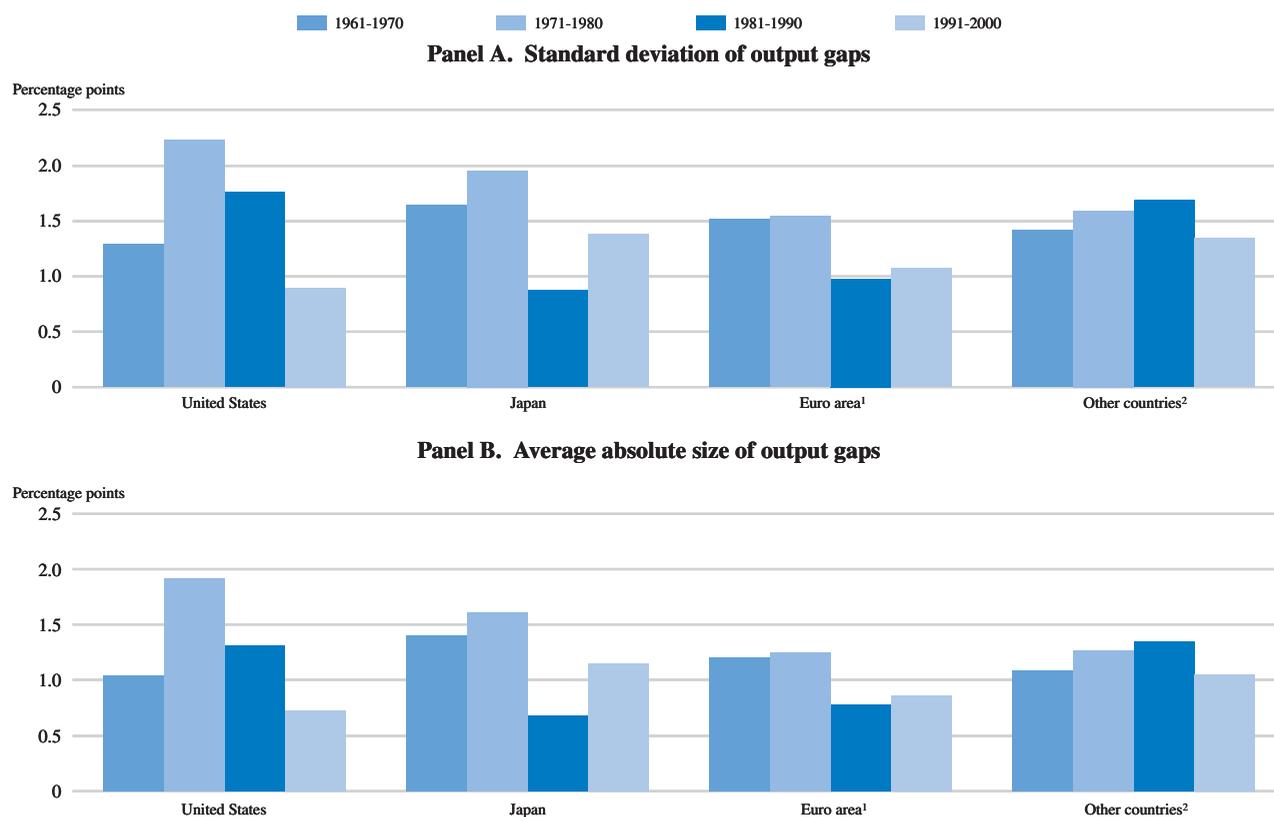5. See for example, Canova (1998).
6. See Giorno *et al.* (1995). The aggregate business cycle results are broadly similar under both measures.

Figure V.1. **Output gaps**

Note: Gaps are calculated using the Hodrick-Prescott Filter, given the objective of this chapter as discussed in the text.
Source: OECD.

Figure V.2. **The amplitude of output gaps has diminished**

| 1961-1970 | 1971-1980 | 1981-1990 | 1991-2000 |

Panel A. Standard deviation of output gaps

Percentage points

Panel B. Average absolute size of output gaps

Percentage points

Note: The gap is calculated using an HP 1600 filter.
1. Simple average of Austria, France, Germany, Italy and Spain.
2. Simple average of Australia, Canada, Sweden and the United Kingdom.
Source: OECD.

size of the output gap over ten-year periods.[7] Compared with 30 years ago, the volatility of the business cycle for most of the OECD countries examined appears to be lower.[8] A notable exception is Japan where the amplitude of the cycle markedly increased in the 1990s.

7. The data used are seasonally adjusted quarterly data from the OECD's Analytical Database. The 13 OECD countries for which quarterly national accounts data are generally available from 1960 onwards are: United States, Japan, Germany France, Italy, the United Kingdom, Canada, Australia, Austria, Spain, Sweden, Norway and New Zealand. Note that due to data limitations Norway and New Zealand were not included in some of the analyses. As the default, an HP filter with $\lambda = 1600$ is used uniformly across all time series and all countries. Gaps are calculated as $100*[\log(X)–HP(\log(X)]$, except for ratios, where the HP filter is applied directly to the ratio. For the purpose of filtering the time series, data have been extended to 2006q4 and backcasted to 1955q1 in order to mitigate potential bias in both ends of the sample. These extensions of the dataset have been constructed by replicating the growth path of the previous/next 20 quarters.
8. In general, the decline in volatility occurs across both small and large OECD economies and is also apparent using a levels-based definition of the business cycle, see *IMF World Economic Outlook* (2002) for details.

Table V.1. **Contributions to the variance of output gaps**

	Total output gap variance[a]	Contribution from total domestic demand	Contribution from trade	Residual
United States				
1961-1970	1.8	2.1	-0.2	0.0
1971-1980	4.6	6.7	-1.6	-0.5
1981-1990	3.1	4.2	-1.0	-0.1
1991-2000	0.7	1.3	-0.6	0.0
Japan				
1961-1970	2.9	2.7	-0.4	0.5
1971-1980	3.3	5.2	-1.8	-0.1
1981-1990	1.1	1.5	-0.3	0.0
1991-2000	1.8	2.2	-0.4	0.0
Euro countries[b]				
1961-1970	2.1	3.1	-0.9	-0.1
1971-1980	2.8	4.5	-1.7	0.0
1981-1990	0.9	1.5	-0.6	0.0
1991-2000	1.0	2.0	-1.0	0.0
Other countries[c]				
1961-1970	1.9	2.5	-0.7	0.1
1971-1980	2.8	3.9	-1.3	0.2
1981-1990	2.8	4.7	-2.3	0.4
1991-2000	1.7	2.2	-0.5	0.0

Note: The variance of the output gaps is a proxy for the average size of the gap (since it measures the squared average distance from the gap mean, which is close to zero). The contributions to total output gap variance from the total domestic demand gap and the trade gap are calculated as a weighted average of their individual variances and their covariance. The residual is the discrepancy between the total output variance and the sum of its components, which is due to statistical discrepancies, averaging effects as well as the non-additivity of real expenditure components for countries using chain-weighted accounts. See Dalsgaard et al. (2002) for more detail.

a) Total output gap variance is equal to contribution from total domestic demand + contribution from trade + residual.
b) Euro countries in the sample include Austria, France, Germany, Italy and Spain. Simple average.
c) Other countries include Canada, Sweden and the United Kingdom (Australia, New Zealand and Norway are not included due to lack of data). Simple average.
Source: OECD.

Looking at the contribution of individual demand components to the overall output gap (Table V.1), the decreasing amplitude of output gaps in the OECD countries is accounted for mainly by the increased stability of domestic demand, in particular, private consumption and stockbuilding. For most countries, the contribution to overall economic fluctuations from government consumption and investment is quite small and fairly stable over time. The declining volatility stemming from inventories partly reflects the increased size of the service sector and partly the improved methods of inventory control.[9]

Domestic demand has become more stable…

The net contribution from trade to output gap variance has been negative for most countries and in most periods – in other words, net trade has generally, and often in a substantial way, acted to dampen the cycle in OECD countries.[10] The stabilising role of

… while net trade has acted as a buffer for some countries

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9. The share of services in total GDP increased from 56 per cent in 1970 to 70 per cent in 1999 for a weighted average of the 13 OECD countries reported upon in this chapter. Part of this increase, however, reflects a re-labelling of activity given a trend towards outsourcing and division of labour.
10. The only exceptions are Austria in the 1990s where trade contributed slightly to increased output gap variance, and Germany in the 1980s and 1990s where trade on net did not affect total output gap variance.

Figure V.3. **Cushioning from trade has increased in some regions**

Output gap variance relative to domestic demand variance
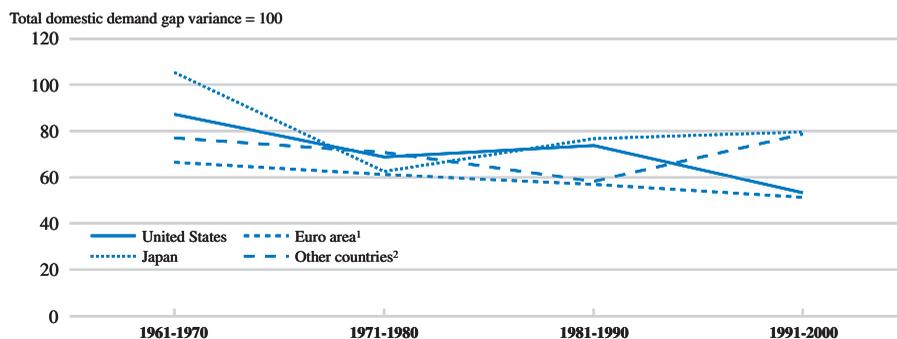
Note: The figure shows the variance of output gaps relative to that of total domestic demand gaps. It indicates the net
cushioning effect from trade on overall output gap variance, *i.e.* the more distant from 100, the more cushioning.
1. Simple average of Austria, France, Germany, Italy and Spain.
2. Simple average of Australia, Canada, Sweden and the United Kingdom.
Source: OECD.

net trade reflects offsetting influences on domestic demand from exports and
imports. In general, both tend to move in a pro-cyclical direction; however, for
exports this positively contributes to output gap volatility while for imports it makes
a negative contribution. Overall, imports are more responsive to domestic demand
conditions than exports; hence, net exports tend to move in a counter-cyclical fashion,
cushioning the cycle.[11] However, the extent to which this occurs varies considerably
over time and across countries. For the United States as well as for the euro area on
average, net trade has to an increasing extent acted to stabilise output over the past
four decades (Figure V.3).[12] For Japan post-1970, there has been a tendency for net
trade to become less stabilising.

The duration of the cycle

*The length of the cycle
is largely unchanged…*

There are not enough full business cycles in OECD economies from the 1960s
onwards to make any firm statements on trends in their duration. Nonetheless, changes
in the duration of the cycle can be roughly gauged from changes in the persistence of
output gaps, measured as the change over time in the first order auto-correlations.[13]
Using this measure of duration, the persistence of the business cycle appears to have
been more or less unchanged for the euro area, United States and Japan (Figure V.4).

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11. Changes in exchange rate regimes for OECD countries over the past decades are also likely to have
    had a bearing on how trade influences the cycle but is outside the scope of this chapter.
12. The euro area average, however, disguises major differences across countries: net trade is now less of
    a stabiliser for Austria and Germany than it was 20-30 years ago while, for Italy and Spain, the stabili-
    sation effects have increased substantially. The effect for France is almost unchanged over the past
    three decades (see Table A1 of Dalsgaard *et al.* (2002) for details).
13. This is akin to the concept used in a number of other business cycle studies (see *e.g.* Christodoulakis
    et al., (1995), or Barro (1988) in an examination of unemployment persistence). By focusing only on
    the first-order auto-correlation, no specific assumptions about the dynamic process driving the output-
    gap are required (other than it contains an autoregressive element, which is clearly the case). See also
    Greene (1997).

Figure V.4. **The persistence of output gaps is mostly stable**
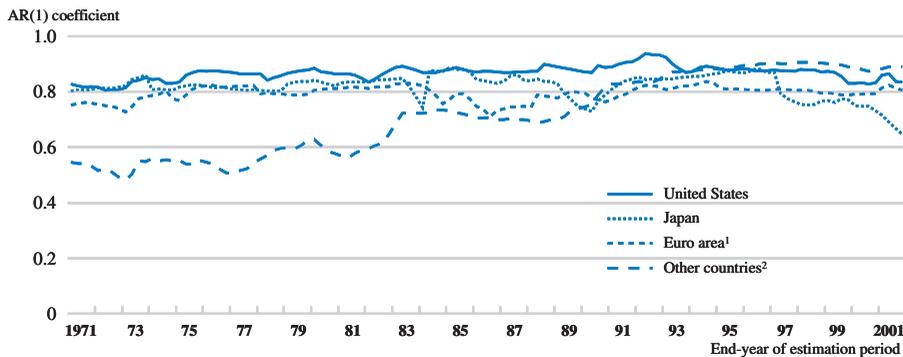
Note: The persistence of the gaps is measured by the first order autocorrelation of the gap. An AR(1) process is fitted to
    a moving 10-year window.
  1. Simple average of Austria, France, Germany, Italy and Spain.
  2. Simple average of Australia, Canada, Sweden and the United Kingdom.
Source: OECD.

For other countries (Australia, Canada, New Zealand, Norway, Sweden and the United
Kingdom) there is a relatively clear tendency for the previously short duration of the
cycle to converge towards the same duration as the other countries.[14]

International divergences in the cycle and synchronisation

Greater economic integration among a group of countries might be expected to
lead to more similar cycles with respect to intensity, duration and timing. One mea-
sure of the degree of business cycle divergence across countries is the standard devia-
tion of output gaps across countries. This would be zero across all time periods if the
business cycle had the same periodicity and amplitude in all countries. Hence, the
smaller the standard deviation, the less divergent business cycles are. On this basis,
cycles indeed seem to have become gradually less divergent over time, most clearly
since the early 1990s (Figure V.5).[15] However, the reduction in the cross-country dis-
persion of gaps seems to be related mainly to the fact that output gaps on averag have
become smaller over time rather than being the result of business cycles becoming
increasingly in phase across countries. That is, a number of indicators of business
cycle synchronisation do not point to clear trends, except possibly a closer alignment
in the timing of Euro area business cycles.[16]

*… and international
divergences have diminished…*

*… but synchronisation
has not increased*

14. Possible contributing factors to this are improving data quality and/or a reduced incidence of negative
    shocks, given that contractions to the level of output appear to be becoming less frequent than
    expansions, see *IMF World Economic Outlook* (2002) for details.
15. Daalsgard *et al.* (2002) find this result is robust to a number of different detrending methods, including
    the OECD's standard measures of the output gap.
16. This is found in a number of other studies, see Daalsgard *et al.* (2002) for references.

Figure V.5. **Reduced divergencies of output gaps**

Cross-country standard deviation of gaps
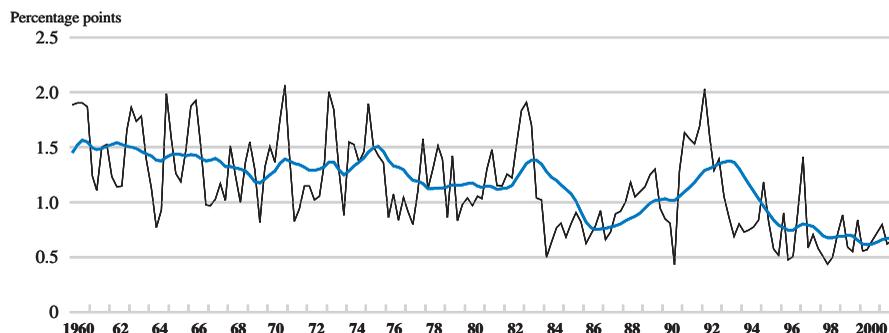
Note: The degree of synchronisation is measured by the standard deviation of the gap across 11 OECD countries in each period of time. The thick line shows the 12 quarter moving average. The gap is calculated using an HP 1600 filter.
Source: OECD.

Factors shaping changes in the business cycle

Several factors may have reduced cyclical fluctuations…

Aside from changes in the size and nature of disturbances to the world economy, the tendency for smaller output gaps appears to have been associated with the shift towards a more service-based economy and better management of inventories. In addition several other, inherently harder to quantify, factors may also have played an important role in shaping the cycle both in the past and going forward. In particular, the shift in monetary and fiscal policy regimes towards stability-oriented frameworks, the so-called "New Economy", and deregulation and increased globalisation of financial markets, may also have played a role.[17] These factors are discussed in the following sections.

Monetary and fiscal policy

… including price-stability oriented monetary policies…

Over the 1980s and into the early 1990s, macroeconomic policies aimed to establish low inflation and to check and reduce burgeoning government debt levels. Although the policies applied involved some initial non-negligible output sacrifice, over the longer term one of the benefits sought was a more stable business cycle, as has been the case since the early 1990s.[18] For example, the successful reduction and maintenance of low inflation rates have seemingly better anchored inflation expectations, reducing the risk that excessive price and wage increases might occur as activity expands or as prices temporarily rise due to negative supply influences.[19] The need for producers to control so-called "cost-push" factors has increased because the

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17. Ongoing structural changes in other areas – such as labour-market reform, strengthening of competition policies, privatisation and deregulation of network industries in many OECD countries – have undoubtedly also exerted some influence on the business cycle. Exploring such effects, however, is outside the scope of this chapter.
18. See Turner and Seghezza (1999) for estimates of the output sacrifice involved in reducing inflation for OECD economies.
19. It is difficult to measure accurately changes in inflation expectations, but an indication can be derived from the variability of inflation relative to that of the output gap. A reduction in this ratio is consistent with a firmer anchoring of inflation expectations. As shown in Dalsgaard *et al.* (2002) such a development seems to have taken place in most OECD countries over the past 20 years, except for Germany and the United States, where the ratio has been relatively constant, and Italy and Norway, where it has increased.

maintenance of low inflation rates has made relative price changes more transparent. Across a number of OECD countries, it appears that the pass-through of exchange rate or import price movements onto final consumption prices has declined.[20] These are likely to be stabilising influences on the cycle in the sense that policy can be conducted in a way that may involve relatively less dislocation to the real economy.

For fiscal policy, a distinction must be made between automatic stabilisation and discretionary fiscal changes. Automatic stabilisers, by definition, exert a damping effect on the cycle, and countries with large stabilisers will experience smaller fluctuations, *ceteris paribus.*[21] Since taxes and government transfers have increased significantly as a share of total income in most OECD countries over the past 40 years, such an effect from fiscal stabilisers is likely to have become stronger.[22] Although there is no evidence readily available about changes over time in the magnitude of automatic fiscal stabilisation, there is some evidence to suggest that the discretionary fiscal policy changes (which for well-known reasons can be de-stabilising) have been counter-cyclical in more countries throughout the 1990s compared to earlier periods.[23]

… and counter-cyclical policies

The new economy and technological change

The term "New Economy" is used to capture, among other things, the effect that production and use of information and communications technology (ICT) has on the economy. So far, most interest has focused on the role of ICT for trend growth where the evidence, in spite of the current slowdown, points to considerable positive effects for the United States but much more limited effects elsewhere. In addition to the trend, ICT use is also likely to affect the shape of cyclical fluctuations over possibly two, in practice difficult to separate, phases. First, the cycle may well be affected in the transition path to the higher trend growth associated with increasing ICT use. Second, once the transition path is complete, the greater share of ICT in the economy may, in itself, affect the cycle.

ICT and the "New Economy" have changed trend growth…

The economic effects that occur in shifting to an apparently higher trend growth path are uncertain. If the shift in trend growth is not well perceived, it may imply that the impact on wealth, consumption, and overall activity, is spread out over some time. On the other hand, it could lead to mistakenly optimistic growth expectations, resulting in excessive equity price reactions as seemed to have been recently the case in the United States.[24] For major continental European countries, stock market

… but may also provide a cyclical impulse…

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20. See Taylor (2000) and Hampton (2002). Note that the decline in pass-through can be attributable to a combination of factors: foreign suppliers increasingly pricing goods at local market prices, domestic importers and producers increasingly absorbing import price fluctuations in margins, and domestic importers increasingly shifting foreign suppliers should bilateral exchange rate movements or prices become unfavourable.

21. Of course, this may be achieved at the cost of efficiency losses to the extent large stabilisers reflect highly distortive taxes and/or government expenditure.

22. Taxes in per cent of GDP have increased by almost 12 percentage points for the average OECD country since 1965 (from around 25 per cent to 37-38 per cent). Government transfers have, on average, doubled over the same period (from around 8 per cent of GDP in the mid-1960s to around 16 per cent today). However, there is not necessarily a simple, linear, relationship between the size of taxes and government transfers and the size of fiscal stabilisation. The stabilisation effect depends, among other things, on the degree of progressivity in the tax and transfer system as well as the composition of taxes on income, consumption and property taxes.

23. See Dalsgaard *et al.* (2002) and Van den Noord (2000).

24. This uncertainty may also have a bearing on labour market developments. In particular, Meyer (2000) argues that because real wage aspirations are slow to catch up with higher trend productivity growth, the NAIRU may temporarily have dropped by as much as a full percentage point in the United States. Considering the experience of most OECD countries, however, Richardson *et al.* (2000) find little cross-country empirical support for the NAIRU being significantly affected by temporary increases in productivity growth that at the time were also associated with declining wage shares.

capitalisation and marginal propensities to consume out of stock market wealth are lower than for the United States, suggesting that the effect on spending from the financial wealth channel may be much more moderate should any significant "New Economy" effects on European growth materialise. Furthermore, given the experience in the United States, it is perhaps less likely that such overly optimistic growth expectations will be repeated.

… and permanently affect features of the cycle

Moving to the effects on the business cycle of a greater role for ICT in the economy, several selected effects may be relevant. First, ICT use entails a greater ability to control inventories which may further reduce the volatility arising from the stock cycle. Second, relating to aggregate investment flows, the higher depreciation rate and declining relative price of ICT goods will, *ceteris paribus,* tend to raise the gross investment rate, increasing the weight in GDP of a typically volatile component. However, an opposing, though possibly smaller, effect is that the volatility of investment over longer time frames may be reduced as more rapid depreciation implies a more rapid return of investment to equilibrium following a shock. Finally, another characteristic of the ICT industry is the use of vertical supply linkages across national borders, emphasising the increasing link between cycles in trade and domestic cycles. Although the development of vertical supply linkages is not limited to the ICT sector, the use of ICT often facilitates such developments in other industries.

Financial deregulation and liberalisation

Credit constraints are eased, but asset price cycles may be larger

Another potent factor affecting the nature of the business cycle over past decades is deregulation and liberalisation of financial markets. As for the "New Economy", these changes are likely to have opposing effects on the nature of the business cycle. On the one hand, easier and cheaper access to credit implies that income and liquidity constraints are loosened, likely exerting a stabilising influence on private consumption and investment. On the other hand, deregulation may also lead to greater instability insofar as it amplifies the role of the financial accelerator and the risk of excessive asset-price cycles. In line with the mechanisms driving the financial accelerator, developments in asset prices are typically procyclical (Figure V.6) and the two are often mutually reinforcing.[25] However, formal evidence that asset prices have become more procyclical following deregulation is scarce.

Asset price and balance sheet changes have become more important

In any case, the financial accelerator may now play a larger role in shaping the cycle because financial liberalisation has spurred a significant financial deepening of private sector balance sheets, including a marked increase in corporate debt levels and larger household holdings of market-linked financial assets. The larger financial exposure of households has increased the sensitivity of domestic demand to changes in financial asset prices. Likewise, enterprise balance sheets, and thereby their capacity to borrow, has become more dependent on asset prices.
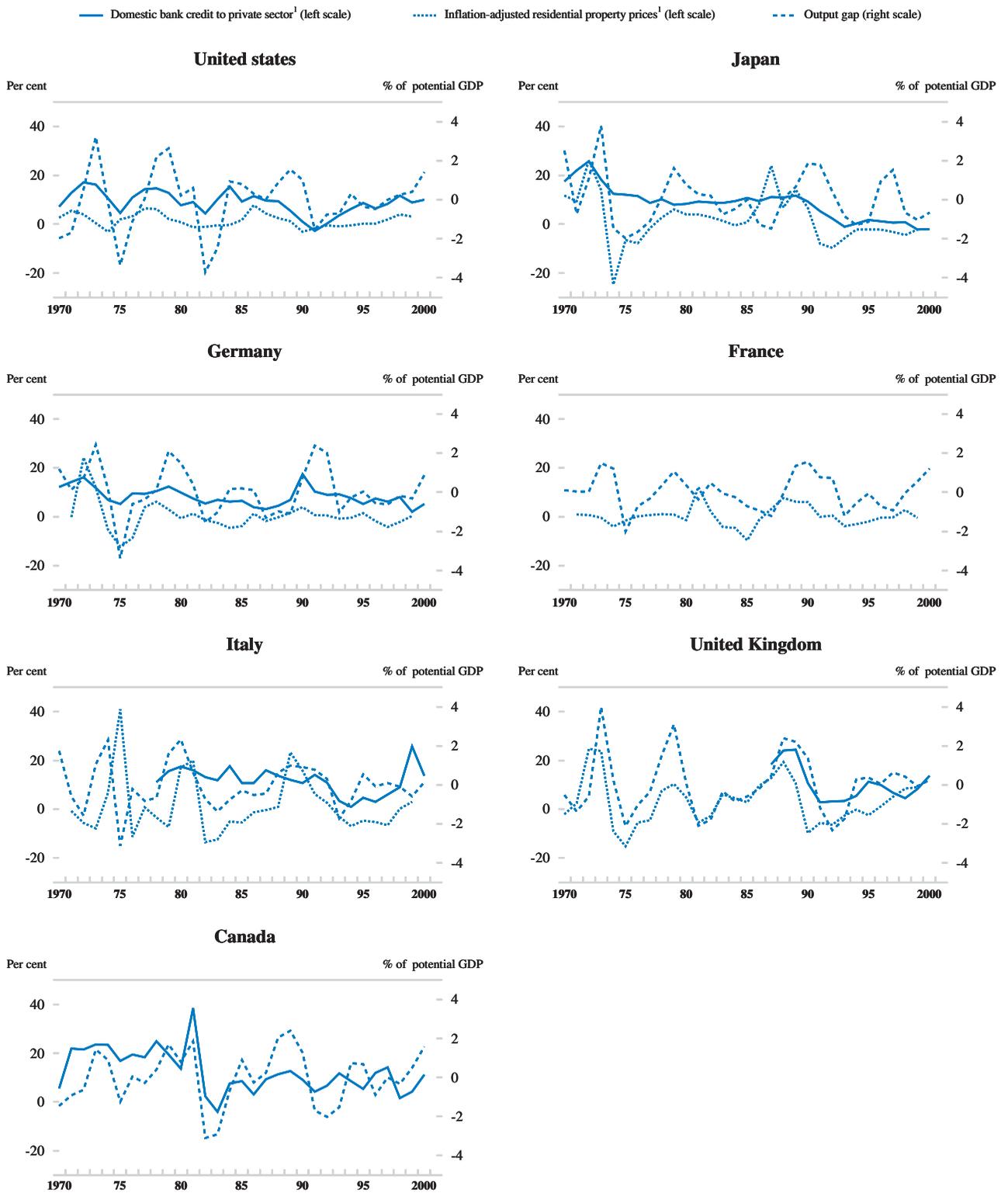
Factors shaping recent synchronisation

Recent events show stronger synchronisation…

The finding that there is little historical evidence of increasing synchronisation of economic cycles is somewhat at odds with the recent global slowdown impacting trade and activity across the OECD. In part, the recent synchronised downturn

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25. See Bank for International Settlements (2001).

Figure V.6. **Cyclicality of credit and asset prices**

——— Domestic bank credit to private sector[1] (left scale) ·········· Inflation-adjusted residential property prices[1] (left scale) – – – Output gap (right scale)

1. Percentage change from previous period.
Source: Bank for International Settlements; OECD.

reflects adjustment to a common shock, in particular, global over capacity in the ICT sector. The increases in oil prices over 2000 are also likely to have played a role in the slowdown. In addition, it may also in part reflect new channels of synchronisation that may be growing in importance, as next discussed.

… reflecting common shocks to ICT and asset prices…

The slowdown in the US economy starting in the ICT sector was accompanied by a major adjustment to stock prices across many countries. This reflects that a significant shock to any large economy in general may also be transmitted to the rest of the world through financial market linkages. Cross-country correlation coefficients of returns on broad stock market and TMT (technology, media and telecommunications) sector indices have risen significantly in the 1990s in almost all cases, except those involving Japan (Figure V.7).[26] The associated wealth effects of equity price correlations across countries constitute a potentially important transmission channel given the increasing share ownership of households in the OECD.[27] For North America and the United Kingdom, wealth effects from equity markets are estimated to be relatively large, given the greater importance of shareholding in household wealth compared with the euro area and Japan.

… greater internationalisation of enterprises…

Another harder-to-measure channel for increased synchronisation is the internationalisation of enterprises – over and above the effect it may have on share prices. For example, to the extent that enterprises are multinational, the need to retrench because of developments in one market may cause cutbacks in activities in other countries, and *vice versa* in case of buoyant conditions.[28] It is difficult to obtain an

Figure V.7. **Stock market returns have become more correlated**
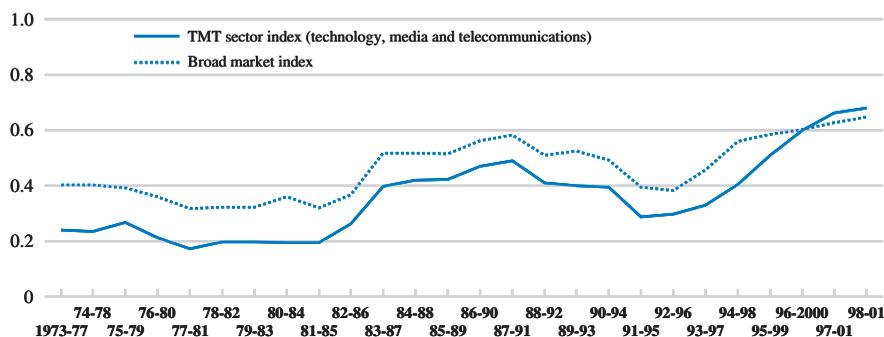
Note: Monthly stock returns are calculated as log differences between end-of-month prices for the broad market and TMT sector indices of the G7 countries; *i.e.* United States, Japan, Germany, France, Italy, United Kingdom and Canada. Bivariate correlation coefficients are then calculated for each pair of the G7 countries' stock returns from 1973 to May 2001 in 5-year moving windows. Average correlation coefficients are constructed as arithmetic averages of the estimated bivariate correlation coefficients.
Source: Datastream, OECD.

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26. This would be consistent with the observation that, at least in the ICT and finance sectors, the value of individual firms' shares has become more highly correlated with sectoral (cross-country) indices than with national (cross-sector) indices. See G. Galati and K. Tsatsaronis (2001).

27. It is estimated that a 10 per cent decline in the stock market index would generate a decline of around 0.6 per cent in consumption in the United States but only of two-tenths of a per cent or less in Japan, Germany, France and Italy. For details see Boone *et al.* (1998).

28. Conceivably, this may be the case even where no cross-border trade is concerned. By contrast, where a downturn in one market affects activities elsewhere through trade linkages, it should not matter for the international propagation whether these trade linkages occur within or between firms.

accurate picture of the potential importance of such effects. However, foreign direct investment flows have expanded strongly in recent years pointing to a potentially rising influence of this channel.

The transmission of cyclical fluctuations over time may also be affected by "soft" factors such as confidence. There is some evidence that consumer confidence is increasingly influenced by equity price changes. This may contribute to magnifying the impact of stock market developments on private consumption even in countries where household shareholding is not very widespread. Considering that the correlation with equity returns is even stronger in the case of business confidence, a decline in demand in a large economy or across a large region, *via* the same channel, could affect private investment in other countries. More generally, however, it is not clear that cross-country correlations of confidence indicators have increased in a systematic manner over time increasing the importance of this transmission channel, or the equity price transmission channel.

… and confidence effects

Some policy implications of international transmission

As discussed above, the declining amplitude of national business cycles may be partly related to the greater emphasis on medium-term oriented monetary and fiscal policies. However, within this overall orientation, additional challenges to monetary policy in particular may arise from the apparent increasing synchronisation of activity and through the related rising importance of non-trade channels of international spillover. In what follows, some aspects of this are illustrated through simulations of the OECD Interlink model.

New channels pose a challenge to monetary policies

The simulations conducted concern the effects of a hypothetical upturn in the United States, through exogenous shocks to domestic demand and equity prices.[29] Some outcomes for the United States, euro area and world trade volumes are presented in Table V.2. The Federal Reserve is assumed to respond to the positive shock by raising short-term interest rates by 200 basis points, while long-term US interest rates are assumed to increase by half the rise in short rates. In the model, this increase in interest rates is sufficient to bring inflation and output back towards baseline over the medium term. Three variants of the simulation are considered in order to gauge the effect of the US economy on the euro area through different mechanisms. In all cases, the ECB is assumed to raise interest rates sufficiently to bring inflation back towards baseline over the medium term and nominal exchange rates remain unchanged. In the first simulation, activity is affected only through trade links, while European share prices remain unchanged and bond yields respond only partly to the tightening in ECB interest rates. In the second simulation, European share prices increase to the same extent as in the United States. The third simulation combines this with the assumption that European bond yields are affected by their US counterparts.

A simulated shock to the US economy…

The assumptions adopted for these simulations are obviously rough-and-ready but they nevertheless illustrate the potential importance of non-trade linkages. With only the trade channel in operation, the required short-term interest rate increase in the euro area peaks at 125 basis points. As in the case for the United States, long

… spreads more quickly and requires larger policy responses…

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29. The US shock is an expansion in domestic demand of 2 per cent over one year, and over the same time it is assumed that this will lead to an increase in US share prices of 20 per cent.

Table V.2. **Impact of the shocks on GDP and world trade volumes**

*P*er cent deviation from baseline

Imp*a*ct of the shocks on the level of US *a*nd euro-*a*re*a* GDP

Simul*a*tion	Pe*a*k effect		Imp*a*ct *a*fter one ye*a*r	
	United St*a*tes	Euro *a*rea	United St*a*tes	Euro *a*rea
Trade channel only operating	1.5	0.5	1.2	0.3
Plus euro equity prices fall	1.6	0.7	1.2	0.5
Plus alternative euro long-bond rate reaction	1.5	0.6	1.2	0.4

Imp*a*ct of the shocks on world tr*a*de volumes

Simul*a*tion	Effect on world tr*a*de volume			
	ye*a*r 1	ye*a*r 2	ye*a*r 3	ye*a*r 4
Trade channel only operating	1.1	2.5	1.8	0.6
Plus euro equity prices fall	1.4	3.2	2.3	0.7
Plus alternative euro long-bond rate reaction	1.2	3.0	2.1	0.7

*S*ource*:* OECD

rates are assumed to rise by half this amount. Output rises by a little more than ½ per cent before returning to its baseline, while world trade volumes increase at most by 2½ per cent relative to the baseline level. Despite equity prices having smaller impacts on consumption and investment in Europe than in the United States, the second simulation shows that more monetary restraint is needed when incorporating the wider effects of international share price movements. Concretely, short rates are increased by 175 basis points in the euro area (and the pass-through to long rates maintained at 50 per cent), but despite the additional monetary restraint, the peak increase in output and world trade are now around ¾ per cent. The third simulation illustrates the importance of reactions in the long rates: euro area short rates are raised by 150 basis points, but since European long rates now reacts to US long rates as well as euro area short rates, the ensuing increase in the euro area long rates turns out to be similar to the increase in short rates, *i.e.* 150 basis points. In this case, the increase in output is contained at around 0.6 per cent, while world trade volumes increase 3 per cent at peak, *i.e.* an intermediate position compared with the two former simulations.

… because of the growing strength of new transmission channels

The broad conclusion of these model simulations is that non-trade spillovers are potentially powerful. Thus, monetary policy may need to react more forcefully than in a situation where trade is the only cross-country transmission channel. At the same time, however, asset prices – including not only shares and bonds, but also fixed property – have become more important for the monetary transmission mechanism through wealth and balance-sheet effects.[30] This might be an argument for a more gradual approach to monetary policy given that the links between interest rates and asset prices may be tenuous and unstable.[31] The "optimal" balance between these

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30. Exchange rate effects are potentially even more important, but given equilibrium positions are uncertain, and long rates are assumed to fall across countries, they have been left unchanged.
31. As may the links between asset prices and activity, see OECD (2000).

two potentially conflicting factors is, of course, something that cannot be readily quantified. An awareness of their possible implications, however, may become increasingly important for policy makers.

Concluding remarks

Overall, the evidence suggests that the amplitude of the business cycle has significantly declined for most OECD countries over the past decade or more. It seems likely that part of the reduction in volatility stems from the fact that the size and nature of shocks have changed over time. In addition, the increasing role of services in the economy, the related reduction in the importance of inventories, and the adoption of macroeconomic frameworks that have increasingly focused upon medium-term stability objectives, may also have played a role.

A changing economic environment has affected the cycle…

As the amplitude of the business cycle has fallen for individual countries, international divergences in activity have also diminished. However, evidence on international business cycle correlations suggests that so far, over the period examined this has not led to a significant increase in the synchronisation of activity across the OECD as a whole. Nonetheless, more recent experience suggests that certain aspects of synchronisation, such as financial market linkages, have become more important. The main challenge this presents for policy makers is that significant shocks emanating in one country, sector, or industry, may now spread more quickly across national borders, through a possibly wider range of transmission mechanisms.

… and may pose new challenges for policy

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