III

The Business Cycle, International Linkages, and Exchange Rates

Cyclical fluctuations in economic activity are a feature of the behavior of most economies, and an understanding of their patterns and causes is important to the decisions of both policymakers and market participants. The objectives of macroeconomic policy have long included the avoidance of protracted recessions in which resources go underutilized, and of periods of unsustainable growth that jeopardize reasonable price stability. Similarly, market participants implicitly or explicitly assess current and prospective economic conditions when weighing risks and making choices about saving and investment plans and portfolio allocation.

A notable achievement of recent years has been the progress made toward reasonable price stability in most advanced economies (see the October 1996 *World Economic Outlook*). This seems attributable in part to the way in which policies have increasingly come to be set in forward-looking frameworks based on an improved understanding of the interaction between policies and the economic cycle. Experiences with inflation targeting in some countries since the early 1990s, as well as other forward-looking strategies, appear to have been successful in allowing monetary conditions to be adjusted early in response to signs of inflationary pressures in order to head off incipient inflation. This approach has helped to avoid some of the difficulties that developed with monetary targeting and, if maintained, should help to safeguard reasonable price stability and thereby lessen the risk of large economic fluctuations in the future.

Even though trade and financial linkages among countries may propagate and amplify economic disturbances internationally, they can help to dampen economic fluctuations when activity is unsynchronized. Economies in strong cyclical positions tend to stimulate activity in other economies in which demand is weaker, partly through movements in trade balances. This stabilizing role of trade flows is reinforced through divergences in financial conditions and changes in exchange rates. There is, in theory, a natural relationship between exchange rate movements and international divergences in activity, with the currencies of countries operating at relatively high levels of utilization, such as the United Kingdom and the United States recently, tending to appreciate as a result of favorable interest rate differentials vis-à-vis other currencies and also stronger profit performance vis-à-vis countries in weaker cyclical positions. However,
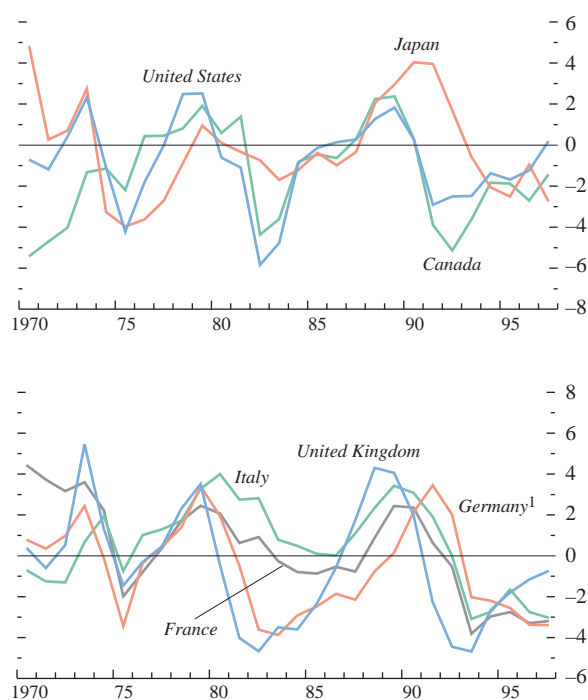
econometric research has generally failed to establish a firm relationship between the exchange rate and the business cycle and other fundamental economic influences. One explanation for this failure is that exchange rates depend on expectations, which are difficult to explain or model. Another is that observed relationships between exchange rates and such variables as interest rates, which are in part determined by policy, may reflect the reactions of policymakers to exchange rate changes as well as the determinants of exchange rate movements. This is one reason why a depreciating exchange rate may be associated with rising, not falling, domestic interest rates. In addition, the limited number of episodes in which cycles have been out of phase across countries makes it difficult to observe or estimate the cyclical sensitivity of exchange rates. For such reasons, the relationships between exchange rates and interest rates and other business cycle indicators that one might expect to see can sometimes be observed, and sometimes not.

This chapter explores two main topics. It first examines the main features of business cycles over the past 25 years and looks at some of the theories that seek to explain the stylized facts of economic fluctuations. It is found that, while business cycles appear to have been relatively closely synchronized across the major industrial countries over most of this period, they have been less so most recently. This can be explained by the dominant role of global shocks in driving economic fluctuations in the 1970s and 1980s, with country-specific circumstances playing a larger role in recent years. The global shocks referred to may to some extent be viewed as an outcome of policies. Second, the chapter attempts to assess the two-way interactions between business cycles and exchange rates: first, by examining the factors that influence exchange rates, and then by considering the role of exchange rates in international linkages and macroeconomic stabilization. Uncertainties are found in both directions, which are related in part to the difficulty of understanding the nature of the economic disturbances that cause business cycles, and in part to the difficulty referred to earlier of identifying the determinants of exchange rate movements. Nevertheless, despite these uncertainties, there does appear to be sufficient basis for assuming that cyclical factors may give rise to changes in exchange rates. This suggests that there is at least some basis for distinguishing between cycli-

cally warranted movements in exchange rates and more fundamental misalignments. The second section of the chapter also discusses exchange rates and business cycles as they relate to EMU. A concluding section draws together implications for policymaking and multilateral surveillance.

Business Cycles

Economic developments in the 1980s and 1990s have given rise to new questions about the business cycle. The U.S. economy has been experiencing a period of sustained expansion since the middle of 1991, with unemployment declining to levels not witnessed since the early 1970s. While the decline in unemployment during this upswing in the United States stands in marked contrast to recent experience in many economies in Europe, it is not out of line with the trends observed during past expansionary phases of U.S. business cycles. More of a surprise in terms of business cycle history has been the decline in inflation (Figures 19 and 20).

The strong expansion of economic activity in the United States in the 1990s provides a striking contrast to the recent evolution of output in Japan, where output growth has been under 1 percent in four out of the past six years and intermittently negative. In France, Germany, and Italy, the strong recoveries in output following the recessions of 1992–93 petered out in the latter half of 1995. While activity rebounded in all three of these countries during 1997, unemployment rates have risen inexorably since the early 1990s, reaching postwar highs recently.[40] The United Kingdom's recent business cycle experience, however, has been closer to that of the United States.

The recent unusually positive configuration of economic indicators in the United States and the prolonged periods of economic sluggishness and resource underutilization in Japan and much of Europe have given rise to conjectures about the possibility of fundamental changes taking place in the nature of the business cycle. Why have movements in activity apparently become less synchronized among the industrial countries, and why have the upswings and periods of stagnation apparently become more prolonged? Are business cycle phenomena exclusive to the industrial countries, or are they also a feature of the developing countries? If so, how are business cycles in the developing countries related to cyclical developments in the industrial countries? To what extent do market mechanisms, including exchange rate movements, help to

Figure 19. Major Industrial Countries: Output Gaps
(Actual less potential, as percent of potential)

Output gaps provide one measure of cyclical fluctuation.

[1]Data through 1991 apply to west Germany only.

_____

[40]The increases in unemployment in these countries are attributable not only to the weakness of economic growth but also to structural factors related to rigidities in the labor market. For a more detailed discussion of this issue, see the October 1997 *World Economic Outlook,* p. 76.

smooth business cycles? And most controversial, does the experience of the United States suggest that we may be heading toward a new paradigm in which technological developments and policy innovations render the business cycle obsolete?

Main Features of Business Cycles

Providing answers to these questions requires an understanding of both the main features of the business cycle and the causes of fluctuations in economic activity. Figures 19 and 20 indicate that, while fluctuations in economic activity are a recurrent feature of developments in the major industrial economies, they are not characterized by any clear regularity in terms of either duration or amplitude. Variations in the characteristics of economic fluctuations, as discussed in more detail below, have implications for an understanding of the forces underlying them.

There is, however, a different type of regularity that can be observed in business cycles that relates more to the correlation among economic variables within countries than to the recurrence of similar phases of expansions and contractions in aggregate economic activity. Table 13 shows some of the patterns displayed by the business cycles of the major industrial countries since the early 1970s. The growth of private consumption is, in general, smoother than the growth of GDP, while the growth of fixed investment, exports, and imports is much more volatile than that of GDP.[41] The cyclical component of GDP in all the major industrial countries is highly positively correlated with the cyclical components of both private consumption and fixed investment, but negatively correlated with the trade balance.[42] While the unemployment rate is countercyclical and employment procyclical in all the major industrial countries, the labor market indicators are more strongly correlated with output in the United States than in the other major industrial countries.

---

[41]The greater volatility of fixed investment, for instance, does not necessarily imply that it contributes more to fluctuations in GDP than variations in private consumption. Whether it does depends not only on its relative volatility but also on its relative share in GDP. Because private consumption is generally the largest major expenditure component in GDP, it is often the largest contributor to GDP movements.

[42]The cyclical components of the variables have been derived by using the band-pass filter, which removes both long-term trends (fluctuations over 32 quarters), and high-frequency fluctuations (fewer than 6 quarters) from the underlying time series. See Marianne Baxter and Robert G. King, "Measuring Business Cycles: Approximate Band-Pass Filters for Economic Time Series," NBER Working Paper 5022 (Cambridge, Massachusetts: National Bureau of Economic Research, February 1995), for details regarding the construction of the band-pass filters. Using band-pass filters or output gaps to capture business cycle fluctuations tends to smooth over higher-frequency fluctuations. See Paula R. De Masi, "IMF Estimates of Potential Output: Theory and Practice" in *Staff Studies for the World Economic Outlook* (Washington: IMF, December 1997), pp. 40–46.

Figure 20. Major Industrial Countries: Unemployment, Inflation, and Output Gaps
(In percent)

Unemployment has declined in Canada, the United Kingdom, and the United States but has risen in other countries.
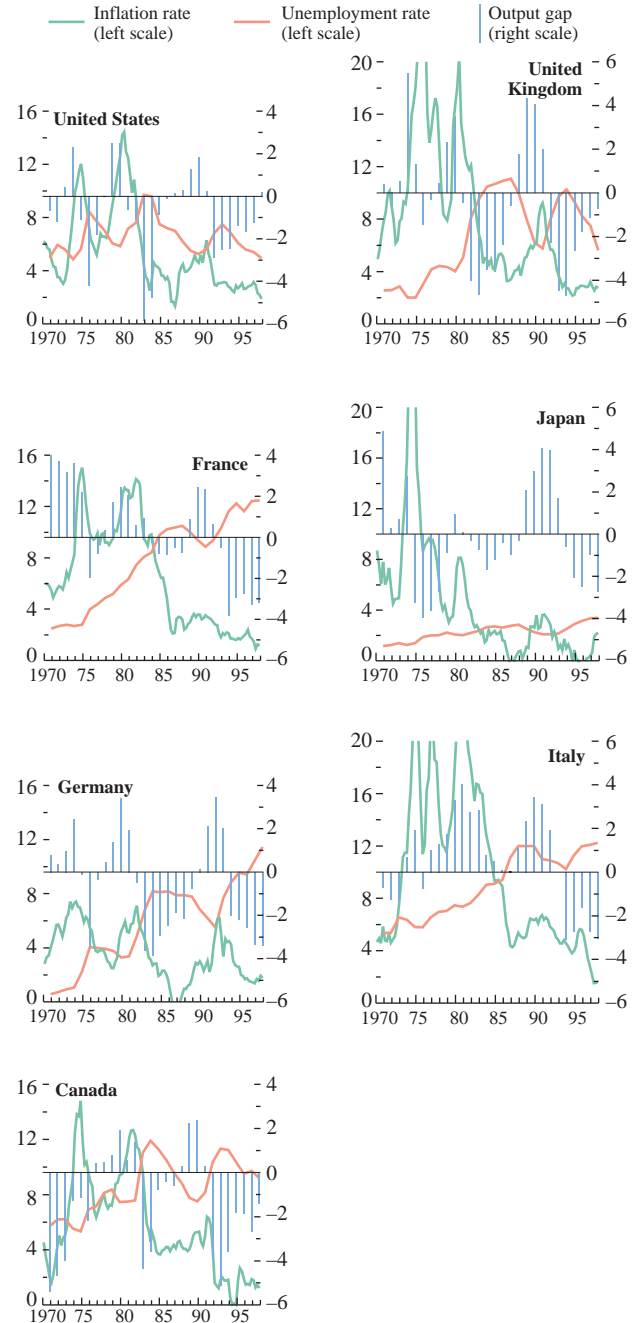
Table 13. Major Industrial Countries: Business Cycle Indicators

	United States		Japan		Germany		United Kingdom		France		Italy		Canada	
	Mean	STD[1]	Mean	STD[1]	Mean	STD[1]	Mean	STD[1]	Mean	STD[1]	Mean	STD[1]	Mean	STD[1]
Means and standard deviations of four-quarter growth rates—1973–97														
GDP	2.7	2.5	3.3	2.2	2.6	2.7	2.1	2.6	2.3	1.7	2.5	2.6	3.1	2.6
Private consumption[2]	2.8	2.0	3.5	2.1	2.9	3.8	2.4	2.9	2.4	1.5	2.8	2.2	3.1	2.5
Public consumption	1.5	1.6	3.3	2.6	2.8	4.0	1.5	1.7	2.5	1.4	2.0	1.2	2.3	2.4
Fixed investment	3.1	6.9	3.4	5.2	2.0	6.7	1.7	6.3	1.2	4.5	1.2	5.4	4.3	6.5
Exports	7.0	6.5	6.5	7.4	4.2	6.2	4.4	5.0	4.8	4.2	5.6	6.5	6.2	6.7
Imports	5.9	8.2	5.6	9.4	4.2	4.8	4.3	6.7	4.1	6.2	4.5	7.5	7.0	7.7
Correlation coefficients with GDP using band-pass filters—1973–97														
GDP	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Private consumption[2]	0.89		0.81		0.65		0.89		0.70		0.83		0.91	
Fixed investment	0.97		0.95		0.86		0.78		0.85		0.78		0.68	
Exports	0.39		–0.19		0.39		0.57		0.65		0.36		0.73	
Imports	0.85		0.61		0.90		0.79		0.84		0.88		0.86	
Trade balance	–0.51		–0.55		–0.31		–0.59		–0.45		–0.49		–0.35	
Inflation (CPI)	0.10		0.05		0.24		–0.10		0.18		0.14		0.14	
Stock prices	0.21		0.36		0.08		0.23		0.04		0.23		0.46	
Labor productivity	0.80		0.92		0.61		0.57		0.92		0.87		0.57	
Unemployment	–0.74		–0.42		–0.51		–0.50		–0.36		–0.13		–0.69	
Employment	0.90		0.75		0.55		0.72		0.89		0.50		0.84	

[1]Standard deviation.
[2]Includes the consumption of both durables and nondurables.

Both inflation and equity prices are only weakly pro-cyclical.[43] Labor productivity growth is consistently procyclical in all the major industrial countries.

Business cycles also appear to have been relatively closely synchronized across the major industrial countries in the past, suggesting a potential role for common shocks in generating economic fluctuations.[44] Experience since the early 1990s thus appears to be something of an exception to the general pattern, although the cyclical positions of the three major continental European economies have been highly synchronized. Cyclical convergence in the prospective euro area countries is discussed below.

Theories of the Business Cycle

There is a relatively long lineage of economic theories that have attempted to explain business cycles. These theories have, in general, been distinct from theories of economic growth, whose primary concern has been to explain observed patterns in long-term trends in output across countries. Business cycle theories focus instead on the factors that cause output to fluctuate around these long-term trends.[45]

The approach taken by recent theories of the business cycle has been to focus on combinations of shocks and propagation mechanisms that give rise to fluctuations in economic activity, on the basis of co-variations among economic variables that are observed in practice.[46] As discussed below, while there is disagreement among various schools of thought on the precise nature of the shocks and the types of propagation mechanisms that drive economic fluctuations, as well as on policy implications, there is a consensus that shocks often have long-lasting effects.[47]

"New Keynesian" models of the business cycle tend to stress the crucial role played by demand shocks in causing economic fluctuations. These models build on

---

[43]The calculated correlation coefficients between inflation and the cyclical component of GDP are not statistically significant in a number of countries.

[44]Recent work by Robin L. Lumsdaine and Eswar S. Prasad, "Identifying the Common Component in International Economic Fluctuations," NBER Working Paper 5984 (Cambridge, Massachusetts: National Bureau of Economic Research, April 1997), indicates that there are strong positive correlations between fluctuations in the growth of industrial production in a number of industrial countries and the time-varying weighted common component of international fluctuations.

[45]Proponents of "real business cycle theories," among others, argue that the same economic forces ought to explain both growth and fluctuations. See the discussion in Thomas F. Cooley and Edward C. Prescott, "Economic Growth and Business Cycles," in Thomas F. Cooley, ed., *Frontiers of Business Cycle Research* (Princeton, New Jersey: Princeton University Press, 1995).

[46]"Shocks" in this context refer to unexpected macroeconomic disturbances, such as abrupt changes in oil prices or in policies.

[47]The recent theories of the business cycle and their emphasis on random economic shocks bear a close resemblance to the theories of the business cycle put forward in Jan Tinbergen and J.J. Polak, *The Dynamics of Business Cycles* (Chicago, Illinois: University of Chicago Press, 1950). See the discussion by Michael Dotsey and Robert G. King, "Business Cycles," in John Eatwell, Murray Milgate, and Peter Newman, eds., *The New Palgrave: A Dictionary of Economics* (New York: Stockton, 1987).

the traditional Keynesian theories that emphasize the roles of aggregate demand and market failure in causing the business cycle. The key difference between Keynesian and New Keynesian theories is that New Keynesian models are based on the assumption of optimizing economic agents and are therefore considered by some to have an advantage of firmer microeconomic foundations. But in New, as in old, Keynesian models, prices and wages are assumed to adjust only slowly in response to disturbances. The relatively slow adjustment of prices and wages is attributed to the environment of imperfect information in which economic agents have to make decisions, and to the existence of nominal wage contracts that are fixed in advance for relatively long periods.[48] Consequently, markets for both goods and labor fail to clear instantaneously, and a variety of aggregate demand shocks can cause fluctuations in economic activity and employment. Policy-induced shocks are thus obvious candidates for explaining fluctuations in aggregate output, and both old and New Keynesian theories argue that both anticipated and unanticipated changes in monetary policy can cause fluctuations in output.[49] Exogenous disturbances to either consumption or investment, arising perhaps from shifts in the degree of optimism or pessimism in the economy, can also be sources of fluctuations in aggregate output and employment, including when those changes in sentiment are not warranted by objective changes in economic fundamentals. Thus, economic fluctuations can arise solely as a consequence of changes in expectations, which can therefore be self-fulfilling.[50] A central implication of New Keynesian theories is that economic policy matters and that policy measures can help to stabilize the economy, particularly in cases where contractions in economic activity are induced by bouts of pessimism.

New Keynesian models of the business cycle therefore provide a useful analytical framework for explaining fluctuations in economic activity arising from both policy- and non-policy-induced shocks. Because shifts in policies and in sentiment tend not to occur with regularity, the framework provided by New Keynesian models is particularly appropriate for explaining irregular fluctuations in economic activity. In this framework, recessions or recoveries come to an end either because policy responds to imbalances developing in the economy or because economic agents respond independently of policy to these imbalances. Concrete examples of both policy- and non-policy-induced shocks in the business cycle histories of the major industrial countries are discussed below.

Supply shocks, such as changes in the terms of trade or in commodity prices, are considered to be a possible, even important, cause of cyclical fluctuations in old and New Keynesian theories. But in "real" business cycle theories, supply shocks are central. Proponents of real business cycle theories posit that cyclical fluctuations originate mainly in random (positive and negative) shocks in production technology. Fluctuations in economic activity are viewed as the consequence of optimizing responses by economic agents, who alter their allocation of time between work and leisure, and of income between present and future consumption, in response to productivity shocks.[51] Thus there is little scope for involuntary unemployment or for economic policy in real business cycle models. Given the lack of convincing explanations of what the random productivity shocks have been that have caused actual cyclical fluctuations, as well as the absence of adequate empirical support for the propagation mechanisms outlined in the theory, real business cycle theories do not seem to have found much practical use among policymakers.

Explaining Recent Business Cycles

The general perspectives provided by the various theories of the business cycle offer useful frameworks for interpreting the main cyclical episodes observed over the past 25 years, in particular the roles of shocks and policies. The sharp fall in economic activity during 1973–75 in the industrial countries, following almost two decades of sustained expansion, is sometimes

---

[48]For a more detailed discussion of the New Keynesian theories of the business cycle, see N. Gregory Mankiw, "Small Menu Costs and Large Business Cycles: A Macroeconomic Model of Monopoly," *Quarterly Journal of Economics*, Vol. 100 (May 1985), pp. 529–37; George Akerlof and Janet Yellen, "A Near-Rational Model of the Business Cycle, with Wage and Price Inertia," *Quarterly Journal of Economics*, Vol. 100 (Suppl., May 1985), pp. 823–38; Olivier Jean Blanchard and Nobuhiro Kiyotaki, "Monopolistic Competition and the Effects of Aggregate Demand," *American Economic Review*, Vol. 77 (September 1987), pp. 647–66; and Stanley Fischer, "Long-Term Contracts, Rational Expectations, and the Optimal Money Supply Rule," *Journal of Political Economy*, Vol. 85 (No. 1, 1977), pp. 191–205.

[49]Thus, the perspectives provided by New Keynesian theories on the role of monetary policy are different from those of the early vintage of rational expectations theories of the business cycle. Because early rational expectations models assumed that there were imperfections in the information that was available to economic agents, but that markets for goods and labor cleared instantaneously, they deduced that only unanticipated changes in monetary policy could lead to fluctuations in output. See Robert E. Lucas, "Expectations and the Neutrality of Money," *Journal of Economic Theory*, Vol. 4 (April 1972), pp. 103–24.

[50]For more detailed discussions of expectations-based models of the business cycle, see Michael Woodford, "Self-Fulfilling Expectations and Fluctuations in Aggregate Demand," in N. Gregory Mankiw and David Romer, eds., *New Keynesian Economics: Imperfect Competition and Sticky Prices* (Cambridge, Massachusetts: MIT Press, 1991); and Andrei Shleifer, "Implementation Cycles," *Journal of Political Economy*, Vol. 94 (December 1986), pp. 1163–90.

[51]For a more detailed discussion of real business cycle models, see Charles I. Plosser, "Understanding Real Business Cycles," *Journal of Economic Perspectives*, Vol. 3 (Summer 1989), pp. 51–77; and Robert G. King and Charles I. Plosser, "Real Business Cycles and the Test of the Adelmans," *Journal of Monetary Economics*, Vol. 33 (April 1994), pp. 405–38.

viewed as being largely the effect of a supply shock, represented by the sharp hike in oil prices. However, inflation was already on the upturn before the oil shock of October 1973, which occurred toward the end of a strong boom in non-oil commodity prices, and the rise in inflation came in the wake of strongly expansionary demand management policies in the industrial countries. Because policymakers at the time largely focused on the contractionary effect of the oil price shock on aggregate demand, the initial policy response in most industrial countries was to accommodate inflation. The response in Germany, in particular, was less accommodative than in the other major industrial countries, which helps to explain why Germany had a steeper fall in output following the oil price shock, but a less severe buildup of inflationary pressures than the other industrial countries (see Figure 20).

Another major shock occurred about five years later. Inflationary pressures had again started to build up, following a coordinated expansion by the industrial countries in 1978, by the time of the second oil price shock in 1979. In the United States, the initial tightening of monetary policy in 1979 was partially reversed during the 1980 recession. But monetary conditions were tightened again in late 1980 as inflation reached a postwar high; and, reflecting the actual and expected inflation that had become built into the system during the 1970s, monetary conditions had to be kept restrictive for a relatively long period before inflation was brought down. The need to unwind inflation expectations also necessitated tight monetary conditions in the United Kingdom after the second oil price shock. Thus, both the United States and the United Kingdom had steeper contractions of economic activity following the second oil price shock than did Germany, which had adopted a more restrictive monetary stance at the time of the first.

The relatively long expansion of economic activity in the 1980s was propelled in many industrial countries by the robust growth of private consumption, which was driven in large part by the combined effects of financial liberalization and the resulting rapid increases in credit and asset prices. The large decline in oil prices in 1986 helped to keep consumer price inflation relatively subdued despite the robust pace of economic growth during this period. By contrast, the downturns in activity in the early 1990s in many industrial countries appear to have been induced mainly by various country-specific shocks and policy actions. In the United States and the United Kingdom, the recessions of the early 1990s were induced partly by the tightening of monetary policies in 1989–90 and also by a weakening of consumption originating from bouts of pessimism.[52] The Middle East crisis in

1990–91 may have deepened and prolonged the downturns. In many European countries, the downturns in economic activity that began in the middle of 1992 appear to have been largely induced by the restrictive monetary stances that were needed to maintain currency pegs to an appreciating deutsche mark following the large fiscal expansion in Germany in the wake of unification, but the fiscal consolidation occurring as part of the convergence process for EMU may also have played a role. The bubble in asset prices in Japan during the late 1980s was more pronounced than in the other major industrial countries, and the collapse thereafter had severe consequences for the banking sector. Japan is still being buffeted by the negative consequences of the asset price collapse and its lingering effects on the financial sector. The strength of the yen in foreign exchange markets until mid-1995 contributed to the weakness of the recovery. Meanwhile, the recent upswing in continental Europe has been muted not only by the tight policies needed for convergence, but also by the effects of structural rigidities on employment and confidence.

As noted earlier, developments since the early 1990s have been somewhat unusual in that the United States has experienced a sustained expansion of economic activity without generating the inflationary pressures that would have been expected on the basis of past behavior. Could this mean that we are currently witnessing the end of the business cycle in the United States? Some analysts have suggested that the behavior of the U.S. economy is now described by a new paradigm, characterized by increased rates of sustainable growth, a reduced natural rate of unemployment, and a reduced tendency to inflation. Proponents of this view point to advances in computing and telecommunication technologies and their effects on productivity, competitive pressures arising from increased globalization, and increased wage moderation stemming from the shift in employment toward less permanent jobs as among the principal reasons for this conjecture. The dampening of cyclical fluctuations is attributed to such developments as just-in-time inventory management, and to the increasing success of forward-looking monetary policies. For example, the preemptive monetary tightening in 1994 probably helped to extend the expansionary phase of the current cycle.[53]

It is still too early to know whether these features represent a fundamental change in the way that the

---

[52]For a more detailed discussion of the hypothesis of expectations-induced consumption shocks in the early 1990s in both the United States and the United Kingdom, see Olivier Jean Blanchard,

"What Caused the Last Recession? Consumption and the Recession of 1990–91," *American Economic Review, Papers and Proceedings*, Vol. 83 (May 1993), pp. 270–74; and Luis Catão and Ramana Ramaswamy, "Recession and Recovery in the United Kingdom in the 1990s: Identifying the Shocks," *National Institute Economic Review*, No. 157 (July 1996), pp. 97–106.

[53]For a fuller evaluation of these issues, see Alan Greenspan, "Monetary Policy: Testimony and Report to the Congress" (Washington: Board of Governors of the Federal Reserve System, July 22, 1997).
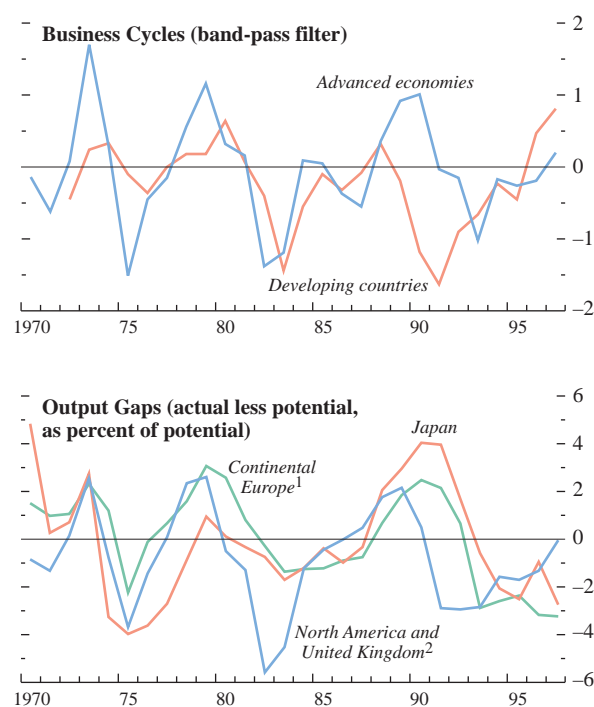
U.S. economy functions, or whether they merely represent a series of unusually positive developments, whose effects will eventually end. Recent increases in U.S. wage growth would suggest that the current rate of unemployment is close to or slightly below the natural rate, and that further significant declines in it would be likely to lead to higher inflation. Employment growth persistently above the growth of the working-age population has been at the root of above-trend growth in output, and this cannot continue indefinitely. Other factors that have helped to hold down price increases—such as the strong dollar, cost reductions in healthcare, and, possibly, increased job insecurity—cannot be expected to have a sustained effect on inflation. More fundamentally, past business cycles in the advanced economies show that there are no clear-cut regularities in terms of how long expansions last, or how deep recessions are. Thus, the near-record length of the current upturn offers no firm information on the duration of future cycles. In addition, any of a wide variety of shocks can bring economic expansions to an end, and fluctuations in economic activity are driven by the persistent effects of these shocks. Speculation about the end of the business cycle was rife in the late 1960s, but it was swept away in the mid-1970s as a deep recession, originating partly in complacency about inflation, took its toll. If the past can offer any guide to the future, then—notwithstanding indications that significant structural changes may be fostering prolonged expansions—downturns in activity owing to large shocks will still occur.

Business Cycles in Developing Countries

Figure 21 indicates not only that business cycles have been evident in the developing countries over the past quarter century, but also that there has been relatively close synchronization with business cycles in the industrial countries as a group through much of this period.[54] Between 1988 and 1990, however, the developing countries experienced an abrupt slowing of growth before the 1990–93 slowdown in the industrial countries; and during 1991–93, growth in the developing countries picked up despite the industrial country slowdown. The observed divergences during this period, however, reflect in part the decoupling of economic fluctuations within the industrial country group. The lower panel of Figure 21 shows that the troughs in North America and the United Kingdom occurred

---

[54]Developing countries also exhibit many of the same business cycle regularities as in the industrial countries, in terms of comovements among economic variables. The stylized facts of macroeconomic fluctuations and business cycle regularities for a group of 12 developing countries have been documented in Pierre-Richard Agenor, C. John McDermott, and Eswar Prasad, "Macroeconomic Fluctuations in Developing Countries: Some Stylized Facts," Georgetown University Working Paper 97–09 (Washington, August 1997).

Figure 21. Business Cycles and Output Gaps

Business cycles are also evident in developing countries.

Business Cycles (band-pass filter)

Advanced economies

Developing countries

Output Gaps (actual less potential, as percent of potential)

Japan

Continental Europe[1]

North America and United Kingdom[2]

[1]Continental Europe comprises France, Germany, and Italy.
[2]North America comprises Canada and the United States.

earlier than those in Japan and continental Europe and are more closely correlated with the pattern in the developing countries, suggesting that the cyclical ties between the two groups may not have weakened to the extent indicated in the upper panel. In 1997–98 many emerging market countries seem headed for a significant slowdown despite relatively robust growth in most industrial countries except Japan.

What else might account for a desynchronization of business cycles between the developing and industrial countries in these episodes since the late 1980s? A number of different explanations have been put forward, one of which is that the developing countries have diversified their export base significantly, both in terms of the commodity composition of exports and in terms of the country composition of trading partners, with relatively rapid growth in trade among developing countries themselves. Thus, developing countries may have become better able to insulate themselves from economic fluctuations in the industrial countries. Another likely explanation is that better policies in developing countries contributed to their strong growth beginning in the early 1990s, just as the industrial economies moved into recession. Further, with more open capital markets, low interest rates in the industrial countries during episodes of sluggish growth may have come to have a stronger effect in boosting economic activity in the developing countries by increasing capital flows.[55] Capital inflows to many emerging market economies in the 1990s were also boosted by positive expectations about future growth and profitability. More recently, the Mexican crisis in 1994–95 and the crises in Asia have demonstrated the potential for reversals of market sentiment to contribute to desynchronized movements in activity between mature and emerging countries.

The Relationship Between Business Cycles and Exchange Rates

Exchange rates and business cycles are interdependent. The tendency for currencies to appreciate in domestic economic upturns and depreciate in downturns, although not evident at all times, can be seen in many past episodes and is visible in recent movements in, and the current configuration of, exchange rates among the major currencies. Thus the recent strength of the dollar and pound sterling relative to other major currencies, such as the yen and the deutsche mark, broadly matches the recent strength of activity in the United States and the United Kingdom and the weak-

ness of activity in Germany and Japan. At the same time, movements in exchange rates affect activity, typically with a countercyclical effect, so that demand is redistributed, by their appreciating currencies, away from the economies where activity is strongest and toward those experiencing cyclical weakness. To an important extent, the cyclical behavior of exchange rates reflects changes in monetary policy over the business cycle, and thus it provides one of the channels through which short-run stabilization policy operates.

Movements in exchange rates are a natural feature of countries' adjustment over the business cycle, and the deviations from medium-term equilibria that they involve do not necessarily constitute misalignment— that is, a departure from medium-term equilibrium that is so large as to be potentially destabilizing and therefore requiring remedial policy actions.[56] Establishing that there is a departure that exceeds the magnitude warranted by cyclical conditions and that should thus be of concern to policymakers requires both an understanding of cyclical fluctuations in exchange rates and an analytical framework to gauge the "fundamental" equilibrium level of exchange rates (Box 5). A common definition of this fundamental equilibrium exchange rate is the exchange rate at which the current account balance is consistent with medium-term fundamentals, such as an economy's normal pattern of saving and investment when the economy is at potential. If a deviation from the fundamental equilibrium exchange rate is purely cyclical, then it may be presumed that it will be corrected naturally by the evolution of the cycle. But if it stems from unbalanced policies, as with an appreciation associated with a large fiscal deficit or a depreciation resulting from overly loose monetary policy, the appropriate assessment would be that policies should adjust in order to restore macroeconomic balance and reduce the risk of disruptive shifts in market sentiment.

Factors Influencing Movements in Exchange Rates

A central feature of most theories of exchange rate determination is the relationship between exchange rates and cross-country interest rate differentials—the uncovered interest rate parity condition—that states that, in the absence of a risk premium (that is, if similar assets denominated in different currencies are perfect substitutes), the exchange rate must be expected by the market to adjust to offset the difference between

[55]For a more detailed discussion of these issues, see Alexander W. Hoffmaister, Mahmood Pradhan, and Hossein Samiei, "Have North-South Growth Linkages Changed?" Working Paper 96/54 (Washington: IMF, May 1996); forthcoming in *World Development*, Vol. 26 (No. 5, May 1998).

[56]Ofair Razin and Susan M. Collins, "Real Exchange Rate Misalignments and Growth," NBER Working Paper 6174 (Cambridge, Massachusetts: National Bureau of Economic Research, September 1997), find that a misalignment could have long-term consequences beyond the usual short-term effects on domestic firms' competitiveness, with very large overvaluation associated with slower growth, and moderate to high (but not very high) undervaluations associated with increased growth.

domestic and foreign interest rates. This provides a clear link between exchange rates and business cycles: a business cycle upturn in an economy relative to others leads, through an increased demand for money, to an increased interest rate differential in favor of the domestic currency, which therefore will tend to appreciate. The value of the domestic currency rises sufficiently relative to its expected future value for its expected future depreciation to match the wider interest differential in its favor.[57] Fiscal policy actions likewise affect exchange rates; for example, expansionary fiscal policy not accommodated by monetary expansion leads to increased interest rates and an exchange rate appreciation, with an associated future expected depreciation.[58]

With imperfect capital mobility, which seems to be a more realistic assumption, capital flows respond with imperfect elasticity to changes in interest differentials, and exchange rates move in response to changing supplies and demands for assets denominated in different currencies. In this case, the imperfect substitutability of assets in investors' portfolios gives rise to risk premia that depend on portfolio preferences and relative asset supplies and that cause the uncovered interest rate parity condition not to hold.[59] This approach suggests that the current account of the balance of payments can affect the exchange rate not only through its influence on expectations about future exchange rates (which tend to reflect assessments of medium-run equilibrium exchange rates), but also via relative supplies of assets and the risk premium. For example, a current account surplus in a country will reduce the supply of assets denominated in the currency of that country, tending to reduce its risk premium and to cause the currency to appreciate. The risk premium would also be affected, for example, by the issuance of private or public securities that change the supply of financial assets denominated in any particular currency.

A cyclical expansion would be expected both to raise domestic interest rates and, by improving the economy's fiscal balance, to lower the risk premium on a country's currency. Both effects will tend to lead to an appreciation of the domestic currency. But interest rates and exchange rates could in some circumstances move in opposite directions. If monetary pol-

icy is devoted to maintaining an exchange rate target, for example, then an actual or expected appreciation of the domestic currency may lead to a lowering of domestic interest rates and, in the short term at least, to a smaller interest differential in favor of domestic currency assets.

Evidence on Factors That Influence Real Exchange Rates

The connection between the business cycle and the exchange rate is illustrated for the three major industrial countries in Figure 22, which shows movements since 1982 in their real effective exchange rates, short-term and long-term real interest rate differentials vis-à-vis the six other major industrial countries in each case, and the relative output gap for each country (again, in relation to the other major industrial countries).[60] Although not all movements in real effective exchange rates can be linked to relative changes in activity or interest rates, there does appear to be a positive correlation between currency movements and the business cycle in several prominent episodes of large exchange rate fluctuations. At other times, however, the correlation between exchange rates and the cycle is less apparent or even negative, and the mix of policies, including countercyclical policies aimed at alleviating recessions or heading off overheating in upturns, appears to have had a larger influence on exchange rates.

The influence of policies can be seen in the case of the appreciation of the dollar in the early 1980s, which at least in part reflected the mix of expansionary fiscal policy and restrictive monetary policy in the United States, with cyclical effects possibly playing a role as the economy came out of recession in late 1983 and 1984. The later stages of the dollar appreciation at the end of 1984 and the beginning of 1985 are, as is well known, more difficult to explain in terms of fundamentals, especially since they coincided with both a surging U.S. current account deficit and movements in interest differentials unfavorable to dollar-denominated assets. In fact, it appears that bandwagon effects or a speculative bubble played a role in this spike of the dollar.[61] The subsequent fall of the dollar more closely exhibits the expected relationship with the cycle, with a positive association between the exchange rate and real interest rates, especially the long-

---

[57]Peter Isard, *Exchange Rate Economics* (New York and Cambridge: Cambridge University Press, 1995), provides a comprehensive account of recent developments in exchange rate models.

[58]See the October 1995 *World Economic Outlook,* pp. 73–81, for a more complete discussion of the effects of fiscal policies on exchange rates.

[59]The risk premium on the domestic currency measures the amount that the domestic interest rate must exceed the foreign interest rate—after adjusting for the expected change in the exchange rate—to equilibrate asset markets. Thus, for given levels of interest rates and the expected future exchange rate, a decline in the risk premium on the domestic currency implies an appreciation of the currency.

[60]Interest differentials and relative output gaps are measured relative to a weighted average of the real interest rates and output gaps of the six other major industrial countries, the weights being based on the trade weights used in the calculation of the effective exchange rate indices. Especially for interest rates, however, it must be noted that weights of countries in financial markets may be quite different from their trade weights. The real effective exchange rate is based on consumer prices and is measured relative to 20 industrial countries.

[61]See the April 1988 *World Economic Outlook*, Supplementary Note 2, pp. 53–62, for a complete discussion of this episode.

Box 5.   Evaluating Exchange Rates

There are different views on the usefulness of calculating "equilibrium" exchange rates, as well as different approaches to doing so. Moreover, those who engage in such calculations generally realize that deviations from equilibrium exchange rates can arise for various reasons, that they need to be interpreted carefully, and that they do not necessarily call for policy action.

Views on Equilibrium Exchange Rate Calculations

Some economists argue that exchange rates, if they are free to clear foreign exchange markets, must always reflect the fundamental forces of supply and demand and should never be regarded as substantially out of equilibrium. Others accept that exchange rates can become misaligned with fundamentals, while remaining skeptical about the adequacy of any particular model, or set of models, for calculating "equilibrium" exchange rates. A third group maintains that some market exchange rates have at times become badly misaligned with fundamentals, and that a quantitative framework is needed to try to identify misalignments at an early stage. Most proponents of the last view recognize, however, that estimates of equilibrium exchange rates are inherently imprecise, and that considerable deference should be given to markets before suggesting that exchange rates have become misaligned.

Approaches to Calculating Equilibrium Exchange Rates

There are several approaches to calculating equilibrium exchange rates. The simplest, and perhaps the most widely used, involves measures of *purchasing power parity* (PPP) or international competitiveness levels. Such calculations generally employ price or cost indices (such as consumer price indices, GDP deflators, export prices, or unit labor costs); they are based on the notion that the prices of (or costs of producing) similar goods, when translated into a common currency, should be similar across countries—that is, should conform to the so-called law of one price—at least in the case of tradable goods. There is strong evidence that rejects the law of one price as a proposition about short-run behavior, but recent years have brought a resurgence of interest in testing the validity of PPP as a long-run hypothesis,[1] and thus as a

framework for defining equilibrium exchange rates from a medium- to long-run perspective.

The *macroeconomic* balance framework provides a second approach to calculating equilibrium exchange rates from a medium-run perspective. Reliance on this approach within the IMF dates at least to the summer of 1967, when views were being developed about the appropriate size of the prospective devaluation of the pound sterling.[2] The distinguishing feature of the methodology (as elaborated below) is its orientation toward deriving equilibrium exchange rates from estimates of the external current account balances that would constitute equilibrium positions if countries were operating at positions of internal balance (full employment without rising inflation).

A third approach relies on single-equation *reduced-form models,* with exchange rates as dependent variables, where the reduced-form equations often draw on both a modified PPP framework and the macroeconomic balance framework.[3] More specifically, the reduced-form equations are typically derived from models of net foreign asset accumulation that incorporate trends in productivity, terms-of-trade variables, fiscal balances, and other "fundamentals."

Use of the Macroeconomic Balance Approach at the IMF

IMF staff rely on a variety of analytic frameworks, in complementary ways, in pursuing their operational and research work on exchange rate issues. The macroeconomic balance approach has been regarded as particularly relevant for evaluating exchange rates of the major industrial countries in recent years,[4] but it is important to complement it with other approaches, which sometimes provide different perspectives.

[1]There are different interpretations of the evidence on the long-run PPP hypothesis. See, for example, Peter Isard, *Exchange Rate Economics* (New York and Cambridge: Cambridge University Press, 1995); and Kenneth Rogoff, "The Purchasing Power Parity Puzzle," *Journal of Economic Literature,* Vol. 34 (June 1996), pp. 647–68, and references cited therein.

[2]Recent work on the macroeconomic balance framework within the IMF is reported in Peter Isard and Hamid Faruqee, eds., "*Exchange Rate Assessment: Some Recent Extensions and Applications of the Macroeconomic Balance Approach,*" Occasional Paper (Washington: IMF, 1998, forthcoming). Additional perspectives on this and other approaches are provided in John Williamson, ed., *Estimating Equilibrium Exchange Rates* (Washington: Institute for International Economics, 1994).

[3]For examples of this approach see Hamid Faruqee, "Long-Run Determinants of the Real Exchange Rate: A Stock-Flow Perspective," *Staff Papers,* IMF, Vol. 42 (March 1995), pp. 80–107; and Ronald MacDonald, "What Determines Real Exchange Rates? The Long and Short of It," Working Paper 97/21 (Washington: IMF, 1997).

[4]This is reflected, for example, in the views expressed in the May 1997 *World Economic Outlook,* pp. 7 and 9.

term interest differential, starting in the months immediately before the Plaza Agreement of September 1985. The rapid decline in the dollar over the year following the Plaza Agreement was both a correction of the previous overshooting and a reflection of the fall in U.S. long-term interest rates as inflationary expecta-

tions adjusted downward and monetary policy eased. The relationship between the dollar and interest differentials was reversed, however, following the Louvre Accord of February 1987, which sought to foster stability of exchange rates around the prevailing levels. Thus an increased perception of inflationary risks in

The macroeconomic balance approach builds on the equilibrium condition (or ex post accounting identity) that links the current account balance (net exports), *CA,* to the balance between domestic saving, *S,* and domestic investment, *I*: $CA = S - I$. The current account balance is a measure of net saving from abroad, and the balance of payments accounts show it to be identical to the capital account balance (including any change in official reserves). As currently applied at the IMF, the use of this approach to evaluate the appropriateness of exchange rates has the following four steps.

The first step involves the application of a trade-equation model to estimate the underlying current account positions that would emerge at prevailing market exchange rates if all countries were producing at their potential output levels; this focuses on the left-hand side of the above equation. The second step uses a separate model to estimate the "equilibrium" or "normal" position for saving-investment balances based on the medium-run determinants of saving and investment, and also assuming that countries are producing at potential output; this focuses on the right-hand side of the equation. The third step is to calculate, in a multilateral framework, how much exchange rates would have to change, other things being equal, to equilibrate the underlying current account positions with the equilibrium saving-investment positions for each country simultaneously. The final step involves judgmental assessments of whether the calculations in the third step suggest that any currencies are badly misaligned.

Several points may be noted about the application of this approach. First, the primary motivation for the analysis, especially given the limitations of the conceptual framework and the imprecision of the estimates, is to look for cases of badly misaligned exchange rates, not to prescribe exchange rate targets. Second, by focusing on the current account and saving-investment positions that would emerge if countries were producing at potential output, the analysis is oriented toward quantifying equilibrium exchange rates and identifying misalignments from a medium-run perspective. Third, the approach has the attractive feature of assessing external positions and exchange rates within a multilateral framework, and in a manner that is globally consistent. Fourth, the focus of the analysis is on estimating equilibrium values for real multilateral (rather than nominal, bilateral) exchange rates. Fifth, the formal analytic framework is intended only to provide inputs to use as a starting point when assessing the appropriateness of prevailing exchange rates; for a full assessment, the results from the framework have to be interpreted judgmentally, in the context of a broader range of considerations, including the cyclical positions of national economies, the influence of structural changes, and market expectations about exchange rate movements over the medium run. And sixth, to date applications of the methodology within the IMF have been largely confined to industrial countries, in part because of data limitations, but also because the particular model that is used to assess equilibrium saving-investment balances assumes a high degree of capital mobility.

Interpreting Deviations from Medium-Run Equilibrium

In addition to acknowledging that estimates of equilibrium exchange rates are inherently imprecise, the Fund's analysis recognizes that substantial deviations of exchange rates from their medium-run equilibrium levels do not always imply that "markets are wrong." In some cases, particularly when countries are in different phases of the business cycle, market participants may expect exchange rates to move over time toward their medium-run equilibrium levels, such that the initial deviations from these levels would be largely eliminated. These anticipated adjustments of exchange rates—from appropriate levels in the short run to equilibrium levels in the medium run—would normally be reflected in the interest differentials (and forward exchange rates) associated with appropriate countercyclical monetary policies. In other cases, substantial deviations of exchange rates from their medium-run equilibria may imply that "policies are wrong." Such situations are also sometimes characterized by large interest differentials—for example, when they reflect market concerns about large fiscal imbalances—and these situations do not necessarily imply that markets are wrong, given such policy concerns. In still other cases, however, substantial deviations from medium-run equilibrium exchange rates may be identified against a background of sound policies and relatively narrow interest differentials, suggesting that currencies may indeed have become misaligned.

There is no general answer to the question of what actions, if any, should be taken when exchange rates appear to deviate substantially from their medium-run equilibrium values. Rather, the question has to be addressed on a case-by-case basis in the context of a broader assessment of the macroeconomic situation. Policy advice in such circumstances is conditioned by the extent to which macroeconomic policies seem consistent with ultimate targets, as well as the extent to which market exchange rates deviate from estimates of their equilibrium levels.

the United States appears to have led to further declines in the dollar over the course of 1987, notwithstanding increased interest rates, as monetary policy responded.

In the case of Germany, although the ups and downs of exchange rates and interest differentials were by no means closely aligned in the 1980s, a positive relationship can be seen at times, such as in the appreciation of the deutsche mark around 1986 (which also reflects the general decline of the dollar). The appreciation of the deutsche mark starting in 1991 may be attributed mainly to developments surrounding German

Figure 22. Three Major Industrial Countries: Real Effective Exchange Rates and Selected Relative Cyclical Variables

Exchange rate movements have at times corresponded to business cycle fluctuations in activity and interest rates.
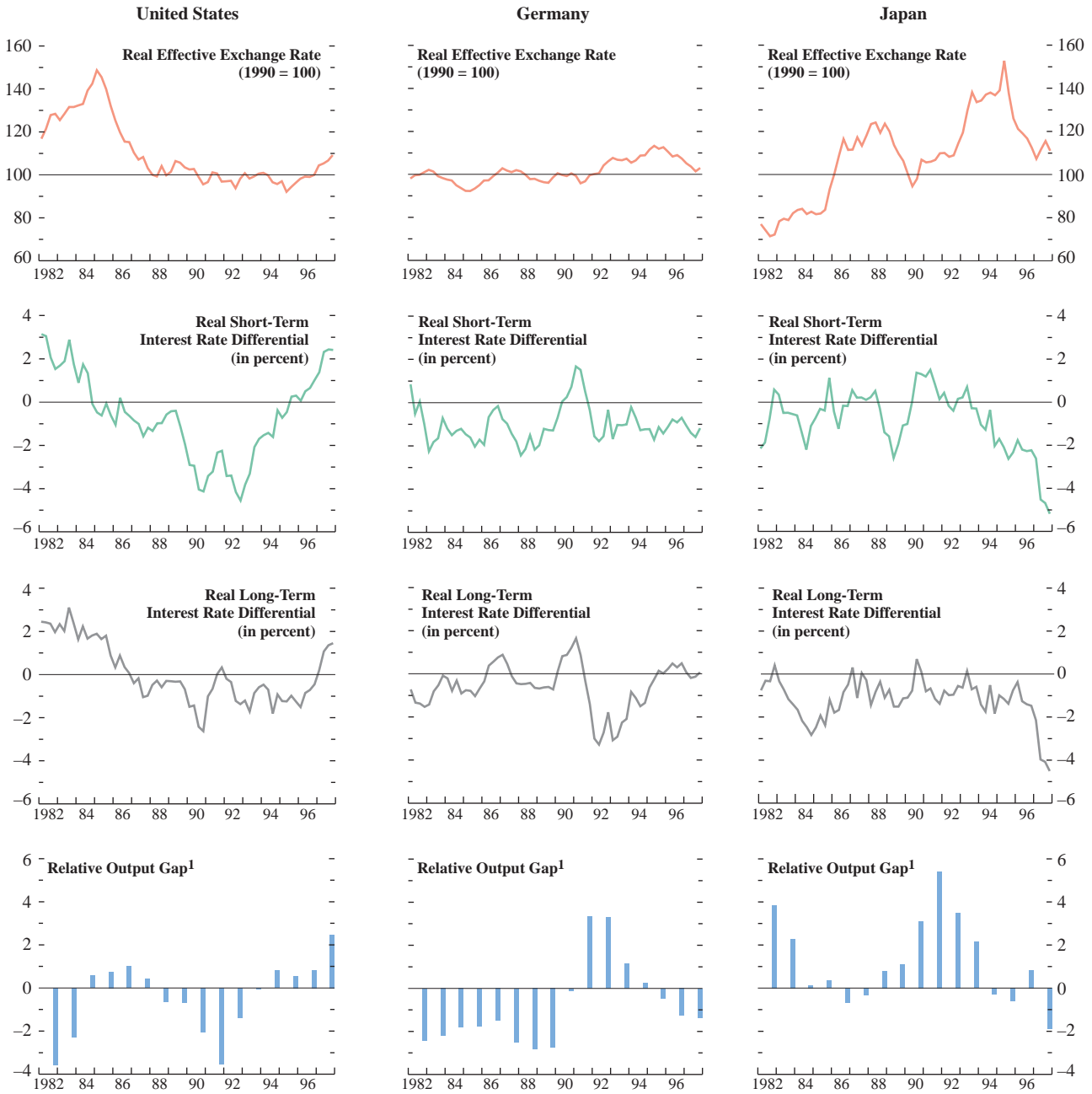
[1]The estimated output gap in each of the three countries less a weighted average of output gaps in the other major industrial countries.

reunification, especially the shifts to deficit in both the fiscal position and the external current account to finance investment in the eastern Länder.[62] The strength of the deutsche mark in late 1994 and 1995 is more difficult to explain in terms of business cycle fundamentals.

Similarly, the appreciation of the yen starting in early 1993 and culminating in the spike in 1995 is difficult to fully explain in terms of economic fundamentals. The current account surplus in Japan suggested some scope for yen appreciation, but the currency's sharp rise during the period is contrary to what might have been expected on the basis of cyclical conditions, and certainly the strength of the yen constituted an impediment to the recovery of activity in Japan starting in 1994.[63] In contrast, the current constellation of exchange rates—notably the strength of the dollar and the weakness of the yen and, until very recently, of the deutsche mark—appears to be quite consistent with cyclical conditions, including both interest differentials and relative output gaps in the three countries.

Perhaps not surprisingly, given the mixed evidence from such casual inspection of Figure 22, econometric research to date provides little statistical evidence of a significant systematic relationship between exchange rates and interest differentials, or in support of *any* model of exchange rate determination as far as short-term movements are concerned. In fact, the evidence for the most part suggests that short-term changes in exchange rates are essentially random.[64] Although it is often possible to observe influences on exchange rates that are consistent with business cycle factors, such as in the current conjuncture, these influences are frequently overshadowed by other factors, so that they cannot be captured through formal statistical analysis—at least, they have not been captured by research carried out so far.

Reasons for this finding, as mentioned earlier, include the difficulty of modeling exchange rate expectations and policy reactions, both of which can cause observed statistical relationships to differ from those implied by models of exchange rate determination. Another possible explanation for the failure to identify

a relationship between the exchange rate and interest differentials or other measures of relative cyclical positions is that these empirical investigations focus only on the short-term—month-to-month or quarter-to-quarter—movements in exchange rates and interest differentials. Indeed, a stronger relationship has been found in some research in which statistical techniques have been used to isolate the components of movement in exchange rates and interest differentials with frequencies of 1½ to 8 years, which correspond to the length of typical business cycles.[65] A further factor complicating the estimation of the influence on exchange rates of interest differentials, or other representations of relative cyclical developments, is the simultaneity that arises from the fact that causation also runs the other way, not only because of policy reactions but also because exchange rate movements affect aggregate demand and activity. The way in which they do so is considered in the following section.

Do Exchange Rates Stabilize Business Cycles?

Depending on the circumstances, exchange rates may or may not help to stabilize output over the business cycle. Currency movements may be considered to be a natural part of countries' adjustment over the business cycle, with stabilizing effects on aggregate demand. Thus, an appreciating currency associated with strong growth will lead to leakages of demand through declining net exports and consequently to a moderation of the expansion, while in many economies suffering from weak activity export-led growth spurred by currency depreciation is an important part of the recovery process. Following the crisis in the ERM in Europe in 1992, depreciations of the British pound, Italian lira, and Swedish krona helped to generate recoveries following protracted recessions, especially in Sweden and the United Kingdom. These recoveries were sustained and broadened because the competitiveness gains arising from the initial nominal depreciations were not offset by rising domestic costs, and, perhaps equally important, because significant output gaps allowed the monetary authorities in the United Kingdom and Sweden to reduce official interest rates to boost domestic demand without risking their central objective of low inflation. More recently, the appreciations of the pound and the dollar since 1995 have helped to dampen inflationary pressures in the United Kingdom and the United States by moderating the growth of aggregate demand, and they have also helped by holding down domestic inflation through lower import costs. Similarly, recent recoveries in continental Europe have been based mainly on gains in the

---

[62]The fall in real long-term interest rates in Germany reflects the unexpected rise in inflation from around 2½ percent at the beginning of 1991 to a peak of just above 6 percent in the middle of 1992.

[63]Bankim Chadha and Eswar Prasad, "Real Exchange Rate Fluctuations and the Business Cycle: Evidence from Japan," *Staff Papers*, IMF, Vol. 44 (September 1997), pp. 328–55, finds that the behavior of the yen has differed across business cycles, with changes in monetary conditions playing a leading role in creating and then bursting the "asset price bubble."

[64]See Richard A. Meese and Kenneth Rogoff, "Empirical Exchange Rate Models of the Seventies: Do They Fit Out of Sample?" *Journal of International Economics*, Vol. 14 (February 1983), pp. 3–24, which showed that the random walk was superior to economic models in explaining exchange rate behavior, and that interest differentials or the forward exchange rate added no information to the spot rate in predicting exchange rates.

[65]See Marianne Baxter, "Real Exchange Rates and Real Interest Differentials: Have We Missed the Business-Cycle Relationship?" *Journal of Monetary Economics*, Vol. 33 (February 1994), pp. 5–37.

external sector, supported by depreciated currencies, especially vis-à-vis the dollar.

There are, however, reasons why the influence on business cycles of the exchange rate is not as clear-cut as these examples suggest. Recent empirical studies of the relationship between business cycles and net exports (a key channel through which exchange rates affect output) have found that net exports do not always contribute to cyclical recoveries in the advanced economies.[66] This result can be explained in several ways, all of which qualify the conditions in which exchange rates can act as a stabilizer. First, if business cycles are closely synchronized across countries, trade balances are unlikely to provide an adjustment channel or to influence economic fluctuations. Second, movements in currency values affect real incomes and wealth in ways that can offset the effects of currency movements on aggregate demand through net exports. For example, with a currency depreciation, domestic real incomes decline as import prices rise; whether the net worth of domestic residents increases or declines depends on whether residents are net creditors or debtors in foreign currencies. The result is likely to be a reduction in domestic demand, offsetting to some extent the expansionary effect of the depreciation on net exports. Third, as presented above, the nature of the shocks underlying cyclical fluctuations can be critical in determining the movements of certain variables, including the relationship between the exchange rate and activity. For instance, an exogenous increase in domestic interest rates would reduce domestic demand and at the same time lead to an appreciation of the domestic currency, which would tend to move the trade balance toward deficit. Here, currency appreciation would be associated with a fall in activity. But an exogenous drop in domestic demand would tend to lead to lower interest rates, depreciation of the domestic currency, and a move in the trade balance toward surplus. In this case, currency depreciation could be associated with a rise or fall in overall activity. Thus, over long periods, correlations between the exchange rate on the one hand and output and the trade balance on the other may be weak, because of the mix of driving forces affecting economies and their differing effects on exchange rates and trade.

Another possible explanation for the evidence suggesting a weak stabilizing effect of exchange rates and the external sector on activity is that output may appear to be unresponsive to currency movements because of adjustment lags or the concurrent operation of other influences on the economy. One recent example is the substantial depreciation of the Mexican peso in 1994–95, which contributed to a sharp turnaround in the Mexican trade balance that was not, however, large enough to offset the accompanying drop in domestic demand. In Mexico there was both a currency collapse and a banking crisis that resulted in a monetary squeeze, which contributed to a large drop in domestic demand. Domestic real incomes and wealth were also reduced by the depreciation, partly on account of high levels of external debt. Aggregate output did not recover until about a year after the crisis broke. Thus, a very large currency depreciation can contribute to a large drop in output, especially when it is associated with disruptions in the financial system. Currency overshooting can also lead to misallocations of resources and lower output. The current situation in the Asian economies in crisis is likely to follow a similar path, with the strengthening in net exports unlikely initially to offset the declines in domestic demand, and with recovery coming later.

Quantifying the Influence of the Exchange Rate on Output

The influence of exchange rate changes on output over the business cycle depends on several factors, including the elasticity of trade flows with respect to prices, the response of trade prices to exchange rates, and the size and openness of the economy.[67] The larger a country's external sector is in relation to total output, the larger is the potential influence on overall activity of an exchange rate movement. However, in large countries, even ones with large external sectors, the impact of exchange rate movements may be muted because exporters to that country may tend to "price to market." Evidence suggests that prices of imported goods in the United States, for example, tend to reflect only about one-half of exchange rate changes. A consequence of this behavior is that changes in dollar exchange rates may have a smaller impact on U.S. imports in the near term than equal exchange rate changes in smaller countries.[68]

The effects of moderate exchange rate movements on output can be quantified using MULTIMOD, the IMF's international macroeconometric model, which

[66]Eswar S. Prasad and Manmohan Kumar, "International Trade and the Business Cycle" (unpublished; Washington: IMF, August 1997), summarize the quantitative evidence on the correlations between output and the trade balance, as shown in Table 13. They suggest that exports may be a catalyst for recovery.

[67]Empirical estimates of trade elasticities and their related adjustment speeds vary, but results for most advanced economies indicate that price sensitivities are sufficient to ensure that real currency depreciation increases net exports and vice versa. See Peter Hooper and Jaime Marquez, "Exchange Rates, Prices, and External Adjustment in the United States and Japan," in Peter B. Kenen, ed., *Understanding Interdependence: The Macroeconomic of the Open Economy* (Princeton, New Jersey: Princeton University Press, 1993).

[68]See Paul Krugman, "Pricing to Market When the Exchange Rate Changes," NBER Working Paper 1926 (Cambridge, Massachusetts: National Bureau of Economic Research, May 1986). Hooper and Marquez, cited above, reported pass-through estimates of about 85 percent for U.S. exporters compared with 50 percent to 70 percent for exporters in Japan and Europe.

incorporates estimates of the impact of exchange rates on both trade flows and domestic absorption. In this framework, a temporary appreciation of the U.S. dollar against other major currencies, assumed to result from a shift in preferences in favor of dollar-denominated assets, results in an initial deterioration in the U.S. trade balance (Figure 23, years 1 and 2).[69] One might expect the impact on aggregate U.S. output to be larger than that on the trade balance, owing to multiplier effects. This is not the case, however, because of an offsetting rise in domestic demand that results from the lower interest rates associated with the assumed shift in asset preferences. This effect on domestic demand and output can be seen continuing in years 3–5, when currency preferences and exchange rates are assumed to return to baseline levels. For Japan and Europe, financial and real variables move in the opposite direction. The impact on Japan is smaller than that in the United States because trade flows in Japan are assumed (on the basis of empirical evidence) to be less sensitive to exchange rates in the shortrun; in contrast, continental Europe shows larger trade and output responses than Japan and the United States because trade in Europe is assumed to be more sensitive to exchange rates.

These simulation results indicate that moderate movements in nominal exchange rates can have measurable effects on demand and output and thus can play a role in stabilization. Put in terms of "representative" exchange rate movements witnessed over the past 25 years, a temporary appreciation of the U.S. dollar of about 15 percent would result in a reduction in aggregate output in the United States of about 1 percent. Results for Germany and Japan are broadly similar for representative depreciations in the yen and deutsche mark.[70] Put in terms of annual relative output fluctuations, which are typically on the order of 2 to 3 percentage points, it appears that a representative exchange rate variation can offset about one-third to one-half of relative cyclical fluctuations.[71] As the record

---

[69]In MULTIMOD, exchange rates are assumed to be determined by market forces, and to introduce the dollar appreciation it is convenient to assume a shift in preferences in favor of U.S. dollar assets. The actual appreciation is less that 10 percent owing to endogenous effects of the decline in U.S. interest rates. Results for the United States are in line with the Federal Reserve's new global model. See Andrew T. Levin, John H. Rogers, and Ralph W. Tryon, "Evaluating International Economic Policy with the Federal Reserve's Global Model," *Federal Reserve Bulletin* (October 1997), pp. 797–817.

[70]A representative change in the exchange rate is assumed to be equal to 1 standard deviation in the real quarterly effective exchange rate—namely, 15 percent for the United States, 5 percent for Germany, and 20 percent for Japan.

[71]Over the past 25 years, *relative* business cycles—that is, economic fluctuations in one country relative to those in its trading partners—have been on the order of 2 to 3 percentage points, compared with as much as 4 to 6 percentage points for absolute changes (see Figure 24). Thus, a 1 standard deviation change in the exchange rate results in about a 1 percentage point change in output, which is equivalent to one-third to one-half a typical relative output gap.

Figure 23. Selected Major Industrial Countries: Temporary Dollar Appreciation Scenario
(Deviation from baseline; in percent)

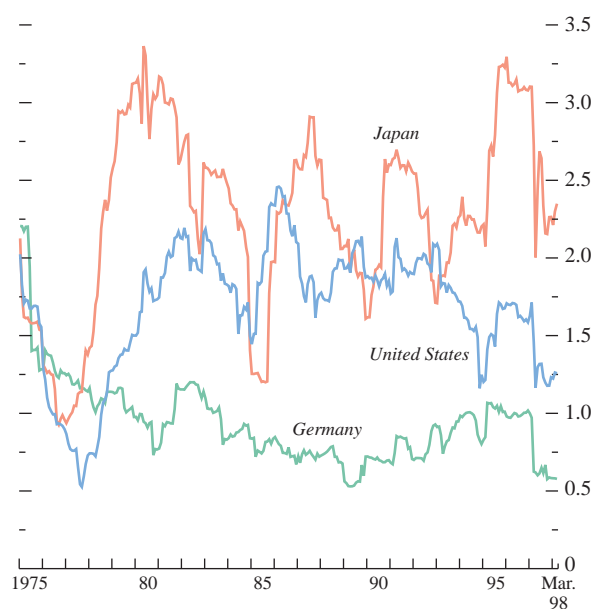The U.S. dollar appreciates against the yen and European currencies.
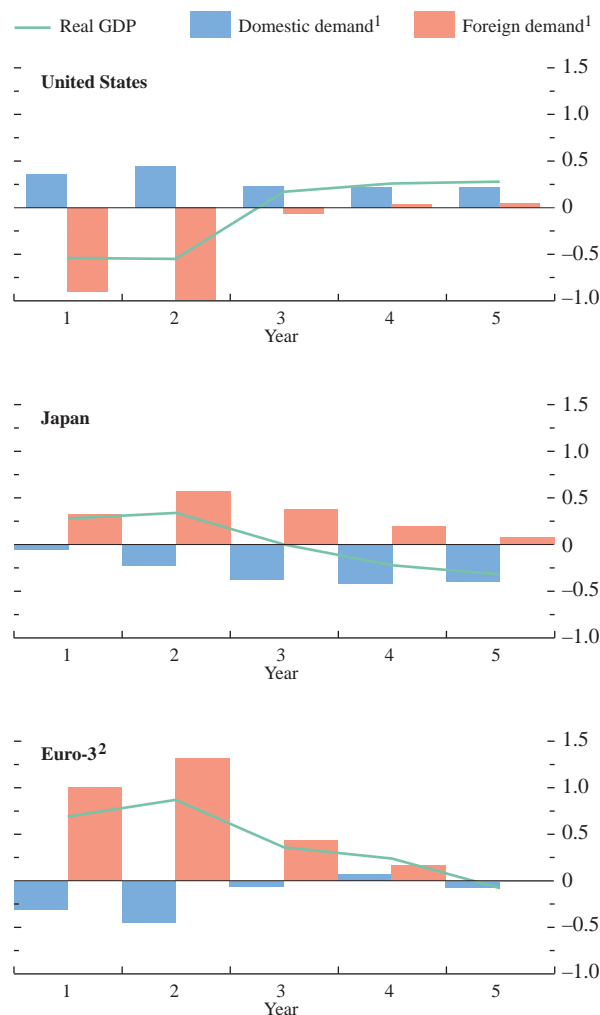
[1]Contributions to real GDP growth.
[2]Comprises France, Germany, and Italy.

demonstrates, however, currency values can vary in the short term for reasons other than the business cycle, which can potentially be destabilizing.

These estimates are subject to several qualifications and thus should be seen only as indicative. First, as noted above, exchange rates best help moderate cyclical fluctuations when the cycle is caused by country-specific shocks, so that demand can be redistributed through international linkages. Second, because exchange rates mainly operate in the near term through the relative price of traded goods, they will be more effective in moderating fluctuations in activity in traded-goods rather than in nontraded-goods sectors. A third qualification relates to the implications for policy: exchange rates in a floating regime are determined by market mechanisms, and they can be influenced only indirectly by policymakers.

Exchange Rate Variability

Have exchange rates become more variable over time?[72] They have certainly been more variable in the post–1973 regime of generalized floating than during the Bretton Woods system of adjustable pegs.[73] And instances in recent years such as the 1992–93 ERM crisis and the 1995 episode in which the Japanese yen reached record levels against the U.S. dollar and subsequently depreciated by some 30 percent have led some to suggest that currencies have become more variable since generalized floating began. However, at least for the three major industrial countries, data show no clear trend in exchange rate variability since generalized floating began (Figure 24).[74] And there is no statistical support for the notion that variability increased in the 1990s. Attempts to find correlations between exchange rate variability and inflation, a variable that might cause variability, also have been unsuccessful.[75] It may still be the case, however, that exchange rate variability is influenced by the variability of expectations and therefore could eventually be

Figure 24. Three Major Industrial Countries: Variability in Effective Exchange Rates[1]
(In percent)

Exchange rate variability shows no trend during the floating-rate period.

[1]Standard deviation of month-to-month changes calculated over 24-month moving windows.

[72]This section discusses exchange rate variability at such frequencies as month to month, quarter to quarter, or year to year, rather than exchange rate volatility—the variability of exchange rates at high frequencies, such as within a day, week, or month.

[73]See Michael Mussa, "Nominal Exchange Rate Regimes and the Behavior of Real Exchange Rates: Evidence and Implications," *Carnegie-Rochester Conference Series on Public Policy*, Vol. 25 (1986), pp. 117–214.

[74]Figure 24 shows the standard deviations of month-to-month changes in the logarithm of effective exchange rates over moving 24-month windows. Logarithmic changes are used to account for the trend in the original time series. Other statistics such as the coefficient of variation were also used to measure variability and produced similar results.

[75]For a review of these statistical findings, see John E. Morton, "Trends in Financial Market Volatility in the G-7 Countries," in Bank for International Settlements, *Financial Market Volatility: Measurement, Causes, and Consequences* (Basle, Switzerland, March 1996).

reduced by credible monetary policies geared consistently to the objective of reasonable price stability. From this perspective, it is rather surprising that the decline of inflation since the early 1980s appears not to have reduced exchange rate variability. Perhaps, however, such an effect will become more apparent with the passage of time.

European Monetary Union, Business Cycles, and Exchange Rates

As discussed in the appendix to Chapter I, progress toward meeting the Maastricht criteria relating to nominal and financial convergence among EU economies has been sufficient for Stage 3 of EMU to begin on January 1, 1999. This high degree of nominal convergence has been supported by some convergence of real growth rates among many of the EU economies. There nevertheless remain some notable differences in cyclical positions at the present time.[76] Germany, France, and Italy, in particular, have significant degrees of economic slack, while output in some of the smaller countries—for example, Ireland and the Netherlands—is estimated to be close to capacity.

It is difficult to assess whether cyclical divergences will become more or less pronounced among countries participating in the euro area. On the one hand, the increasing correlation in output growth among EU members in recent years, reflecting increasing economic integration as well as convergence of macroeconomic policies, suggests that cyclical differences could become even smaller as these processes continue. Thus the common monetary policy of the euro area will reduce the likelihood of nominal shocks that differ across participating countries while the observance by countries of the Stability and Growth Pact should reduce the frequency of asymmetric fiscal shocks. At the same time, on the other hand, monetary union will eliminate the mechanisms of adjustment to country-specific disturbances provided by real interest differentials and nominal exchange rate movements within the euro area. This will increase the risk of overheating and bubbles in asset prices, such as in the property market, in some regions and of stagnation in others, unless product and factor markets are sufficiently flexible.

It is equally difficult to assess the extent to which monetary union might affect economic fluctuations in the euro area as a whole when global disturbances occur. One possibility is that policy interest rates will need to vary more than in the past to achieve the same result in price stability objectives and stabilizing economic fluctuations. Monetary policy transmission through changes in the euro's exchange rate vis-à-vis other currencies could be less powerful than transmission through exchange rate changes in the past because there will no longer be any scope for nominal exchange rates within the area to respond. It is possible, however, that monetary policy transmission to the real economy will be strengthened as financial markets in the euro area become more integrated, deeper, and more efficient. This would mean that any change in policy interest rates would have larger effects on real activity than in the past.

In spite of these considerations, the move to a monetary union is unlikely to have a major immediate impact on relative cyclical positions or on the policies followed to mitigate them because the prospective participants have in recent years used monetary policy mainly to hold their currencies relatively stable against the deutsche mark and have followed fiscal policies aimed at meeting the Maastricht reference values. Thus monetary union in 1999 will not represent a sea change in policies, but a further step in a process. Since, from the start of 1999, there will be one monetary policy in the euro area, remaining business cycle divergences among EMU participants will tend to result in differentials in wage and price inflation across the region. On the policy front, it will be necessary for member countries to reduce structural budget deficits further to provide room for the use of fiscal policy for stabilization purposes while complying with the Stability and Growth Pact. Further progress in structural reforms aimed at enhancing market flexibility will contribute to real convergence and facilitate adjustment to future shocks.

Implications for Policy and Surveillance

Business cycles may be expected to remain a prominent feature of the global economy. Although policies can help to reduce the amplitude of fluctuations in activity and mitigate their adverse effects, they cannot be expected to eliminate economic cycles entirely.

An important function of the multilateral surveillance process as carried out by the IMF is to assess how cyclical developments in individual economies relate to each other and to the global economy, and thus to determine the extent to which economic fluctuations are synchronized across countries or are likely to spread. When cycles are not synchronized internationally and largely reflect regional or country-specific factors, cycles in world output may be less pronounced, and international linkages through trade and financial flows, and through exchange rate changes, can help to contain inflationary excesses and to moderate downturns in activity at the national level. The 1990s have been characterized by less synchronization among national cycles in the major economies than the

---

[76]See the December 1997 *OECD Economic Outlook* (Paris), p. 21, for evidence of increased correlation in output among EU countries. The differences in cyclical positions are shown by IMF staff estimates of output gaps as seen in Figure 19 for the larger countries.

1970s and 1980s, when contemporaneous upturns, not only in most industrial countries but in the developing world also, led to the most intense global inflationary pressures of the postwar period.

Periods of desynchronization provide safety valves for inflationary pressures, in a way that synchronized expansions do not, because demand can be redistributed from countries near the top of their business cycles to those where demand is weak and there is spare capacity. Peaks and troughs in demand for primary commodities are also moderated when expansions are not synchronized, thus avoiding the pressures that can arise when the fast-moving prices in commodity markets respond to imbalances. In the present situation, the crisis in Asia, unwelcome as it is, is likely to help contain inflationary pressures in the United States, the United Kingdom, and other economies operating close to their capacity constraints. These economies near their cyclical peaks will provide outlets for the exports of the countries in crisis and support the beginnings of their recoveries, just as Mexico in 1995–96 also benefited from a favorable external environment. The recent desynchronization has therefore brought some benefits, but there seems little reason to assume that cycles will be predominantly desynchronized in the future. Coordination has a role in this regard, since an important lesson from the 1970s and 1980s is that simultaneous rapid expansions of demand, whether deliberately engineered and coordinated or not, risk producing large fluctuations in global activity and inflation.

When business cycles are not synchronized, variations in exchange rates can play a useful stabilizing role, especially when economies are open and internationally integrated. In these circumstances, policies need to allow exchange rates to diverge, sometimes by significant amounts, from their medium-term equilibria. A challenge for policy evaluation and multilateral surveillance is to distinguish exchange rate movements warranted by international cyclical divergences not only from those due to changes in fundamental factors determining medium-term equilibrium, but also from movements that represent overshooting or gross misalignments. Experience confirms that this type of differentiation is difficult, except in extreme cases such as the significant overvaluation of the U.S. dollar in the mid-1980s and of the yen in 1995.

Policies can dampen potential fluctuations in activity to a large extent by being forward-looking, and by responding to shocks when they occur in ways that do not destabilize expectations about the medium term, particularly with respect to inflation. The need to be forward-looking applies to both fiscal and monetary policies. Past experience suggests that fluctuations in activity can be exacerbated if monetary policy is tightened too late, and then by more than would have been necessary earlier. In this context, recent moves in several countries toward implicit or explicit inflation tar-

geting, which provides a formal structure for carrying out forward-looking monetary policy, should help to mitigate economic fluctuation to some extent. In recent episodes of preemptive tightening of monetary policy, such as in the United States and the United Kingdom in 1994–95, policy actions clearly averted the need for significantly sharper tightening of monetary policy later.

The active use of fiscal policy for stabilization purposes has declined considerably since the early 1980s for a number of reasons. In most industrial countries, deficit and debt positions forced governments to make budgetary consolidation, over a medium-term horizon, the prime objective of fiscal policy. In addition, experience suggested that active fiscal policy not only failed to stabilize activity—in fact, many studies found it to be positively destabilizing—but also tended to ratchet up deficits and debt because of the political difficulty of reducing spending or increasing taxes. Moreover, increased awareness of the distortionary effects of high tax rates, and of the advantages for private sector decision making of a stable tax structure, led governments to be more reluctant to use changes in tax rates for stabilization policy. Now that fiscal positions have been significantly improved in most industrial countries, the scope for the use of fiscal policy for stabilization purposes has, from that viewpoint, increased. And in some circumstances, fiscal policy may be the only tool available, particularly when both inflation and nominal interest rates are very low, as in Japan currently. In other circumstances, however, the use of fiscal policy, other than through automatic stabilizers, is likely again to carry dangers, as the above considerations suggest. Monetary policy is in most circumstances, therefore, likely to be the best tool both for counteracting overheating and for supporting demand when activity is weak, but it needs to be implemented in a forward-looking framework.

International capital flows have always played an important role in the transmission of economic disturbances among countries. But in recent years they appear to have become a more active and independent source of economic fluctuations. From the beginning of this decade up to mid-1997, the sharp increase in private capital flows to emerging market countries was widely and correctly perceived to be helpful in enhancing the financial resources available to countries with strong growth performance and potential, during a period in which growth was sluggish and investment opportunities were less attractive in many advanced economies, particularly Japan and much of western Europe. At the same time, however, the flows became very large relative to the absorptive capacity of the recipient countries. Moreover, in part because of weak financial sectors and inadequate prudential supervision, both borrowers and lenders appear to have considerably underestimated the risks associated with

many investments. The result was a belated but sharp correction of market sentiment that is now producing a serious slowdown in many countries in Asia. In contrast to the debt crisis of the early 1980s, which was partly triggered by the needed tightening of monetary policy in the United States and other industrial countries to combat inflation, in the present episode the reversal of capital flows does not appear to have been closely related to any significant change in global financial or economic conditions. If financial markets have a tendency to overreact to developments and to be subject to swings in sentiment, policymakers need to be prepared to counteract the potentially damaging consequences of market excesses and to ensure that financial systems and institutions are sufficiently robust to withstand market shifts.