16 INTERNATIONAL FACTORS IN THE RECESSIONS OF THE EARLY NINETIES

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16.1 INTRODUCTION

Economists have noted common patterns in economic fluctuations across countries dating back at least to early business cycle chronologies constructed by the NBER (see, e.g., Moore and Zarnowitz (1986)) and extending to the most recent "global" recession of the early 1990s. In modern language, these patterns are typically characterized as correlations between the movements in aggregate output of different economies. This striking feature of international fluctuations has stimulated a large body of work on common sources of business cycles and on their international transmission. Despite a long and distinguished history, the mechanisms linking cycles across countries remain, in our view, something of a mystery.

This paper examines the international transmission of business cycles through a case study of particular episode: the recession of the early nineties experienced by most of the developed world. We start by describing the features of this recession: its timing, its magnitude, and its scope. We go on to document the related behavior of expenditure components, trade, exchange rates, and interest rates. The behavior of these additional variables sheds some light, we think, on the economic connections among countries and on the role played by macroeconomic policy in the last recession.

We focus on eight countries: Japan, the United States, Canada, the United Kingdom, Germany, France, Italy, and Spain - the G7 plus Spain, which we

refer to as the G8. These eight countries account for 87 percent of OECD output. All of them experienced recessions in the early 1990s.

16.2 THE 1990S RECESSION

The early nineties witnessed a significant slowdown in economic growth worldwide by almost any measure. A closer look suggests, however, that its magnitude and timing were far from uniform.

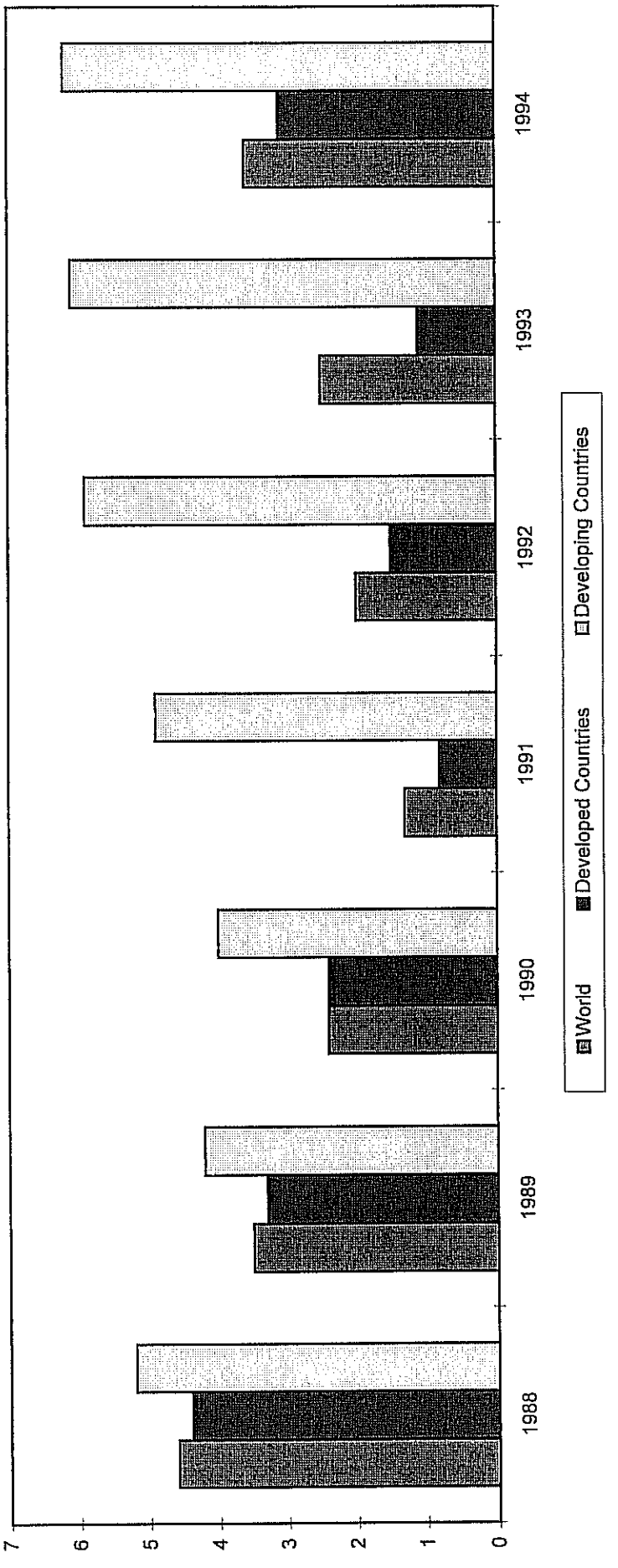
Worldwide macroeconomic performance is pictured in Figure 1. We see there a significant decline in the rate of growth of world economic activity during the quadriennium 1990-1993. This aggregate measure of economic performance, however, masks very different performance of industrial and developing countries, as well as among individual countries. During this period the developing countries grew faster, on average, than the industrial world, and their slowdown occurred about two years earlier. Perhaps more striking, the formerly socialist economies of Eastern Europe and Asia, which are not pictured separately, suffered average annual output losses greater than ten percent between 1991 and 1994.

In Figure 2 we report similar information for individual countries in our G8 sample. Each experienced at least three quarters of negative growth during the early part of the decade. The details of this experience, however, differ substantially across countries. Japan experienced five quarters in which output fell between the start of 1992 and the end of 1994. The US experienced three consecutive quarters of negative growth between 1990:3 and 1991:1, but averaged close to 3 percent annual growth since then. Germany's worst quarter, an output fall of more than 1.5 percent in 1993:1, came well after the US recession ended.

A similar story emerges from Figure 3, where we illustrate the timing of recessions in the G8 countries over the period 1970 to 1994. In the absence of an international standard, we define a recession as a sequence of quarters consisting of either (i) two or more consecutive quarters in which real output falls or (ii) a sequence with predominantly negative growth in which individual quarters of positive growth are surrounded by declines. This definition associates a recession with a period of output contraction lasting two quarters or longer, while ignoring isolated one-quarter episodes of positive growth that may occur during that contraction. It seems to correspond with official accounts published by the NBER for the US and the OECD for other countries. Figure 3 displays, for this definition, the recessions in each of our G8 countries since 1970. A casual glance suggests three episodes of "generalized" output contraction: one in the mid-1970s (the 1974-75 recession associated with the OPEC oil price increase), one at the dawn of the 1980s (between 1979 and 1983), and another in the early 1990s. There are also a number of isolated recessions, including recessions in the UK and Italy in 1977, a Spanish contraction in 1978, and a downturn in the UK in 1984.

The general clustering of recessions pictured in Figure 3 is a manifestation of a more general phenomenon: the positive comovement of economic activity

Figure 1: GDP Growth (%)



Source: World Economic Outlook, October 1995

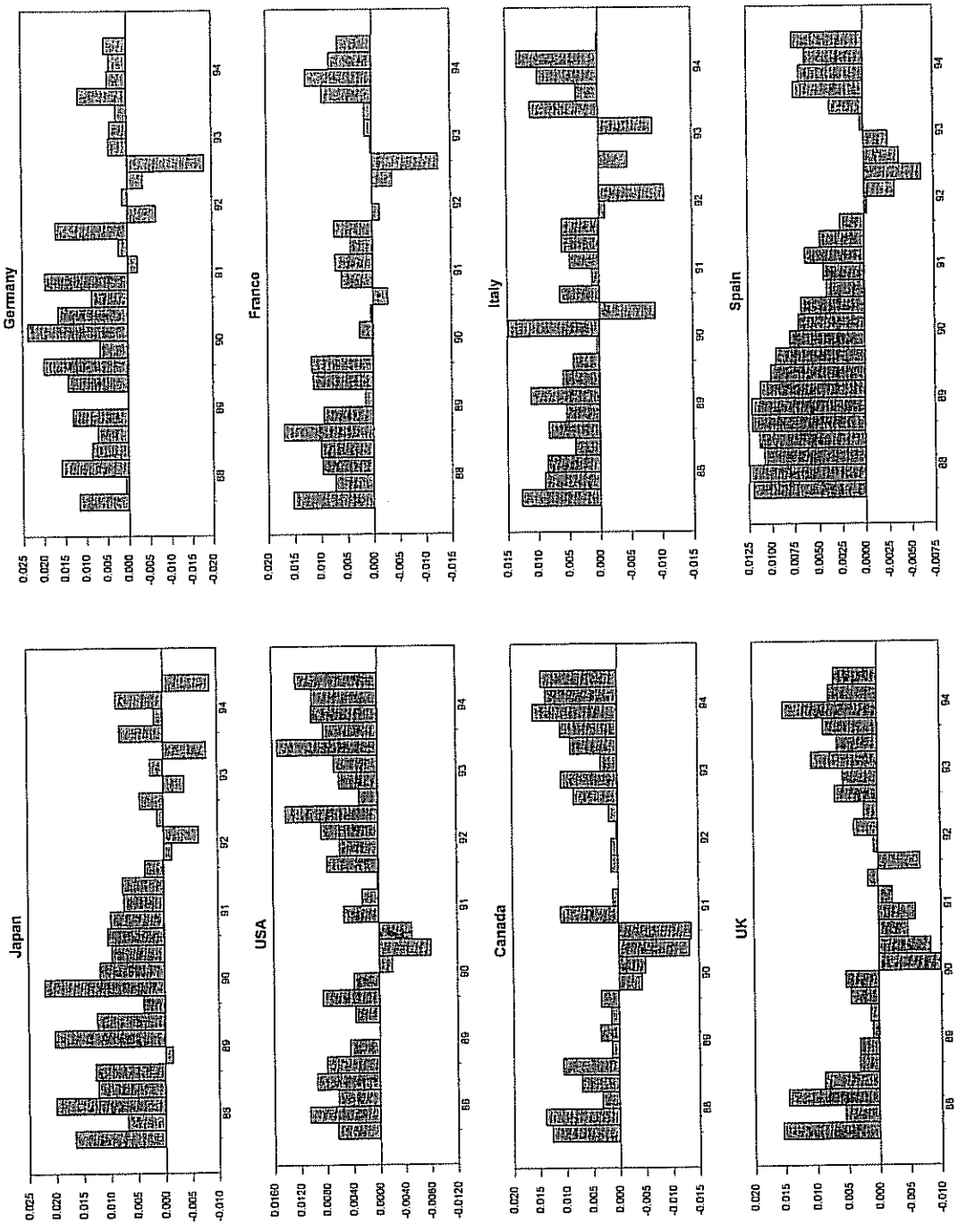


Figure 2: Quarterly GDP Growth Rates in G8 Countries

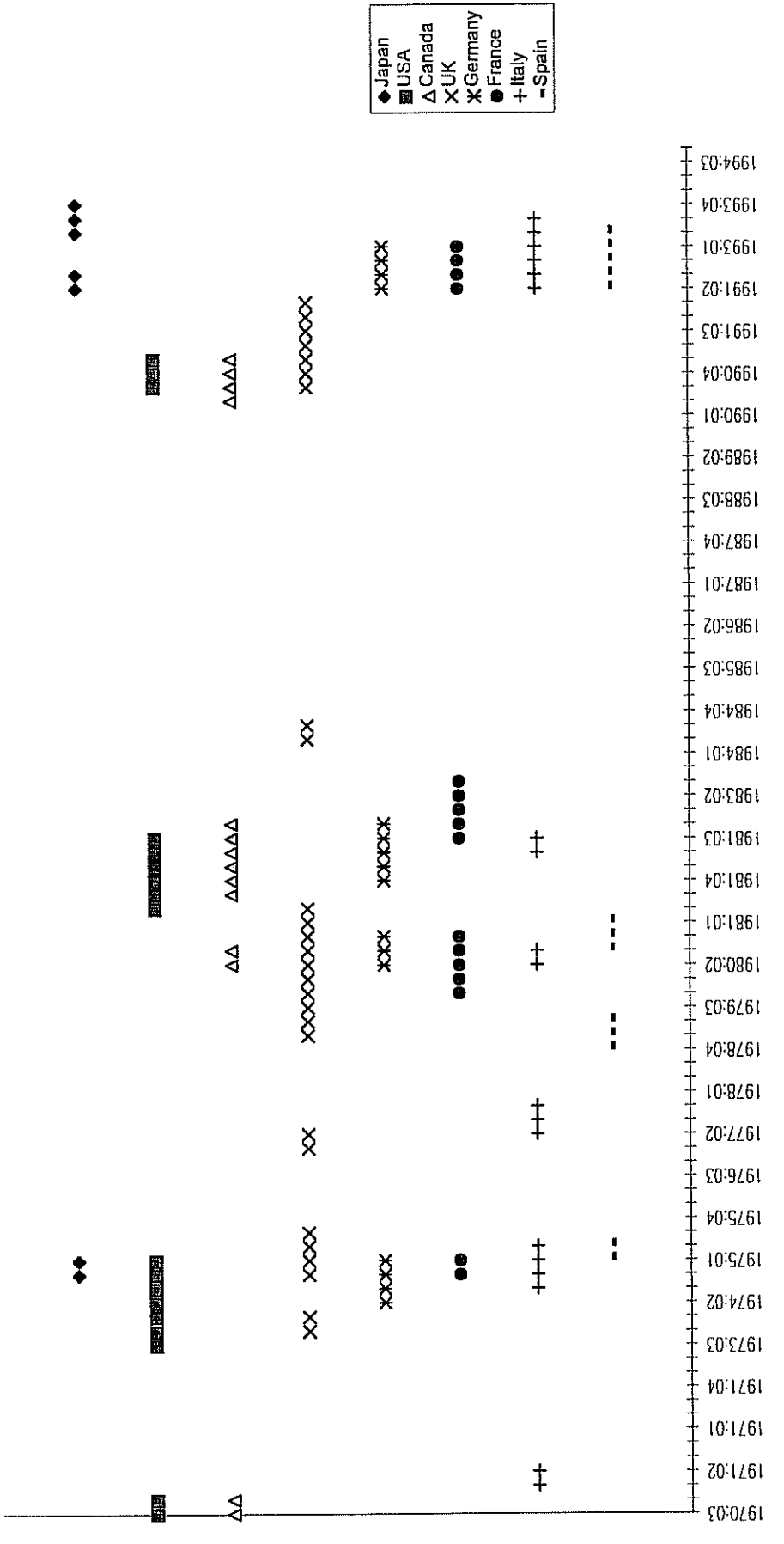


Figure 3: Recessions in G8 Countries (1970-1994)

Source: constructed by the authors, using data from Main Economic Indicators, OECD

among industrial economies. This property has been documented for many countries over long periods of time, and appears to be extremely resilient to the methods used. Work using the NBER methodology for the US, Great Britain, France, and Germany is summarized by Moore and Zarnowitz (1986). More recent work, using a variety of time series methods, is reviewed in Backus, Kehoe, and Kydland (1995), and includes prominent studies by Blackburn and Ravn (1991), Fiorito and Kollintzas (1994), and Gerlach (1988).

Given this body of work, it is not surprising that we find positive cross-country output correlations in our sample. We report in Table 1 the cross correlations of output growth rates at leads and lags of up to six quarters. Estimates that are statistically significant (at the 5% level) are displayed in italics; the largest correlation for each country is shown in bold type. The first panel covers correlations between country growth rates and the growth rate of the output of the other seven countries combined. The aggregate of the other seven countries in each case has been constructed using weights based on 1980 PPP-adjusted estimates of real GDP. In the second and third panels we report correlations of country growth rates with, respectively, the growth rate of the European countries in our sample (excluding the country of interest) and the growth rate of US GDP.

The picture that emerges is easily summarized:

- Growth rates in each of our countries are positively correlated with contemporaneous aggregate GDP growth for the remaining seven countries.
- The contemporaneous correlation with the aggregate of other countries is generally the largest. The exceptions are Spain and Italy, which lag the international cycle by one and two quarters, respectively. The overall appearance of synchronization hides a more complex pattern to which we turn next.
- Canada, the UK, and especially the US lead the European cycle by one or two quarters, while Spain lags it by one quarter. The lead and lag pattern is apparent in the 1990s, as we will see shortly, but is not unique to it: a similar pattern emerges if we end our sample in 1989:4.
- The US lead is particularly strong and significant vis a vis France, Italy, and Spain.

These patterns could, in principle, be a consequence of our using growth rates to compute cross-correlation functions. However, the close agreement between our characterization of events and official reports suggest that this issue is not a critical one in this case.

Figure 3 gives a visual representation to the same pattern, with two apparent waves in the most recent cluster of recessions. The first wave occurs during the biennium 1990-91, and includes the US, Canada, and the UK. The second wave (92-93) includes two Japanese recessions (which we label Japan-I and Japan-II), as well as parallel recessions in Germany, France, Italy and Spain. The recessions start in the same quarter in all of these countries, but extend longer in Japan-II, Italy, and Spain. It thus appears that cyclical fluctuations in the G8 group are led by the three Anglo-Saxon countries (with apologies to the Quebecois). The qualification, and it's an important one, has to do with the

Table 1.a.: 'Cross-Correlation of Output Growth Rates: G7 GDP(t) with each country's GDP(t+k)

k:	*-6*	*-5*	*-4*	*-3*	*-2*	*-1*	*0*	*1*	*2*	*3*	*4*	*5*	*6*
Japan	-0.06	-0.10	0.12	0.13	0.17	*0.21*	***0.39***	0.18	0.07	0.12	0.09	0.06	0.10
U.S.	0.06	0.08	0.15	*0.30*	*0.29*	*0.32*	***0.42***	*0.24*	0.00	-0.01	-0.13	-0.17	-0.03
Canada	0.11	-0.06	-0.02	0.17	*0.28*	*0.27*	***0.51***	*0.46*	0.10	0.17	0.10	-0.03	-0.07
U.K.	0.17	0.08	0.09	*0.25*	0.05	*0.32*	***0.38***	*0.24*	*0.21*	0.16	-0.01	-0.02	-0.05
Germany	-0.05	-0.14	-0.15	0.07	0.05	*0.29*	***0.47***	*0.27*	*0.26*	*0.23*	0.09	-0.08	0.00
France	0.11	-0.01	-0.07	-0.06	0.00	*0.20*	***0.42***	*0.33*	*0.25*	*0.34*	0.14	0.13	0.09
Italy	-0.15	-0.14	*-0.20*	*-0.24*	-0.10	*0.22*	*0.32*	*0.38*	***0.42***	*0.33*	*0.27*	*0.23*	0.12
Spain	0.01	0.05	0.08	0.13	0.18	*0.27*	*0.35*	***0.39***	*0.36*	*0.34*	*0.30*	*0.25*	0.19

Table 1.b.: 'Cross-Correlation of Output Growth Rates: Europe GDP(t) with each country's GDP(t+k)

k:	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
Japan	0.06	0.08	*0.24*	*0.27*	*0.28*	*0.25*	***0.41***	*0.25*	0.02	0.05	0.06	0.12	0.07
U.S.	0.05	0.10	0.14	***0.34***	***0.34***	*0.31*	***0.34***	*0.23*	-0.09	-0.04	-0.19	-0.12	0.04
Canada	0.16	0.00	0.02	*0.24*	***0.36***	*0.32*	*0.25*	*0.29*	-0.09	0.03	0.08	-0.01	0.01
U.K.	0.17	0.17	0.21	*0.26*	0.14	***0.32***	*0.30*	0.10	0.01	-0.09	-0.10	-0.17	-0.13
Germany	-0.12	-0.07	-0.09	0.18	*0.32*	*0.30*	***0.59***	*0.22*	0.06	0.07	0.02	-0.05	0.00
France	0.03	-0.01	0.00	0.03	*0.24*	*0.27*	*0.67*	*0.45*	*0.20*	*0.20*	0.04	0.06	0.01
Italy	-0.26	-0.21	-0.08	-0.08	0.03	*0.29*	*0.43*	*0.42*	*0.40*	*0.23*	0.08	0.08	-0.02
Spain	0.07	0.08	0.10	0.16	*0.27*	*0.38*	*0.49*	***0.52***	*0.43*	*0.35*	*0.25*	0.16	0.12

Table 1.c.: 'Cross-Correlation of Output Growth Rates: US GDP(t) with each country's GDP(t+k)

k:	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
Japan	-0.10	-0.18	0.01	0.01	0.08	0.12	***0.27***	0.11	0.06	0.10	0.08	0.01	0.06
Canada	-0.04	-0.10	-0.07	0.04	0.18	*0.21*	***0.51***	*0.45*	*0.20*	0.17	0.07	-0.01	-0.05
U.K.	0.09	0.03	0.02	*0.20*	0.03	*0.23*	***0.27***	*0.26*	*0.25*	*0.20*	0.07	0.05	-0.02
Germany	0.01	-0.16	-0.19	0.02	-0.08	0.17	***0.32***	0.18	*0.23*	*0.22*	0.04	-0.06	-0.01
France	0.09	-0.07	-0.12	-0.12	-0.11	0.11	0.19	0.17	0.18	***0.30***	0.08	0.10	0.09
Italy	-0.08	-0.16	*-0.26*	*-0.27*	-0.11	0.14	0.19	*0.26.*	***0.29***	*0.26*	*0.23*	*0.22*	0.12
Spain	-0.06	-0.02	0.00	0.03	0.04	0.10	0.16	0.19	*0.20*	***0.20***	*0.20*	0.18	0.14

size of the phase shift, which appears small in our full-sample cross-correlation estimates, but large when we look at the timing of the last recession.

The identification of two recession waves in the early 1990s, together with the unusually large phase shift, raises a question: are we actually seeing one or two recessions? In other words, are the two "recession waves" manifestations of a single contraction episode, or are they largely unrelated events experienced by two different sets of countries?

The recessions differ not only in their timing, but to some extent in their magnitudes as well. We illustrate the magnitudes in Figure 4 with the cumulative output decline in each country over the recessions identified by our method in the early 1990s. The size of the decline varies substantially across countries, with Canada and the UK showing the greatest drops (3.64% in each case), the US, Spain, France, and Japan (I and II combined) the smallest (between 1.5 and 1.8%), and Germany and Italy in between (2.77% and 2.50%, respectively).

A cross-country comparison of the statistical contributions of expenditure com-ponents (consumption, private fixed investment, change in inventories, government purchases, imports, and exports) to the observed output decline shows both similarities and differences. The strongest similarity is the large contribution of investment, which accounts for more than one-half of the output decline in all countries, and more than 100% in Japan, Italy, and Spain. A fall in consumption (with the exception of Germany) and a reduction in inventories (except for Japan-II and Canada) also account for a significant share of the GDP decline during each country's recession. On the other hand, the behavior of government purchases is moderately countercyclical in all countries but Germany, in which a decline in purchases makes a small contribution to the output decline. In addition to the government component, the downward adjustment of imports makes a positive contribution to output growth in all of the 1990s recessions but Japan-II the effect being particularly important quantitatively in Spain and Italy.

The greatest difference in the composition of GDP declines across countries lies, undoubtedly, in contribution of exports. Thus we see that Japan-II, Canada, Germany, and France experienced declines in exports during their respective recessions, which therefore contribute to their declines in GDP. By contrast, Japan-I, the US, the UK, and - most significantly - Italy and Spain saw their exports increase during the recession, which were offset by declines in the other components. We think this observation is central to any interpretation of the source and international transmission of the recessions.

16.3 INTERPRETATIONS OF THE 1990S

The strong correlations of output growth across countries, exemplified but not limited to the recessions of the 1990s, suggest three general categories of interpretations. The first is that output growth in each country responds, to a large extent, to a common shock or impulse. The recession of 1974-75 is a prime candidate, with the sudden rise in the world price of oil engineered by OPEC as the obvious impulse. A second interpretation is that country-

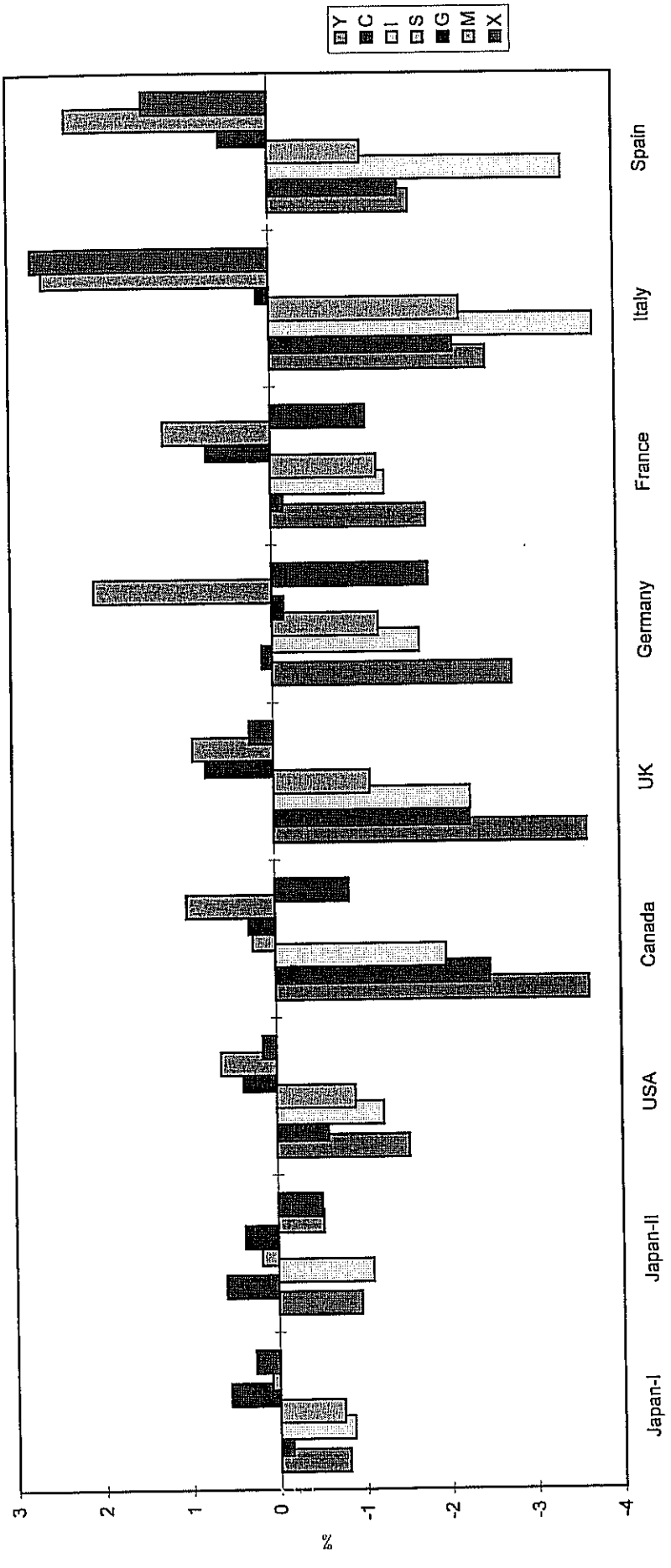


Figure 4: Composition of GDP Decline in the 90's Recessions

Source: Main Economic Indicators, OECD.

specific shocks tend, by design or accident, to trigger recessions in countries at about the same time – that the shocks themselves are correlated across countries. The third interpretation is that economic linkages between countries tend to transmit fluctuations in one country to others. The challenge in this case is to describe the transmission mechanism. We discuss the plausibility of those interpretations in the context of the 1990s experience.

16.3.1 Common External Shocks?

In the 1990s, as in 1974-75, a natural candidate for a common external shock that may have impinged simultaneously on all industrial economies is the sharp increase in oil prices, which in 1990 resulted from Iraq's August invasion of Kuwait. The monthly average spot price of oil rose from about $16 a barrel in July 1990 to a peak of $33 a barrel in October, before stabilizing in the range of $17 to $18 a barrel in the aftermath of the war. The price of oil, in other words, experienced a short-lived rise of about 100%.

Given the timing, one might argue that this shock helps to account for the recessions in the US and the UK, which started in 1990:3, and the temporary output decline in Italy in 1990:4. Our discussant, Charles Bean, argues that this interpretation of the UK is "ludicrous". For other countries not even the timing conforms with the rise in oil prices. The recession in Canada started in 1990:2, prior to the invasion of Kuwait, and downturns in other countries began at least a year after the end of the Gulf War.

On the whole, we find little evidence that a global impulse triggered the recessions of the 1990s. Indeed, most observers attribute 1990s downturns to factors specific to each country: the credit crunch in the US, the collapse of equity and real estate prices in Japan, and the impact of German reunification. None of these suggest a common-shock account of the early 1990s. If anything they make our second interpretation-the approximate coincidence in time of a variety of adverse domestic shocks-seem a plausible one.

16.3.2 Transmission Through Trade Flows

An alternative interpretation is that the recession, whatever its original source, was transmitted systematically across national boundaries by international trade in goods and services. This argument has a long history. In its simplest form, a recession in one country reduces its imports from others, which in turn reduces output abroad. As Zarnowitz (1985, p 530) puts it:

[B]usiness cycles are likely to be induced primarily by internal mechanisms,... but they are then transmitted abroad through the movements in imports that are a positive function of production and income... Thus the volume, prices, and value of US exports show fluctuations that correspond well to cycles in the dollar value of imports by the outside world... The demand changes are powerfully reinforced when the links among the major countries convert their independent cyclical tendencies into fluctuations that are roughly synchronized.

At least part of this story is undeniable: imports are invariably procyclical. We see the same thing in the 1990s: imports declined in the recessions of all countries in our sample, with the exception of Japan-II (which was associated with an extremely strong yen). Figure 4, described earlier, reports this behavior in a different way. There we see that in the US, cumulative output growth of -1.54 percent has components of -0.59 and -1.24 associated with consumption and investment, -0.91 associated with the change in inventories, and $+0.38$ with government purchases. The decline in imports appears, since imports enter the national income identity negatively, as a positive contribution to GDP growth of $+0.64$. The parallel increase in exports accounted for $+0.16$ of the cumulative output growth of -1.54. In other words, the contributions of imports and exports have the opposite sign of the change in output.

Figure 5 focuses directly on trade flows. For each country we plot time series of import (triangles) and export (squares) volumes for the 1988-94 period. The shaded area represents the effective real exchange rate (the relative price of domestic goods, from the OECD's Main Economic Indicators). The vertical lines indicate the start and end of recessions. The figure indicates, for all countries but Japan, that imports declined during the recessions of the early 1990s.

However, if the positive correlation of output results from the transmission of country-specific shocks through trade flows, we would expect the country to which a recession is being transmitted to experience a decline in exports leading up to and/or during the recession. We see this in Japan-II, Germany, and France, but not generally in the other countries. In Canada there is indeed a decline in exports during most of the recession, but in the three quarters leading up to the recession, as well as the recession's first quarter, exports were growing at a rapid pace. The pattern is tied to the imperfect synchronization with the US recession, with exports dropping only when the latter is underway. Spain and Italy actually experienced rapid export growth throughout their recessions, which appears in Figure 4 as a large positive contribution of exports to output growth.

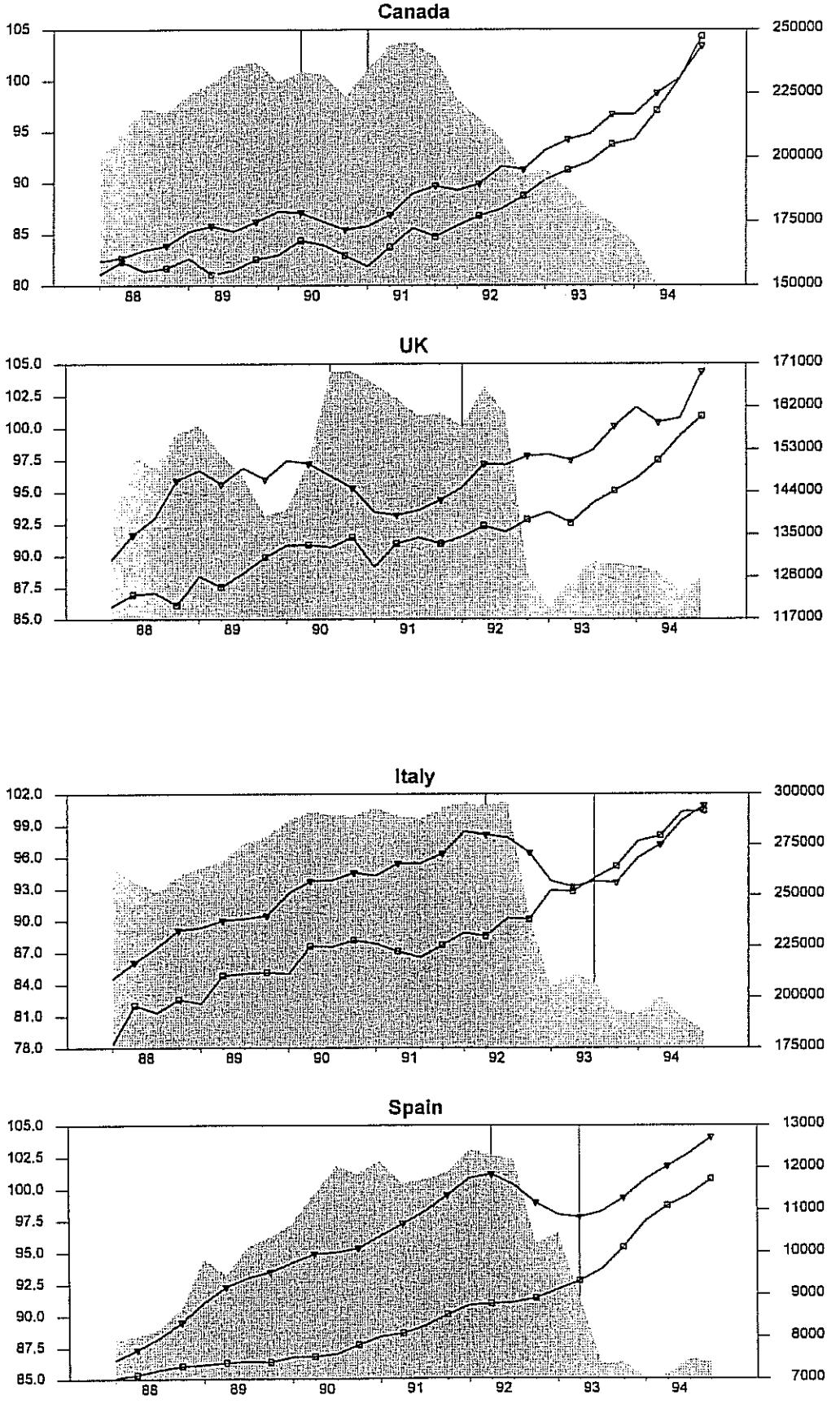
At least part of this mixed signal seems to be related to the behavior of relative prices. The drop in export volume during Japan-II is associated with a roughly 25 percent increase in the relative price of Japanese goods. Similarly, the export declines in Germany and France accompany real appreciations of 5 to 7%. Export growth in Spain and Italy extend recent trends, but perhaps accelerate when the peseta was devalued repeatedly and the lira depreciated after suspending its participation in the Exchange Rate Mechanism (ERM) of the European Monetary System.

The mixed behavior of exports weakens the case, we think, for trade in goods as the primary mechanism synchronizing cycles across countries. For France one might argue that a decline in exports was an important ingredient in spreading the German recession. But for Spain and Italy, the rise in exports makes them a less likely candidate for explaining the synchronization of recessions in Europe.

If we nevertheless think of trade flows as the predominant mechanism by which cyclical fluctuations are transmitted across countries, we run into

Figure 5: Real Exchange Rates and Trade

Exports (squares), Imports (triangles), Real Exchange Rate (shaded)



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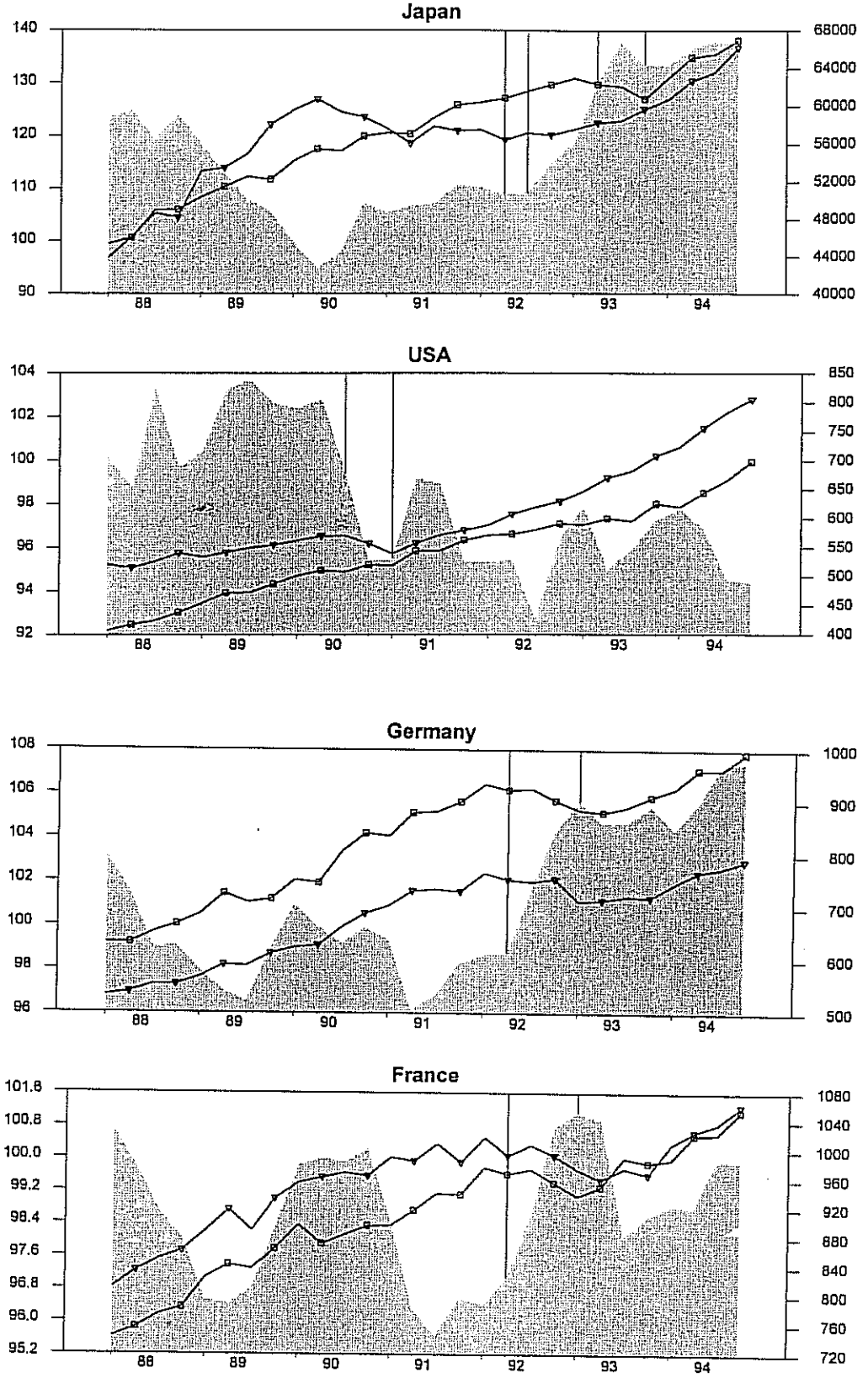
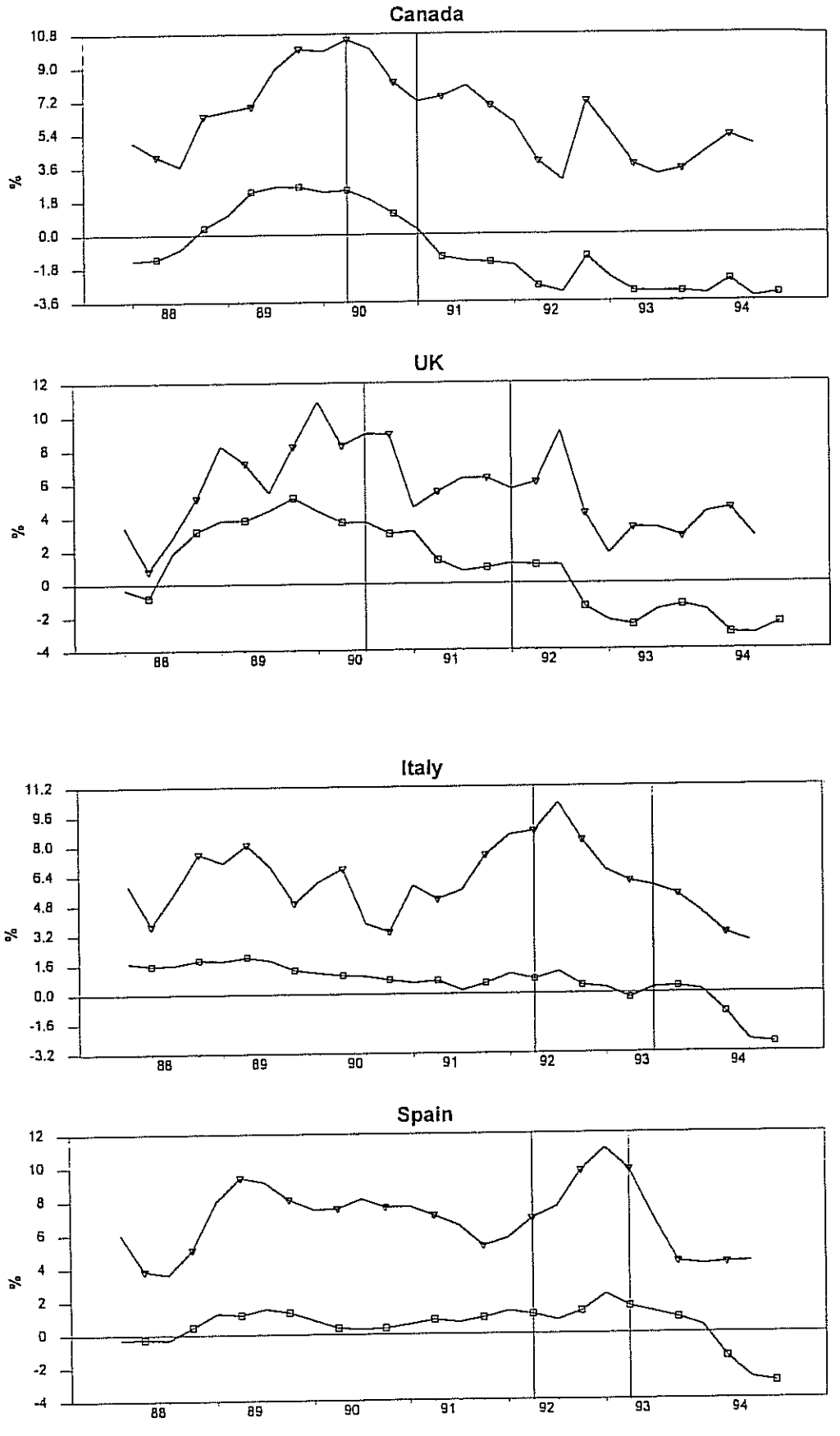


Figure 6: Interest Rates

Real Rate (triangles), Spread (squares)



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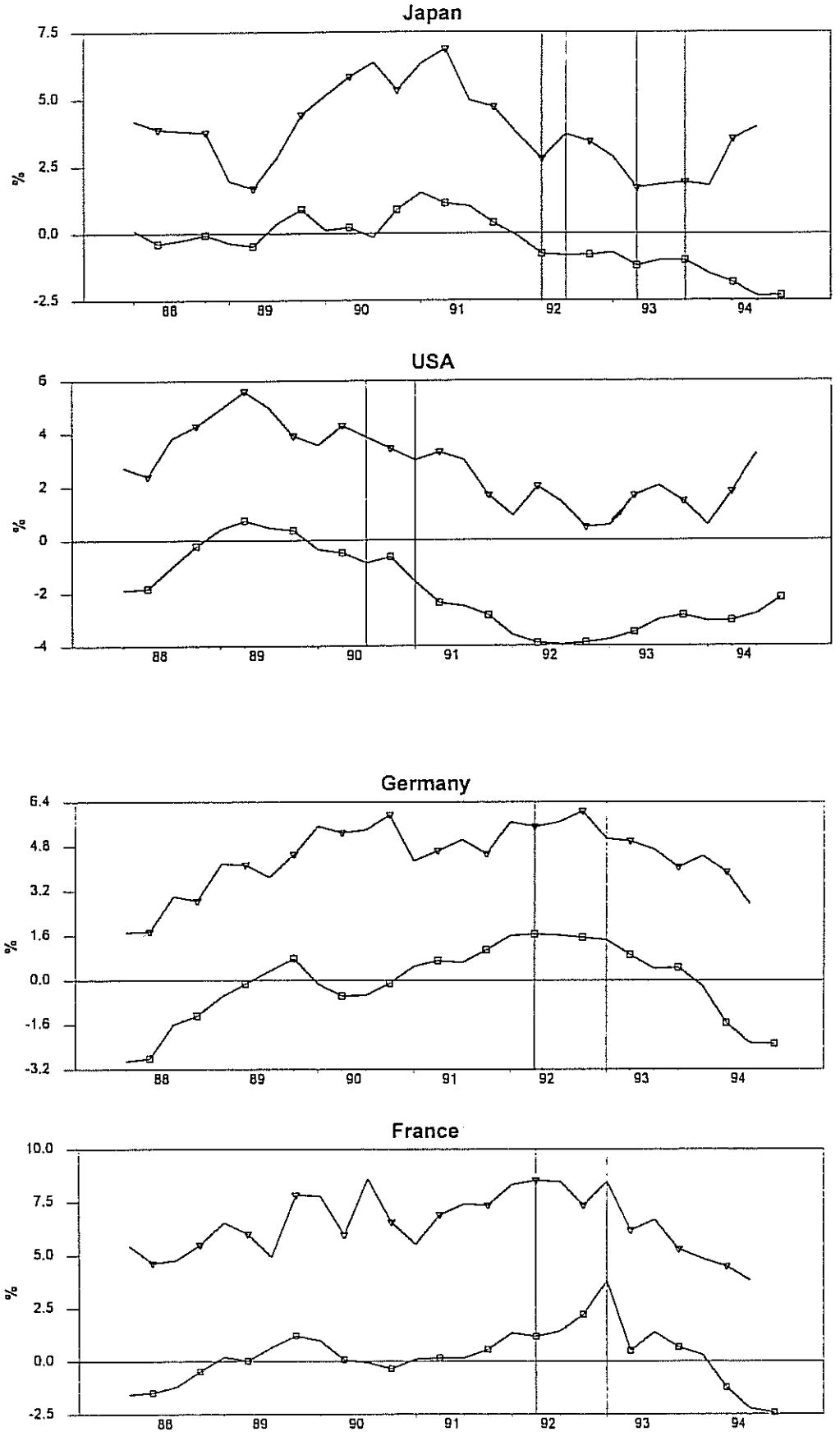

another difficulty. A country whose fluctuations are largely caused by foreign developments transmitted through its exports would display procyclical movements in net exports, as changes in exports lead to changes in the same direction in aggregate economic activity. In fact, net exports are almost uniformly countercyclical. The only exception we've found among the G7 and the EC combined is Luxembourg, which exhibits a modest correlation of 0.2 between net exports and GDP (Fiorito and Kollintzas, 1995, Table 1, Part (f)).

16.3.3 Transmission Through Financial Markets

A second mechanism for the international transmission of business cycle is through financial markets - in particular, through interest rates. World capital markets connect interest rates across countries, but the form of this connection varies with the extent of controls on international capital flows and on the regime governing the exchange rate. A rise in interest rates might initiate a recession in a number of ways, including the mechanism studied by Mendoza (1992) and Schmitt-Grohe' (1995) in the context of a real business cycle model: a rise in the foreign interest rate leads to a rise in the domestic rate (they're effectively the same in their models) and declines in investment, output, and employment.

We report interest rate experiences in Figure 6, where we graph real short term interest rates (triangles) and the spread between short and long rates (squares). A number of researchers have reported a countercyclical pattern for both indicators over long sample periods. That property is often interpreted as evidence of a significant role of monetary policy, both as a cause of recessions and as a factor in the subsequent recoveries. That connection between interest rates and the business cycle also seems to be present in the cyclical episode studied here: we see in most countries a rise in short rates, and in the short-long spread, prior to the recession. In the US, for example, the real short rate rose about 250 basis points in 1988 and 1989, and the yield curve turned slightly inverted (the short rate exceeding the long rate by about 75 basis points in mid 1989). In the UK a similar pattern is even more pronounced. In Germany, a sharp run-up in the real short rate leveled off almost two years before the recession commenced. In France, Spain and Italy we see protracted periods in which short rates exceeded long rates, and relatively high real rates in the three years prior to their recessions. In fact, Germany, France, and Spain do not see their real rates go down until the recession is about to end. In all of these episodes, investment declines; see Figure 4. Moreover, the declines are especially pronounced in Spain and Italy, which experienced dramatic rises in interest rates.

The issue, though, is why these events are synchronized within Europe, if not between the first and second recession waves. A popular explanation - and a persuasive one, in our view - is that the ERM led to synchronization of interest rate movements within Europe, but not between Europe and other countries. Under this interpretation, high interest rates in (say) Germany, whatever their source, were transmitted to other ERM countries and instigated recessions in

most of them. The exception is the UK, which was just leaving its recession as real rates were rising throughout Europe.

16.4 LESSONS FOR THEORY AND POLICY

We are led to believe that the approximately coincident recessions of the "G8" in the early 1990s were, with an important exception, just that - a coincidence. A variety of largely country-specific factors apparently led to recessions in all eight countries at about the same time. For the first wave, there is neither evidence of a single global shock or of transmission across countries that would account for the nearly simultaneous recessions in the US and Canada, on the one hand, and in the UK on the other. The exception to this coincidence is continental Europe, where the ERM may very well have played a role in transmitting interest rate movements in Germany throughout the member countries.

A lesson for policymakers, and not a new one, is that the ERM may increase the coherence of cycles of member countries. Such a conclusion follows, as Charlie Bean has noted in his discussion, from the Mundell-Fleming model with fixed ex-change rates, when monetary shocks are the primary source of fluctuations. Artis and Zhang (1995) go somewhat further and document a striking increase in the correlation of output fluctuations inside the ERM since its onset, and concurrent decreases in correlations with US fluctuations. Whether this development is good or bad is hard to say, but it does seem to be a by-product of the exchange rate system. Speaking more broadly, it appears that the globalization of world capi-tal markets and consequent connections between domestic interest rates has the potential to increase the international synchronization of business cycles.

A lesson for theorists concerns the mechanism through which fluctuations in one country are transmitted to others. The traditional export mechanism, in which reduced imports in one country reduce exports and hence output in another, does not appear quantitatively large. A similar conclusion was reached by Canova and Dellas (1993, p 23), who found that "the role of trade interdependence is moderate." They find, more specifically, that countries with greater trade linkages display a stronger correlation of output movements, but the effect is typically small. In our view, transmission through interest rates appears to have been more significant in synchronizing the recessions within Europe in the early 1990s. As an example, Spain's three devaluations were accompanied by continued growth in export volume. Nevertheless, real interest rates remained high and even increased during the recession. The more important mechanism, in other words, appears to be through interest rates.

Central to this interpretation is the role played by monetary arrangements, including the exchange rate regime. Dynamic general equilibrium theories of fluctuations, like those surveyed by Backus, Kehoe, and Kydland (1995), generally fare poorly in accounting for the correlations across countries in economic activity. Perhaps their disregard of monetary arrangements is part of the reason, and should be addressed in future work.

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