OECD Economics Department Working Papers No. 51

The Effects of Monetary Policy on the Real Sector: An Overview of Empirical Evidence for Selected OECD Economies

Jean-Claude Chouraqui,

Michael Driscoll,

Marc-Olivier Strauss-Kahn

https://dx.doi.org/10.1787/076618776054

OECD

General Distribution

OECD
DEPARTMENT
OF ECONOMICS AND STATISTICS

WORKING PAPERS

No. 51 THE EFFECTS OF MONETARY POLICY ON THE REAL SECTOR:
AN OVERVIEW OF EMPIRICAL EVIDENCE
FOR SELECTED OECD ECONOMIES

by

Jean-Claude Chouraqui, Michael Driscoll
and Marc-Olivier Strauss-Kahn

April 1988

OCDE
OECD

THE EFFECTS OF MONETARY POLICY ON THE REAL SECTOR: AN OVERVIEW OF EMPIRICAL EVIDENCE FOR SELECTED OECD ECONOMIES

by

Jean-Claude Chouraqui, Michael Driscoll and
Marc-Olivier Strauss-Kahn*

Respectively Head of Division and Administrator, OECD Monetary and Fiscal Policy Division, and Economist, Bank of France. Mr. Strauss-Kahn was on secondment at the OECD during the preparation of the paper. The authors wish to thank Isabelle Wanner for her valuable assistance in preparing the supporting statistical material. They are also grateful for comments from Kumiharu Shigehara, Paul Atkinson, Kevin Clinton, Mitsuhiru Fukao and other colleagues in the OECD Economics and Statistics Department. However, the views expressed reflect their own opinions and do not necessarily represent those of the OECD or of the governments of its Member countries.

GENERAL DISTRIBUTION

ECONOMICS AND STATISTICS DEPARTMENT

WORKING PAPERS

This series of Working Papers is designed to make available, to a wider readership, selected studies which the Department has prepared for use within OECD. Authorship is generally collective, but main individual authors are named. The Papers are generally available in their original language, English or French, with a summary in the other.

Comment on the Papers is invited, and may be sent to OECD, Department of Economics and Statistics, 2 rue André Pascal, 75775 Paris Cedex 16, France. Additional copies of the Papers on a limited basis can be forwarded on request.

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

12 177

W.6167E

TABLE OF CONTENTS

I. INTRODUCTION

The purpose of this study is to assess the current state of understanding about the effects of monetary policy, both at the conceptual level and in the light of the experience of the seven major OECD countries (the United States, Japan, Germany, France, the United Kingdom, Italy and Canada) and three selected smaller open economies (Australia, the Netherlands and Sweden) since the early 1970s (1). Over this period, there have been substantial developments in the policy making environment and in the conduct and implementation of monetary policy which may have significantly affected the way monetary variables influence the real sector of the economy.

A. Changes in the macroeconomic and financial environment and their implications for policy making

Since the early 1970s there has been a general deterioration in the macroeconomic situation in OECD countries. These have been subjected to large supply shocks, to substantial changes in the rate of inflation, to slow economic growth, to an upsurge in unemployment, which has remained stubornly high (particularly in Europe), and to increases in budget and external imbalances -- Table 1 illustrates some of these developments by comparing the performance in a number of areas over the last decade with the preceeding period from the beginning of the 1960s. Moreover, radical adjustments have been experienced in financial markets, brought about by the collapse of the Bretton Woods fixed exchange rate system, the growth of the international banking system (see Table 2) and the related trends in financial market deregulation and innovation. One effect of this has been that domestic financial conditions have become more sensitive to monetary policy in other countries.

In such an environment, the optimistic Keynesian consensus of the 1960s and early 1970s did not survive; nor did the ways of formulating and conducting monetary policy practised up to the early 1970s. Accelerating inflation raised serious doubts about traditional methods of inflation control and created an opening for the sort of alternative analysis being offered by monetarists and later by new classical economists. The liberalization of financial markets and the increasing use of market mechanisms encouraged the search for alternatives to direct controls on interest rates and the availability of credit; the money stock seemed the obvious choice. In addition, the move to a floating exchange rate system was generally seen as creating the opportunity for independent monetary policy. As a result, increased emphasis was put on domestic monetary aggregates, culminating in the widespread adoption of target-oriented monetary policies after the first oil shock.

Reasons for this shift were generally pragmatic rather than a reflection of strong "monetarist", or emerging new classical views within central banks (2). One consideration was the difficulty of interpreting movements in nominal interest rates as an indication of the policy stance in a context of accelerating inflation. A second consideration was the need to adjust interest rates more flexibly; monetary targeting provided a framework permitting the authorities to make the appropriate adjustments more easily and earlier. Third, it was hoped that, by publicising the monetary authorities' intentions, announcements of monetary targets would have favourable effects on inflation expectations and would provide a yardstick for proving the

commitment of central banks to controlling inflation. Finally, monetary targeting appeared justified, in a number of countries, by the evidence of a close relationship between the growth of monetary aggregates and nominal income over the medium term -- a factor which heavily influenced the choice of particular aggregates to be targeted.

As well as contributing, almost everywhere, to a gradual reduction of inflation to rates which prevailed in the 1960s, this approach provided the required flexibility to cope with the external stocks of the 1970s and the emergence of large budget deficits. It also allowed the central banks to raise interest rates until they were appropriately restrictive. However, problems have emerged in recent years which have considerably complicated the conduct of target orientated monetary policies (3). Interest rates and exchange rates have, at times, exhibited marked fluctuations which have been deemed to be excessive, forcing departures from announced monetary targets. Different measures of money have often moved in divergent ways (see Chart 1), posing problems for the measurement of the stance of monetary policy and the choice of monetary aggregate to target. Moreover, the relationship between monetary aggregates and nominal income has become unstable in some countries; money demand equations began to predict badly out of sample and measures of income velocity have been subject to unexpected shifts. Chart 2 gives some indication of the swings in the velocities of broad and narrow monetary aggregates in recent years (4).

A number of reasons have been advanced for the breakdown in the money-income relationship. One popular explanation has been that financial innovation and financial market deregulation distorted the monetary aggregates by increasing the range of substitutes for assets included in these aggregates (5). Another account of this development, known as "Goodhart's Law", is that formerly well-determined and stable relationships disintegrate when any attempt is made to exploit them for policy purposes. Viewed from this perspective the shift towards a quantitative objective for the money supply in the 1970s would have been responsible for the deterioration in money demand and velocity behaviour. An alternative explanation is that some of the determinants of money demand -- i.e. interest rates and inflation expectations -- may have changed sharply and unpredictably as a consequence of the successful disinflationary process. On this argument, as gains against inflation are consolidated, a stable relationship between money and income should reassert itself in the future.

Whatever the reasons for the instability that has characterized the money demand behaviour since the early 1980s, this has led the monetary authorities, in countries most seriously affected, to adopt a more pragmatic attitude. They have relied increasingly on judgement, taking into account a broad range of economic and financial indicators in implementing their policy. In so doing, they have felt less constrained to adhere rigidly to previously announced targets as circumstances have changed in unforeseen ways. This has been the case notably in the United States, Germany the United Kingdom, Canada and Australia, where the authorities have at times missed targets (all five countries), revised their targets in mid-year (United States), or suspended targets in part (United States, United Kingdom) or altogether (Canada, Australia) -- see Table 3.

The more pragmatic approach adopted in recent years with respect to monetary targeting has been matched by a general move towards greater reliance

on market-oriented techniques of monetary control. Schemes for imposing quantitative ceilings on bank lending have been abolished or phased out in a number of countries (France, United Kingdom, Italy, Australia, and Sweden) in favour of the use of interest rates as operational instruments to achieve announced monetary objectives. To enhance their ability to maintain effective monetary control, central banks in these countries have been moving away from focussing on credit counterparts, placing more emphasis on open market operations to influence the cash reserves of the banking system. This has tended to make short-run interest rates more flexible.

In the context of such greater flexibility in the conduct of monetary policy, the exchange rate has played an increasing role (6). This has reflected attempts to adopt a more coordinated and cooperative approach in policy making, as epitomized by the Plaza Agreement in September 1985 and the Louvre Accord in February 1987. In some countries, the behaviour of the exchange rate has been used to provide the authorities with information about real and monetary developments. In Germany and the United Kingdom, in particular, decisions such as i) the choice of the monetary target range, ii) whether to aim for the top or the bottom of the range, and iii) whether to allow overshooting, have at times been influenced by exchange rate considerations. Even in the United States, where the exchange rate has traditionally had less of an influence on policy than elsewhere, foreign exchange market developments played a role in policy decisions made by monetary authorities in 1978-79, and again since 1985.

A number of other countries -- including (among those considered in this study) the Netherlands, Sweden and, to some extent, France, Italy and Canada -- have implicitly or explicitly made the stabilization of the exchange rate an important objective of their policy. This has largely reflected the exposure of these countries to the developments in large neighbouring economies. Operationally, such a policy has involved choosing a reference exchange rate, usually the currency of the major trading partner (for example, the Deutschemark for the "EMS countries" and traditionally the U.S. dollar for Canada) or a basket of currencies (in the case of Sweden). In practice, this has implied some combination of exchange market intervention and adjustment in monetary conditions to ensure that the exchange rate objective is met. Despite the strength of the U.S. dollar in the first half of the 1980s and some exchange rate adjustments (mainly involving devaluations of European currencies against the Deutschemark to take account of price diffentials), overall this policy has greatly facilitated the reduction of inflation in the countries concerned.

B. Changes in the transmission mechanisms of monetary policy

The radical developments in the financial structures and exchange rate regime outlined above are widely perceived to have resulted in important changes in the channels through which monetary policy operates domestically. Because the general thrust of such developments has been in the direction of giving market mechanisms a greater role in the allocation of resources, the burden of monetary policy transmission has increasingly fallen on market determined financial "prices" such as interest rates and exchange rates. The ability of central banks to influence these variables thus has an important bearing on the control of domestic financial conditions and, hence, on the overall effectiveness of monetary policy.

1. From direct controls to market-related mechanisms

Interest rates and credit flows have traditionally been regarded as the main internal channels through which monetary policy influences economic activity. Interest rates have important consequences for the costs of capital, mortgage finance and consumer credit and the stock of financial wealth, while credit flows determine the availability of loanable funds -- variables which are viewed as important determinants of private expenditure. In many OECD countries in the 1960s and 1970s monetary policy closely influenced the level of interest rates and the availability of credit. This arose out of the use of direct controls on interest rates, bank lending and consumer credit terms as instruments of policy. These interest rate and credit availability effects have been regarded as of evident importance in influencing housing and consumer durables expenditure, especially in major economies like France, the United Kingdom, Italy and even in the United States.

As far as the credit availability effect is concerned, the removal of ceilings on bank lending and on interest rates in recent years (see Table 4 for details of when such controls have been in force), as well as the easing of various banks' balance sheet constraints, has inevitably reduced the importance of this channel of monetary policy influence. Although loan markets are by no means completely unregulated, under current circumstances credit flows are typically governed much more than before by competitive forces reacting to opportunities for consumption and profitable investment. The reduced reliance on quantitative controls on lending has in effect increased the role of interest rates in the transmission process of monetary policy. The trend towards more deregulated financial markets has meant that monetary authorities have had to adopt indirect market-based methods to influence the costs of capital, mortgage finance and consumer credit. In so doing monetary authorities have come to rely more on open market operations and on "signalling" the direction in which they think market interest rates ought to go by, for example, adjusting their discount rates and making public statements aimed directly at financial markets.

The link between short-term and long-term interest rates has also become more decoupled. The increasing use of open market operations by central banks and the development of markets for new financial instruments has lead to a term structure of interest rates which is now less subject to manipulation by the authorities in a number of countries. With the removal of administrative controls, the authorities action on long-term rates essentially depends on conditioning market participants views about future short-term rates, which in practice has meant trying to influence the climate of expectations about the stance of monetary policy and the implications of this for future inflation. This inevitably makes control of long-term interest rates a difficult task.

In countries where monetary aggregates are used as key indicators of monetary policy, and in which targets are announced for the growth rates of these aggregates, the control of money growth relies increasingly on money market interest rates to achieve a desired change in money demand. The tendency for substantial shifts to occur in the portfolio behaviour of the private sector as a result of financial innovation has, however, made such control difficult. In particular the increasing propensity for components of monetary aggregates (especially broad ones) to bear market related interest

rates has lowered interest elasticities in some countries, making it necessary to accept larger changes in short rates. Moreover, exclusive reliance on this way of influencing money growth implies that it is no longer possible to have separate objectives for the cost of borrowing and the level of liquidity, as was possible in the short-run under the former system of direct administrative controls.

The ability of the monetary authorities to influence market interest rates, and thus money growth, has been further complicated by the emergence of large swings in exchange rates and the growing international integration of financial markets, which has been facilitated by the removal of controls on capital flows. The scope, especially in small countries, for sustaining lower interest rate levels than those prevailing in the rest of the world may be limited, especially if volatile exchange rate movements are unwanted. Also, reduced segmentation in asset markets means that it is sometimes difficult to exert any independent influence on exchange rates via sterilised intervention while pursuing targets for money growth. In these circumstances, independent monetary and exchange rate targets cannot be pursued simultaneously.

In addition to being a possible constraint on changes in domestic financial conditions, the exchange rate is a potentially important channel through which monetary policy influences the real sector. Exchange rate adjustments have important effects on the relative prices of domestic and foreign goods, so that, apart from influencing trade flows, they condition domestic costs and prices through their impact on import prices. In addition, given the importance of foreign asset holdings in domestic portfolios in some countries (see Table 5), by directly affecting the price of foreign assets in terms of the domestic currency, exchange rate movements are a potential avenue for significant wealth effects. However, because of data limitations, these changes in portfolio values are difficult to measure.

2. The role of money in the determination of interest rates and exchange rates

In most theoretical macroeconomic models, money growth, interest rates and exchange rates are depicted as being highly interdependent. Typically a sustained change in the rate of expansion of the money supply causes interest rates to adjust, which, given world interest rates, results in exchange rate adjustments. The direction of the responses of interest rates and exchange rates depends upon particular features of the economic system, such as the role of expectations and the speed with which goods prices and wages adjust. These features are particularly important in determining whether real interest rates and real exchange rates can be influenced by monetary policy and, therefore, whether they constitute a channel by which monetary policy can affect real economic activity as well as nominal aggregate demand.

With respect to interest rates, the traditional liquidity preference theory of interest rate determination posits that initially monetary expansion will cause short-term nominal interest rates to fall, this being necessary to maintain equilibrium in the money market (7). If price expectations exhibit inertia, the decline in nominal interest rates will also imply a fall in real rates. The existence of such a "liquidity effect", by enabling the authorities to control the real cost of capital, provides an important potential channel for the execution of stabilisation policy. This may depend, however, on the extent to which the liquidity effect can be sustained

sufficiently to reduce long-term interest rates, which may be of more importance than short rates for some categories of expenditure, such as business fixed investment.

The relevance of this liquidity effect for anything but the very short-run has been questioned increasingly. If monetary expansion raises inflation expectations then nominal interest rates will tend to rise, and real interest rates will eventually revert to their initial levels (8). By this reckoning, money growth and nominal interest rates should be positively related beyond the short run. This means that if monetary expansion is fully anticipated and the inflationary consequences of such a move are fully understood, there will be no initial liquidity effect and nominal interest rates will rise immediately by expected inflation, leaving real rates unaffected (9). This outcome could result from a situation in which expectations are formed rationally, in the sense that all the available knowledge is used optimally to predict the inflationary consequences of monetary policy. In such a world the monetary authorities may only be able to influence real interest rates by engineering a surprise (to the private sector) change in money growth. However, their ability to do this clearly depends upon their having an informational advantage concerning the money supply process.

Overall then, a priori, the effects of monetary policy on real and nominal interest rates are ambiguous. The relationship between money growth and real interest rates will depend on the relative strengths of the "liquidity effect" and the "inflation premium effect", The importance of the latter effect is likely to increase over time and to be more relevant for long-term interest rates than it is initially for short rates, especially if monetary expansion affects the price level with a lag. However, the inflation premium could swamp the liquidity effect even at the outset if inflation and inflation expectations respond quickly to monetary expansion.

As for the exchange rate, a sustained inflationary monetary expansion is typically predicted to cause a nominal depreciation of the domestic currency for two main reasons (10). First, money growth may be reflected in lower interest rates, which -- given foreign monetary conditions -- may lead to incipient capital outflows and a reduction in the demand for the domestic currency. Second, higher money growth may raise inflation expectations, which will set in motion forces to restore purchasing power parity between domestic and foreign currencies. In addition rising inflation expectations will, if not fully reflected in nominal interest rates, lower domestic real rates, thus reinforcing capital flight and exchange rate depreciation. If wages and prices increase more slowly than the nominal exchange rate, the real exchange rate will also depreciate. But as prices increase, the real exchange rate will gradually be restored to its initial level. The extent to which monetary expansion will cause the real as well as the nominal exchange rate to adjust depends on the same factors that govern real interest rate movements, namely the degree of inertia in the price level and in inflation expectations and the predictability of the inflationary consequences of monetary policy. If goods prices adjust more slowly than the exchange rate the latter may "overshoot" the level to which it will eventually adjust (11). If, on the other hand, goods prices adjust as rapidly as financial "prices", and expectations are formed rationally, there may be no scope for using monetary policy to systematically influence real economic activity by a real exchange rate channel.

The effects of a temporary, rather than sustained, expansion in money growth on interest rates and exchange rates will depend crucially upon the expectations about the future stance of monetary policy. If the monetary stimulus is expected to be reversed subsequently, in order to remain consistent with the stated policy of the authorities, any interest rate reduction or exchange rate depreciation may be very short lived if they occur at all. Indeed, both nominal interest rates and exchange rates may rise if monetary policy is expected to tighten in the future in order to correct for a temporary unanticipated monetary expansion. On the other hand, if the monetary expansion is expected to be sustained it will illicit the same interest rate and exchange rate responses described previously. The credibility of the monetary authorities announcements will thus have a crucial influence on the effects of actual policies. For example, those authorities which are suspected by the private sector having a prediliction for monetary expansion may eventually find that nominal interest rates remain stubbornly high and the exchange rate relatively weak despite a policy of sustained deceleration in money growth. Similarly long-term interest rates may not respond to monetary policy changes which are only expected to be temporary. The potential importance of policy credibility on expectations formation, coupled with the inherent difficulty of measuring this concept, poses severe problems for predicting the effects of any given change in money growth on interest rates and exchange rates.

C. The scope of the study

In the light of the developments discussed above, the present study specifically examines how the macroeconomic influence of monetary policy has changed over recent years. As such, the study constitutes an attempt to take stock of the current state of knowledge about the effects of monetary policy on the basis of available empirical evidence for the ten countries considered.

The rest of the study is organised as follows. Part II examines the effects of monetary policy on domestic real sector variables -- expenditure components, output, employment and the price level -- under the traditional non-clearing market approach to macroeconomic modelling. Part III assesses the relevance of the alternative market-clearing assumption adopted in new classical analysis, which predicts a different impact of monetary policy on the real economy. An overview of these competing conceptual frameworks is provided in Annex A. Part IV broadens the scope of the analysis by considering the international spillover effects of monetary policy -- i.e. how and to what extent monetary policy in other countries influences the domestic economy. A summary of the main findings of the study is provided in Part V, together with a brief assessment of their implications for the conduct of policy.

II. THE EFFECTS OF MONETARY POLICY UNDER SLOWLY ADJUSTING PRICES

The following analysis is based mainly on evidence from some thirty large scale models. Athough these models differ in numerous ways many of them share a broad basic structure. Nominal wages and prices exhibit inertia so that employment and output respond to changes in aggregate demand. Aggregate supply is essentially demand determined and prices are set as a mark-up on variable costs. These costs include import prices and wage costs. Import prices are determined by, among other things, the exchange rate. Wages are determined by some version of the expectations augmented Phillips curve; price expectations and excess demand being the main factors driving wages. Price expectations are typically adaptive and not model consistent. In this framework monetary policy directly affects aggregate demand and thereby output and employment. Monetary policy affects prices by influencing costs; it influences import prices via the exchange rate and wage costs via its impact on excess demand, often equated with the unemployment rate. One implication of this is that monetary disinflation is achieved by an unavoidable reduction in real economic activity. In addition to the evidence from large scale models, the results of a number of single equation studies are also considered here together with some empirical work undertaken by the OECD Secretariat.

A. The effects on real expenditure

The empirical assessment of the role of monetary policy in goods markets has tended to concentrate on its impact on the main component of private expenditure -- business and residential investment, consumption, imports, exports and inventories. In Annex B the evidence on the role of monetary variables (such as interest rates, money balances, exchange rates, financial net worth, credit availability, etc.) and non-monetary variables (such as inflation, real income etc.) in the determination of these categories of private spending is discussed in detail. A number of interesting features emerge from that discussion:

i) Monetary variables usually have some direct role in explaining total expenditure but they are not generally the major proximate determinants. Of the financial variables affecting expenditures, interest rates appear most frequently in the models considered, especially in equations explaining business and residential investment. Exchange rates, where these are allowed to vary, are important determinants of trade flows, and hence the current account of the balance of payments; they are, however, rarely used to explain directly other categories of expenditure. The same is true for other financial variables, such as money balances (real and nominal), financial net worth and credit availability, the inclusion of which in models is rarely successful. In fact the main determinant of all categories of expenditure turns out to be the overall level of aggregate demand. It is, therefore, predominantly via its impact on aggregate demand as a whole that monetary policy influences the different categories of expenditure, its small initial impact on each being magnified by multiplier and accelerator mechanisms. It is important to be aware that the relative importance of financial and non-financial variables and the magnitude of the impact and duration of monetary policy effects differ between different categories of expenditure, and between models for the same type of expenditure.

ii) Business fixed investment, arguably the component of aggregate demand which has received the most attention, is illustrative of the

differences in the reported role of financial and other variables. In contrast with earlier surveys, recent evidence points to interest rates generally having an important influence on investment, notably in Japan, Germany and Australia. One main exception is the United Kingdom, where, in keeping with earlier studies, interest rate effects are typically absent in most models of investment. When an interest rate effect can be found, its size differs considerably between countries and, disturbingly, between different models for the same country. For example, estimates of the interest rate elasticity in the long run range from 1 to about 3 in France and Italy. Despite the emergence of some interest rate effects on fixed investment, which may in part reflect the increasingly important role that the interest rate has been given in the allocation of capital, the prospects for profits, which dominate investment decisions, are generally captured in various other ways by the inclusion of such variable as sales, output or capacity utilisation, inflation and real labour costs.

iii) Residential investment is also marked by a wide variety of model specifications and measured effects of financial variables. Interest rates are uniformally found to be an important determinant of this category of expenditure, even in the United Kingdom. This impact is generally stronger and more rapid than for business investment, but estimates of actual elasticities vary considerably, partly because of the use of different interest rates to measure the cost of borrowing. The other main financial determinant of housing expenditure is the availability of funds. The supply of loans for house purchase is notoriously inelastic and appears to have remained so despite the recent deregulation of mortgage markets in a number of countries. Because mortgage rates tend to adjust slowly, as a result of institutional constraints and sometimes political pressure, rationing or availability effects remain important. Credit availability measures are indeed incorporated in a number of the national models in the United States, France, the United Kingdom and Canada; by contrast they do not usually feature in models for Japan, Germany and the Netherlands. The direct role of interest rate and credit availability effects is dominated in all countries by the influence of real disposable income, which is meant to proxy some concept of permanent income or wealth. Most of the decline in the share of residential investment in nominal income since the mid-1970s can in fact be explained by changes in real disposable income and hence is not directly linked to monetary policy or the rise in real interest rates. Inflation has also been a feature of some housing expenditure models in the United States and Germany; it raises housing expenditure due to the higher opportunity cost of holding nominal assets.

iv) Consumption, the largest category of expenditure, is the least clearly directly related to financial variables. As far as the role of interest rates are concerned, the evidence indicates that the magnitude of the effects is very limited and that the direction of these effects is sometimes ambiguous. When a net worth variable is taken into account it usually has the expected stimulatory effect on consumption, especially in models of the United States, the United Kingdom and Canada, countries where capital markets are large and competitive. In addition wealth effects on consumption may partly explain the association between recent stock exchange booms and the persistent decline in savings rates over recent years in most major OECD countries. The consumption effects of gains on the stock market are, however, likely to be limited; measured propensities to consume out of capital gains are low (around 0.1 or 0.2 in the United Kingdom and Japan and 0.5 in the United

States) compared with those of income (around 0.7 to 0.8). By the same token, the pure effect of wealth losses from the October 1987 stock market crash are unlikely in themselves to be of great importance. The consequences for the United States consumption has been measured to be a reduction of about 1 per cent from what it would otherwise have been.

Credit rationing rarely appears as a variable in consumption models, mainly because of the lack of adequate data. Attempts to include this effect have been made in some models for France, the United Kingdom and Italy. As in the case of housing expenditure, the main determinant of consumption is real disposable income, but inflation also often features in consumption models. A priori the direction of inflation effects can be ambiguous. Inflation may affect the propensity to consume positively, either by boosting spending, if the cost of holding money is expected to rise, or by leading households to view rises in nominal income as increases in real income, if inflation is not fully anticipated. Inflation, however, may reduce consumption propensities for several reasons, for example by inducing households to compensate for the depreciation in the real value of non-interest-bearing assets or even to raise asset holdings for precautionary reasons. Recently the share of consumption in nominal income has been associated inversely with changes in the rate of inflation.

v) Imports and exports are the aggregate demand components which appear most sensitive to monetary policy. This influence comes through the effect that monetary policy has on the exchange rate, the terms of trade and the level of economic activity. In contrast with other categories of demand, the actual proportion varies considerably among economies: from about 10 per cent in the United States to more than 50 per cent in the Netherlands. Imports and exports are usually specified to depend on domestic and foreign aggregate demand and on domestic and foreign prices and, hence, on exchange rates. Given short-run rigidity in prices, exchange rate changes alter the terms of trade. The effect that changed aggregate demand and terms of trade have on export and import volumes will then depend on their price and income elasticities.

Available estimates of the medium-run price elasticities of total imports and exports are highly variable both across different countries and across different studies for the same country: estimates can differ by a factor of 5 for the same country but the range of estimates is generally smaller for imports than exports (see Annex B for details). The only consistent result for each study is that the sum of import and export price elasticities after 2 years exceeds unity, supporting the view of "elasticity optimists". The prevalence of J-curve effects on the trade balance, however, highlights the short-run drawback of exchange rate depreciation. The income elasticity estimates indicate that in most countries a reduction in domestic activity of 1 per cent will reduce imports and exports by about 1 to 2 per cent in the medium run. Such estimates vary less than those of price elasticities. Income elasticities of imports are higher in the United States and United Kingdom than in Japan and France. The difference between the United States and Japan reflects the secular evolution of current account imbalances.

vi) The final expenditure component considered here is inventory investment. Unfortunately the determination of inventory investment and the particular role of financial variables is not well articulated in structural

models. When specified explicitly, and not just as the residual between supply and demand, inventories appear to depend less on financial variables than on output and sales. In most country models the only financial variable included is the rate of interest, which is meant to capture the holding cost of inventories.

The foregoing analysis is based on the static properties of isolated equations. Though this enables the direct role of monetary policy in expenditures to be identified, it cannot provide an overall assessment of the contribution of monetary variables to spending changes. This is evident from the importance of income and prices in explaining expenditures and the knowledge that large-scale models involve considerable dynamic interaction. Arguably an adequate assessment would require full model simulations. Although results are too numerous and sometimes too dispersed to be described in detail, the main common features of dynamic simulations of monetary policy effects on expenditure components are worth noting. When monetary policy simulations are conducted in terms of a permanent change in nominal interest rates, variations in business fixed investment provide the major contribution to real output changes in countries like Japan, Germany and, to a lesser extent, Canada. In other major countries, the relative contribution of residential investment may be as (or even more) important, especially in France, the United Kingdom and Italy. In contrast, the share of consumption in output changes does not exhibit any clear international pattern. Consumption may actually vary inversely with output in the short run. This is the case in France and the United Kingdom, mainly because of the dominance of income or wealth effects. Similarly trade balances generally make a negative contribution to short-run changes in output; for example they improve when output decreases after an exchange rate appreciation due to a tightening in monetary policy.

One thing that does emerge from recent evidence compared with studies of earlier vintage is the finding of significant interest rate effects. This could imply a number of things. It could signal a higher degree of responsiveness of expenditure to interest rates; but it could also merely reflect the fact that the effects of interest rates have become more transparent now that they are allowed to vary more freely. According to this last argument if interest rates are not flexible then their measured effect on expenditure will tend to be biased towards zero because other variables will tend to account for more of the variation in spending. At the limit, if the rate of interest were fixed over the whole of the estimation period it would show no effect on the level of expenditure even if borrowing costs were an important consideration in spending decisions. Alternatively, the new found importance of the rate of interest could reflect differences in the statistical tests used and the availability of longer runs of data in more recent empirical work.

There are two main reasons, however, for thinking that the effects of interest rates may have become more significant in the wake of financial market deregulation and recent developments in the macroeconomic environment. First, the very high levels that interest rates, and in particular real rates, reached in the early 1980s may have passed thresholds beyond which "consciousness" of borrowing costs is awakened. Whether or not this sensitivity will persist when real interest rates have fallen to more normal levels is uncertain. But this would be more likely to be the case if deregulation has permanently raised interest rates to higher "normal" levels,

which it may well have done if the perception that credit rationing was important in the past is correct. Also the volatility that has been experienced in financial market yields may have increased the risk premium included in interest rates. Second, the development of freer and more competitive financial markets may have raised the average interest elasticity of private sector expenditure. This may have happened because interest rates changes spread more quickly affecting a larger number of transactions and borrowers, or because financial assets have become more substitutable as a result of reduced market segmentation (the changes in interest rates thus altering the return on all financial assets vis-à-vis physical assets). Finally, the growth in variable rate loan contracts and short-term lending implies that interest rate adjustments will have a larger impact on overall borrowing costs, because they will affect outstanding loans as well as new loan contracts. In the case of rising interest rates, the impact will depend upon the extent to which borrowers are approaching the limits of their capacity to service the interest payments on existing loans.

The factors acting to raise the interest rate responsiveness of expenditures may, however, be offset by other influences. The increased availability of variable rate financing and hedging instruments may reduce the impact of a large increase in interest rates because the fear of being locked into high borrowing costs is lessened. This is especially likely if a tightening of monetary policy is expected to be only temporary. Moreover, the higher volatility in interest rates and prices that has been experienced recently, if this has increased uncertainty about future inflation, may mean that a larger increase in interest rates is needed in order to achieve a particular increase in expected real credit costs. In addition, if nominal interest rates adjust rapidly to reflect changes in inflation expectations, shifts in monetary policy may have less impact on real rates and, therefore, less impact on expenditure.

Another reason why interest changes may have, in particular, a reduced impact on physical investment is related to the phenomenon of "short-termism" in financial markets -- i.e. the tendency to give excessive weight to immediate and short-term returns to financial investment. The idea that financial markets are myopic is not new; it dates back at least to Keynes and is a popular notion among industrialists in some countries (12). Although this problem has not been studied extensively, there is some evidence of financial market myopia (13). What is less clear, and this is something that empirical researchers have not addressed, is whether short-termism is becoming a more important problem in the present context. There are those who see short-termism as being bound up with the structure of the economic and financial system and, therefore, view it as a feature of financial markets that has been present for some time (14). On the other hand, some consider that the development of sophisticated financial markets, dealing with spot and short-term futures and options contracts, may have permanently shifted flows of funds away from physical investment. Also the more competitive environment that fund managers have to operate nowadays may necessitate adopting a very short investment horizon. Furthermore, the worldwide boom in stock markets since the early 1980s may have shifted funds into assets which are easily traded on secondary markets. In this environment, companies not large enough to attract equity finance may thus not be able to easily obtain loans for physical investment whatever the rate of interest.

Thus, overall, it is not possible to say a priori if interest rates now, in what is widely regarded as a period of transition in financial markets, have a more important effect on expenditure than in the past. The limited evidence that is available on this issue is also far from being decisive, though some recent studies have reported results in support of increased interest rate elasticities (15). As long as there remains uncertainty about the magnitude of the expenditure response to interest rate effects, the conduct of monetary policy aimed at influencing private sector spending will need to be more pragmatic and flexible than it was in the days when direct controls on expenditure could be relied upon for this purpose.

B. The effects on inflation

The existence of some long-run causal relationship between money and the price level is rarely challenged. Long-run money neutrality implies that money growth will ultimately be fully reflected in the aggregate price level. This assumption which seems to be a plausible first order approximation is, however, difficult to establish empirically. Much of the evidence that is advanced in support of a long-run money-inflation link is in fact anecdotal in nature (descriptions of hyperinflation episodes, for example) and as such has been criticized as lacking rigour. Other approaches, which are designed to overcome this limitation, have been adopted recently. One of these involves measuring the association between money growth and inflation on a cross-country basis over a long period, the idea behind this being that problems of spurious association will be avoided, by using only one observation (the average value over a given period of time) for each country. As shown in Chart 3, such an approach suggests a positive relationship between money growth and inflation for the sample of countries covered in this study, though the sample is too small for this to be taken as categorical. Nevertheless, the use of larger samples (16) and alternative time series approaches, which are also designed to extract the long-run "signal" in the data, generally support the proposition that money growth has a permanent effect on the price level, under the assumption of an exogenous money supply (17). None of these tests, however, are capable of settling the question of causality between money and inflation.

Most macroeconomic models which incorporate non-clearing markets predict that the relationship between money growth and prices will be weaker in the short-to-medium run than over the long run. Additionally the widely-held view that the speed of price adjustment is variable would tend to suggest that the relationship will also be unreliable. Simple regressions of inflation on current and past values of money growth may provide some insight into this issue. Annex B presents such regressions for each of the major OECD countries over two sub-periods -- up to 1972 (starting dates differ between countries because of data limitations) and between 1973-1984 -- as well as over the whole period in order to get some insight into the robustness of the relationship. What emerges from this is that although a significant regression can be found for all countries over the whole period, for some combination of lag length, monetary aggregate and data periodicity, it is not always possible to identify a significant relationship over sub-periods. In the case of the United States, for instance, most of the regressions that were found to be significant in one of the sub-periods are not significant in the others. On the whole, the evidence seems to bear out the idea that a strong and reliable short-run money-growth-inflation relationship is difficult to establish. This may explain why monetary aggregates are generally absent from

equations explaining prices and price expectations in large-scale structural models. Nevertheless, in these models monetary policy typically has important effects on prices, via its influence on cost variables such as import prices, capital and inventory costs and wages. In other words, prices are determined as a mark-up on such costs.

An important channel by which monetary policy affects the domestic price level in most models is via its influence on the exchange rate and, hence, import prices, which depends on the extent of the adjustments made by traders to their cost-price margins. Some estimates of the role of import prices in domestic price indexes are reported in Annex B. Although the usual range of estimates is between 0.2 and 0.3, these vary considerably over the choice of index, the country in question and the particular study. In some models the cost of capital also enters directly in price equations, for example via the cost of mortgage finance or borrowing costs in general, and occasionally via credit availability. In a few models the price-cost mark-up process incorporates inventory costs and hence the rate of interest, as the opportunity cost of holding real assets. These effects of interest rates on prices are especially prominent in models of the French economy. The more open the industrial sector to foreign competitiveness, however, the weaker the mark-up of prices on unit costs such as inventory costs.

To gain further insight into the role of monetary policy in the inflationary process as described in structural models, it is necessary to examine the determination of wage inflation. This is usually encapsulated in some version of the "expectations augmented Phillips curve", according to which nominal wage inflation depends on inflation expectations and demand pressure that is usually reflected in the rate of unemployment. As expectations are often assumed to be formed adaptively and, therefore, to be independent of the current stance of monetary policy, any influence that monetary variables exert on wage inflation must come via their impact on excess demand and the degree of nominal wage indexation to the price level. On the whole, indexation is more rapid in Europe and Japan than in North America. In Europe full indexation generally occurs within 2 to 4 quarters following a price level increase, while in the United States and Canada full indexation often takes from 8 to 12 quarters. This difference partly reflects the fact that adjustments of nominal wages for cost-of-living changes generally occur ex post, coupled with the fact that wage contracts in North America have a longer duration -- typically 2 to 3 years -- than those in Europe and Japan where the usual bargaining cycle is one year. Though the notion of indexation tends to suggest that price level changes lead wage changes, it should be noted that in most national models, if prices can affect wages they do so as part of the adjustment process of wages in response to excess demand pressures.

Recent evidence tends to suggest that the process of wage inflation may be changing. Though the sharp abatement of wage inflation during the 1981/1982 recession and its continued moderation are consistent with the widespread adoption of non-accommodating monetary policy after the second oil shock in 1979 and persistent high unemployment rates, wage equations have not been able to capture this development satisfactorily. Indeed most models have tended to overpredict recent wage inflation, which might indicate the emergence of significant structural changes (18). In particular, policy statements aimed at signaling the commitment of the authorities to control inflation may have become more credible as a result of the recent success in

this area. In countries where indexation had formerly been prevalent, government as well as workers may have become more aware of the risks of such arrangements associated with the increase in vulnerability to supply shocks (19). Recent studies have shown that under wage indexation domestic prices become more sentitive to changes in foreign interest rates, and foreign prices through exchange rate movements (20). The reduced emphasis on indexed wage contracts is not captured in wage models and it is too early to say if any permanent change has occurred in the behaviour of wages.

C. Overall implications for the price level, output and unemployment

As already noted, if prices exhibit significant inertia, any impact that monetary policy has on aggregate demand will, in the short to medium run at least, be distributed over both the level of output and the price level. The extent to which these are affected is of considerable importance in assessing the role of monetary policy. If changes in aggregate demand are dominated by changes in the price level this may mean that significant output gains can only be achieved by expansionary policy at the cost of a substantial increase in inflation but that, at the same time, rapid disinflation can be brought about at little cost in terms of output. As far as the costs of disinflation are concerned these may be considerable if aggregate demand changes are mainly reflected in output.

One way of measuring the overall impact of monetary policy on prices, output and employment is through a dynamic simulation of models involving all potential monetary policy transmission mechanisms. The following discussion compares the simulation results from the main disaggregated models published in the countries under review (21). Ten years ago a comparison of this type would have been difficult, if not impossible, since at that time few countries had produced a single large-scale macroeconomic model which included a financial sector block. Today there is a large number of models to choose from, incorporating developed financial blocks. As instruments for assessing the impact of monetary policy in the current environment these models have, however, a number of limitations. The weight unavoidably given to earlier period, through the use of long runs of data, stretching back to the 1960s, may be misleading and also it is difficult for large models to be adapted quickly to incorporate recent developments. Moreover, the overall structure of these models is essentially imposed on the basis of the prior beliefs of the model builders; besides which they often contain a mixture of statistically estimated parameters and imposed judgemental parameters. These models should, therefore, be seen as reflecting particular lines of thought rather than as the outcome of an exhaustive testing procedure. Simulating monetary shocks requires some simplifying assumptions which inevitably limit the realism of such experiments (for more details on the conduct of simulations, see Annex B).

1. Monetary policy and the price-output split

Monetary policy simulations of large-scale models are typically conducted in terms of an exogenous change to a key short-term nominal interest rate. Simulations conducted in terms of a measure of the money stock, are comparatively rare. Arguably short-term interest rates are closer to the actual instruments that monetary authorities actually control directly. Nevertheless, there are problems with using nominal interest rates to measure the stance of monetary policy over anything but the very short run. The

reason for this is that a permanent change in the rate of interest requires an accelerating rate of change in money growth. Ideally, therefore, simulations should be conducted in terms of the ultimate instruments of monetary policy with models incorporating well-specified links between such instruments and other variables in the transmission process. Unfortunately these links are not quantitatively well understood and are not included in existing models.

Three types of simulation results are surveyed here, which are reported in Tables 6, 7 and 8 respectively: those conducted in terms of a once-and-for-all decrease in the stock of money; those based on a permanent reduction in the rate of money growth; and those involving a permanent increase in the level of nominal interest rates. It should be noted that these simulations results are not the product of exactly the same experiment and that they are not, therefore, fully comparable. Simulations have been conducted using different baseline assumptions regarding the "neutral" stance of monetary policy and the settings of other policy variables such as fiscal deficits, which may be an important factor in explaining the striking dispersion that appears in the results. Nevertheless the following features are worth noting:

i) According to all simulation results, a tightening of monetary policy has a restrictive impact on nominal income, the magnitude of which is greater under a floating exchange rate regime than it is under fixed exchange rates. This finding supports the view that the exchange rate, when floating, is an important channel for the transmission of monetary policy. The way in which this operates is easy to envisage: the exchange rate appreciates in response to tight monetary policy, lowering import prices. In the absence of purchasing power parity, partly due to slow price adjustment, the real exchange rate also rises and output falls because of the worsening of the terms of trade. Under fixed exchange rates monetary policy changes may be offset by capital flows as reported by simulation results showing that, in such a case, the response of money growth to interest rate changes is generally smaller than under flexible rates. This difference is, however, often small, suggesting that effective sterilization of capital flows may have occurred or that exchange rate regimes may not be well specified in the simulations.

ii) Although both output and prices usually fall in the face of a restrictive monetary policy, a few models exhibit stagflationary outcomes. Some interest rate simulations in France, the United Kingdom and the Netherlands, under fixed exchange rates, generate a decline in output but a rise in the price level when policy is tightened. This outcome could be the result of the effects of monetary policy tightening on nominal financial costs, which are passed on to prices, thereby eroding households' purchasing power. According to a recent (end-1986) experimental version of the OECD INTERLINK model, where prices largely depend on a mark-up on the user cost of capital and hence on long-term interest rates, this stagflationary effect may occur in most countries except the United States. The mirror image of this, an anti-stagflationary outcome (lower inflation and higher output), is generally not found even in the medium run (last year of the simulation, typically the 5th or the 7th year). This does not encourage the view that monetary disinflation will quickly (or within the sorts of periods covered by simulations) succeed in establishing the conditions for higher output growth.

iii) The short-run split of nominal income between output and the price level is frequently in favour of output in the short run (measured as the average of the first three years of the simulation, see Annex B); this is especially true under fixed exchange rates (see Table 9). The split turns out in favour of prices in Canada, only under floating exchange rates, and in the United Kingdom, under both exchange rate regimes. Over the medium run, the price-output split is less clear-cut and depends on the nature of the monetary shocks. Three types of shock can be distinguished:

-- First, in the case of a once-and-for-all reduction in the level of the money stock, the initial increase in interest rates should in principle vanish as prices adjust and as the level of real money balances returns to baseline. In such a case, for money neutrality to hold in the medium run, the output effect should disappear or tend to disappear by the last year of simulation. In the few available simulations expressed in terms of a shock to the quantity of money, changes in interest rates and in output persist into the medium run. In terms of the price-output split, however, these responses are generally smaller than in the short run. This trend suggests that in the longer run, money neutrality may hold in these models.

-- Second, in the case of a permanent reduction in the rate of money growth, the initial liquidity effect should be more than compensated by an opposite inflation expectations effect in the short-to-medium run, as discussed in Part II. In the longer run, for neutrality of money to hold, the change in the pace of money creation should only affect the rate of inflation but not the rate of real growth. There are only a few simulations available involving a change in money growth. In the majority of these the effect on output relative to prices more or less disappears over the medium term. Only in the MPS model for the United States is the rate of real growth in the last year of simulations significantly affected by the change in the rate of money creation. In this case, however, the last year of simulation is only the fifth and under floating exchange rates the output deviation from baseline in terms of level tends to vanish since the rate of growth for the last year is reverting. As for price effects, the ratio of price changes over money changes, either in terms of levels or rates of growth, do not equal unity in the last year of simulation (except for the Canadian model SAM), but they tend to approach this value in some models (such as MPS for the United States or RDXF for Canada).

-- Third, in the case of an exogenous permanent increase in short-term nominal interest rates, most models exhibit a persistent change in real output, which is often larger than in the short run. Indeed, most simulations generate the largest output changes in or around the last year of simulation. The responses of prices to interest rate changes also increases over time, especially under floating exchange rates. With a few exceptions, the peak effects in terms of prices corresponds to the last year of simulation and exceeds the effect on output. As shown in Table 9, for a 1 per cent change in nominal GDP, the output share of this change (and conversely for the price share) decreases from the short run to the medium run at which point it is generally below 0.5, especially under floating exchange rates. This increase in the dominance of the response of prices to interest rates is not sufficient to confirm longer-term money neutrality. As indicated in Table 10 output elasticities with respect to money calculated from data provided for the last year of the simulation period often remain positive and price elasticities seldom become close to unity. Nothing definitive, however, can be said about

the question of medium-term neutrality in the case of monetary policy simulations couched in terms of a permanent change in the rate of interest. To maintain a permanent increase in the nominal rate of interest, money growth must decrease considerably over time with very strong and persistent real and nominal effects.

Japan is typically the country with the strongest real effects relative to price effects, both in the short and medium run. The reverse case is the United Kingdom, where price effects generally dominate output effects especially under flexible exchange rates. The price-output split for other countries lies between these extremes, with Germany closer to Japan (although magnitudes of real effects are lower) and Italy closer to the United Kingdom. As for the United States and Canada, the major impression is of a wide divergence in simulation results across the different models.These results can be compared with the actual price-output split observed since 1973. As shown in Table 11, actual experience is not far from that predicted by large scale models, with Japan exhibiting the highest output share of nominal GDP changes and the United Kingdom or Italy among the lowest. Such a comparison must of course take account of the effective trend and variations of prices and output over a period characterized by several structural disruptances and supply-side shocks. Nevertheless, over a less unstable sub-period, such as 1976-1979, the results are roughly similar.

Overall then, the assumption of non-market clearing prices included in the structure of these models largely explains the short-to-medium-run non-neutrality of monetary policy. The impression that emerges is that the costs of disinflationary monetary policy in output terms are significant and far from temporary. Nevertheless, as will be argued further below, the real effects of monetary policy are generally neither sufficiently persistent nor predictable to make real economic activity a feasible short-run target for monetary authorities.

A striking feature of the simulation results reviewed here is the dispersion in the magnitude of effects across countries and sometimes across models for the same country -- dispersion is even greater if the more common interest rate simulations are considered. The dispersion in the magnitude of results stems mainly from differences in the size of parameters and in simulation conditions. In most cases however the overall process described by models run along the following lines. Under fixed exchange rates and some imperfection in capital mobility and substitutability, a rise in the interest rate (initially nominal and real) induced by a slowing of money creation inhibits the growth of the main aggregate demand components, especially business and residential investment. The slowing of economic activity and, hence, the reduction in the rate of growth of real income strengthen the direct restrictive effects on consumption. In addition to the rising cost of holding money, this slackening of the economy reduces the demand for liquidity and prevents a persistent disequilibrium. At the same time, the easing on the goods and, therefore, labour markets helps to slow the rise in prices, wages and inflationary expectations, which are usually modelled as an adaptive process. The resulting increase in the real interest rate (the increase in the nominal rate assumed constant) reinforces the deflationary mechanism, but income effects associated with increased real interest transfers partially offset these movements. This is a feature of most models, especially in France and the United Kingdom. Wealth effects are small and their impact on output and price is ambiguous. Finally, the slowing of activity, and thereby

of imports, together with possible enhanced competitiveness and increased exports, usually bring about a general improvement on current account.

Under floating exchange rates, this adjustment process is reinforced. In addition to the mechanisms already cited, the exchange rate appreciates in most cases under the impetus of the initial current account and/or capital account improvement, with revisions in expectations playing a variable role. This exchange rate appreciation (especially large in the United Kingdom, Canada and Italy) strengthens the deflationary momentum to a greater or lesser degree, depending in particular on its interaction with the wage-price spiral (stronger in the Netherlands and Italy for instance) and its effects on the trade or capital account (22). However, the trade balance may worsen as, for example, in the United Kingdom and Italy, mainly because of the J-curve effects.

2. Monetary policy and unemployment

Since unemployment rates have remained stubornly high in many OECD countries despite a revival in output growth, the question arises of whether monetary policy effects on relative prices and expectations may have any influence on unemployment via changes in actual and expected real wages. Most structural models predict that monetary policy has little effect on the unemployment rate in the short run, while in the medium run the improvement in output which may result from monetary disinflation is never sufficient to make a substantial impact on employment. Such a poor response is commonly attributed to a wide range of factors including: the uncertainty about the duration and magnitude of changes in production; the search, training and transaction costs of adjusting employment; and the non commensurate relationship between employment and unemployment because of variations in the labour force due to the "additional" or "discouraged worker" effects (23).

Table 12 (left columns) summarises the short and medium-run effects of a restrictive monetary policy on the unemployment rate, simulated under floating and fixed exchange rates. In contrast with output effects, the repercussions of a permanent shock to interest rates on unemployment is not very different from the impact of a permanent shock to the stock or the growth rate of money. For a 1 percentage point rise in interest rates, the increase in the unemployment rate is generally small (0.1 to 0.2 points); in other words a fall of 5 points in interest rates would be needed to obtain, on average, less than a 1 point fall in the unemployment rate. The rise in unemployment after a restrictive monetary policy is usually more pronounced under floating exchange rates than under fixed exchange rates, but the difference remains slight: the short-run change in the unemployment rate is still nil or virtually nil in two-thirds of the simulations.

In the medium run, a restrictive monetary policy resulting in lower inflation never leads to an improvement in economic activity which is sufficient to reduce the unemployment rate. This finding contrasts with the more encouraging results that used to be reported by older versions of a few national models. In a majority of countries, the unemployment rate remains at or virtually returns to its initial level. Japan is a case where the impact is very small, although the unemployment rate has been historically relatively low and stable in this country. A weak effect is also found in France and the United Kingdom (barring a few models), where the unemployment rate has tended to rise significantly since the 1960s. The invariance of unemployment with

respect to monetary policy in these countries could be related to the existence of high real wage rigidity (and conversely high nominal wage flexibility). In contrast, a stronger effect is often found in the United States and Canada, where labour markets are more flexible (24).

Any effects of monetary policy on unemployment are obviously transmitted by a large number of channels, including variations in aggregate demand components and the movement of absolute and relative prices. The overall impact of monetary policy on the labour market can therefore be assessed through the links between money and output and between output and unemployment (or money-price and price-unemployment). Simulation results as shown in Table 12 (right columns) allow some evaluation of the output-unemployment linkage, which may be compared with the "sacrifice ratio" of 1:3 (implying a 1/3 percentage point increase in unemployment for a 1 percentage point decrease in output) reported by Okun (25). The figures reflect, however, the interaction of all model relationships and not a simple direct link between unemployment and output. Their orders of magnitude should also be viewed with caution, mainly because of rounding (a high ratio may conceal a fairly slight, measured impact on both output and unemployment).

According to these results, elasticities of unemployment with respect to real income lie below unity in absolute value. In other words, even an expansionary policy allowing a 1 per cent rise in GDP would result in a far smaller fall in the unemployment rate in the short run; in three-quarters of the cases, it would even be less than half, which is close to Okun's finding. However the elasticity estimates vary across countries and models. They seem particularly low in Japan (close to zero) and in France (less than 1/3), irrespective of the exchange rate regime. The elasticity is higher in contrast in the United Kingdom, at least under floating exchange rates. Thus, while, as noted earlier, the ultimate impact on unemployment due to a rise in the short-run interest rate is noticeably weak in all three countries, it is apparently not for the same reasons. In France and Japan, the impact may be appreciable in terms of GDP, but it loses all its force in terms of unemployment. In the United Kingdom, the main weakness seems to lie, not in the output-employment relationship but in the money-output relationship.

D. A brief assessment

The above evidence on the real sector effects of monetary policy, based mainly on large-scale models, does not generally support the view that the price level, output or employment can be closely controlled in the short run. The diversity in the size of the reported multipliers and the widely varying structure of the models, the parameters of which are often subject to large revisions, means that the short-run response of real sector variables to changes in financial conditions cannot be known with any degree of confidence. Various reasons can be advanced for this. One conjecture is that the structure of the economy is subject to change. Casual observation of time series reveals substantial shifts in such variables as savings ratios, money velocity, etc., over the last decade or so. The changing economic and financial environment briefly described in the Introduction is likely to have played an important role in this respect. Another consideration is that, in the present context, the relationships between macroeconomic variables, depend, to an important extent, on market sentiment and expectations. This has been underlined by the overriding weight given by commentators and central banks to the importance of market "confidence" in determining the effects of

the stock market crash in October 1987 -- a factor which is seen as likely to swamp the traditional wealth effects of financial asset price changes. This means that the effects of adjustments in particular policy instruments will differ depending on whether market participants anticipate these adjustments or not and whether they expect policy changes to be permanent or only temporary. Consequently, in assessing the effects of monetary policy, it is important to take into account the conditions -- notably the state of expectations -- in which it is being conducted and the effects that monetary policy might have on these conditions. Other things being equal, monetary policy effects are likely to be most predictable in an environment where the authorities are able to convince market participants that they are pursuing a credible medium-term strategy which they fully intend to stick to.

III. THE EFFECTS OF MONETARY POLICY UNDER RAPIDLY ADJUSTING PRICES

This part begins with an examination of the evidence concerning the assumptions of market clearing and rational expectations underlying monetary policy neutrality. It then continues with a review of the evidence on the role of monetary policy in the business cycle as well as on the real effects of monetary instability and price uncertainty.

A. Market clearing and rational expectations

1. Market clearing evidence

From an empirical standpoint not enough formal empirical evidence has been advanced concerning the existence of non-market clearing prices to draw any firm conclusions (26). The orthodox view that prices do not adjust sufficiently rapidly to maintain market clearing is usually based on casual observation of particular markets and the existence of rationing in such markets. The assumption of price inertia is often justified by reference to the existence of controls and regulations, monopolistic pricing behaviour (by firms or trade unions), staggered nominal wage contracts, indexation, desynchronisation and decentralisation of microeconomic decisions, etc. (27). For example, unemployment is seen frequently as a sign that wages are inflexible in the face of excess labour supply. The prices of many retail goods are also seen as being unresponsive to changes in demand and supply conditions and as changing far less frequently than asset prices or interest rates in financial markets. Apart from this casual empiricism, one of the main pieces of evidence used to justify the non-market-clearing assumption is the behaviour of the aggregate price level. Indeed, the apparent dependence of the current price level on its own past values is often interpreted as evidence that prices adjust slowly.

Supporters of the market clearing approach have reacted to this type of evidence by claiming either that it is irrelevant or that it is open to interpretations which are consistent with the existence of market clearing prices. It could be argued, for example, that changes in measured unemployment do not reflect temporary disequilibria but are instead a symptom of the microeconomic conditions in the labour market which influence the long-run or "natural" rate of unemployment. Indeed a good deal of the empirical evidence on the causes of the growth in unemployment in the 1980s supports the view that this has been mainly due to the rise in the natural rate of unemployment. While the prices of many goods and services do not exhibit the same frequency of adjustment as some market determined interest rates or market determined exchange rates, they do nevertheless adjust. The important question is whether price adjustment takes significantly longer to achieve market clearing than the relevant policy response period, rather than whether prices in goods markets adjust more slowly than those in financial markets.

On the question of the implications of the dependence of the current price level on its own past values, this, it is argued, could reflect the movement of prices from one equilibrium to another or it could, instead, reflect the persistence of the causes of changes in prices (e.g. permanence of fiscal deficits expected to be monetized) (28). What is needed in order to identify the correct interpretation of price level inertia is a careful comparison of the performance of models which can be constructed using either

gradual price adjustment or gradual quantity adjustment. Nevertheless, the limited amount of work that has been done on this issue has on the whole produced results which support gradual price adjustment (29).

As noted above, this market clearing versus non-market-clearing debate has important implications for the analysis of the effects of monetary policy. Market clearing implies that monetary policy will, in the absence of money illusion, only have effects on the real economy, in the sense of causing real variables to deviate from their equilibrium values if it is unanticipated, or if its effects on the price level are unanticipated. If monetary policy has this characteristic the economy is said to be structurally neutral with respect to monetary policy. In contrast non-market-clearing implies structural non-neutrality. If markets fail to clear within the policy response period, anticipated and unanticipated monetary policy will have real effects.

2. Rational expectations evidence

The way expectations are formed is also important for the assessment of the impact of monetary policy. If expectations are non-rational because they are not based on an optimal use of all the available information, this may give rise to systematic biases which could be exploited in order to stabilise real aggregates. Non-rational expectations formation could result in the anticipated component of monetary policy having a substantial and identifiable deterministic effect. In contrast, if expectations are rational and markets always clear, there can be no scope for monetary stabilisation policy even if monetary policy actually affects real variables, because these effects will be purely random (see Annex A). Preferences for one interpretation or the other are typically justified on a priori grounds. This is probably because of the paucity of evidence on expectations and the difficulty of establishing whether or not expectations are being formed rationally. Expectations are rational if they are consistent with the way that the economy works in practice. As this cannot be exactly replicated by an econometric model, model consistent expectations should not, therefore, be equated automatically with rational expectations.

Nevertheless, there are statistical properties which might be reasonably expected from observed expectations if they are rational. In particular, they should be unbiased and efficient predictors of the actual values of the corresponding variables, in the sense that on average they coincide with actual observation of the variable concerned and that they reflect all the relevant available information. Evidence from survey data on expectations does not generally support the idea that expectations are formed rationally (30). Of course these survey data may not be fully reliable, and the tests performed are based on asymptotic properties. It is possible for time series data on expectations to appear to be biased and inefficient over considerable spans of time even though expectations are truly rational. This may happen, for example, if the private sector perceive that the authorities are temporarily following policies which are not consistent with the incentives they face. Under these circumstances the authorities will be expected, sooner or later, to abandon such policies in favour of time consistent ones.

Faced with the lack of any clear support for rational expectations, the model builder has to consider whether to use an alternative non-rational

expectations formation scheme. Unfortunately most of the alternatives such as static or adaptive expectations appear even less attractive. The approach that is adopted increasingly is to impose rational expectations, where this is feasible, as the default assumption. This approach at least has the advantage of being rooted in more reasonable forward looking behaviour, thus highlighting the importance of the interaction between the behaviour of the authorities and the private sector.

B. Implications for the price-output split

Prior to the development of "market-clearing" analysis the consensus view on the short-run effects of monetary policy was that they would be felt by both real and nominal variables, but that the actual distribution of these effects was uncertain in the short run and difficult to establish empirically. The main reason for the prevalence of the view that the best that could be done was to measure the relationship between monetary policy and nominal income was the lack of any empirically established theory explaining the price-quantity composition of nominal income. The Phillips curve, in its "static expectations" form or in its "adaptive expectations augmented" variant, proved elusive to robust empirical identification. This impasse was overcome by the adoption of the joint hypothesis of rational expectations and structural neutrality (RESN), which appeared a priori to provide a clear and empirically implementable basis for dichotomising the price level and output effects of monetary policy.

In empirical terms, RESN implies that, in equations designed to explain real variables, such as employment or output, deviations of these variables from natural (or equilibrium) values will only occur as a result of unanticipated monetary policy and random non-policy influences. In such equations there should be no role for the anticipated component of monetary policy. In other words, if monetary policy is currently observable, it amounts to being fully anticipated and should prove to be of no significance for real economic activity. Even in this case, however, there may be confusion about the extent to which movements in policy stance represent autonomous changes in policy or endogenous reactions to current real variables. In general, therefore, only exogenous anticipated monetary policy should be neutral under RESN.

The proposition that it is only the unanticipated component of monetary policy (i.e. the difference between the actual and anticipated policy) which matters can be assessed by examining separately the size of the real effects of the actual and unanticipated monetary policy variables in equations for output and employment. This proposition cannot be rejected if the effects of actual and anticipated monetary policy are significantly different from each other. Rational expectations implies that unanticipated policy will vary unsystematically in the sense that it cannot be predicted from its past values or from other information. The immediate implication of this is that systematic and, therefore, predictable monetary policy will have no real effects. Where there is full current information about monetary policy the unanticipated policy term will be zero, in which case no role should be found for currently observed actual monetary policy in equations explaining real economic activity.

C. Money and the business cycle

Barro (31) published in the late 1970s a pathbreaking empirical study employing the distinction between anticipated and unanticipated monetary policy. Since then there have been numerous studies which have claimed to corroborate Barro's finding that only unanticipated monetary policy affects unemployment. Further research has extended Barro's analysis to the examination of the effects of monetary policy on other real variables such as output, real wages, real interest rates, etc. Although there has been some measure of support for the wider irrelevance of anticipated monetary policy, the findings of all this work, including those reported by Barro, have not gone unchallenged. Indeed, on balance, as indicated by Table 13, the number of studies claiming refutation of the proposition that only unanticipated monetary policy matters is running ahead of corroborative ones. (A more detailed discussion of this evidence is contained in Annex B.)

Recent studies have also addressed the question of real versus monetary causes of the business cycle. Taken at face value, they generally conclude that the business cycle has predominantly real causes. Whether such a view will survive further close examination is an open question. Certainly the notion that the business cycle is an exclusively monetary phenomenon is under attack and is likely to continue to remain so as more theoretical and empirical work is produced on the role of real factors in explaining the variation in real activity. Certain analyses have, in particular, produced evidence on the importance of real factors, connected with structural adjustments and supply shocks (see Annex B).

D. The importance of monetary instability

Investigations into the role of monetary instability have usually focussed on one of the links in the causal chain running from money to output. The main links are usually identified as those between: i) monetary instability and price variability; ii) inflation and price variability; iii) price variability and price uncertainty; and iv) price variability or price uncertainty and output. Studies which address the question of the effect of monetary instability on real output, often take for granted the existence of well-defined first link in the causal chain. However, this relationship is rarely checked. One approach to assessing its empirical relevance is to regress measures of inflation variability on measures of the rate of money growth or its instability. The results of such an exercise, for some OECD countries are reported in Table 14. There is evidence of some relationship in the majority of these countries. Support appears strongest in Japan, Italy and Australia. In the United Kingdom and Canada, inflation variability appears to be related to the variability of a broad measure of money. In Germany and France, the evidence is on the whole less supportive of the importance of money growth instability. No link could be found for the United States.

Available empirical evidence on the second and third links is mixed (see Annex B for details). Most cross-country studies report a close association between the level and variability of inflation, a conclusion which is not generally supported by multi-country or single country studies. More consistent support is found for a link between the level or variability of inflation and relative price dispersion. The relationship between price variability and price uncertainty has received little attention. This is in

one way surprising since the real effects of price variability are typically seen as arising from the impact that it has on the confidence with which relative price movements can be identified. However, research on this question is inevitably limited by the absence of an agreed measure of price uncertainty. Despite this some attempts to test for a relationship between price variability and proxies for price uncertainty have been made (32). Most of these studies report a significant correlation, subject of course to the validity of the proxies for uncertainty that have been used.

Most of the evidence on the final link supports the view that price variability or price uncertainty have a depressing effect on economic activity (see Annex B). This is often interpreted as justifying policies aimed at low and stable rates of money growth. In the limit, according to this view, a perfectly constant low rate of growth of the money supply may at worst have no beneficial effects but an unstable money supply could lower output. This contention, however, ignores the possible consequences for financial markets of suppressing money growth instability. One consequence might be greater volatility of interest rates, which might, in turn, create uncertainty about relative returns on alternative investments and lower capital accumulation and hence, output. Though the consequences of interest rate volatility has not been studied extensively, the available evidence supports the view that it has a negative effect on economic activity (33).

E. A brief assessment

On the whole, the evidence on models which combined market clearing and rational expectations is not favourable to their relevance in current circumstances. Market clearing and rational expectations have little or no empirical foundation, the weight of evidence providing more support for a macroeconomic framework in which prices adjust gradually. Furthermore, monetary shocks (unanticipated changes in money growth) do not appear to be wholly responsible for the business cycle. Real as opposed to monetary factors have an important role to play in generating business cycles.

However, even if slow price adjustment is currently the most empirically relevant assumption to make for the analysis of monetary policy, it is not obvious that this will always be the case. If the structural reforms that many governments have been pursuing succeed in increasing the competitiveness and flexibility of markets, including the labour market, this will result in more rapid elimination of excess demand. Consequently, flexible prices and market clearing might emerge as a closer approximation of reality than the currently more orthodox sticky price approach, at least over the medium term. Moreover, the introduction of the market clearing rational expectations framework into the debate on monetary policy has already had some important effects. In particular, it has focussed attention on the evolution of the equilibrium in the economy and raised questions about how this might be influenced by monetary policy. It has also highlighted the potentially important role of expectations in the transmission process of monetary policy. Finally, it has mostly been within this framework that the damaging effects of instability in monetary policy on output and employment have been analysed. Therefore, although the sticky price model remains the main tool of monetary policy analysis, there may be much to be gained from paying more attention to equilibrium properties of economies, the role of expectations and the effects of monetary policy instability -- at the moment these areas are not well understood.

IV. THE INTERNATIONAL SPILLOVER EFFECTS OF MONETARY POLICY

The perception has been gaining ground that the openness and interdependence of economies, as reflected in the growing importance of external transactions in goods and services and the development of integrated international financial markets, is increasingly limiting the efficacy of monetary policy in individual countries. In this context, "insular" approaches focussing exclusively upon the effects of domestic monetary policies have come to be regarded as less relevant. In a large number of countries domestic financial conditions are perceived as being dependent to an important extent on foreign monetary policies, which has implications for the domestic economic situation and for the role of international monetary coordination. In what follows, the channels of influence of foreign monetary policies are discussed as well as the nature and extent of monetary policy spillover effects.

A. The channels of influence of foreign monetary policy

1. The conditions for insulation from external disturbances

The idea that economies are essentially financially insular, in the sense that capital mobility is low, with domestic investment being mainly financed by domestic savings, was widely accepted at least up until the early 1970s; indeed, in some quarters this is still regarded as a reasonable approximation to the current world economic structure (34). The assumption of financial insularity played a crucial role in the analysis of those who in the 1960s advocated floating exchange rates as a means of isolating domestic economies from foreign disturbances and gaining monetary autonomy. Floating exchange rates were expected to give rise to these effects because the current account would always be in balance. A domestic monetary expansion would cause domestic aggregate demand to rise and the exchange rate to depreciate sufficiently to leave imports and the current account unchanged. If all domestic economies functioned in this way -- their monetary impacts being "bottled-up" -- the absence of external effects would mean that they would be insulated from each others monetary disturbances.

This situation was typically contrasted with that of a fixed exchange rate regime, under which domestic monetary expansion was predicted to cause a rise in domestic demand leading to a rise in imports and a deterioration in the current account matched by a reduction in official foreign exchange reserves. In this regime a monetary policy induced increase in domestic aggregate demand tended to raise world aggregate demand, and by reciprocity the domestic economy was influenced by foreign monetary disturbances. The importance of the current account channel of foreign monetary policy depended in these circumstances on the size of the external sector, most open economies being more vulnerable to foreign monetary disturbances. The system of fixed exchange rates adopted under the Bretton Woods agreement was not, however, seen as necessarily ruling-out monetary independence and the insulation of countries engaged in international trade. As long as the monetary authorities could offset the reserve flows associated with balance of payment disequilibria, a domestic monetary stance different from that in the rest of the world could be adopted. The ability of the authorities to maintain an independent monetary policy was typically seen to depend on the economies degree of openness to trade, the extent of foreign exchange reserves and the degree of international immobility of private capital (35).

The assumption of capital immobility seemed crucial for independence under either fixed or floating exchange rates. In a fixed rate regime, if foreign securities were held by domestic residents this would be likely to make sterilization operations more difficult. In the limit if domestic residents regarded foreign securities as perfect substitutes for domestic securities sterilization of reserve flows would be impossible and, for small countries, financial conditions would be determined in the rest of the world. Only large economies, by virtue of having a significant impact on world monetary conditions, would be able to influence their own monetary situation. However, in any case they would be unlikely to be in a position to completely insulate themselves from foreign monetary disturbances, unless all other countries tacitly agreed to undertake the role of making the adjustments necessarily to maintain fixed parities.

With floating exchange rates, monetary independence and macroeconomic insulation can be maintained in a world of perfect capital mobility but only under very restrictive assumptions which are unlikely to be met in practice (36). For example, if foreign economies are fully indexed for inflation and the exchange rate adjusts to maintain the foreign price level equal to the domestic price level in domestic currency terms (purchasing power parity) the domestic economy will be fully insulated from foreign monetary disturbances. In other words, indexation will ensure that foreign monetary policy is reflected in the foreign economy in a "pure" inflation -- one in which the values of nominal variables are adjusted uniformly so that relative prices remain unchanged -- and that output will be unaffected. Under purchasing power parity (PPP), this price disturbance will then be fully offset by adjustment in the value of foreign currency. If, however, the foreign price disturbance is not fully anticipated, this will also be the case for domestic price disturbances. Complete price indexation which compensates for price level surprises will again be required in order to alow insulation of the domestic economy.

One thing that this discussion illustrates is that, analytically, conditions can be envisaged in which economies are insulated from foreign monetary disturbances in a financially integrated world where domestic residents hold foreign securities denominated in foreign currency as well as domestic securities. In such a world, however, for complete independence to hold, domestic residents would need to adjust their portfolios of foreign securities by the full amount of the revenue from the inflation component of the foreign interest rate (37). Given that this is unlikely to happen in practice, greater financial integration will typically imply greater interdependence.

The stringency of the conditions for domestic insulation and domestic monetary autonomy tend to point to the likelihood that these will not be met in practice, especially given the current trend to more economies' openness to trade and to increasing integration of financial markets. To the extent that the channels of foreign monetary policy influence are strong, this will tend to weaken the effects of domestic monetary policy and make world financial conditions relatively more important. The precise conditions that are required in order to avoid international transmission of foreign monetary policy will depend upon the structure of the domestic economy in question as has already been seen. The structure of the foreign economy itself will also be important because the way in which monetary policy affects that economy will be crucial in determining the type of shock that the domestic economy

will ultimately face. Generally the foreign price level, the level of the foreign interest rate and level of foreign output may be affected by foreign monetary policy. Changes in these variables may in turn influence variables which affect the demand for domestic goods and financial assets; these may include: interest rates, wages and prices, wealth and the terms of trade.

The foregoing discussion suggests that foreign monetary policy could influence the domestic economy via a large number of channels, the overall strength of which will depend upon such factors as: i) exchange rate intervention; ii) the degree of financial market integration; iii) the availability of information about prices and the sources of price disturbances; iv) the deviations from purchasing power parity and the speed with which goods prices adjust; v) the importance of wealth effects in expenditure and vi) the extent of currency substitution.

B. The nature of monetary policy spillover effects

It is important at the outset to establish the precise nature of the spillover effects of monetary policy on output and prices among different countries: i.e. whether they are positive or negative, in which case monetary expansion in one country increases or reduces economic activity in other countries, and whether they are symmetric or asymmetric, in which case the magnitude and direction of the spillover effects for a given monetary policy change are the same or different for all countries.

In the frequently cited two-country version of the Mundell-Fleming model an expansionary foreign monetary policy lowers domestic output; the effect of expansionary foreign monetary policy is negative (38). In this context monetary policy is said to be a "beggar-thy-neighbour" policy. The mechanism by which such a negative spillover effect occurs is simple: expansionary monetary policy in the foreign country lowers interest rates and raises income in that country; given domestic interest rates, there is an incipient capital inflow into the domestic economy and the external value of the domestic currency rises; the domestic trade balance deteriorates and domestic output declines. This outcome depends on a number of factors, including the way expectations are formed, the role of domestic and foreign producer prices in the demand for and supply of domestic goods and financial assets, and the differences between countries in the degree of indexation of wages to prices. In the original Mundell-Fleming model prices and nominal wages are fixed, expectations are static, aggregate supply is perfectly elastic and there are no wealth effects. Relaxation of some of these conditions can give rise to a reversal of the Mundell-Fleming predictions and to positive rather than negative effects of expansionary foreign monetary policy on domestic output. Also more general models, which permit flexibility in prices, typically exhibit negative price spillovers which benefit other countries. The following three cases illustrate the ways in which positive output spillovers can arise:

-- First, if expectations about the exchange rate are regressive then expansionary foreign monetary policy may raise domestic output (39). If the depreciation of the foreign currency associated with monetary expansion in the foreign country generates expectations of a future appreciation back to a higher equilibrium level, this may cause a net capital inflow to that country and may allow a foreign trade deficit which the domestic economy can benefit from. This may happen if the demand for money in the domestic country is

reduced because of relatively higher domestic interest rates or if such money demand depends positively on foreign interest rates. Alternatively, if domestic interest rates decline in response to foreign interest rate reductions, even if domestic nominal income falls, the domestic price level might come down by enough to allow a rise in domestic output.

-- Second, if the demand for domestic goods depends on wealth, an appreciation of the external value of domestic currency caused by expansionary foreign monetary policy may also raise domestic output. The appreciation of the exchange rate will lower consumer prices which depend on import prices as well as on prices of goods produced domestically. A lower consumer price index will raise real financial net worth by increasing the real value of money balances and government bonds. Likewise, an appreciating exchange rate may raise domestic wealth if the domestic country is in debt to foreigners in foreign currency or is a creditor to foreigners in domestic currency. If domestic expenditures are sensitive to wealth, output will rise.

-- Third, if producers' supply prices depend on imported input prices and wages, expansionary foreign monetary policy may raise output (40). If imports are priced in terms of the foreign currency, exchange rate appreciation will lower costs and stimulate supply. Assuming that domestic consumer prices decline, this could also give rise to higher output if producers and employees perceptions of the real wage rate differ. In all likelihood, producers will evaluate the real wage rate by deflating nominal wages by the prices of the goods they produce (the "real product wage") whereas employees will use a general price index which incorporates the prices of the domestically and foreign goods that they consume (the "real consumption wage"). This being the case, aggregate supply will depend on the terms of trade. An expansionary foreign monetary policy which improves the terms of trade for the domestic economy will raise domestic output. Although domestic competitiveness will be reduced because of real exchange rate appreciation, this may be offset by lower interest rates and increased foreign demand.

Spillover effects of monetary policy will be symmetrical -- i.e. operate in the same direction and be of the same magnitude -- if the countries in question are identical in their structures and are facing the same circumstances. The most commonly cited potential source of asymmetry is the behaviour of wages (41). If the degree of wage indexation for inflation varies among countries, spillover effects will be different. For example, if a country, undergoing a monetary expansion has fixed real wages while other countries have fixed nominal wages there may be no output spillover effects on the latter. Expansionary monetary policy in countries with nominal wage rigidity will, on the other hand, have positive spillover effects because domestic real wages will fall; domestic output and the domestic value of the foreign currency will rise, increasing the demand for goods from abroad.

If spillover effects are measured as the response to a given percentage change in the growth rate of the national money supply, then differences in the size of countries will give rise to asymmetry. An increase in the rate of monetary expansion in a large country will obviously constitute a larger stimulus to the world economy than the same proportionate increase in the money supply of a small country. In this way, large economies may appear to have a more substantial effect on the world interest rate than small ones.

C. Empirical evidence

As seen above, whether the effects of monetary policy of a particular country are "bottled up" or whether instead they spillover to other countries, whether such spillovers are negative or positive and whether they are the same for all countries will depend upon the structure of each individual economy and the conditions that it faces at the time. The question of the direction and magnitude of monetary policy spillovers is, therefore, essentially an empirical one. Unfortunately it is not an area in which there is a large body of evidence yielding a consistent set of results. Nevertheless, in recent years, a number of large-scale multi-country econometric models have been developed in order to capture the essential structural linkages between countries. Such models provide a means of investigating the importance of policy spillovers and interdependence generally. This was the purpose of a major experiment undertaken in 1986 under the auspices of the Brookings Institution (42).

The Brookings experiment involved the generation of standardised policy simulations -- similar control baselines and the same policy shocks over the same period -- from eleven of the leading international macroeconomic modelling groups, including the OECD Secretariat with its INTERLINK model. The comparability of the results from this experiment has made it an important reference point for recent discussions of macroeconomic interdependence. Two of the standard simulations conducted under the Brookings experiment are of interest here:

-- A temporary one-year increase in the growth rate of the U.S. M1 money stock by 4 percentage points, while the growth rates of monetary aggregates in other OECD countries remain at their baseline levels.

-- A temporary one-year increase in the growth rate of "policy proxy" monetary aggregates in each non-U.S. OECD country by 4 percentage points, while the U.S. M1 aggregate remains at baseline.

The results of these simulations are reported in Tables 15 and 16. Table 15 shows the own country/area effects and international spillover effects for the United States and for the rest of the OECD (ROECD) taken as a whole. Table 16 details the effects of U.S. monetary policy on the other major OECD countries individually. A number of features are worth noting:

i) There is no overall consensus on the direction or size of foreign monetary policy spillover effects, as reflected in the sharp dispersion in both the qualitative (signs of effects) and quantitative (magnitude of effects) results across alternative models. About half of the models exhibit negative transmission of U.S. monetary policy to ROECD output; the remaining models, including OECD INTERLINK, exhibit positive transmission. Most models show negative price spillovers to the rest of the OECD from expansionary U.S. monetary policy. Only two models -- LIVERPOOL and VAR -- show a non-negligible positive transmission of ROECD monetary policy to U.S. output; but price level transmission is generally negligible or negative, with only EEC exhibiting positive price transmission from ROECD to the United States.

ii) Overall the results reveal considerable asymmetry in spillover effects, with most models showing a stronger absolute output spillover from the United States to ROECD. Only LIVERPOOL and VAR exhibit the opposite asymmetry for output in the short run (2 year) and medium term (6th year); MINIMODR exhibits this reverse asymmetry in the short run only. Stronger price spillovers from ROECD to the United States are found in a number of models: OECD (6th year); LIVERPOOL (2nd and 6th year); MINIMODR (2nd and 6th year); VAR (6th year); and TAYLOR (2nd and 6th year).

iii) The reported spillover effects of U.S. policy on individual non-U.S. OECD countries also differ considerably between models. As regards price effects, the largest effects are felt by Canada in the INTERLINK, MCM and TAYLOR models, by Japan in the EPA, by the United Kingdom in LINK, by France in Wharton and by Italy in DRI. Output effects are strongest for Canada in INTERLINK (equal with Germany), EPA (equal with Germany), WHARTON and TAYLOR (equal with Japan); Germany experiences the strongest effects in LINK and Japan experiences the largest effects in DRI and MCM.

iv) Net spillover effects are small in most models -- only LIVERPOOL and VAR exhibit large effects.

The lack of any clear-cut pattern in the simulation results given by the alternative models considered in the Brookings experiment leaves open many of the issues concerning monetary policy interdependence. Much is left to be done in establishing the main reasons for this. As things stand the internal workings of many large-scale models are not well understood, in the sense that it is difficult to identify the key relationships and key parameters which are responsible for particular results. Until this can be achieved it will not be possible to assess the empirical relevance of competing models and achieve a greater consensus about policy effects (43). The main conclusion of the Brookings experiment and of other work in this area would, however, seem to be that domestic output and prices are dependent on the stance of monetary policy in other countries, though the direction and extent of this dependence remains uncertain.

V. CONCLUSIONS

The following main conclusions can be drawn from the above analysis of the effects of monetary policy in the OECD countries covered by this study:

i) Since the early 1980s the working of financing markets has undergone significant changes in a number of countries. These changes have resulted from the authorities decisions to remove direct controls on bank lending and on interest rates, and from the financial innovation process that has followed this liberalization of financial market activity. The abolition of restrictions on international capital flows and the integration of financial markets has provided banks and non-banks with diversified means of fund raising. In this more market-orientated environment, monetary authorities have adopted indirect methods to influence the costs of capital, mortgage finance and consumer credit. They have come to rely more on open-market operations, the adjustment of money market intervention rates and on the use of policy announcements to "signal" the direction in which they think that market interest rates and exchange rates ought to go. They have also come to recognize that their control over monetary conditions now depends upon being able to influence financial market expectations, which is crucially dependent upon the credibility of their stated intentions.

ii) The dismantling of administrative regulations and the adoption of market-orientated techniques of monetary control has resulted in financial market prices such as interest rates, and exchange rates, and in some cases equity prices, having to play a more important role in the transmission process of monetary policy. However, the evidence tends to suggest that in many countries, in recent years, it has not been possible to identify empirically stable links between short-term interest rates, monetary aggregates, interest rates (especially long-term rates) exchange rates and stock market prices. This is perhaps to be expected in the current market-orientated environment, in which, as theory predicts, the effects of monetary policy will depend on how it is perceived by the public: i.e. whether changes in policy stance are temporary or permanent and whether policy announcements are credible or not. A significant degree of uncertainty about these aspects of monetary policy may confound the emergence of any stable behaviour between observable monetary variables.

iii) Measurement of the effects of monetary policy on the real sector of the economy is hindered by the lack of a universally accepted analytical framework. Although there are a myriad of frameworks which differ in scope and structure, from the point of view of analysing the real and nominal effects of monetary policy, these frameworks fall into two broad categories: those which characterise the economy as being in disequilibrium in the short run because of the failure of prices to adjust rapidly to eliminate excess demand ("non-clearing market" approach), and those which consider goods and labour markets as being maintained in continuous equilibrium via rapid price adjustment ("clearing market" assumption). While the first category has traditionally dominated policy formulation, the

second has tended to be closely associated with the presumption that rational individuals are forward-looking and try to anticipate the actions of policymakers and results of those actions. This assumption of rational expectations formation has been influential in two respects: a) in stressing the importance of the credibility of policymakers' actions on outcomes; and b) in explaining why, in the short run, monetary policy action does not appear to have the same effects at all times, and why these effects appear to differ across countries. In the present paper, the view taken is that the strength of existing evidence indicates that price level inertia, coupled with forward-looking behaviour (even if not strongly rational) and flexible asset prices, provides a more convincing basis than the market clearing assumption per se to analyse the effects of monetary policy on the policy goal variables such as output, inflation and unemployment.

iv) As regards output the empirical evidence presented in this survey tends to suggest that the effects of monetary policy are uncertain, both in terms of their initial impact and in terms of their duration. Neo-Keynesian econometric models tend to show the largest effects (positive in sign) in the first or second year, with the influence of monetary policy tailing-off into the medium term, but typically remaining significant. One issue that has arisen recently in this context has been the extent to which private expenditures have become more or less sensitive to changes in interest rates and in financial wealth, one of the main channels through which monetary policy might normally be expected to work. Unfortunately, there are arguments which run both ways and the empirical evidence is inconclusive. The most that can be said is that studies now more frequently report significant interest rate and wealth effects on expenditure, but these are by no means well-determined.

As for inflation, it is clear that, among the countries considered, typically no strong and reliable short-run relationships exist between money growth and inflation. However, generally, those OECD countries with higher average rates of money growth tend to have higher average rates of inflation reflecting a medium- to long-term relationship. This suggests that sustained changes in the rate of money growth will have a lasting effect on the rate of inflation.

Unemployment generally appears to be weakly responsive to monetary policy. The reason for this varies from country to country; in some it is due to the weakness in the money-output relationship, while in others it results from the weakness in the output-employment relationship. Taken at face value this suggests that the substantial increase in European unemployment in the first half of the 1980s cannot be explained in terms of tight monetary policy causing a temporary cyclical increase in unemployment. However, if recent labour market theoretical developments concerned with "hysteresis" phenomena are relevant, monetary policy may be of importance for the equilibrium unemployment rate, with its effects having a more permanent and possibly asymmetric influence (this being more effective in raising than in lowering unemployment).

v) The move towards more internationally integrated financial markets, implying inter alia greater capital mobility between countries, has strengthened the monetary and financial interdependence of OECD economies. However, the evidence based on multicountry macroeconomic models does not generally support the view that even if interdependence has increased it is significant; indeed, the domestic macroeconomic impact of monetary policy is typically found to be much higher than the spillover effects on other countries because of offsetting exchange rate and activity effects. But apart from this general feature there is no agreement about the direction and size of monetary policy spillover effects. The only exception concerns U.S. monetary policy which is found to have a larger effect on the rest of the OECD area than vice versa. This is undoubtedly because of the relatively large contribution of the United States to the stance of world monetary policy, which is reflected in the fact that monetary conditions in the rest of the world have tended to adjust to those in the United States.

If the above points represent where we stand at present with regard to understanding the effects and transmission mechanisms of monetary policy, what are the implications for the conduct of policy? Although it is beyond the scope of the present study to address this issue in detail, there are some relevant points which can be made briefly.

In current circumstances, policymakers cannot rely on a particular model of the economy for accurately assessing short-run effects of monetary policy and for formulating a policy that can be guaranteed to be fully consistent with stated objectives. Moreover, there are no uniquely reliable indicators of the stance of policy -- in particular, no single nominal financial variable that can be used with confidence to "anchor" the price level -- and relationships between financial variables such as money aggregates, interest rates, exchange rates and stock prices are uncertain. Furthermore, relationships over the short run between such financial variables and nominal and real economic activity are not well determined. This suggests that attempts to use monetary policy for "fine tuning" economic activity runs the risk of having perverse effects on price and output developments. By creating uncertainty about the general direction of policy, such active short-run monetary policy may also destabilize private sector expectations.

This does not mean that monetary authorities should not react at all to events. Monetary policy has to be aimed at sustaining the integrity of the financial system and of preventing "excessive volatility" in financial markets, which may have adverse effects on investor and consumer confidence. In this context it was clearly appropriate for central banks to provide liquidity to financial systems after the October 1987 stock market crash as well as to intervene in foreign exchange markets to bring about an orderly adjustment in exchange rates from the autumn of 1985. The pursuit of such market stabilization should, however, involve no more than temporary operations until policies can be put in place which deal with the fundamental cause of financial disturbances.

There is in fact nothing in the available empirical evidence that would suggest that, in order to preserve price stability, monetary authorities should abandon the medium-term approach to policy that has been practised in OECD countries in the 1980s. In particular, monetary policy should not be

designed to take on the responsibility for correcting the cyclical instability of output and employment; it should be orientated towards the less ambitious objective of price stability over the medium term. Indeed, the provision of a stable nominal framework, on which the private sector can rely in forming expectations, is perhaps the best contribution that monetary policy can make to limiting costly adjustments in economic activity. However, the task of conducting monetary policy in a way that will lead to price stability may not be trivial. The uncertainty that manifestly exists about the measurement of the stance of policy -- as indicated above, few central banks really feel able to rely upon a single indicator -- means that monetary authorities need to be pragmatic and to monitor all potentially informative variables (including real sector variables). This pragmatism implies some flexibility both in pursuing intermediate monetary targets and in the setting of monetary instruments. If such short-run flexibility is to be effective it, nevertheless, remains crucial for monetary authorities to maintain public confidence in the credibility of their medium-term goal of price stability.

NOTES

1. For views on the role of monetary policy in major OECD countries up to the early 1970s, see OECD (1972, 1973a, 1973b, 1974a, 1974b, 1975).

2. The main motivations for the adoption of monetary targets are described in OECD (1979).

3. For a more detailed discussion of these problems see Atkinson and Chouraqui (1986).

4. An interesting insight into the predictability of M1 velocity in the United States is given in a recent study by the Federal Reserve [(Winninger (1986)]. Taking the projections for nominal GNP given in the Monetary Policy Report to Congress and the midpoints of the M1 target ranges the implied projection for M1 velocity growth was calculated and compared with the outturn for velocity growth. For the first halves of 1982, 1983 and 1984 velocity growth was projected by the Federal Open Market Committee to be 5.3, 2.5 and 1.3 respectively. The actual outturns for these three periods were -3.6, -1.7 and -5.1 respectively.

5. For a review of country experiences in this respect, see BIS Annual Reports.

6. Issues raised by the use of the exchange rate in the conduct of monetary policy have been the subject of a recent study by the OECD -- see OECD (1985).

7. The role of liquidity preference in interest rate determination which, originated with Keynes (1937) is outlined in most macroeconomic textbooks -- see, for example, Dornbusch and Fischer (1983).

8. This phenomenon is known as the Fisher effect -- see Fisher (1930). A modern re-statement of this effect if given by Friedman (1968).

9. For such a view see Barro (1984), Fama (1975), Fama and Gibbons (1982) and Garbade and Wachtel (1978).

10. For an overview of the role of money in models of exchange rate determination see OECD (1985).

11. See Dornbush (1976).

12. See Keynes (1937), pp.148-153 and Knight (1981).

13. See Nickell and Wadhwani (1987) and the references cited therein.

14. See Mayer (1987) who tries to account for differences in the investment performances between the United States and the United Kingdom on the one hand with Japan on the other in terms of the structure of their financial systems. The comparatively better investment rate in Japan is attributed to the close involvement between Japanese banks and the corporate sector. He argues that despite being competitive (and perhaps even because of this) the financial systems in the United States and the United Kingdom have not been efficient providers of funds to industry.

15. See Akhtar (1983) and Akhtar and Harris (1987) for attempts to measure the changing role of interest rates in expenditure. The results reported in both of these papers point to an increase in the sensitivity of expenditure to interest rates.

16. See for example Lothian (1985), or Aftalion and Poncet (1985). In the latter study the authors regress the average of the rate of inflation over the last two decades for 10 major OECD countries on the excess of money growth over the output growth. By doing so they constrain the coefficients on money and output growth to be equal and velocity to be constant.

17. See Lucas (1985).

18. See in this respect Coe and Gagliardi (1985).

19. For further analysis on optimal wage indexation and monetary policy, especially in open economies, see Barro (1977), Fisher (1977a), Gray (1976), Cukierman (1980), Karni (1983); Aizenman and Frenkel (1985).

20. See for instance Artus (1985) for a comparative study on Germany, France and the United Kingdom. See also Spivak, Weinblatt and Zilberfarb (1985) who show that wage indexation increases the variability of inflation.

21. The OECD Secretariat has already published a comparative analysis of some of these models, in their pre-1982-83 versions (see Chan-Lee and Kato, 1984).

22. The sum of the import and export elasticities used is generally greater than unity so that, starting out from an equilibrium position, a devaluation (or revaluation) leads to an improvement (or worsening) of the current balance.

23. Changes in employment are not commensurate with changes in unemployment because of variations in the labour force. These result from various effects moving in opposite directions. In case of growing unemployment, "discouraged workers" may leave the labour force. On the contrary "additional workers" may enter the labour force for instance to benefit from unemployment compensation.

24. However, according to Grubb, Jackman and Layard (1982, 1983); or Gordon, (1982 and 1984), if nominal inertia is more prevalent in the United States than in most other countries, especially Japan, real wages do not seem unusually flexible in the United-States. Recent OECD studies (1985) also suggest that real wage flexibility is not particularly pronounced in the United States; it is however stronger in Japan and definitely lower in France and the United Kingdom.

25. See Okun (1975).

26. Carlton (1986) reports micro-based evidence for significant price rigidity and rationing in the United-States over the period 1957-66.

27. This is surveyed b/ Bailey et al. (1987).

28. See Bordes, Driscoll and Strauss-Kahn (1987).

29. See Lucas (1975).

30. See Holden, Peel and Thompson (1985) for a comprehensive survey of studies of data on expectations surveys.

31. See Barro (1977).

32. Froyen and Waud (1984b) for instance, constructed proxies for price uncertainty based on the error variance of the anticipated prediction of the energy price index and the import price index. Cukierman and Watchel (1979) and Fischer (1981) have used the variance across respondents in inflation expectations survey data. They found support for a positive relationship between inflation uncertainty and the variance of inflation and/or the level of inflation (in the United States, the United Kingdom and Canada).

33. Evans (1984), in particular, addressed this issue for the United States. He found that interest rate volatility due to a greater short-run stability in the money stock had a strong and significant negative effect on output.

34. See, for example Niehans (1987) and Feldstein (1983) and Feldstein and Horioka (1980).

35. See Marston (1985).

36. See Turnovsky (1979) and Saidi (1980).

37. See Pitchford (1985).

38. See Mussa (1979) for a detailed exposition of this model.

39. See Helliwell and Padmore (1985).

40. See Branson and Rotemberg (1980) and Argy and Salop (1983).

41. See Asikoglu (1986).

42. The results of this experiment were reported at the 1986 Brookings Conference on "Empirical Macroeconomics for Interdependent Economies: Where do We Stand?". For other summaries of these results see Frankel (1986), Helliwell (1986), Holtham (1986) and Clinton and Chouraqui (1987).

43. For attempts to account for differences between simulation results in terms of key model properties see Helliwell and Pudmore (1986), and for attempts to make their models more "penetrable" to outside users see Edison, Marquez and Tryon (1986) on the Federal Reserve Board Multicountry Model and Richardson (1987) on the OECD INTERLINK Model.

TABLES AND CHARTS

Tables

Charts

Table 1

MACROECONOMIC DEVELOPMENTS

	Growth of GNP (% per annum)		Inflation (GDP deflator)		Total unemployment (% of labour force)				Budget deficit (% of GDP)		Outstanding debt (% of GDP)			Current account (% of GDP)	
	1961-73	1973-87	1960-73	1974-87	(a) 1960-67	(a) 1968-73	(a) 1974-79	(b) 1980-87	1960-73	1974-87	1970	1973	1987	1974-79	1980-87
UNITED STATES	3.93	2.42	3.70	6.39	4.96	4.63	6.68	7.75	-0.4	-2.1	45.3	40.8	52.1	0.01	-1.71
JAPAN	9.51	3.76	6.12	4.53	1.31	1.23	1.93	2.51	0.8	-2.8	12.1	17.0	68.6	0.69	-2.07
GERMANY	4.37	1.86	4.38	3.90	0.81	0.84	3.49	5.90	0.6	-2.6	18.4	18.6	43.2	0.47(c)	1.07
FRANCE	5.57	2.24	4.89	9.17	1.13	2.54	4.54	8.97	0.6	-1.7	..	..	47.3	0.74(c)	-0.49
UNITED KINGDOM	3.09	1.68	5.14	11.35	1.46	2.40	4.18	10.27	-0.1	-3.4	85.6	69.4	51.0	-1.43	-0.90
ITALY	5.31	2.40	5.42	14.72	4.91	5.71	6.56	9.05	-3.3	-10.5	38.5	52.5	92.6	-0.43	-0.75
CANADA	5.45	3.42	3.81	7.47	4.79	5.37	7.15	9.78	0.1	-3.6	53.8	46.7	68.6	-1.59	-0.34
AUSTRALIA	5.14	2.81	4.53	10.26	1.93	2.00	5.04	7.75	1.7	-1.6	41.7	31.8	24.5	-2.06	-4.57
NETHERLANDS	4.98	1.83	6.07	4.82	0.71	1.53	4.92	12.30	-0.6	-4.4	51.4	43.4	79.9	-0.56(c)	2.32
SWEDEN	4.13	1.80	4.91	9.26	1.60	2.22	1.89	2.30	3.9	-1.1	30.5	30.0	63.4	-1.66(c)	-1.31

a) Standardized unemployment rates.
b) Commonly used definitions.
c) 1977-1979.

Note: Figures are averages for the specified periods.

Table 2

GROWTH OF THE INTERNATIONAL CAPITAL MARKETS

	Stocks ($ billion) at				
	Sept. 1963	Dec. 1972	Dec. 1984	Dec. 1985	Dec. 1986
External assets of banks in BIS reporting area (a)	n.a.	n.a.	2 153.2	2 512.7	3 221.1
of which in foreign currency	12.4	131.8	n.a.	n.a.	n.a.
External liabilities of banks in BIS reporting area (a)	n.a.	n.a.	2 118.0	2 476.4	3 179.5
of which in foreign currency	12.2	131.9	n.a.	n.a.	n.a.
Total international bank lending net of double counting (b)	n.a.	n.a.	1 265.0	1 480.0	1 770.0
	Flows ($ billion)				
	1963	1972	1984	1985	1986
Eurobond issues	n.a.	6.5	81.4	136.5	187.7
Foreign bond issues	n.a.	4.2	28.1	31.2	39.3
Total international bond issues	n.a.	11.7	109.5	167.7	227.0

a) Belgium, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom and, in 1984, Austria, Denmark, Finland, Ireland, Norway, Sweden, the United States, Canada, Japan and branches of American banks in the Bahamas, the Caymans, Panama, Hong Kong and Singapore.

b) First line in the table less interbank deposits with the reporting area.

Source: BIS Annual Reports and OECD Financial Statistics.

Table 3
TARGETED (OR PROJECTED) AND ACTUAL GROWTH RATES OF MONETARY AND CREDIT AGGREGATES

		1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
United States														
M1	Target	5.0-7.5	4.5-7.5	4.5-6.5	4.0-6.5	3.0-6.0	4.0-6.5	3.5-6.0	2.5-5.5	4.0-8.0	4.0-8.0	4.0-7.0	4.0-7.0	..
	Outcome	5.3	5.8	7.9	7.2	5.5	7.3	2.3	8.5	10.0	5.2	11.9	15.3	
M2	Target	8.5-10.5	7.5-10.5	7.0-10.0	6.5-9.0	5.0-8.0	6.0-9.0	6.0-9.0	6.0-9.0	7.0-10.0	6.0-9.0	6.0-9.0	6.0-9.0	5.5-8.5
	Outcome	9.7	10.9	9.8	8.7	8.3	9.6	9.5	9.2	8.3	7.7	8.7	9.1	4.1
M3	Target	10.0-12.0	9.0-12.0	8.5-11.5	7.5-10.0	6.0-9.0	6.5-9.5	6.5-9.5	6.5-9.5	6.5-9.5	6.0-9.0	6.0-9.5	6.0-9.0	5.5-8.5
	Outcome	12.3	12.7	11.7	9.5	8.1	10.2	11.4	10.1	9.7	10.5	7.7	8.9	5.4
Germany														
CBM	Target	8.0	8.0	8.0	8.0	6.0-9.0	5.0-8.0	4.0-7.0	4.0-7.0	4.0-7.0	4.0-6.0	3.0-5.0	3.5-5.5	3.0-6.0
	Outcome	9.5	9.1	9.5	11.4	6.4	4.9	3.6	6.1	7.0	4.6	4.5	7.7	8.1
France														
M2,M2R,M3	Target			12.5	12.0	11.0	11.0	10.0	12.5-13.5	9.0	5.5-6.5	4.0-6.0	3.0-5.0	3.0-5.0
	Outcome			13.9	12.2	14.4	9.8	11.4	11.5	10.2	7.6	6.9	4.7	9.2
United Kingdom														
M3,£M3	Target		9.0-13.0	9.0-13.0	8.0-12.0	8.0-12.0	7.0-11.0	6.0-10.0	8.0-12.0	7.0-11.0	6.0-10.0	5.0-9.0	11.0-15.0	..
	Outcome		7.3	15.4	11.4	10.3	19.1	12.8	11.2	9.5	11.9	16.9	19.0	
M1	Target								8.0-12.0	7.0-11.0	..	..	..	..
	Outcome								12.3	14.0				
PSL2	Target								8.0-12.0	7.0-11.0	..	..	..	..
	Outcome								11.5	12.6				
M0	Target										4.0-8.0	3.0-7.0	2.0-6.0	2.0-6.0
	Outcome										5.4	4.1	3.5	
Italy														
TDC (a)	Target	21.8	29.5	32.0	46.0	53.0	59.3	64.5	73.0	105.0	124.0	138.0	133.0	11
	Outcome	19.9	33.7	34.9	48.6	53.1	62.5	72.7	99.9	119.5	143.3	152.5	152.3	13.1
M2	Target										11.0	10.0	7.0-11.0	6.0-9.0
	Outcome										12.1	11.1	9.4	9.6
Canada														
M1	Target		10.0-15.0	8.0-12.0	7.0-11.0	6.0-10.0	5.0-9.0	4.0-8.0	4.0-8.0	..	..	..	..	..
	Outcome		10.9	8.3	9.2	8.0	6.2	3.9	3.5					
Australia														
M3	Projection				10.0-12.0	8.0-10.0	6.0-8.0	10.0	9.0-11.0	10.0-11.0	9.0-11.0	10.0-12.0	8.0-10.0	..
	Outcome			10.5	8.0	11.8	12.3	12.7	11.3	12.5	10.8	..	..	

Table 3 (continued)

TARGETED (OR PROJECTED) AND ACTUAL GROWTH RATES OF MONETARY AND CREDIT AGGREGATES

		1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Japan M2 (M2+CD from 1979)														
1st quarter	Projection					12.0	10.0	7.0	11.0	7.0	7.0	8.0	9.0	8.0
	Outcome					12.4	10.7	7.5	10.5	7.5	7.8	7.9	9.0	8.8
2nd quarter	Projection					12.0	10.0	7.0	10.0	7.0	8.0	8.0	8.5	9.0
	Outcome					12.2	10.1	8.0	9.3	7.7	7.6	8.4	8.5	10.0
3rd quarter	Projection				11.0	12.0	10.0	9.0	9.0	7.0	8.0	8.0	8.5	10.0
	Outcome				12.1	11.7	8.4	9.6	9.0	7.1	7.9	8.3	8.8	10.8
4th quarter	Projection				12.0	11.0	8.0	10.0	8.0	7.0	8.0	8.0	8.5	11.0
	Outcome				12.2	11.2	7.8	10.5	8.1	7.2	7.9	9.0	8.3	11.8

Note: Figures correspond to annualised growth rates for the definitions of aggregates used at the time by national authorities. M1 corresponds to the "narrow" money supply, typically consisting of cash in circulation and sight deposits. CBM, M2, M2R, M3, £M3, correspond to "broad" definitions of money which include various interest-bearing demand deposits. M0 is the broad monetary base, consisting mainly of currency in circulation. TDC is total domestic credit. CD is interest-bearing certificates of deposit.

.. = Target abandoned

a) Target expressed in L 1000 billion up to 1986; from 1987 target expressed as an annualised growth rate.

Source: Based on Isard and Rojas-Suarez (1986).

NOTES TO TABLE 3

Annualized growth rates with outcomes corresponding to the target periods, except where indicated in the following footnotes. Definitions of the monetary aggregates are those used by the national authorities in each country. Aggregates with identical labels are comparable but not identical across countries, and in some cases countries have modified the coverage of their monetary aggregates over time. In such cases, the numbers in the table correspond to the definitions existing during each indicated period.

For the United States, target growth ranges correspond to annual percentage changes from the fourth quarter of the previous year to the fourth quarter of the target year, except in 1975, for which the target period was from March 1975 to March 1976, and for the M2 target in 1983, which was from the February-March average to the fourth quarter. The targets also correspond to objectives set around the beginning of the target year. In February 1980, the U.S. monetary aggregates were redefined, and for 1980 and 1981 the M1 targets in the table are those for M1-B and shift-adjusted M1-B, respectively; M1-B was relabeled M1 in January 1982. Outcomes correspond to actual rates reported at the ends of the policy periods.

For Germany, the 1975 target is for the rate of growth from December 1974 to December 1975; the targets during 1976-78 are for rates of growth on an annual average basis; and beginning in 1979 the targets are for rates of growth between the fourth quarter of the previous year and the fourth quarter of the target year.

For France, the target periods are from December to December for the years up to 1982; the targets during 1983-85 are for rates of growth from November-January averages to November-January averages for subsequent years; for 1986, the targets are for rates of growth between the fourth quarter of 1986 and the fourth quarter of 1985. The target was specified for M2 from 1976 through 1983, for M2R in 1984 and 1985 and for the new redefined aggregate M2 for 1986.

For the United Kingdom, the targets are for periods beginning in April for each year from 1976 to 1978, in June 1979, and in February for subsequent years. For 1980 to 1984, the outcomes are annualized rates for 14-month periods from February of the target year through April of the following year. For 1985 and 1986 the outcomes are for the 12 months through April 1987. A target for M3 was set only in 1976; thereafter the indicated targets and outcomes are for sterling M3.

For Italy, the targets, expressed in billions of lira, are consistent with the increases shown in this table. The 1975 target is for the difference between March 1974 and March 1975, beginning in 1976 the targets are for the increase between December of the previous year and December of the target year. The target for 1977 was revised down from 36,600 billion lira.

For Canada, the targets indicated for the years 1976-80 are the annualized target growth rates announced for the periods beginning, respectively, in the second quarter of 1975, February-April 1976, June 1977, June 1978, and the second quarter of 1979. The targets indicated for the years 1981 and 1982 correspond to the objective announced for the period beginning in August-October 1980 which continued to apply until the practice of monetary targeting was discontinued in November 1982. Outcomes correspond to annualized actual rates of growth between the beginning of successive target periods, except for 1981, which is an annualized rate from August-October 1980 to December 1981, and for 1982, which is from December 1981 to December 1982. The somewhat arbitrary assignment of target periods and outcomes to calendar years has been adopted from the Bank for International Settlements, 53rd Annual Report, June 1983, p.71.

For Australia, the projections are for the rates of growth between June of the previous year and June of the target year. For June 1983-June 1984 the target initially set at 9-11 was changed to 10-12 in December 1983. The projection was suspended in January 1985.

For Japan, the targets correspond to annual percentage changes for each quarter from the same quarter of the preceding year. M2 includes certificates of deposit from 1979.

8278E.7

Table 4

INTEREST RATE AND CREDIT RESTRICTIONS*

	Deposit rates		Lending rates	Capital market rates	Credit Restrictions	
	Wholesale	Retail			Period(s) of use	Institutions Subjected
UNITED STATES (a)	0 since 1971	↔ until 1983 0 since 1986	↔	0	1980	All
JAPAN (b)	↔ until 1978 0 since 1979	↔	↔ until 1975 0 since 1975	↔	1960 (with many interruptions)	At first city banks, since 1967-68 deposit banks and other financial institutions
GERMANY	0	0	0	0	-	-
FRANCE(c)	↔ until end-'70s 0 since early '80s	↔	↔ until mid-'70s ↔ since early '80s	↔ until early '80s 0 since mid-'80s	1958-59 1963-65 1968-70 1972-85	Deposit banks (g)
UNITED KINGDOM (d)	0 since 1971	↔ in 1973-75 0 since 1976	↔ since 1971	0	1964-71	Deposit banks
ITALY	0	↔ mid-1970s 0 since 1970	0	0	1973-75 1976-83	Deposit banks (g)
CANADA	↔ in 1972-74 0 since 1975	0	0	0	-	-
AUSTRALIA (e)	↔ until 1983 0 since 1984	↔ until 1980 0 since 1980	↔ until 1981 0 since 1982	0	Early 1960s to 1982	Deposit banks
NETHERLANDS	0	↔	0	0	1961-67 1969-72 1977-81	Deposit banks (g) Commercial banks
SWEDEN (f)	0	↔ until 1980 ↔ since 1980	↔ until 1981 ↔ since 1982 0 since 1985	0(h)	1969-70 1974-75 1976-77 1981-83	Deposit banks (g) from 1981 also other financial institutions

Source: T.R.G. Bingham (OECD, 1985) and Central Bank reports.

Notes: * As of April 1987.
0 No administrative restrictions or cartel agreement.
↔ Bank agreement without dominant direct administrative influence.
↔ Direct (non market) influence by the authorities.
- not applicable.

a) Remaining restrictions on business current accounts and on some loans (housing, consumer, ...).
b) Controls on minimum CD size.
c) Progressive deregulation in the 1980s
d) Limited restrictions on some loans (consumer, state government, housing, ...).
e) Limited restrictions and limited size of some deposits.
f) Relaxation on lending rates in 1985.
g) Exemption for some categories of loans (for details see T.R.G. Bingham, Banking and Monetary Policy, 1985; Bank for International Settlements, Quantitative Credit Restrictions, 1971; D.R. Hodgman, Selective Credit Control in Western Europe, 1976).
h) But until 1986 banks and insurance companies forced to buy government and housing bonds at non-market prices.

Table 5

INTERNATIONAL ASSET POSITION OF SELECTED COUNTRIES

Per cent of GNP/GDP

	UNITED STATES					GERMANY				
	1970	1975	1980	1985	1986	1974	1975	1980	1985	1986*
External assets	16.71	19.14	23.28	23.67	25.22	28.31	31.55	32.94	44.00	47.17
Public sector	4.71	3.76	3.46	3.26	3.26	12.27	11.26	8.07	8.27	8.09
Official reserve	1.46	1.05	1.03	1.08	1.15	9.09	7.27	5.33	4.53	4.42
Other assets	3.25	2.71	2.44	2.19	2.11	3.18	3.99	2.73	3.74	3.67
Private sector	12.00	15.37	19.82	20.41	21.96	16.04	20.28	24.88	35.72	39.08
Direct investment	7.63	8.04	8.26	5.73	6.14	..	2.43	3.13	4.13	4.06
Other assets	4.37	7.33	11.55	13.69	14.62	..	17.86	21.76	31.59	35.02
Stocks	0.66	0.62	0.74	0.99	1.20	0.89	0.98	0.71	1.03	
External liabilities	10.80	14.32	19.21	26.46	31.44	19.26	21.50	28.56	35.44	37.31
Public sector	2.64	5.64	6.76	5.05	5.69	0.51	0.98	3.92	7.75	8.84
Private sector	8.16	8.69	12.46	21.41	25.75	18.76	20.52	24.64	27.69	28.47
Direct investment	1.34	1.79	3.18	4.60	4.94	..	3.73	2.96	2.62	2.65
Other liabilities	6.82	6.89	9.27	13.71	16.86	..	16.79	21.68	25.07	25.82
Stocks	2.75	2.31	2.48	3.10	3.95	0.68	0.84	1.17	2.02	
Net external assets	5.91	4.81	4.07	-2.79	-6.22	9.05	10.05	4.38	8.55	9.87

* mid-year

	JAPAN					UNITED KINGDOM				
	1973	1975	1980	1985	1986	1970	1975	1980	1985	1986
External assets	3.20	12.14	16.37	28.42	37.72	67.75	87.80	99.46	169.23	195.00
Public sector	4.98	4.30	4.82	4.19	4.84	4.91	4.60	8.15	6.48	7.40
Official reserve	3.36	2.67	2.63	1.80	2.16	2.30	2.55	5.78	3.75	4.65
Other assets	1.63	1.63	2.19	2.39	2.68	2.61	2.05	2.36	2.73	2.76
Private sector	8.05	7.84	11.55	24.23	32.32	62.83	83.20	91.31	162.75	187.59
Direct investment	1.25	1.73	2.01	2.85	2.97	12.54	10.87	14.75	20.30	22.56
Other assets	6.80	6.11	9.53	21.37	29.35	50.30	72.33	76.57	142.46	165.05
Stocks	..	..	..	..		..	..	..	..	..
External liabilities	9.46	10.68	15.19	19.99	27.96	60.74	89.46	92.04	147.29	164.48
Public sector	0.59	0.63	1.93	2.54	2.70	11.52	10.03	6.46	5.75	6.37
Private sector	8.88	10.05	13.25	17.45	25.24	49.22	79.43	85.58	141.55	158.12
Direct investment	0.44	0.43	0.34	0.31	0.33	6.51	6.63	11.51	12.31	12.97
Other liabilities	8.44	9.61	12.92	17.14	24.90	42.72	72.79	74.07	129.24	145.14
Stocks	..	..	..	..	..	..	..	..	..	..
Net external assets	3.57	1.46	1.18	8.43	9.21	7.01	-1.66	7.41	21.94	30.51

.. not available

Sources: United States: Survey of Current Business, U.S. Department of Commerce: Germany: Monthly Report of the Deutsche Bundesbank; Japan: Fiscal and Monetary Statistics Monthly, Ministry of Finance; United Kingdom: Bank of England Quarterly Bulletin

8228E.1

Table 6

EFFECTS OF A ONCE-AND-FOR-ALL 1 PER CENT REDUCTION IN THE MONEY STOCK*

COUNTRY	Model	Short-term(a)		Medium-term(b)		Memorandum items: Year of Peak effect		Exchange rate (a)	Interest rate	
		GDP	Prices	GDP	Prices	GDP	Prices		Short-term(a)	Medium-term(b)
1. Floating exchange rates										
UNITED STATES	MCM 82	-0.5	-0.1	-0.2	-0.5	2	L	0.7	0.6	0.4
CANADA	CAND 82	-0.1	-0.4	-0.1	-0.4	L	L	1.1	0.7	0.8
	RDXF 84	-0.3	-0.1	0	-0.8	2	L	1.0	0.3	0
AUSTRALIA	RBA 82	-0.5	0	-0.2	-0.1	3	2	1.2	0.5	1.4
	RBII 84	-0.3	-0.8	-1.2	4.9	L	L	0.9	0.1	0.4
2. Fixed exchange rates										
UNITED STATES	MCM 82	-0.3	0	-0.2	-0.3	2	L	..	0.7	0.6
CANADA	RDXF 84	-0.1	0	0	0	2	L	..	0.4	0.3
AUSTRALIA	RBA 82	-0.4	0	-0.6	0	2	2	..	0.5	0.9
	RBII 84	-0.2	-0.7	-0.8	-4.1	L	1	..	0.1	0.5

* A once-and-for-all shock is applied by lowering the path of a chosen money aggregate relative to its base. All results have been normalized to represent a 1 per cent shock by taking the ratio of each variables deviation from the baseline over that of money stock. For simpler comparisons with previous tables, a minus sign corresponds to a decrease (in output or prices) after a money stock reduction.

.. = Not available or inapplicable.

L = Last year reported.

a) Short-term = average of first three years.

b) Medium-term = last year of simultion (5th to 7th Year).

c) Non-corrected values for 1 per cent rise in the interest rate controlled by the government.

Source: National models (see list in Table H of Annex B).

8228E2

Table 7

EFFECTS OF A CONTINUOUS 1 PER CENT REDUCTION IN THE RATE OF MONEY GROWTH*

COUNTRY	Model	Short-term(a) GDP	Short-term(a) Prices	Medium-term(b) GDP	Medium-term(b) Prices	Memorandum items: Ratio of growth rates (medium-run) GDP	Memorandum items: Ratio of growth rates (medium-run) Prices
1. Floating exchange rates							
UNITED STATES	DRI 82	-0.4	-0.3	-0.0	-0.4	0.0	-0.5
	CHA 82	-0.2	-0.1	-0.1	-0.1	0.0	-0.2
	WHAR 82	-0.4	-0.0	-0.1	-0.3	0.0	-0.7
	MPS 85	-0.7	-0.3	-0.3	-0.8	+0.3	-1.8
CANADA	SAM 85(e)	-0.2	-0.4	0.0	-1.0	0.0	-1.0
	RDXF 85	-0.2	-0.1	-0.1	-0.4	0.0	-0.7
AUSTRALIA	RBII 84	-0.6	-1.6	-2.4	-9.8		
2. Fixed exchange rates							
UNITED STATES	MPS 85	-0.7	-0.2	-0.4	-0.7	+0.3	-1.7
CANADA	RDXF 85	-0.1	0	-0.1	-0.1	0.0	-0.2
AUSTRALIA	RBII 84	0.4	-1.4	-1.6	-8.2		

* A 1 per cent continuous shock is applied by lowering the growth rate of a chosen aggregate by 1 per cent each year relative to its baseline, with the previous years difference added to the current year. Figures correspond to the ratio of output (or price level) deviations over money stock deviations. To compare results easily with previous tables, a minus sign corresponds to a decrease (in output or prices) after a money growth reduction.

a),b), see Table 6.

e) The shock on IRL is maintained for 3 years only. The "medium" run outcome corresponds to the 15th to the 20th year of simulation.

Source: National models (see list in Table H of Annex B).

8228E3

Table 8

1. EFFECTS OF AN INTEREST RATE SHOCK ON OUTPUT (GDP) AND PRICES UNDER A FLOATING-EXCHANGE RATE REGIME *

COUNTRY	Model	Short-term(a)		Medium-term(b)		Year of peak effect on		Effect on: money		Effect on exchange rates	
		GDP	Prices	GDP	Prices	GDP	Prices	Short-term	Medium-term	Short-term	Medium-term
UNITED STATES	MCM 82	-0.8	-0.3	-0.1	-1.6	2	L	-1.9	+2.6	+1.3	+1.4
	MCM 82(c)	-0.2	-0.1	0	-0.3	2	L	-0.5	..	+0.4	..
	MPS 1 85	-2.1	-0.9	-5.9	-7.8	L	L	-3.3	-13.2	+4.4	+15.8
	MPS 2 85(d)	-0.4	-0.3	-0.6	-1.7	L	L	-1.6	-3.1	+1.4	+2.3
	OECD 85	-0.3	-0.2	-0.6	-1.1	L	L	-1.1	..	+1.0	+1.7
JAPAN	WLD 82	-1.0	-0.5	-1.5	-1.1	L	L	-4.3	-6.6	+4.5	+5.1
	WLD 84	-0.2	-0.4	-0.4	0	L	2	-3.0	-3.9	+1.2	-0.2
	OECD 85	-0.7	-0.5	-1.3	-2.3	L	L	-1.8	..	+1.4	+4.0
GERMANY	BBk 82	-0.2	-0.2	+0.1	-0.3	3	L	-0.2	+0.6	+1.1	+1.1
	BBk 84	-0.6	-0.1	-0.4	-0.4	3	L	-1.9	-1.9	+0.5	+0.7
	OECD 85	-0.1	-0.1	-0.4	-1.0	L	L	-0.9	..	..	+2.7
FRANCE	MET 81	-0.4	-0.1	-0.3	-1.5	3	L	-0.4	..	+1.4	..
Idem for 1% rise in BR		-2.0	-0.6	-1.5	-7.5	3	L	-2.1	+3.8	+7.2	..
	OECD 85	-0.4	-0.3	-1.1	-1.5	L	L	-1.1	..	+1.1	+2.9
UNITED KINGDOM	HMT 82	-0.3	-0.6	-0.2	-2.0	3	L	-1.1	+0.6	+2.7	+2.2
	HMT 84	-0.5	-0.7	..	..	2	..	-1.0	..	+2.6	..
	BKE 84	0	-0.1	..	..	L	L	-0.4	..	+0.2	..
	NIESR 7 84	-0.2	-0.8	-1.4	-8.8	L	L	-3.0	..	+4.1	..
	LBS 5 84	-0.4	-1.3	0	-2.0	L	L	0	..	+2.7	..
	LIV 84	-0.6	-0.6	0	-1.5	L	L	-0.6	..	-0.6	..
	OECD 85	-0.1	-0.3	-0.2	-1.3	L	L	-3.8	..	+1.1	+3.0
ITALY	BKI 85	-0.2	-0.1	-0.4	-0.7	L	L	-0.5	-0.9	+0.6	+2.5
	OECD 85	-0.2	-0.6	-0.2	-2.7	2	L	-3.0	..	+3.5	+3.7
CANADA	RDXF 82	-0.5	-0.5	-0.5	-3.1	3	L	-2.2	-6.8	+1.6	+4.3
	CAND 82	-0.1	-0.3	-0.4	-0.4	L	L	-1.7	-1.6	+1.1	+0.9
	QFS 82	-0.4	-0.5	-0.3	-2.6	3	L	-2.6	-5.1	+0.3	+0.1
	SAM 82	-0.2	-1.7	+0.1	-8.5	L	L	-5.0	..	+1.0	..
	RDXF 84	-0.8	-0.4	-0.5	-3.5	3	L	-3.0	-6.7	+2.0	+4.7
	RDXF 85	-1.0	-0.4	-1.1	-4.0	3	L	-3.3	-8.1	+2.4	+5.5
	SAM 85(e)	-1.2	-3.7	0	0	..	..	-8.4	..	+5.1	..
	OECD 85	-0.5	-1.2	-1.0	-5.8	L	L	-3.1	..	+1.5	+6.5
AUSTRALIA	RBII 84	-0.8	-0.4	-0.9	-1.0	L	5	-2.7	-4.0	+1.9	+2.6
NETHERLANDS	Freia 82	-0.3	-4.8	0.5	-10.0	L	L	-0.6	-3.5	+9.5	+10.9
	Freia 82(c)	-0.1	-1.1	-0.1	-2.3	L	L	0	..	+2.2	..
	MKM 85	-1.1	-0.3	-0.9	+0.1	2	2	0	-0.2	+0.2	+0.3

8228E4

Table 8 (cont.)

2. EFFECTS OF AN INTEREST RATE SHOCK ON OUTPUT (GDP) AND PRICES UNDER A FIXED EXCHANGE RATE REGIME *

COUNTRY	Model	Short-term(a)		Medium-term(b)		Year of peak effect on		Effect on: money	
		GDP	Prices	GDP	Prices	GDP	Prices	Short-term	Medium-term
UNITED STATES	MCM 82	-0.5	-0.1	-0.7	-0.7	2	L	-1.5	2.0
	MCM 82(c)	-0.2	0	-0.2	-0.2	2	L	-0.5	..
	MPS 1 85	-2.1	-0.6	-4.2	-5.5	L	L	-2.9	-9.8
	MPS 2 85(d)	-0.3	-0.1	-0.3	-1.0	L	L	-1.4	-2.2
	OECD 85	-0.3	-0.1	-0.8	-0.6	L	L	-1.2	-2.3
JAPAN	WLD 82	-0.4	-0.1	-0.6	-0.1	3	L	-3.3	-4.7
	WLD 84	-0.1	-0.1	-0.3	+0.1	L	2	-2.0	-3.6
	OECD 85	-0.5	-0.3	-0.5	-1.0	3	L	-1.5	-5.2
GERMANY	BBk 84	-0.4	-0.1	-0.4	-0.5	3	L	-1.9	-1.8
	OECD 85	-0.1	0	-0.2	-0.1	3	2	-0.8	-2.6
FRANCE	MET 81	-0.3	0	-0.2	0	2	..	-0.7	..
Idem for 1% rise in BR		-1.0	-0.1	-0.7	0	2	..	-2.8	..
	COP 81	-0.3	+0.3	-0.5	0	L	3	-0.8	..
Idem for 1% rise in BR		-0.5	+0.6	-0.6	0	L	3	-1.1	..
	MET 83	-0.1	+0.1	-0.2	+0.2	L	3	..	..
Idem for 1% rise in BR		-0.4	+0.2	-0.6	+0.6	L	3	..	..
	BDF	-0.1	-0.1	+0.3	-0.6	2	L	..	..
	OECD 85	-0.4	-0.1	-0.9	-0.6	L	L	-1.3	-4.2
UNITED KINGDOM	HMT 82	-0.1	+0.1	-0.1	+0.3	L	L	-0.7	0.7
	HMT 84	-0.4	+0.3	..	..	..	L	-0.5	..
	BKE 84	0	-0.1	..	..	1	L	-0.4	..
	NIESR 7 84	0	0.1	..	..	L	L	-2.2	..
	LBS 5 84	-0.2	+0.1	0	0	-	-	-0.7	..
	OECD 85	-0.1	-0.1	-0.1	-0.3	1	L	-2.0	-7.5
ITALY	BKI 85	-0.2	-0.4	-0.5	-0.1	L	2	-0.6	-0.1
	OECD 85	-0.3	-0.2	-0.4	-0.7	2	L	-4.0	-6.7
CANADA	RDXF 84	-0.8	0.0	-0.5	-0.1	2	L	-3.4	-8.1
	OECD 85	-0.4	-0.2	-0.4	-0.6	1	L	-2.0	-7.8
AUSTRALIA	RBII 84	-0.4	-0.1	-1.7	-1.8	L	L	-1.6	-2.1
NETHERLANDS	FREIA 82	-0.1	0	-0.5	+0.4	L	L	-1.7	1.3
	FREIA 82(c)	0	0	-0.1	+0.1	-	-	-0.4	..

* Results as a percentage deviation from the baseline; shock standardised as a 1 percentage point rise in the representative short-term interest rate (IRS), with long-term rates (IRL) generally endogeneous.

BR = Base rate (considered as representative of the short-term interest rate (IRS) instead of the money market rate in some comparative studies of simulations); see OECD Study by Chan-Lee and Kato (1984).

For notes a), b), c) and e) see Table 6.

d) This version of MPS assumes that long-term interest rates are fixed.

Source: OECD INTERLINK and national models (see list in Table H of Annex B).

8228E5

Table 9

OUTPUT/PRICE SPLIT SIMULATION RESULTS

(For a 1% change in nominal GDP, only the share of real GDP is given, with the remainder corresponding to the share of prices)

COUNTRY	MODEL	Floating Short-term(a)	Floating Medium-term(b)	Fixed Short-term(a)	Fixed Medium-term(b)
A. Shock on money					
UNITED STATES	MCM 82*	0.8	0.3	1.0	0.4
	DRI 82	0.6	0.0	..	..
	CHA 82	0.8	0.5	..	..
	WHAR 82	1.0	0.3	..	..
	MPS 85	0.7	0.3	0.8	0.3
CANADA	RDXF 84*	0.3	0.0	1.0	0
	RDXF 85	0.7	0.3	1.0	0.5
	CAND 82*	0.2	0.2	..	..
	SAM 85	0.4	0.0	..	..
AUSTRALIA	RBA 82*	1.0	0.7	1.0	1.0
B. Shock on interest rates					
UNITED STATES	MCM 82	0.8	0.1	0.9	0.5
	MPS 1 85	0.7	0.4	0.8	0.4
	MPS 2 85(d)	0.6	0.3	0.8	0.2
	OECD 85	0.6	0.4	0.8	0.6
JAPAN	WLD 82	0.7	0.6	0.9	0.8
	WLD 84	0.3	1.0	0.5	1.5
	OECD 85	0.6	0.4	0.6	0.3
GERMANY	BBK 82	0.6	-0.4	..	..
	BBK 84	0.9	0.5	0.9	0.4
	OECD 85	0.5	0.3	0.8	0.8
FRANCE	MET 81	0.9	0.2	0.9	1.0
	COP 81	..	..	..	1.0
	MET 83	..	..	1.2	..
	BDF 85	..	..	0.5	-1.0
	OECD 85	0.6	0.4	0.8	0.6
UNITED KINGDOM	HMT 82	0.4	-0.1	5.8	1.1
	HMT 84	0.4	..	8.8	..
	BKE 84	0.1	..	0.1	..
	NIESR 84	0.2	0.1	0.2	..
	LBS 84	0.2	0.0	2.5	..
	LIV 84	0.5	0.0	..	..
	OECD 85	0.2	0.1	0.7	0.2
ITALY	BKI 85	0.3	0.5	0.3	0.9
	OECD 85	0.3	0.1	0.6	0.4
CANADA	RDXF 82	0.5	0.1	..	..
	CAND 82	0.2	0.5	..	..
	QFS 82	0.4	0.1	..	..
	Mace 82	0.9	0.4	..	..
	SAM 82	0.1	0.0	..	..
	RDXF 84	..	..	1.0	0.8
	RDXF 85	0.7	0.2	..	..
	SAM 85(e)	0.3	0.2	..	..
	OECD 85	0.3	0.2	0.7	0.4
NETHERLANDS	FREIA 82	0.1	0.1	1.3	3.3
	MKM 85	0.8	1.1	..	..

* Shocks corresponding to a once-and-for-all change in the money stock. All other shocks on money correspond to a one per cent change in the money growth.

For notes a), b), d), e), see Table 6

- (or +) Negative (or positive effect on real GDP roughly offset by an equivalent (opposite) change in prices so that nominal GDP remains virtually constant.

Source: OECD INTERLINK and national models (see list in Table H of Annex B).

8228E6

Table 10

MEDIUM-TERM MONEY NEUTRALITY*

COUNTRY	Model (version)	Last simulation year considered	Elasticity of GDP with respect to money		Elasticity of prices with respect to money	
			Floating exchange rates	Fixed exchange rates	Floating exchange rates	Fixed exchange rates
UNITED STATES						
	MCM 82	7	0.04 (-)	0.35	0.62 (+)	0.33
	MPS1 85	5	-0.45	-0.44	-0.59	-0.56
	OECD 85	5	0.27	0.37	0.47	0.29
JAPAN						
	WLD 82	7	0.23	0.13	0.17	0.03
	WLD 84		0.1	0.08	-0.01	-0.03
	OECD 85	5	0.25 (-)	0.18 (-)	0.45	0.37
GERMANY						
	BBK 82	7	0.18 (-)	..	-0.59	..
	BBK 85	7	0.23	0.20	0.28	0.29
	OECD 85	5	0.15	0.11	0.38	0.04
FRANCE						
	MET 81	7	0.14 (-)	0.14 (-)	0.68 (+)	0
	COP 81	7	..	0.13 (-)	..	0
	MET 83		..	..	..	..
	OECD 85		0.26	0.31	0.42	0.20
UNITED KINGDOM						
	HMT 82	7	0.32	-0.20	-3.15	0.39
	HMT 84	(3)	(0.55)	(0.83)	(1.43)	(-0.61)
	BKE 84	(3)	(-0.06)	(-0.09)	(0.36)	(0.23)
	NIESR 7 84	(3)	(0.06)	(-0.01)	(0.31)	(-0.03)
	LBS 5 84	(3)	(-0.12)	(-0.04)	(-7.71)	(0.03)
	LIV 84	4	0.2	..	1.0	..
	OECD 85	5	0.03	0.01	0.19	0.04
ITALY						
	BKI 85	9	1.28	3.46	1.58	0.46
	OECD 85	5	0.02 (-)	0.09	0.40	0.14
CANADA						
	RDXF 82	7	0.08 (-)	..	0.46 (+)	..
	CAND 82	7	0.26	..	0.26	..
	QFS 82	7	0.05 (-)	..	0.51	..
	SAM 82	7	-0.01	..	1.15	..
	RDXF 84	7	0.02	-0.5-3.5	0.1	
	SAM 85	8	-0.20	..	1.03	..
	OECD 85	5	0.13	0.14 (-)	0.74 (+)	0.21
NETHERLANDS						
	FREIA 82	7	0.13	-0.42 (?)	2.46	0.29
	MKM 85		4.5	..	-0.5	..

* Shock standardised as a 1 percentage point rise in the representative short-term interest rate (IRS), with the long-term rate generally exogenous. The elasticities are calculated as the ratio of percentage deviations from the baseline of volume or price (numerator) and money (denominator) for the last observation.

(-) The elasticity of output tends to fall, although it is not 0 by the last year of the simulation.

(+) The elasticity of price tends to rise even though it remains far from one by the last year of the simulation.

(?) Indicates that the elasticity varies erratically from year to year.

Source: OECD INTERLINK and national models (see list in Table H of Annex B).

8228E.7

Table 11

ACTUAL PRICE/OUTPUT SPLIT OBSERVED SINCE THE EARLY 1970s

- Average share of real output for one per cent growth in nominal income -

Average	United States	Japan	Germany	France	United Kingdom	Italy	Canada	Australia	Netherlands	Sweden
1973-1986	0.22	0.52	0.27	0.19	0.15	0.12	0.29	0.20	0.25	0.14
1976-1979	0.34	0.53	0.44	0.24	0.18	0.16	0.35	0.22	0.30	0.10

8228E8

Table 12
EFFECTS OF MONETARY POLICY ON UNEMPLOYMENT AND IMPLICIT EVALUATION OF OKUN'S LAW

COUNTRY	Model	Change in unemployment rate: Floating exchange rates, Short-term (a)	Change in unemployment rate: Floating exchange rates, Medium-term (b)	Change in unemployment rate: Fixed exchange rates, Short-term (a)	Change in unemployment rate: Fixed exchange rates, Medium-term (b)	"Okun" relationship (ratio of unemployment to output): Floating exchange rate, Short-term(a)	"Okun" relationship (ratio of unemployment to output): Floating exchange rate, Medium-term (b)	"Okun" relationship (ratio of unemployment to output): Fixed exchange rate, Short-term (a)	"Okun" relationship (ratio of unemployment to output): Fixed exchange rate, Medium-term (b)
A. Shock on money supply									
UNITED STATES	DRI 82	0.2	0.0	..	..	-0.6	X	..	..
	CHA 82	0.2	0.1	..	..	-0.8	-1.2	..	..
	WHAR 82	0.2	0.0	..	..	-0.6	X	..	..
CANADA	RDXF 84*	0.1	0.0	0.1	0.0	-0.6	X	-0.4	X
	RDXF 85	0.1	-0.1	0.1	0.1	-0.4	-0.8	-0.4	-0.7
	SAM 85	0.1	0.0	..	..	-0.6	X	..	..
AUSTRALIA	RBA 82*	0.1	0.0	0.1	0.1	-0.3	-0.2	-0.3	-0.2
B. Shock on interest rate									
UNITED STATES	MCM 82	0.3	-0.5	0.2	-0.1	-0.4	+7.7	-0.5	+0.3
	MCM 82(c)	0.1	-0.1	0.1	-0.0	..	..	..	..
	OECD 85	0.2	0.4	0.2	0.5	-0.5	-0.8	-0.5	-0.6
JAPAN	WLD 82	0.0	0.0	0.1	0.0	0.0	0.0	-0.3	0.0
	WLD 84	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	OECD 85	0.1	0.1	0.1	0.0	-0.1	-0.1	0.0	-0.1
GERMANY	BBk 82	0.1	-0.3	..	..	-0.4	-2.4	..	..
	BBk 84	0.2	0.0	0.2	0.0	-0.3	0.1	-0.3	0.0
	OECD 85	0.1	0.3	0.1	0.2	-0.6	-0.8	-0.6	-1.0
FRANCE	MET 81	0.1	0.0	0.0	0.1	-0.2	0.0	-0.1	-0.5
idem for 1 % rise in BR		0.3	0.0	0.1	0.4	..	..	..	..
	COP 81	..	..	0.0	0.0	..	..	0.0	-0.5
idem for 1 % rise in BR		..	..	0.0	0.0	..	..	..	..
	OECD 85	0.1	0.3	0.1	0.1	-0.2	-0.2	-0.2	-0.2
UNITED KINGDOM	HMT 82	0.2	-0.2	0.1	0.1	-0.6	-0.8	-0.6	-0.6
	OECD 85	0.1	0.2	0.1	0.1	-0.7	-0.8	-0.2	-0.2
ITALY	BKI 85	0.1	0.1	0.0	0.0	-0.3	-0.2	-0.2	-0.1
	OECD 85	0.1	0.1	0.2	0.3	-0.4	-0.3	-0.5	-0.6
CANADA	RDXF 82	0.3	0.2	..	..	-0.5	-0.4	..	..
	CAND 82	0.0	0.0	..	..	0.0	0.0	..	..
	QFS 82	0.2	0.2	..	..	-0.7	-1.0	..	..
	SAM 82	0.1	0.1	..	..	0.4	+1.0	..	..
	SAM 85(e)	0.7	0.0	..	..	-0.6	X	..	..
	RDXF 84	0.4	0.4	0.2	0.0	-0.5	-0.8	-0.3	0.0
	RDXF 85	0.4	0.9	0.2	0.3	..	..	..	..
	OECD 85	0.3	0.7	0.2	0.3	-0.5	-0.7	-0.5	-0.8
NETHERLANDS	Freia 82	0.1	-0.2	0.0	0.0	-0.3	+0.3	0.0	0

a) b) c) d) see Table 6.
.. Results not available.
X Indeterminate ratio (nil or negligible effect on denominator).
* Results on interest rates and money supply shocks are not directly comparable because they are not generally available on the same basis.
Source: OECD INTERLINK national models (see list in Table H of Annex B).

8228E.9

Table 13

TIME SERIES TESTS OF THE ROLE OF ANTICIPATED AND UNANTICIPATED MONETARY POLICY IN OUTPUT AND EMPLOYMENT

COUNTRY	Both anticipated and unanticipated policy significant	Anticipated policy not significant unanticipated policy significant	Neither unanticipated nor anticipated policy significant
United States	Small (1979), Froyen (1979) Mishkin (1982a, 1982b) Boschen and Grossman (1982), Peseran (1982), Makin (1982), Marrick (1983), Cannerella and Garston (1983), Cairns and Lombra (1984), McGee and Staisiak (1985), Driscoll et al. (1983), Sheehey (1984) Frydman and Rappoport (1987)	Barro (1977, 1978), Sheffrin (1979) Leiderman (1980), Barro and Rush (1980) Barro and Hereowitz (1980), Fitzgerald and Pollio (1983), Neftci and Sargent (1978), Allfield and Duck (1983), Lillien (1982), Rush 1986	Haraf (1983), Wasserfallen (1984a, 1984b), King and Plosser (1984) Sims (1980), Litterman and Weiss (1985), King and Plosser (1986)
Japan	Piggott (1978), Seo and Takahashi (1981), Hamada and Hayashi (1985), Taniuche (1980), Gochoco (1986) Fitzgerald and Pollio (1983)	Parkin (1984)	
Germany	Bailey et al. (1986)	Demery et al. (1984)	Wasserfallen (1984a, 1984b)
France	Fitzgerald and Pollio (1983) Bailey et al. (1986)		Bordes et al. (1982) Wasserfallen (1984a)
United Kingdom	Symons (1983), Garner (1982) Driscoll et al. (1983) Fitzgerald and Pollio (1983) Bean (1984), Alogoskoufis and Pissarides (1983) Bailey et al. (1986)	Attfield et al. (1981a, 1981b) Attfield and Duck (1983)	Wasserfallen (1984a) Demery (1984)
Italy	Fitzgerald and Pollio (1983) Bailey et al. (1986)	Smaghi and Tardini (1983)	Wasserfallen (1984)
Canada	Jones (1985) Darrat (1986)	Wogin (1980)	

EX.156.ps

Table 14

THE RELATIONSHIP BETWEEN THE VARIANCE OF MONEY GROWTH AND THE VARIANCE OF INFLATION

-- A test of significance using the F-statistics --

8 period moving variance								
Lags(a)	None		2 quarters		4 quarters		6 quarters	
	M1	M2	M1	M2	M1	M2	M1	M2
United States	..	..	..	..	..	..	..	S
Japan	..	S*	S*	S*	S*	S*	S*	S*
Germany	..	..	..	..	S*	..	..	..
France	S	..	S	..	S	..	S*	..
United Kingdom	S	..	..	..	..	S	..	S*
Italy	S	S*	S*	S*	S*	S	S*	..
Canada	..	S	..	S*	..	S*	..	S
Australia	S*	S*	S*	S*	S*	S*	S*	S

16 period moving variance								
Lags(a)	None		4 quarters		8 quarters		12 quarters	
	M1	M2	M1	M2	M1	M2	M1	M2
United States	..	..	S	..	..	..	..	..
Japan	S*	S*	S*	S*	S*	S*	..	..
Germany	..	..	..	..	..	S*	..	S*
France	..	..	S	..	..	..	..	..
United Kingdom	..	S*	S*	S*	S*	S*	..	S*
Italy	S*	S*	S*	S*	S*	S*	..	S
Canada	S	S*	..	S	..	..	..	..
Australia	S*	S*	S*	S*	S*	S*	..	..

S = Significant at the 5 per cent level (S*, and at the 1 per cent level).
.. = Not significant at the 5 per cent level.

a) The moving variance of inflation is regressed on the moving variance of money growth either contemporaneously (no lag) or lagged (from 1 to 6 quarters).

Table 15

MONETARY POLICY SPILLOVER EFFECTS
BETWEEN THE UNITED STATES AND NON-U.S. OECD (a)

Model	Country/Area	GNP				CONSUMER PRICES			
		SIMULATION D		SIMULATION H		SIMULATION D		SIMULATION H	
		2	6	2	6	2	6	2	6
OECD	USA	1.6	0.5	0.1	0.9	0.7	1.8	-0.1	-0.4
	ROECD (b)	0.3	0.1	0.8	0.7	-0.1	0.8	0.3	1.4
MCM	USA	1.5	0.9	0.0	0.0	0.4	2.6	-0.2	0.0
	ROECD	-0.7	-1.1	1.5	1.5	-0.6	-1.1	0.6	2.0
EPA	USA	1.2	-0.6	0.0	0.0	1.0	0.6	0.0	0.0
	ROECD	-0.4	-1.7	0.0	0.0	-0.5	-1.2	0.0	0.0
EEC	USA	1.0	0.8	0.1	0.2	0.8	2.3	0.1	0.3
	ROECD	0.2	0.2	0.8	0.8	-0.4	-0.6	1.0	3.0
LINK	USA	1.0	2.4	0.1	0.0	-0.4	1.0	0.0	0.0
	ROECD	-0.1	0.2	0.8	0.7	-0.1	-1.2	-0.6	-0.2
WHARTON	USA	0.7	1.0	0.0	0.0	-0.3	0.4	0.0	0.0
	ROECD	0.4	0.3	0.2	0.1	0.1	-0.5	-0.1	0.0
MCKIBB	USA	0.3	-0.4	0.3	0.2	1.9	3.7	-0.6	0.0
	ROECD	0.4	0.3	0.2	-0.7	-1.2	-0.5	1.5	4.4
DRI	USA	1.8	-0.8	..	..	0.4	2.2	..	..
	ROECD	-0.6	-0.5	..	..	-1.3	-0.9	..	..
LIVERPOOL	USA	0.1	-0.2	1.6	0.9	3.7	4.5	-3.4	-3.1
	ROECD	0.0	0.0	0.4	0.3	0.0	0.5	2.8	3.2
MINIMODR	USA	1.0	0.8	-0.3	-0.2	0.8	1.9	-0.5	1.1
	ROECD	-0.2	-0.4	0.8	-1.1	-0.2	-0.2	0.2	0.5
VAR	USA	3.0	2.3	1.2	1.5	0.4*	1.4*	-0.7*	-1.2*
	ROECD	0.4	0.5	0.7	1.7	23.7*	0.0*	-6.6	-0.9*
TAYLOR	USA	0.6	0.1	-0.1	0.0	1.2*	2.9*	-0.5*	-1.1*
	ROECD	-0.2	-0.2	0.8	0.0	-0.2*	-1.0*	0.7	1.7

a) Figures reported are percentage deviations from baseline resulting from a 4 per cent increase in money stock in the second and sixth year.

Key: ROECD = Non-U.S. OECD countries.
Simulation D: monetary expansion by U.S. with foreign monetary aggregates unchanged from baseline.
Simulation H: monetary expansion by non-U.S. OECD countries with U.S. policies unchanged from baseline.

* GNP price deflator
.. not available

Source: Report of Brookings Institute Conference on Empirical Macroeconomics for Interdependent Economies, March 1986.

8228E.12

Table 16

EFFECTS OF U.S. MONETARY POLICY ON OTHER MAJOR OECD COUNTRIES

MODEL	JAPAN		GERMANY		FRANCE		U.K.		ITALY		CANADA	
	GNP	CPI	GNP	CPI	GNP	CPI	GNP	CPI	GNP	CPI	GNP	CPI
OECD	0.2	-0.2	0.3	-0.2	0.2	-0.2	0.2	-0.3	0.1	-0.2	0.3	-0.5
MCM	-1.4	-0.2	0.0	-0.9	..	..	-0.1	-0.4	..	..	-0.7	-2.0
EPA	-0.6	-2.0	-1.7	-0.7	..	..	-0.6	0.0	..	..	1.8	0.7
EEC	..	..	..	..	..	..	..	..	..	..	..	..
LINK	-0.2	-0.4	-0.5	-0.3	0.0	-0.1	0.1	-0.5	0.1	0.1	0.0	-0.2
WHARTON	0.3	-0.2	0.5	0.0	0.4	-0.3	0.4	0.0	0.4	-0.2	0.8	-0.2
MCKIBB	0.4	-0.7	..	..	..	..	..	..	..	..	..	..
DRI	-2.6	0.2	0.4	-1.5	0.4	-1.7	0.0	-0.4	0.0	-3.5	0.3	-3.0
LIVERPOOL	0.0	-0.1	-0.1	-0.1	0.0	-0.1	0.0	0.0	0.1	-0.5	0.0	-0.1
MINIMOOR	..	..	..	..	..	..	..	..	..	..	..	..
VAR	0.6	0.0	..	..	..	..	..	..	..	..	..	..
TAYLOR	-0.3	-0.2	-0.1	-0.1	0.0	-0.1	-0.1	-0.4	0.0	-0.2	-0.3	-0.5

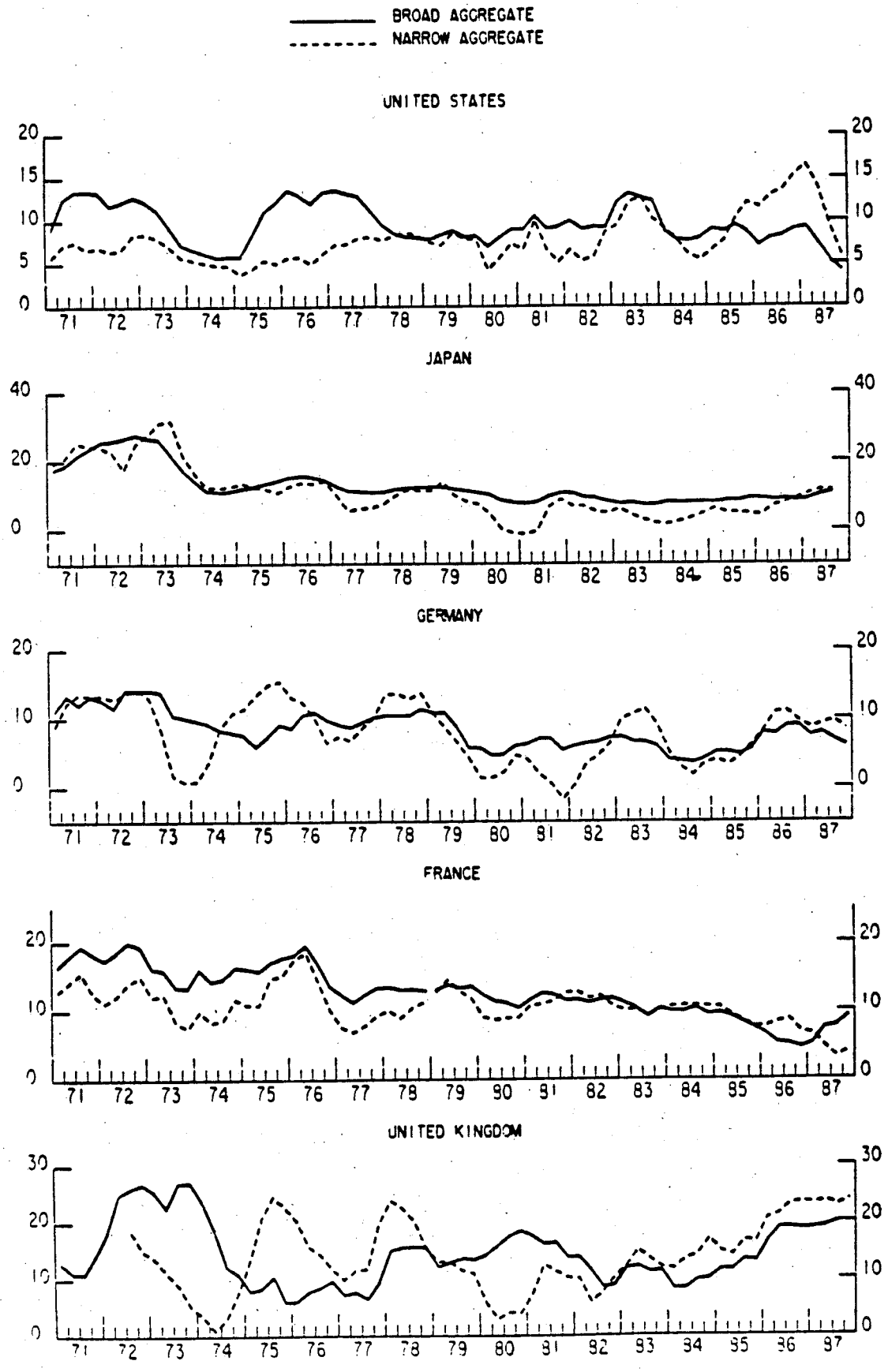
GNP = real gross national product or gross domestic product; CPI = Consumer price index; .. not available.

Source: See Table 15.

8228E.13

CHART 1

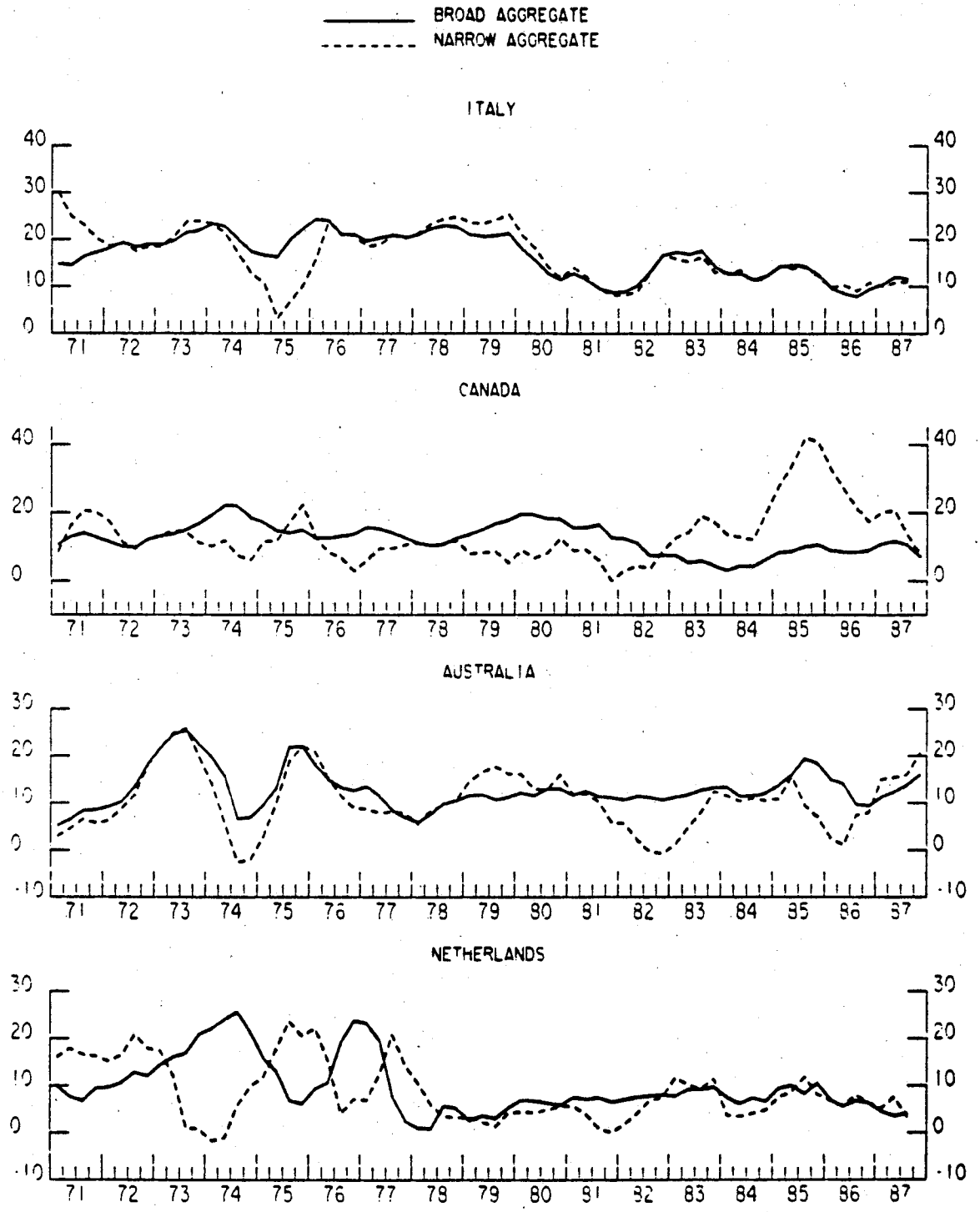
GROWTH RATES OF NARROW AND BROAD MONETARY AGGREGATES *
(YEAR OVER YEAR PERCENTAGE CHANGE)



* Note on next page.

CHART 1 (Continued)

GROWTH RATES OF NARROW AND BROAD MONETARY AGGREGATES*
(YEAR OVER YEAR PERCENTAGE CHANGE)

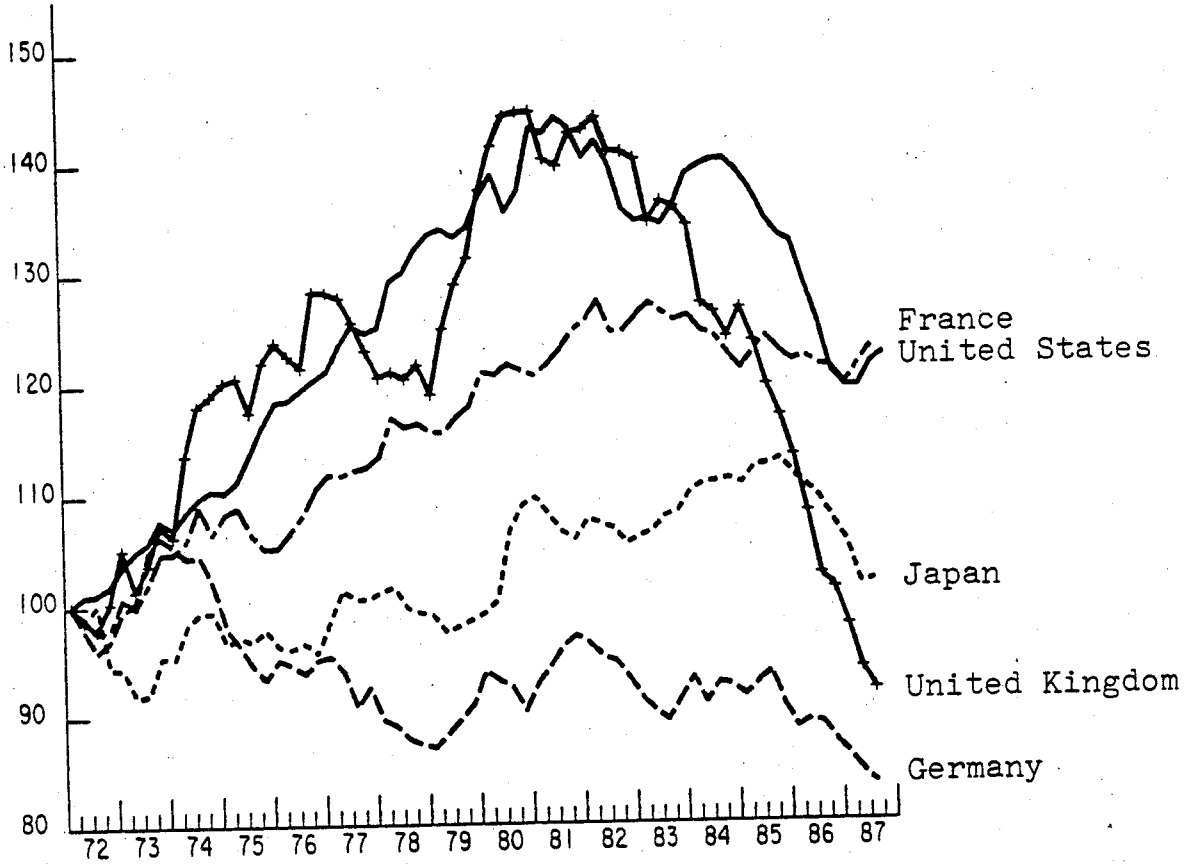


* Narrow monetary aggregates are national definitions of the M1 money supply measure except for Canada for which M1A is used. Broad monetary aggregates are national definitions of the M2 money supply except for the following countries where the aggregate used is given in parenthesis: Japan (M2+CD); Germany (M3); France (M3); United Kingdom (£M3).

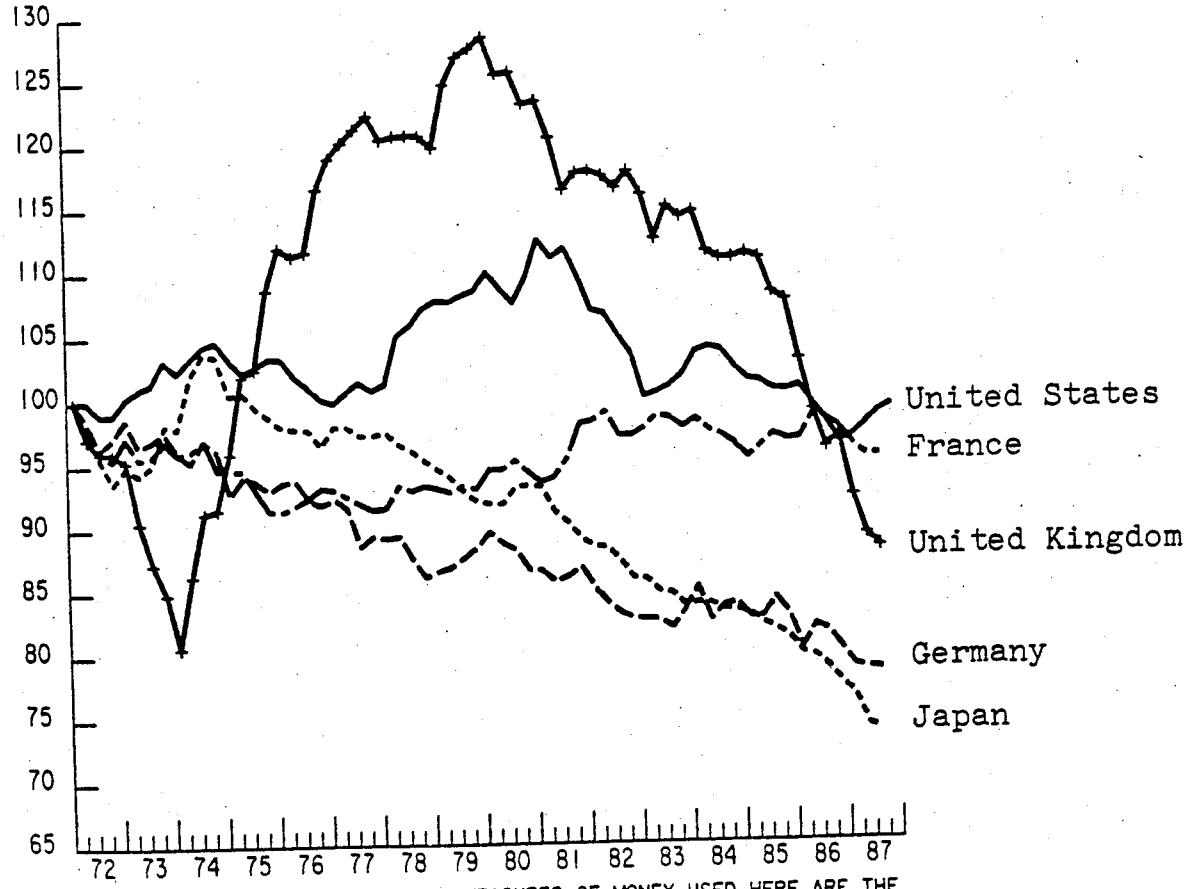
CHART 2

MONEY VELOCITY BEHAVIOUR(*)

Velocity for narrow monetary aggregate



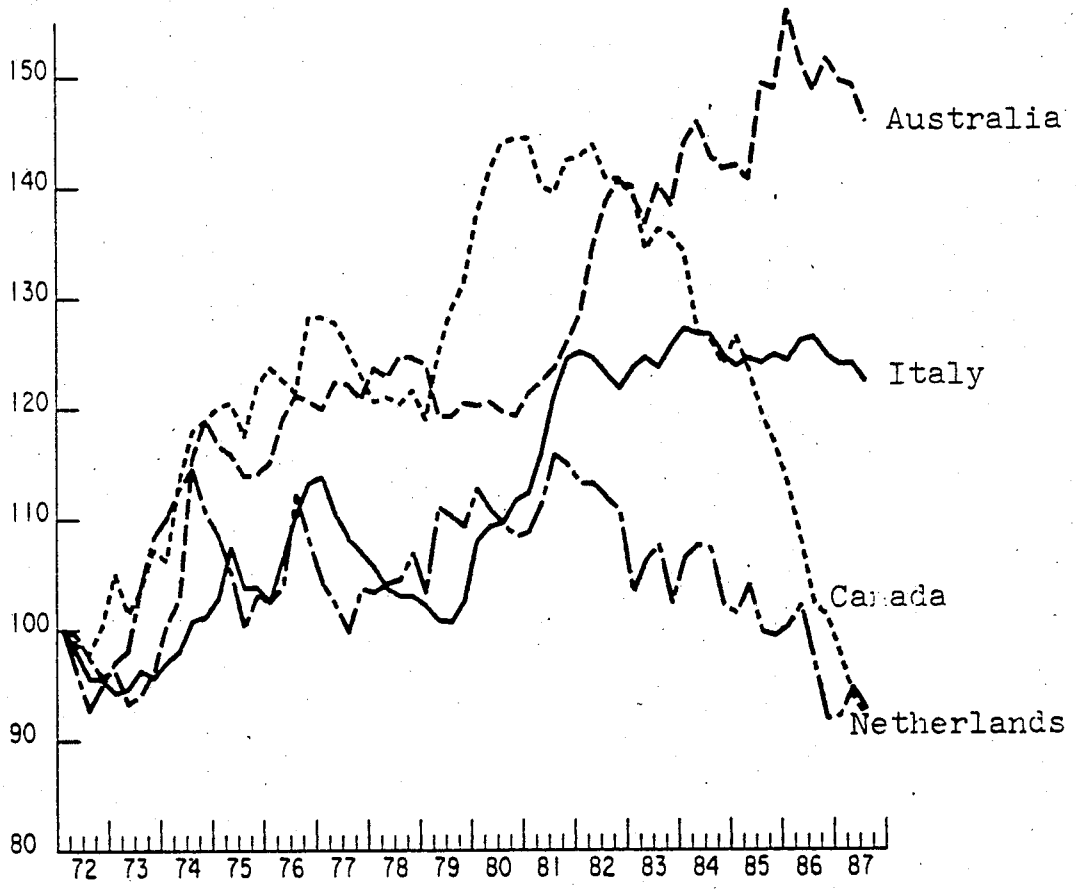
Velocity for broad monetary aggregate



(*) THE BROAD AND NARROW MEASURES OF MONEY USED HERE ARE THE SAME AS THOSE FOR CHART 1

CHART 2 (continued)

Velocity for narrow monetary aggregate



Velocity for broad monetary aggregate

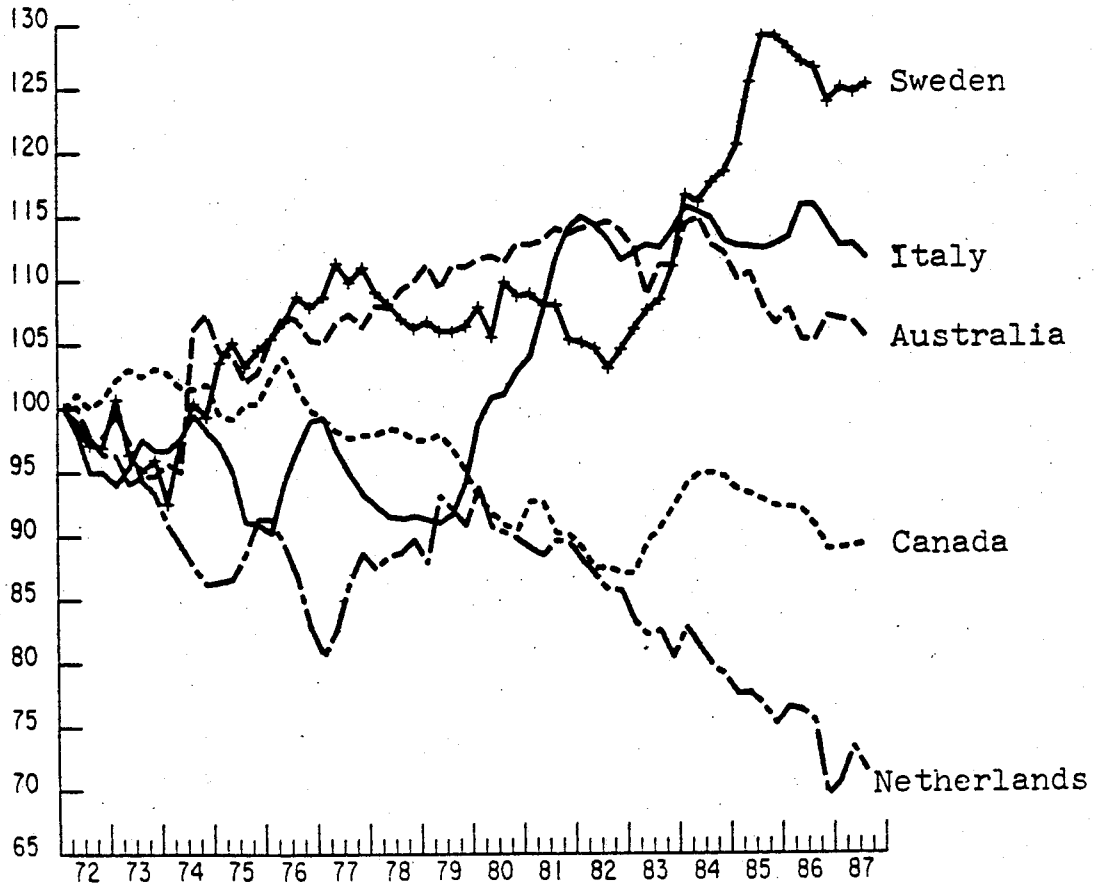
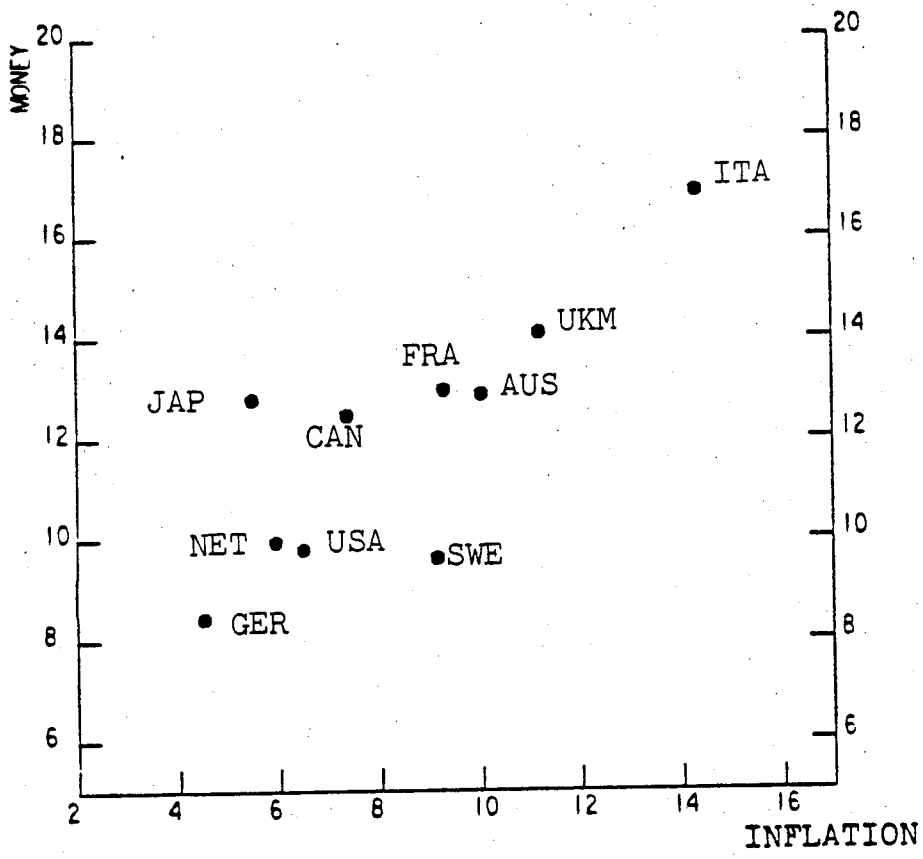


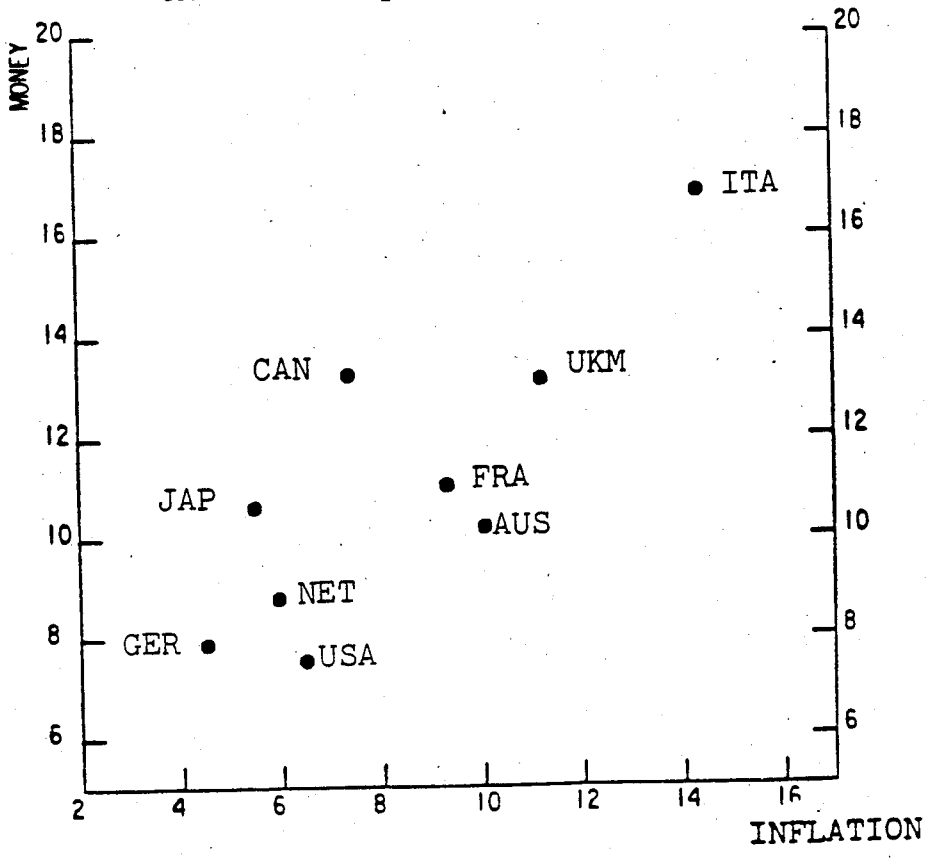
CHART 3

THE RELATIONSHIP BETWEEN INFLATION AND MONEY GROWTH

Relationship with broad money



Relationship with narrow money



ANNEX A

THE EFFECTS OF MONETARY POLICY ON THE REAL SECTOR: AN OVERVIEW OF THEORY

This annex provides a brief stylised overview* of a number of different approaches to the analysis of the real sector effects of monetary policy presented in Part III. These approaches are discussed in two separate sections. The first deals with theoretical frameworks which are based on non-clearing goods and labour markets -- essentially the neo-Keynesian and monetarist approaches. The second section reviews the ideas that have recently emerged from analysis based on a market clearing approach to macroeconomic modelling. Because of their strong emphasis on the short-run (real) ineffectiveness of monetary policies, these views are commonly identified under the heading of new classical macroeconomics.

1. The traditional non-clearing markets approach

Neo-Keynesian and monetarist frameworks have often been seen as representing extreme alternative descriptions of the way economies work. In fact, both adhere to the traditional "short-run" non-clearing markets approach, based on the "stylised fact" of inertia in the adjustment of wages and prices. But given other differences in their assumptions, they come to different conclusions about the conduct and effects of monetary policy.

Neo-Keynesian thinking on the role of monetary policy is usually taken to be epitomised by the standard Hicksian ISLM model. In the simplest versions of this model, prices are taken to be given, expenditure and money demand are interest rate sensitive and well determined with identifiable parameters, while output is perfectly elastic. Thus, monetary policy induced changes in aggregate demand affect output and have no effect on prices. In practice, however, elements of the perceived real world economy have been grafted on to this analysis: generally prices are not assumed to be constant but to adjust gradually, and output is assumed to depend upon the productive potential of the economy. The nearer to the capacity limit of the economy the more that aggregate demand raises prices and the less it affects output. This trade-off between output and prices, known as the "Phillips curve" in its original labour market price-quantity formulation, is assumed to be sufficiently robust to be exploited for stabilizing employment and output, at least in the short run.

Another striking feature of the neo-Keynesian approach is the assumed mechanism by which inflation is generated. Prices are viewed as being determined by a simple mark-up on costs. One implication of this is that aggregate demand pressure will have little or no direct impact on prices and will have more powerful effects on supply. A second implication is that inflation is largely determined by the attempts of labour to alter the distribution of income in its favour. With a full employment goal, monetary policy will have to accommodate any change in wage rates and prices. Within this framework monetary policy has little role in containing inflation. The

---

* A more detailed overview, on which the present note is based, including references to the literature, can be found in Driscoll (1985).

control of inflation has instead to be based on measures to stem wage demands, such as income policies, wage indexation, wage-price guideposts and "social contracts". Inflation in the Keynesian world is largely a social phenomenon. Failure to recognise this, and instead to try to achieve rapid disinflation via monetary deflation, would accordingly result in high real costs for little or no short-run gain, especially if wage settlements are not sensitive to rising unemployment. In open economies with a floating exchange rate regime, monetary policy could be expected to influence inflation via the response of the exchange rate and, hence, import prices. In general floating exchange rates would be expected to worsen the output-inflation tradeoff and, thereby, reduce the potential gains to discretionary stabilisation policy.

Monetarist thought has diverged from neo-Keynesian ideas on a number of issues. Perhaps the most important point of divergence concerns the confidence with which a well-determined model of the economy can be identified. While generally rejecting the possibility of generating such a model, and, therefore, discounting completely the simulation results of large-scale Keynesian models, monetarists have placed substantial emphasis on the power of the same econometric techniques to identify a well-determined structural money demand function and a "reduced form" relationship between money and nominal income. At the same time they have been noted for maintaining that such a relationship suffers from "long and variable lags", which prevent the efficient use of active monetary stabilization policy. It would not be too much of an exaggeration to characterise monetarist thought on the business cycle as viewing this feature of non-market-clearing economies not only as a disequilibrium phenomenon but also as a largely monetary phenomenon. According to this view the excessive swings in economic activity could largely be avoided by formulating monetary policy in terms of a simple rule for the growth of an appropriate monetary aggregate.

A second important point of divergence concerns the long-run effects of monetary policy on output and employment, which monetarists assume to be nil. Formerly opinion divided on the existence of a stable long-run trade-off between inflation and output implied by the Phillips curve. Such a trade-off is rejected by monetarists on the grounds that it seems to imply an implausible degree of money illusion. While they are prepared to accept that inflation might not be fully anticipated in the short run, they cannot support the idea that such errors will remain persistently large in the long run. The monetarists alternative view of the Phillips curve is that it is a short-run phenomenon caused by expectational errors. So if inflation suddenly accelerates, this may lead to an increase in output and employment because labour costs (real wages) decline given temporarily fixed nominal wages. This situation will only last, however, as long as it takes to adjust nominal wages to the new level of expected inflation. Output and employment will then return to their former levels. In these circumstances the only way in which higher output and employment can be maintained will be to accelerate the rate of increase in inflation in order to stay ahead of expectations. This implies an ever deteriorating trade-off, a given level of "excess employment" requiring more and more inflation in the long run. Such a situation is, of course, not sustainable. Actual inflation will then co-incide with expected inflation and the economy will revert to its natural long-run equilibrium output growth and employment rate.

This monetarist interpretation offers a considerably more pessimistic prognosis of the scope for trading output against inflation; it depends on

the speed with which wage rates respond to inflation and is at best temporary. It also offers a bleak outlook for attempts to achieve rapid disinflation via monetary deflation. If nominal wage rates do not adjust quickly, disinflation will be accompanied by high output and employment costs. This has led monetarists to advocate a gradualist approach in which the money supply growth rate is decelerated very slowly in the hope of reducing the adverse output and employment consequences.

According to this interpretation, an exploitable temporary trade-off between output and inflation may exist, however, as long as expectations formation is confined to an adaptive process that uses past values of inflation alone, or because there are persistent nominal rigidities (for example long-term nominal wage contracts). Under adaptive expectations when price increases accelerate, this will give rise to systematically biased forecasts of inflation which, if interpreted as involving a favourable change in relative prices (real wages appear higher than expected), may cause a positive supply response. If expectations formation is, on the other hand, forward-looking and is based on all relevant available information, including aspects of the process by which inflation is generated, no exploitable trade-off will exist. For example, assuming that monetary policy is the sole determinant of the price level and such policy can be observed then the price level will be known also. No errors will occur in expectations and movements in nominal wage rate will not be mistaken for movements in real wages. Perfect foresight is, however, not a requirement for the elimination of an exploitable trade-off based on expectations error. In general all that is required is that price forecasts be based on the efficient use of all available information -- that is be <u>rational</u> -- and that there be an absence of asymmetries in information. The monetary authorities, for example, should not have superior information to the private sector about the inflation process. Even in the absence of expectations errors, however, price and wage inertia may give rise to an exploitable short-run tradeoff.

The concept of rational expectations and the absence of a favourable long-run inflation-output trade-off is now widely accepted by both monetarists and neo-Keynesians. But despite this convergence of views, differences still persist about the long-run effectiveness of monetary policy. Monetarists have tended to charactise the equilibrium or long-run state of the economy as being a "natural", unique reflection of market structure largely impervious to monetary policy induced shifts in aggregate demand. Some neo-Keynesians have, on the other hand, questioned the possibility of eliminating low output growth and high unemployment, which they believe to be responsive to aggregate demand, up to the capacity limits of the economy. Modern neo-Keynesian analysis of under-employment equilibrium is based on the concept of "hysteresis" -- the tendency for the equilibrium rate of unemployment to be strongly dependent on the actual rate. The implication of this is that there is no unique "natural" or equilibrium level of output or unemployment.

2. <u>The new equilibrium business cycle approach</u>

Keynesian and monetarist frameworks are predicated on the assumption that in the short run the economy may be driven into disequilibrium, a situation seen as undesirable and which should be avoided or corrected. Since the early 1970s a radical alternative to this view has emerged. The key proposition of this new approach, known as "new classical economics" (due to the inspiration it draws from classical equilibrium analysis) is that prices

always adjust sufficiently to maintain continuous market clearing. This approach does not, however, reject the idea of a business cycle. Indeed, in a continuous market-clearing framework, the cycle is an equilibrium phenomenon which may not be undesirable and, even if it was the case, may not be correctable. Forward-looking rational expectations is also an important feature of the new classical approach, though less hinges on this assumption alone than its presence in conjunction with the assumption of market clearing.

Such an approach has far reaching implications for the effects of monetary policy and its potential as a tool of stabilization policy. New classical economists have typically dismissed the idea of using monetary policy to stabilise output and employment. In their analytical framework, real variables can only deviate from full information values because of random (non-systematic) variations in the price level induced by monetary policy. The essential prediction of this framework is that only the unanticipated component of monetary policy will have any real effects and that these effects will be only temporary. The price level, on the other hand, will depend upon both the unanticipated and anticipated components. One implication of this is that a monetary policy which is "noisy" or highly variable will tend to cause price level variability, which will swamp relative price changes. This may lead to a tendency to interpret all price changes as reflecting changes in the general price level, thus hampering the efficient working of the price mechanism.

In addition, the view is also held by some that high rates of money growth, even if these are not particularly volatile and are fully anticipated, cause instability in the price level and relative prices. The reason for this is given by the conjecture that high inflation, associated with high money growth, causes the price level to have a higher variance and relative prices to be more dispersed. Such a connection between the rate of inflation and relative price dispersion arises from the different speeds at which individual prices adjust. A pure inflation, one where the price level changes but relative prices remain unchanged, may not be possible because markets are segmented, behaviour is slower to adjust in some sectors, or because price controls vary from industry to industry. If high and unstable monetary growth leads to a situation in which prices do not contain the same degree of reliable information as they do under more stable conditions, the allocative efficiency of the economy may suffer and output and employment may decline.

In the equilibrium business cycle approach the full information equilibrium, or "natural", values of variables are taken to be the "best" (Pareto optimal) that can be achieved. Given that the full information equilibrium is the "best" position for the economy, unanticipated policy is undesirable. Viewed in this way the new classical framework provides, from a different perspective, an alternative rationalization for simple, credible announced monetary targets to that offered by traditional monetarists. As far as disinflation is concerned it gives the comfortable prediction that monetary policy can achieve a rapid and costless reduction in inflation if the policy is well understood and is believed.

The qualification that policy must be believed or be "credible" to have desirable effects -- inflation control with no output or employment costs -- has recently become the focus of much attention in the theoretical literature on monetary policy. It has been shown that in a world where expectations are forward looking and monetary authorities have the power to temporarily raise

output or lower unemployment, either by creating more money or by exploiting rigidities in wages and prices, a policy of maintaining low inflation may be "time-inconsistent" and, therefore, not credible. The problem of time-inconsistency arises when the monetary authorities attach some weight to lower unemployment and higher output which they may be tempted to strive for when inflation is low and, therefore, not seen to be an immediate problem. If private sector agents realise that a policy of low inflation is not compatible with the short-run incentives facing the monetary authorities, the best they can do to avoid a fall in real earnings is to set wages and prices assuming that the autorities will pursue their short-run inclination to inflate. Knowing that the private sector will behave in this way, the authorities could choose not to inflate, but in this case real wages will prove too to be high and employment and output will suffer. In such circumstances the authorities would probably prefer to allow private sector expectations to be realised by monetary expansion.

A number of schemes have been advanced to avoid this inflation bias. One involves the adoption of a commodity standard like gold. A second involves precommitting the monetary authorites in some way, for example by a legal or constitutional devise forbiding inflationnary monetary expansion. But even without this, it has been suggested that low inflation could still be maintained if the monetary authorites have a reputation for low inflation, which they value at least as much as any temporary output gain from expansionary monetary policy. However, establishing and maintaining a favourable reputation, especially for authorites identified as permissive of high inflation in the past, is difficult and may imply a protracted period of low growth and high unemployment. Reputation may also be lost quickly if discretionary measures designed to boost monetary growth are adopted by monetary authorities.

There are reasons for believing, however, that discretionary monetary policy may play no more than a minor role in explaining variations in real economic activity and may not be able to account for the strength of the correlation between money and real growth. From an _a priori_ point of view, the assumption that significant informational gaps would persist, motivated by maximising behaviour, seems as arbitrary and _ad hoc_ as the assumption that prices do not adjust instantanteously because of unspecified costs of adjustment. In practice, there exists a good deal of information that might help to avoid confusion between relative price and absolute price level changes. Many goods are traded throughout the economy and the prices at which they are sold in different localities are easily established. Also there is readily available information on such global price variables as the exchange rate and interest rates. Moreover, in some countries preliminary monetary statistics are available with a very short lag.

If monetary disturbances are rejected as a source of the business cycle two questions remain to be answered: (i) why are the money supply and real activity correlated? and (ii) what is the cause of variations in real activity? One explanation, ironically already often advanced by some Keynesians, for the existence of a significant correlation between money and real activity is that reverse causation is responsible, the money supply responding positively to money demand which is determined by changes in the level of real activity. But if the observed correlation has indeed been derived from data in which money is endogenous, it leaves open the question of what would happen if monetary policy ceased to accommodate output changes;

would output be affected or would the effects be confined to prices? One emerging approach to macroeconomic analysis known as the real equilibrium theory of the business cycle posits that exogenous monetary policy would have no real effects and that the business cycle is an exclusively real phenomenon. In this framework monetary policy could not even be destabilizing (random action has no real consequences) and it does not matter whether monetary policy announcements are credible or not. The source of the serial correlation observed between output and employment are real shocks. Viewed in this light, the business cycle, as well as being independent of nominal monetary policy, is a desirable response of the economy to supply shocks. An important implication of this framework is that the monetary authorites have no incentive to bring about inflation, monetary policy cannot be time-inconsistent and there is no reputation problem.

The challenge offered by the equilibrium business cycle approach has received considerable attention in recent years. This is not surprising in view of the important consequences that such an approach implies for the conduct of monetary policy. In particular, the high costs commonly attributed to disinflationary monetary policy and which are used to justify a gradualist attitude towards inflation control are seen, from this analysis, as exaggerated.

ANNEX B

METHODOLOGICAL ISSUES AND EMPIRICAL EVIDENCE

This annex first discusses the role of financial variables in determining the main components of private sector expenditure as depicted in large-scale models. It then outlines the methodological issues underlying the monetary policy simulation experiments reported in Part II of the main text. The final section reviews some of the empirical evidence on the new classical rational expectations market-clearing approach presented in Part III.

I. The effects of monetary policy on expenditure components

Empirical evidence concerning the role of monetary policy in the determination of the main components of aggregate expenditure is reviewed here. The conceptual and methodological approaches adopted in applied studies on each component are also outlined. The components examined are those discussed in Part III of the main text: (a) business fixed investment; (b) residential investment; (c) private consumption; (d) imports and exports; and (e) inventory investement.

a) Business fixed investment

The role of monetary variables in investment equations partly depends on the underlying theoretical framework. Applied studies on investment usually adopt one of three alternative approaches. The first approach, the accelerator-liquidity theory, has investment as a function of sales, capacity utilisation (exerting a major influence on expected profit) and internal funds (mainly determining the cost of resources) (Eisner and Strotz 1983). The second focuses on the concept of "user cost" of capital, which is the implicit rental price of the capital stock services (Jorgenson, 1963). According to this approach, investment depends on output and the determinants of the rental price of equipment: appropriate rates of interest; expected capital gains; tax structure; etc. The third approach is based upon the "Tobin q" measure, which is the ratio of the market value of new additional investment goods to their replacement costs (Tobin, 1969). It is assumed that firms' capital stock adjusts until the ratio reaches its equilibrium value of unity. All these approaches, however, turn out to be very similar from a practical standpoint, once adjustment costs are taken into account (Hayashi, 1982). Since liquidity constraints, the user cost of capital and Tobin's q are all difficult to measure, most of the investment equations are specified in a rather ad hoc way. Typically, both short-term and/or long-term real interest rates are used, though some models include nominal rates. In addition the specification of equations varies according to the choice of production function, for example, the degree of substitutability between production factors. Long-lasting changes in the rental price affect the equilibrium (or desired) stock of capital only when the production function is putty-clay (i.e. new equipment is malleable as long as it is not installed) and putty-putty (both new and installed equipment is malleable) but not when it is clay-clay (i.e. the capital intensity cannot be changed), although this latter feature is adopted by some models.

In contrast with earlier results, interest rates are now regarded as important determinants of investment behaviour. This is illustrated in Table A, which highlights the importance of interest rates in investment equations for most countries. Although higher interest rates are usually found to induce a decrease in business fixed investment, the magnitude of this effect varies considerably across different countries and across alternative models for the same country. Interest rates are also often included in investment equations as a (negative) proxy for the degree of profitability, but this use may be ambiguous. If, for example, expected profits are largely determined by the growth of future demand, the incidence of profitability on investment may be difficult to isolate from the accelerator mechanism. In addition, higher credit costs may induce rationalisation investment generating higher long-run profits.

Profitability can also be captured in the structure of corporate balance sheets, especially through liquidity constraints and degree of indebtedness. With perfect financial markets, firms should be indifferent between internal and external financing, since the cost of borrowing exactly matches the opportunity cost of lending. Nonetheless, despite recent moves toward more competitive capital markets, the cost of borrowing often increases with the ratio of interest payments to net income. Consequently the lack of internal funds acts as a constraint forcing firms to delay (or even scrap) investment projects. In principle, the influence of internal cash flow and debt services should be higher in countries with less developed capital markets. According to recent econometric work, however, international differences in this respect are not so clear cut. Investment equations usually include a liquidity constraint in Japan, Germany, France, The Netherlands as well as in the United States. A significant negative effect of debt services is also evident in the United States, France and Australia. Both effects generally influence the timing more than the overall magnitude of investment flows. Consequently their long-run impact is rather small.

Nevertheless the combined effects of liquidity contraints, high debt-equity ratios and, hence, excessive leverage, declining profits and rising risk premia may actually reduce and not simply postpone expenditures on long-lived assets and thereby lower the capital stock. These financial constraints may be all the more severe if credit availability is reduced. But most country models (except for France and Italy) do not include this factor, partly because of measurement problems. External financial variables such as exchange rates, capital flows and foreign asset holdings rarely feature as determinants of domestic investment, even though these factors may be potentially important. Exchange rate variability may create uncertainty, capital movement may influence the availability and sources of business investment and changes in the value of foreign assets may have an important effect on company balance sheets.

The prospects for real economic activity is the main indirect channel through which monetary policy affects investment in all models by virtue of their incorporation of measures of sales, output or capacity utilisation (either realised or expected). These factors are likely to have important implications for investment through their impact on profitability. For example, if increases in nominal activity, induced by expansionary monetary policy, are mainly due to real growth, investment is always positively affected. But, if these increases result from a rise in inflation, the impact on investment is far from clear cut. On the one hand, according to a few

econometric studies in Japan and France, when higher (but still moderate) inflation rates induced by an expansionary monetary policy are perceived as depreciating nominal debt whether past or expected, firms' investment is enhanced. On the other hand, higher variability in price levels and relative prices may induce more uncertainty and lead to lower investment. Also if the emergence of inflation leads economic agents to expect a future tightening in monetory policy and lower economic activity, this may bring about the cancelling of current investment plans. Similarly an increase in real wages relative to real interest rates, due to monetary policy induced wage inflation may have ambiguous effects. The relative decrease in the rental price of capital should favor a substitution of labour for capital but higher labour unit costs simultaneously reduce profitability and, hence, investment.

b) Residential investment

Viewed as investment, housing expenditure can be analysed in terms of cost of capital or the analogue of Tobin's q ratio: the price of existing houses to construction costs. Viewed as consumption of durable good services, housing expenditure may also be considered in terms of permanent income or life-cycle theories. In principle the demand and supply sides of the housing market should ideally be analysed separately and then solved simultaneously, but this is rarely done. Demand and supply determinants are often included together in the same hybrid equation. For example, the cost of mortgage credit is a large element of the price of purchasing a house and will, hence, influence the demand for new houses; but the supply of houses is also dependant on the cost of credit since residential construction relies mainly on external finance. In addition, the rationale for the specification of many residential expenditure models is weak. This feature, coupled with differences in the statistical definition of financial and housing variables, makes international comparisons hazardous. Although national accounts are harmonized to some extent through the use of a common framework, housing statistics are not defined in exactly the same way in OECD countries (Blades, 1984). Finally, there are numerous institutional differences between countries in the way residential investment is organised and financed.

In all of the housing expenditure equations summarized in Table B, (higher) interest rates have a significant (negative) impact on residential investment. Furthermore this effect is stronger and more rapid than on business investment, although estimates of interest elasticities of housing expenditure vary considerably. One reason for differences in the magnitude of interest rate effects is the way interest rates are incorporated in housing models. Interest rates are usually represented by long-term rates such as mortgage rates or other proxies, but they are sometimes defined in real terms (user cost of capital approach) and, on other occasions, in nominal terms. Given that real and nominal interest rates may diverge in the short run in response to a change in the stance of monetary policy, this short-run effect on residential expenditure may differ.

Although wealth variables are not usually included, factors reflecting the distribution and composition of wealth are sometimes incorporated in residential investment models. These include movements in the yield curve, alternative saving opportunities and institutional features of financing. Some models, for example in France, take account of shifts between housing and financial saving patterns (substitutable in the short run but complementary in the medium run). Short-run substitution is the result of the switching of

financing for housing between bank borrowing and liquidation of financial assets. In the medium run, however, if saving is in part motivated by the need to meet minimal lump sum requirements for house purchase or savings deposit requirements for mortgage eligibility, higher interest rates may act as a disincentive to saving because they make mortgages more expensive to service. Availability effects are important since the supply of funds for house purchase is notoriously inelastic and has remained so despite the recent deregulation of mortgage markets in a number of countries. Mortgage rates tend to adjust slowly and do not always clear the market because of political and social pressures or possibly because of transaction costs involved in changing these rates. In these circumstances the non-price terms of mortgage contracts may be modified by changes in, for instance, standards of credit worthiness, initial deposits, ceilings, duration, etc. These features of housing finance are included only in a few national models (in the United States, France, the United Kingdom and Canada) and then only partially.

The global impact of monetary policy on income and prices constitutes its major indirect transmission channel on the housing sector since real disposable income is the main determinant of housing expenditure. This variable is usually included in residential expenditure models as a proxy for permanent income or wealth. Most of the downward trend in residential investment expressed as a share of nominal income since the mid 1970s can be explained by changes in real disposable income, so that it is only at the margin that other variables such as interest rates influence the housing investment. Changes in the price level may also be an important determinant of housing expenditure. In several studies, a higher inflation rate, either realised or expected -- which often turn out to be similar because of the use of an adaptive process for expectations formation -- raises housing investment, because the opportunity cost of holding money rises. Inflation, however, may have an adverse impact on housing expenditure through induced wealth effects, e.g. via lower real balances. Higher variability in prices may also induce speculative effects on the relative price of houses.

c) Private consumption

There is a large measure of consensus in the conceptual approach taken in most recent consumption studies, which generally use the life-cycle or permanent income hypotheses, but there may be some disagreement in the way these hypotheses are incorporated into consumption models. Furthermore, consumption equations are flawed in ways which render most estimates less robust than would be desirable. Several studies run regressions on the aggregate consumption (or saving) and not on its disaggregated components. Some statistical choice may also bias the estimation process (autoregressive forms, seasonal adjustment of data). In particular the way income (and hence saving) is measured deserves some comment. In national accounts nominal interest receipts by households are included in income. These interest receipts incorporate the inflation premium intended to compensate for wealth depreciation. It is beyond the scope of this study to discuss all the problems involved by such a method, but its importance in the evaluation of monetary policy effects, through the link between income and consumption, should not be ignored (see Hendry and Von Ungern-Sternberg 1980). The higher are nominal interest rates, the higher are net interest receipts for the household sector (as a net creditor of the economy). Consequently, projections of consumption based on measured income will increase if nominal interest rates increase. If, however, higher nominal interest rates result

exclusively from higher inflation premia, rational agents' consumption should not increase, if they wish to offset the reduction in their wealth due to the more rapid rise in prices. Most models do not adequately deal with this phenomenon (except for a few British and Canadian models).

As a result of statistical problems and offsetting effects, only some of the consumption equations surveyed in Table C succeed in displaying a negative impact of higher real interest rates on private consumption. This relationship results mainly from the effects of changes in credit costs on durable goods expenditures (especially cars). Substitution effects between consumption and saving can also explain this inverse relationship. These results depend crucially on the prevailing assumptions on the evolution of deposit and lending interest rates and the yield curve. The magnitude of substitution, income and wealth effects induced by changes in interest rates varies according to the degree of substitutability between assets, the extent of variable interest rates in existing contracts, the use of hedging technique, etc. For example, the Bank of England model of the United Kingdom economy assumes that if short-term rates increase more than long-term rates, portfolio shifts toward more liquid assets may induce wealth effects that favour greater consumption.

When wealth is included directly as an explanatory variable in consumption equations, its growth has a positive influence. This is especially true in econometric studies for the United States, the United Kingdom and Canada, where capital markets are large and competitive. If equity holders perceive that they are wealthier, they may not feel the need to save as much out of current income. Although this effect is likely to be limited because the propensity to consume out of capital gains is low, capital gains and losses do not need to be permanent or realised to affect consumption behaviour (since capital gains allow other forms of savings like deposits to be reduced and may make borrowing easier). The 1960s belief that capital gains were rarely spent was based on the following <u>a priori</u> arguments: first, capital gains are transitory: second, they accrue to upper income groups with low marginal propensity to consume; third, they cannot be realised by everyone without reducing stock prices. However, these arguments only justify a low (but not zero) marginal propensity to consume out of wealth. In fact, the more the income categories of share holders are diversified and the less transitory capital gains are expected (because of a steady confidence in the future for instance) the greater will be the effect on consumption.

Consequently, as far as monetary policy is concerned, any action inducing a change in the amount or composition of wealth, either directly through open market interventions or indirectly through changes in interest rates or the price level, will affect consumption. All estimates of the magnitude of such wealth effects are, however, tentative, not only because of the poor quality of wealth data but also because of the fundamental disagreement on the role of liquidity versus total net worth and on whether public debt, like government bonds, is a component of net wealth (Barro, 1974). For example, if an open market intervention substitutes money for public bonds, the level of wealth is unchanged unless these bonds are not considered as net wealth by the private sector. This will be the case if they fully discount the tax liabilities implied by their future reimbursement. But even so, "rational" individuals will not necessarily feel wealthier, if they expect the increase in their nominal money balances to result in an equivalent increase in prices.

Credit rationing rarely appears as a determinant of consumption behaviour mainly because of the lack of adequate data. Some attempts to include this variable have been made in France, the United Kingdom and Italy. Demand for consumer durables is likely to be sensitive to consumer credit terms (e.g. statutory controls on the minimum deposit rate and the length of the repayment periods in hire purchase agreements). These effects on durable consumption, however, may not be strong enough to reduce aggregate spending and rule out the possibility that demand shifts to non-durable goods requiring less external financing.

As in the case of housing expenditures, the major indirect transmission channel of monetary policy involves changes in real disposable income which is the main determinant of consumption. The rate of inflation also often features as an explanatory variable in consumption equations, although to a lesser extent in countries with moderate inflation rates such as Germany. Inflation, whether expected or not, was at first believed to affect the propensity to consume positively. In particular, if increases in inflation are not reflected in nominal interest rates, they induce wealth transfers from creditors to debtors. When the former have a lower propensity to consume than the latter, consumption may rise. However, there has been more evidence of a negative correlation between inflation and consumption ratios since the mid-1970s. A number of explanations have been given for this occurence. In addition to the rise in the savings propensity that may result from a desire to restore real balances and to increase holdings of liquid assets for precautionary reasons, failure to distinguish clearly between absolute and relative price changes may reduce household consumption because of a "money illusion on relative prices".

d) Imports and exports

The effect of monetary policy via its influence on trade flows may not be commensurate with the size of the ratios of imports and exports to GDP. This is because the sensitivity of the non-tradeable goods sector -- in terms of nominal and real variables, like prices, wages, intermediate consumption, etc. -- to changes in the tradeable goods sector varies across countries. When floating, the exchange rate constitutes a crucial channel for monetary policy influence, according to the perfect capital mobility and fixed price version of the Mundell-Fleming model. An expansionary domestic monetary policy induces an exchange rate depreciation, increases net exports and thus provides an external boost to any internal stimuli. If, however, short-run price elasticities of demand are very low and the trade balance response to the exchange rate depreciation follows a J-curve pattern, the stimulating effect of monetary expansion will be weakened by a trade deficit rather than strengthened by a trade surplus. Under these circumstances the exchange rate and balance of payments changes may lead to mutually reinforcing "explosive" developments. Private capital flows and/or official interventions may act as buffers to limit these movements to large swings. In such a case, nevertheless, the basic assumptions of the Mundell-Fleming world do not hold and the effects of monetary policy are more difficult to predict.

The overview of evidence on price and income elasticities here is drawn mainly from a survey by Goldstein (1984). Statistical problems, however, surround the measurement of price and income elasticities of imports and exports, which are crucial in determining the effects of monetary policy. First, trade data are most readily available in value terms and the choice of

alternative deflators (unit value indices, wholesale price indices, etc.) affect elasticity estimates. Second, non-price characteristics of domestic and foreign traded goods are not taken into account. Third, the variability of a floating exchange rate, to the extent that it increases price uncertainty, could alter price elasticities or cost-price mark-up behaviour of traders. Fourth, the justifications for imposing homogeneity and symmetry conditions in the estimation process are still in dispute. For example, the usual assumption of no money illusion can be criticised and methodological problems lead to bias in the definition of indices. Fifth, although time lags are essential to explain the dynamics of the process, most methods used are ad hoc and would be unlikely to be supported by the data. Finally, and more generally, trade equations remain very simplistic. In particular both supply and demand factors are mixed in the same equation and potentially important monetary variables are often omitted (such as interest rates, capital flows).

Estimates of price elasticities of total imports and exports appear highly variable both in different countries and in different studies for the same country. As shown in Table D, medium-run price elasticties are considerably larger than very short-run (current semester) price elasticities. The ratio of medium-run to short-run elasticities always equals or exceeds two. Only about 50 per cent of the final relative price adjustment takes place within one year. These characteristics, combined with short-run price elasticities which are lower for imports than for exports (see Table E), result in a J-curve effect on the trade balance, when the exchange rate varies. It is only over time that export prices catch up with import prices and that the price elasticities of demand grow larger with the result that a perverse initial variation in the trade balance is eventually reversed.

The role of domestic (and foreign) demand may be even more important than the effect of relative prices on import (and export) determination. Depending on "demand" or "income" elasticities of trade flows, domestic (or foreign) monetary policy effects on total activity and income is transmitted to the balance of trade. As shown in Table F, if a domestic (or foreign) monetary policy reduces the domestic (foreign) activity by 1 per cent, then imports (exports) will decrease by about one to two per cent in most industrial countries in the medium run. These estimates vary less across countries and studies than those of price elasticities. Income elasticities of imports are generally higher in the United States (and in the United Kingdom) than in Japan and also, perhaps more surprisingly, than in France. For the United States and Japan, this pattern clearly corresponds to the secular evolution of current account imbalances as well as to the comparative effect of an expansionary policy mix. Generally, the greater the size and the dispersion of income elasticities across countries, the larger the current account imbalances associated with shocks affecting expenditures. The larger are these imbalances, the more significant the feedback effects on exchange rates because of various expectation and wealth effects.

e) Inventories

Evidence on inventories is limited. This is not to say that in the sticky price framework, monetary policy effects on stockbuilding are not worth studying. But in contrast with the key role they have in the market-clearing framework -- where they may explain most of the propagation mechanism of the impact of unexpected changes in monetary policy on the business cycle -- inventories are not usually adequately incorporated in structural models.

Although the actual evolution of inventories, particularly during the large cycles of the 1970s and the early 1980s, has certainly been a major feature of the short-run fluctuations of aggregate demand, they are often included in most macroeconomic models as the residual between supply and demand. In such a case, inventories depend simultaneously on all aggregate demand and supply components and hence on the corresponding financial determinants.

Where they are included explicitly in structural models, inventory equations vary considerably from one study to another. Typically though, inventories depend less on financial variables than on (expected) output and sales as shown in Table G. In most countries, only interest rates affect them directly and significantly in the way that they affect business fixed investment (i.e. mainly because of higher cost of credit). A strong a priori case, however, has been made to support the idea that direct linkages between interest rates and stockbuilding might be of negligible importance. This is mainly because interest rates represent only a small fraction of the total cost of carrying stocks. As a result, the more fixed the relationship between stocks and sales, the more inelastic stock demand tends to be to interest rates. Except for a few cases, neither net wealth effects nor credit availability are taken into account in explaining inventories. In contrast, nominal activity (realised or expected) is usually crucial, but the direction of its effect is ambiguous. If monetary policy has a restrictive effect on nominal income, inventories may first increase (buffering role) and then decrease in accordance with the familiar accelerator mechanism. Hence the response of aggregate demand to a given monetary shock may be dampened or reinforced by inventory adjustments.

II. Simulations of monetary policy shocks

Two basic types of simulations are available for assessing the impact of monetary policy. The first examines monetary policy effects while ignoring any change in other policy instruments, notably fiscal policy. This approach does not take account of the context in which adjustments to monetary policy are made. The second type of simulation looks at the different effects of fiscal policy under various assumptions about the monetary stance (whether accommodating or not). Although this type of simulation better reflects the broad "package" nature of actual economic policy and the linkages that exist between monetary and fiscal policies, it is more complex and not generally produced in a systematic manner. For this reason, all estimates presented in Part II result from the the first type of simulation (purely monetary shock). Complementary results based on the second type of simulation are presented at the end of this section. Both sets of results are derived from the national and multicountry models listed in Table H.

As in all such exercises, some simplifying assumptions are made. Relationships are assumed to be symmetrical and linear. Sign reversal is all that is needed to measure the impact of an expansionary policy from the results of a simulation experiment in which there is a contractionary policy of the same magnitude. Given the potential importance of ratchet and credibility effects, the fragility of this assumption is self-evident. The measurement of the impact of a shock, that is twice as great, is assumed to be simply double the value of existing results. Obviously, were shocks are large, existing relationships could become distorted. These simplifying assumptions, however, do not resolve all the problems of interpreting and

comparing simulation results. In the first place monetary shocks need to be normalised. Second the relevant exchange-rate regime must be identified. Third, the major features need to be summarised even at the risk of some information loss. These issues are discussed below along with an examination of the effects of monetary policy derived from simulations involving changes in the fiscal-monetary policy mix.

a) Standardising the monetary shock

i) Diversity of hypotheses

Even if simulations are confined to a shock initiated exclusively on the monetary policy front, much depends on the nature of the shock. Most models test the impact of a change in a nominal short-term interest rate; only a few consider a change in the supply of money. These two types of monetary shock will not be the same if the link between money supply and interest rates is not perfectly stable; this link may be especially unstable in the present context of economic changes and financial innovation. In addition, the equivalence of slower money growth and higher nominal interest rates is valid only in the short run (liquidity effect) and with exogenous expectations. In the longer run, a tight monetary policy should lessen inflationary expectations and hence reduce the level of nominal interest rates. To express the monetary shock in terms of real interest rates would not solve the problem since monetary authorities do not "control" this variable, which is in any case not directly observable.

Apart from the nature of the shock, the choice of instrument variable of monetary policy is also important, particularly if the link between the different monetary aggregates, narrowly or broadly defined, is unstable or if the structure of interest rates is not rigid. In the first case, the growth in the monetary base and in broad aggregates, for example, can be different because of international reserve flows. In the latter case, depending on whether the interest rate initially altered is directly controlled by the monetary authorities (discount rate, etc.) or not (money market or lending rates), the yield curve may be affected. Thus institutional features -- especially the degree of market regulation and segmentation -- and the scope for endogenising the main financial variables influence the simulation results. If the instrumental variable is exogeneous the change in the baseline money aggregate or interest rate is usually kept constant throughout the period. If it is endogeneous, a constant ex ante shock may lead to substantial ex post fluctuations in the instrumental variable.

ii) Solutions adopted

Most of the results reported in Part II on the effects of a tight monetary policy relate to a permanent shock corresponding to a one percentage point rise in the nominal representative short-term interest rate (IRS). This is the most common form of monetary policy simulation. The IRS is here represented by a 90-day interest rate, determined in the money market. In those cases where the simulations do not correspond exactly to a 1 point increase in the IRS, the results have been standardised. For example, if the initial shock is 1 point on the official lending rate resulting in a 1/2 point change in the IRS, all figures are multiplied by two. This adjustment, assuming perfect linearity, provides a way to distinguish the links between the official lending rate and the short-term market rate and the impact of the

latter on the real sector. The first link reflects the presence of indexation mechanisms in the financial sector (see Table I), while the second measures the independant impact of a standardised monetary shock on the real economy. In some cases, the two sets of results are commented on.

A few models simulate monetary policy changes via variations in a chosen monetary aggregate. Two types of shocks are typically considered. In the first case, the effect of a once-and-for-all shock to the stock of money is examined while maintaining approximately the same differential from baseline for all years. In the second case, the rate of growth of the money stock is shocked continuously by a given number of percentage points, with the difference from the baseline money stock in the previous years added to the current year. Assuming linearity, all results are normalised to represent a 1 percentage shock, either on the stock of money or its rate of growth.

b) The exchange rate regime

Some models do not provide simulation results assuming both fixed and flexible exchange rate regimes. A number of model-builders argue that measuring the impact of an autonomous change in a country's monetary policy only makes sense under a floating rate system. Only in this case is monetary policy assumed to have sufficient room for manoeuvre, in keeping with the Mundell-Fleming assignment theorem. However, other model-builders point out that in several OECD countries the exchange rate does not in fact float freely; many countries attempt to stabilise, at least in the short run, the value of their currency vis-à-vis the United States dollar, the Deutschemark, the ECU or a basket of currencies. Under these circumstances, fixed exchange rates are a useful operational benchmark.

In practice, simulations with endogenous exchange rates should clearly be the rule since this variable constitutes one of the main monetary policy transmission channels. The fact that some of the countries under review belong to systems seeking to stabilize relative exchange rates has not led to completely fixed rates; substantial short-term fluctuations are common (e.g. variations ranging from 4.5 to 12 per cent depending on the currency are allowed within the EMS). Furthermore the main reference currency for invoicing and reserve purposes, namely the US dollar, floats against all the others. Nevertheless, simulations assuming a fixed exchange-rate regime are still of some relevance. Owing to imperfect capital mobility, monetary policy may retain some autonomy, even under fixed exchange rates. Furthermore, comparing simulations with exogenous and endogeneous exchange rates is a useful way to assess the role of the exchange rate in the transmission process.

c) Adoption of composite indicators

Even the most comprehensive discussions of simulation experiments do not describe the dynamic structure of models in every detail. Inevitably attention is confined to the effects on a few general parameters and a few representative sub-periods, for example one short-term and the other medium-term. Care must, however, be taken in interpreting these time periods and particularly the latter one which should not be confused with the long term, a time horizon seldom explored by these models.

Composite indicators have usually been used to specify the time profile of real activity (GDP), prices (implicit GDP deflator) and the unemployment

rate. In evaluating the medium-term impact of monetary policy, the meaning of "medium-term" is set by the time horizon of the simulation. The medium-term is equated here with the last year of the simulation, normally the fifth to the seventh. Short-run effects are taken to correspond to the average of the first three years, i.e. the average impact at the end of a year and a half, a solution adopted for all models. There are a number of grounds for proceeding in that way. First, since shocks are applied either at the beginning or in the course of the first year and since the frequency (quarterly, semi-annual or annual) of the models differs, only a measure covering two or three years can offset the inertia affecting certain simulations (without necessarily reflecting economic rigidities). Second, for many models, the real impact is often at its peak in the third year. Unless full account is taken of this, the comparisons could be distorted. Finally, in many of the reduced forms reported in Part II, lags of up to four or five years are often introduced by new classical economists, in the "short term", because of adjustment costs and stock effects (Lucas 1975, Sargent 1977). By this yardstick, an average lag corresponding to six quarters would a fortiori be considered short-term.

In view of the foregoing caveats and the necessarily arbitrary nature of some of the methodological choices, cross-country comparisons are confined to "orders of magnitude", "broad trends", or sometimes only "signs" indicating the direction of the effects. Model-builders seldom provide a comprehensive yardstick by which to gauge the overall reliability of their simulations. An arbitrary yardstick adopted here is that no deviation equal or less than 0.1 point should be considered significant.

d) An alternative approach based on the "crowding out" effect

A change in money growth or in the level of interest rates is seldom implemented independently of other aspects of economic policy. Monetary conditions are often adjusted in response to a change in fiscal policy. This sub-section considers simulation results on the effects of a change in the budget deficit, say an increase equivalent to 1 per cent of GDP, under both an accommodating and non-accommodating monetary policy. In the case of accommodation, interest rates are held constant allowing money to increase in order to avoid a "crowding out" effect. In the non-accommodating case, the rate of money growth remains unchanged and interest rates rise. The contribution of monetary policy may then be measured by the difference between the results of these two scenarios. As discussed below, these differences have been calculated under both fixed and floating exchange rates. The results confirm most of the conclusions derived from the simulation of a pure monetary shock. They also support most of the findings of a previous OECD study (1984) on the extent of crowding-out effects. As such, they provide a means of assessing the contribution of monetary policy to fiscal policy and of studying how its impact varies according to the exchange rate system.

i) The contribution of monetary policy

The comparative study published by the OECD in 1984 revealed a substantial (though never total) "crowding out" effect of fiscal policy. In other words, the impact of fiscal policy on real output was always less in the absence of an accommodating monetary policy even in the medium run. The present analysis is consistent with this finding. Table J shows the ratio of the effects of the accommodating variant (A) to those of the non-accommodating variant (N), in terms of output (GDP) and prices, in the short and medium

terms, under fixed and flexible exchange rates. All A/N ratios for the effects on real output are greater or equal to unity; this confirms the premise that monetary policy effectively contributes to the real impact of fiscal policy, by avoiding a "crowding out" effect induced by interest rate variations. The few cases where the ratio is close to unity generally correspond to situations where there has probably been little change in the interest rate, e.g. in the case of the French METRIC model (1981 version), probably because of the tight regulation of interest rates and capital movements prevailing in the 1970s in France.

The average effect on output in the short run is 50 per cent greater in the case of an accommodating policy than without money accommodation. This average measure of the monetary policy contribution corresponds to about 0.5 per cent of real GDP in both the short and medium term, for an initial shock on the budget balance equal to 1 per cent of GDP, which would have otherwise raised the interest rate on average by 1 point. These results are consistent (in magnitude) with those obtained in the case of a purely monetary shock, at least for the short run. Usually, this "crowding out" effect increases over time. By and large the A/N ratios for real output are higher in the medium run than in the short run. This does not hold in a few cases (the Japanese and British models under floating exchange rates and the French and Canadian models under fixed exchange rates), probably as a result of the relative stability of the interest rate. Indeed, the change in interest rate avoided by an accommodating policy also frequently increases over time, though less systematically; it even declines significantly in the case of Germany under floating exchange rates and to a lesser extent in the Canadian RDXF model under fixed rates.

ii) The influence specific to exchange rate regimes

According to the OECD 1984 study and in contrast with the predictions of the Mundell-Fleming model, the real effects of fiscal policy, without an accommodating monetary policy, often appear to be slightly greater under flexible exchange rates than under fixed rates, at least in the short run ("crowding in" effect of the exchange rate). Table K, which shows the ratios of the effects under floating rates (L) to those under fixed rates (X) with non-accommodating (and accommodating) policies, confirms this paradoxical result. As stated in the OECD's 1984 study, this paradox may be explained by a number of constraining assumptions of the Mundell-Fleming model under fixed prices. Moreover, the assignment theorem does not allow the exchange rate to respond directly to current account movements. Finally this model disregards the role played by expectations in determining the exchange rate.

Regarding the contribution of monetary policy, however, the theoretical conclusions of the Mundell-Felming model on the greater effectiveness of monetary policy under floating exchange rates are maintained. This confirms the results obtained in the case of a pure monetary shock. Most A/N ratios for output in Table J are generally greater under floating rates than under fixed rates. Similarly, the L/X ratios for output corresponding to an accommodating policy in Table K are not only generally greater than or equal to unity, but more importantly they are greater than the corresponding ratios for a non-accommodating policy.

In terms of prices, the conclusions are less clear cut. Since the A/N ratios exceed unity in most cases, an accommodating monetary policy

(e.g. expansionary) generally enhances the (inflationary) price effect of a change (increase) in the budget deficit. Nonetheless, in more than one quarter of cases, the ratio is not very different from unity, with the contribution of monetary policy being more difficult to assess. In a few instances it even runs counter to the effect of fiscal policy, with the ratio being less than unity and sometimes negative. In the case of a tight monetary policy accompanying a reduction in fiscal deficit, this shock corresponds to the "stagflationary" nature of monetary policy already exhibited in some countries (France, United Kingdom, Australia) under fixed exchange rates. By preventing a change (e.g. a fall) in the interest rate, whose nominal fluctuations affect prices in the same direction (because of money illusion or a mark up process on financial costs) an accommodating monetary policy may reduce the (deflationary) impact on prices of a (tight) fiscal policy.

Finally, the split of the effects of monetary policy reported in Table L is markedly in favour of output in the short run and under fixed exchange rates, whereas it is in favour of prices in the medium term under floating exchange rates. The main exceptions are France, the United Kingdom, and sometimes Japan.

III. Empirical evidence on rational expectations market-clearing models

The following survey of empirical evidence from reduced form models is drawn from a more detailed survey by Driscoll (1985).

a) Anticipated and unanticipated monetary policy

i) Barro's approach

Barro (1977) employed the distinction between anticipated and unanticipated monetary policy and advanced a method by which monetary policy could be dichotomised into these components. Barro's measurement of the effects of unanticipated money growth involved the estimation of an equation for an index of the unemployment rate containing a measure of unanticipated money growth. Unanticipated money growth was measured as the residual of an equation explaining money growth policy. The residual series was obtained prior to the estimation of the unemployment equation. The two equation model used in Barro's work is as follows:

$$\log(U/1-U) = a_0 + a_1\, DMR_{t-1} + a_2\, DMR_{t-2} + a_3\, MIL + a_4\, MINW_t + V_t \qquad (1)$$

$$DM = b_0 + b_1\, DM_{t-1} + b_2\, DM_{t-2} + b_3\, FEDV_t + b_4\, UN_{t-1} + DMR_t \qquad (2)$$

where U = unemployment rate;

DMR = unanticipated money growth;

DM = money growth;

MIL = proxy for military conscription;

$MINW$ = proxy for minimum wage rate;

$FEDV$ = proxy for real government expenditure relative to normal;

V_t = random error.

The inclusion of $FEDV_t$ and UN_t are meant to reflect changes in money-financed deficit spending and counter-cyclical monetary policy. The model was estimated with annual U.S. data for the period 1941-1973. Equation 1 was estimated in three forms: firstly, in the form given in 1; secondly, with the total money growth, DM, substituted for DMR; and thirdly, with DM and DMR included at the same time. The results indicated the superiority of the DMR version over the DM version and a test for the exclusion of DM when DMR was also included were supportive of the irrelevance of DM.

The approach followed by Barro in testing rational expectations market-clearing (REMC) raises a number of important methodological issues. In addition to the problems faced routinely in estimating and interpreting any econometric model, models which are meant to incorporate rational expectations and market clearing involve difficulties which are peculiar, though not exclusively so, to this type of model. The main issues involve: the evaluation of monetary policy and the specification of the equation representing monetary policy expectations; the identification of alternative structural approaches; the Lucas and Goodhart critiques; the avoidance of "observational equivalence"; and the method of estimation. These issues are discussed in detail in Driscoll (1985).

The importance and seminal nature of Barro's study encouraged a number of replicative studies motivated by the desire to test the robustness of such remarkable results. Using Barro's data, Leiderman (1980) was able to confirm Barro's findings. In an early critical assessment, Small (1979) found that Barro's results were sensitive to the estimation period. In particular, deletion of the early years of the data covered by the war and the immediate post-war years lead to Barro's results being overturned. Barro (1979) challenged Small's results; he found that, with modifications to the end of the data period and adjustment for heteroscedasticity in the residuals between the period before 1946 and after, his earlier findings concerning the effects of unanticipated money growth could be re-established.

Driscoll et al. (1983) found that Barro's results were sensitive to the specification of the money growth equation. Using the data employed by Barro and Leiderman, it was discovered that a more general model which included the MINW variable in the money growth equation, could be produced against which the Barro-Leiderman model could be rejected. Camerrella and Garston (1983) and Sheehey (1984), and Peseran (1982), also overturned Barro's results. The upshot of these findings is that Barro's (1977) results are not robust to changes in either the data period or to small changes in the specification of the money growth equation. While it is always possible to dispute particular specification choices, the finding that the results are data-period sensitive is extremely damaging.

ii) Further evidence

In addition to the direct responses to Barro's (1977) seminal study, there has been a considerable amount of empirical work done for the United States which has involved extending Barro's analysis to encompass other real variables, different measures of money, different money growth forecasting equations, different models of the natural values of real variables and different data periodicities. A number of features of these studies are worth noting:

-- First, a recurrent theme has been the importance of alternative specifications of the money growth equation since in a number of cases the outcome of results have been shown to depend on the form of the this equation. One particular issue in this respect is the validity of using actual future information in order to derive the parameters of the forecasting equation. Money growth equations have usually been estimated over the whole data sample. Future information is clearly not available to rational individuals. The use of such information in econometric studies may lead to overfitting of the money growth forecasting equation and to predictions which are too accurate, even for rational individuals. One solution to this is to generate an anticipated money growth series from the one-step-ahead predictions from a rolling regression which is extended one period at a time. Although this procedure avoids the problem of using information that would not be available at the time forecasts were being made, it may lead to a small sample bias in the estimates. It is not clear whether this latter type of bias is likely to be any less important than the bias that may result from overfitting the forecasting equation. In the event, the methodology of generating money growth forecasts has not proved to be decisive.

-- Second, while the form of the money growth equation has attracted considerable attention as a potential source of wrong inference, the specification of equations explaining real variables has been comparatively neglected. This is especially true of the specification of the natural or equilibrium value of the real variable. Most studies have been content to model this component of the real equation as a simple time trend. However, the appropriateness of this type of trend as an approximation to the equilibrium value of real variables has, as noted above, been questioned recently. As different assumptions about the permanent components of real variables leave different residual components to be explained, measurement of the effects of monetary policy may be sensitive to the choice of trend -- deterministic or stochastic, as in the case of a random walk. But the choice of the trend component for real variables does not, on the strength of existing evidence, appear to be able to account for the conflicting results that are the main characteristic of the current body of empirical work.

-- Third, studies for all other OECD countries studies reveal the same lack of consistency to their results as those reported for the United States.

-- Fourth, although the results are somewhat mixed, most studies, especially those of more recent vintage, have been unsupportive of the REMC hypothesis.

One strong implicit assumption in all the work surveyed so far is that information about money growth is only available with a lag of at least one quarter or, in some cases, one year. This assumption has been criticised by King (1981) as being totally unrealistic, at least in the case of the United States, where preliminary money stock figures have been available with a lag of only 8 days since 1965. King (1982) has demonstrated that if money growth statistics are currently available, even if they are subject to measurement error and will be revised later, if REMC holds, these statistics should be uncorrelated with real variables. Boschen and Grossman (1982) and Boschen (1985) have demonstrated that significant positive correlation exists between contemporaneous monetary data and real variables and that these correlations cannot be accounted for by data revisions, which might proxy unperceived monetary policy. Barro and Hercowitz (1970) also failed to find any role for

money stock data revisions. These findings represent a strong rejection of REMC, partly because they do not rely on estimating latent variables such as anticipated and unanticipated money growth. King and Terehan (1984) point out that the results of Boschen and Grossman and Boschen can only be interpreted as a rejection of REMC if money growth is exogenous. If money growth is endogenous, a positive correlation between money growth and output might be observed even if money is neutral.

b) The variability of monetary policy

In addition to the effects that money growth per se might have on real economic activity it is frequently suggested that, irrespective of the average rate of monetary expansion, the variability of money growth will have real effects -- the more variable is money growth from period to period the lower the level of real economic activity. This depressing effect is usually seen as occuring via the impact of the variability of the rate of inflation and the variability of unanticipated aggregate demand respectively. To the extent that the degree of monetary variability is positively related to the growth of the rate of the money supply, which is itself associated with the level of inflation, high rate of money growth is often viewed (as was the case in the 1970s) as causing stagflation. The policy implication of this line of thinking is that rates of money growth should be low and stable if output growth is to be maximised.

On the question of the relationship between the variability of inflation and the level of inflation Okun (1971) found that there was a close association between these two variables in a sample of seventeen industrial countries. Other cross-country studies have found support for Okun's results. This cross-country evidence is, however, not supported by multicountry studies which use a time series country-by-country approach. The negative effect that monetary policy variability is assumed to have on economic activity, is thought to arise because of the impact that such variability has on the confidence with which relative price movements can be identified by private agents. Such uncertainty may make them more cautious in agreeing to supply at prevailing and expected future prices. That monetary policy or price level variability is positively related to uncertainty is difficult to verify in the absence of an agreed measure of the later. Some attempts to measure this kind of relationship have, nevertheless, been made, with the result that on the whole the balance of evidence seems to be in favour of the existence of a close association between measures of inflation uncertainty and the variability and level of inflation.

One factor which may account for the relationship between the level of the inflation rate and inflation uncertainty is that inflation may occur unevenly because of varying supply conditions across individual markets. If this were the case it would be normal to expect the level of the rate of inflation to be positively associated with relative price variability and for the variability in the aggregate price level to be associated with relative price variability. The evidence tends to support such propositions and the potential importance of relative price variability as a channel by which monetary policy variability reduces output growth. But even if relative price variability is of importance for real economic activity it is still necessary to establish to what extent the dispersion of relative prices depends upon monetary policy. There is very little direct evidence on this issue, and what there is is inconclusive. Similarly, as far as the real effects of inflation

uncertainty and inflation variability are concerned the evidence is also inconclusive. Nevertheless, the amount of evidence in favour of the Friedman effect is sufficient for the importance of short-run money growth stability to be taken seriously.

The empirical evidence concerning the Lucas effect -- the reduced potency of monetary policy associated with increased policy variability -- is far from being clear-cut. Since Lucas (1973) first investigated and found evidence supporting the existence of this effect of a number of replicative studies have be undertaken. It is important to note the additional finding reported in one notable study by Lawrence (1983) that most of the variability of price surprises is explained by variability in aggregate supply shocks rather than monetary policy related aggregate demand shocks. This finding should warn of the danger of automatically equating evidence concerning the effects of inflation and its variability as evidence on the effects of monetary policy and its variability, a frequent practice in the contemporary literature. In the short run at least these effects cannot be equated.

There is a presumption in much of the literature on the effects of the variability of monetary policy that a more, rather than less, stable rate of growth of the money stock is desirable in the short run. The usual view is that, at worst, a perfectly constant rate of growth of the money supply week by week would have no beneficial effects, but that an unstable money supply could, via the Lucas and Friedman effects, lower output. This contention ignores the possible consequences of such fine-tuning of the money supply. One consequence, in the short run, might be greater volatility in interest rates, which might, in turn, create uncertainty about relative returns on alternative investments and lower capital accumulation and, hence, output. Evans (1984) presents evidence to suggest that this may be a problem in the United States. While he can find no evidence of a Lucas effect for money stock growth he finds that interest rate volatility has a strong and significant negative effect on output. If the implication of greater short-run stability in the money stock (week by week or month by month rather than year by year) is greater volatility in interest rates there could be significant real costs to short-run stabilization of the money stock. Another related issue is the relevance of Goodharts Law, which if prevelant may make attempts to stabilize prices and output via stabilization of the short-run rate of money supply growth counter productive. Evans (1985) reports evidence which suggests that Goodharts Law is important for the United States.

c) <u>The causes of persistence (serial correlation) in economic activity</u>

In most studies of the effects of monetary policy on real variables are explained by, among other variables, lagged values of the dependent variable or by a distributed lag on the monetary policy variable or by both of these influences. These formulations imply persistence or serial correlation in the real activity. The question arises as to whether this persistence is the result of gradual price adjustment, implying short-run disequilibrium or, instead, whether it can be accounted for by other factors such as information lags or gradual adjustment in capital stock, inventories or the labour force, or by partial adjustment in the holding of financial assets, all of which may be consistent with short-run market clearing. In the absence of other information, the persistence effects reported in most studies cannot be interpreted with any confidence as being consistent with one view and not the other.

A number of studies have, however, addressed this issue and have tended to find in favour of gradual price adjustment. Gordon (1982), in an innovative study for the United States compared an REMC model directly with a neo-Keynesian alternative in which long-run neutrality was combined with gradual price adjustment. The REMC model, involving instantaneous price adjustment, was rejected against the alternative gradual price adjustment model. An interesting finding of this study was that, because of variability in velocity, the link between anticipated monetary policy and aggregate demand and output was weak prior to 1954. In studies replicating Gordon's work, Demery (1984), for the United Kingdom, and Bordes et al. (1987) for the four major European Countries, obtained similar results. In particular, in addition to rejecting instantaneous price adjustment against the gradual price adjustment alternative, it was found that anticipated money growth did not influence output. The source of the ineffectiveness of anticipated policy was not REMC, which was rejected in any case, but the absence of any significant effect on aggregate demand, because of the variability of velocity. This result cautions against automatically interpreting the failure of anticipated monetary policy to affect real variables as support for REMC and new classical economics.

d) Real versus monetary interpretations of the business cycle

A number of studies already reviewed failed to find any significant effect of either unanticipated or anticipated monetary policy on real variables. One interpretation of these findings is that variation in real variables is caused by real not monetary factors and that the business cycle is, therefore, a real phenomenon. Such an interpretation would leave no role for nominal monetary policy in the stabilization of real activity. Furthermore even random monetary policy would have no effect; monetary policy could not even destabilize the real economy. Most studies reporting such results use a random walk model of the natural rate of unemployment.

This evidence is in sharp contrast to most of the results of other empirical work, which supports the idea that monetary policy, even if only its unanticipated component, is responsible for variations in real variables. Certainly the existence of a significant correlation between monetary variables and real activity is well established. It is possible for such correlations to be consistent, however, with models of real activity which give no causal role to nominal monetary variables. King and Plosser (1984), for example, have developed a prototype real business cycle model, which they have reported evidence in support of which predicts a close correlation between real activity and components of monetary variables, while denying the latter any causal role, that is that real activity is determined by monetary variables. In this model bank deposits, or inside money, are regarded as a produced input into the goods and services production process. The quantity of inside money is determined, in this framework, by the needs of industry and commerce and responds passively to demand. Outside money, equated with the monetary base is, on the other hand, exogenous, its quantity being determined independently of the needs of trade. This real business cycle model predicts that inside money will be correlated with real activity and that outside money will not. On the other hand the model predicts that the monetary base will be the main determinant of inflation.

Overall, the evidence on real versus monetary causes of the business cycle, taken at face value, suggests that the business cycle has exclusively real causes. Whether such a view will survive further close examination is an open question. Certainly the notion that the business cycle is essentially a monetary phenomenon is under attack and is likely to continue to remain so as more theoretical and empirical work is produced on the role of real factors in explaining the variation in real activity. Recent studies have reported evidence on the importance of real factors, such as for the United States over the period 1948-80 over half of the variation in the dispersion of employment demand (Lillien, 1982) and associated with oil price changes (Hamilton, 1980). These two studies are important because they attempt to model the effects of specific real factors rather than simply inferring their importance by default; the finding that monetary policy is neutral is frequently taken as signalling the importance of real factors without any attempt being made to suggest which real factors are decisive and in what way.

Tables to Annex B

Table A

INVESTMENT EQUATIONS : ROLE OF THE MAIN FINANCIAL AND NON-FINANCIAL VARIABLES ACROSS COUNTRIES

VARIABLES	INTEREST RATE	DEBT AND LIQUIDITY CONSTRAINTS	CREDIT AVAILABILITY	OTHER MAIN DETERMINANTS
GENERAL EFFECT	NEGATIVE	NEGATIVE	NEGATIVE	MIXED
UNITED STATES	User cost of capital or profitability ratio	Debt service ratio or external finance availability. Liquidity constraint rarely included	NONE*	Output: (+) accelerator effect
JAPAN	Indirectly included via a cash flow variable	NONE * (except for cash flow constraint)	NONE *	Output: (+) accelerator effect Inflation: (+) via profitability effects and nominal debt depreciation
GERMANY	User cost of capital, profitability (affecting timing more than magnitude)	NONE * (except for cash flow constraint)	NONE *	Output: (+) accelerator effect
FRANCE	User cost of capital (semi elasticity from 1 to 3 in medium run)	Overall negative effect (debt service) and liquidity constraints) But positive lever effect (not always)	Directly included or proxied by cash flow shortages	Output: (+) accelerator effect Inflation: (+) nominal debt depreciation Wage: (-) affecting profitability
UNITED KINGDOM	NONE * (except for HMT model with elasticity of about 0.5)	NONE *	NONE *	Output: (+) accelerator effect
ITALY	User cost of capital (medium-run semi-elasticity from 1 to 3.5) only in recent studies	NONE *	Up to 5% of investment flow but reduced by recent deregulation	Output: (+) accelerator effects
CANADA	User cost of capital or profitability (use of short and/or long-term rates)	NONE *	NONE *	Output: (+) accelerator effects Real unit labour cost: (-)
AUSTRALIA	Directly or via "q" ratio	Via "q" ratio when incorporated	NONE *	Output: (+) accelerator effect Real unit labour cost: (-)
NETHER-LANDS	User cost or profitability channels (long-term rate)	Liquidity ratio (+)	NONE *	Output: (+) accelerator effect Utilization rate of capital: (+)
SWEDEN	..	..	..	..

Sources: see in annex
NONE * = absent from most models and/or single equation studies.

(+) or (-) = positive or negative effect of an increase in the explanatory variable.
.. = not enough information available.

3921E.1

Table B

HOUSING EQUATIONS: ROLE OF THE MAIN FINANCIAL AND NON-FINANCIAL VARIABLES ACROSS COUNTRIES

VARIABLES	INTEREST RATE	WEALTH	CREDIT AVAILABILITY	OTHER MAIN DETERMINANTS
GENERAL EFFECT	NEGATIVE	MIXED	NEGATIVE	MIXED
UNITED STATES	User cost of capital (real rates) Elasticy up to 5 in the short run	NONE*	Exclusive factor when relevant (e.g. availability of funds via deposits in saving and loan institutions)	Real disposable income: (+) Inflation: (-) real balance effect only when interest rates are in real terms Unemployment: (-) affecting timing not magnitude
JAPAN	User cost of capital (real rates)	Positive effect of the sum of saving flows	NONE*	Real disposable income: (+)
GERMANY	User cost of capital or proxy measure of Tobin's "q"	NONE*	NONE*	Real disposable income: (+) Inflation (expected): (+) speculative effect
FRANCE	Credit cost, affordability effect and supply-side profitability conditions Elasticity up to 5	Mixed relationship with financial savings (short-run substitutability and long-run complementarity)	Government funds for subsidized sector (not often incorporated)	Real disposable income (+) Relative prices: (+) speculative effect Double approach (supply-demand) sometimes adopted
UNITED KINGDOM	Borrowing cost, house price determination, building society liquidity Elasticities from 1 to 7	..	Financial constraints (not often incorporated)	Real disposable income: (+)
ITALY	..	..	..	Real disposable income: (+)
CANADA	User cost of capital or simply cost of borrowing (generally expressed in nominal terms)	NONE*	Implicit restriction based on mortgage approval	Real disposable income: (+) Relative price of housing: (+) Double approach (supply-demand) sometimes adopted
AUSTRALIA	..	..	..	..
NETHER-LANDS	Elasticity about 1	NONE*	NONE*	Real disposable income: (+)
SWEDEN	..	..	..	..

NONE* = absent from most models and/or single equation studies. .. = not enough information available.
(+) or (-) = positive or negative effect of an increase of the explanatory variable.
Source: See Annex.

3921E.2

Table C

CONSUMPTION EQUATIONS: ROLE OF THE MAIN FINANCIAL AND NON-FINANCIAL VARIABLES ACROSS COUNTRIES

VARIABLES	INTEREST RATE	WEALTH	CREDIT AVAILABILITY	OTHER MAIN DETERMINANTS
GENERAL EFFECT	NEGATIVE OR MIXED	POSITIVE	NEGATIVE	MIXED
UNITED STATES	Credit cost for durables (-) Equities market values (-) Interest property income (+)	Household net worth (either financial and/or real) or (inversely) debt services	NONE*	Real disposable income: (+) Inflation: (-) via nominal asset losses, expectation errors on relative prices, etc.
JAPAN	NONE*	Not always included	NONE*	Real disposable income: (+) Inflation: (-)
GERMANY	Credit cost for durables (-) but rarely isolated	Liquid financial asset (or inversely debt services) and long-term savings deposits	NONE*	Real disposable income: (+) Inflation: (-) only in some single equation studies
FRANCE	Negative effect rarely exhibited (credit cost) Positive property income effect often included	Liquid assets (but not often included)	Affect durable goods (but rarely incorporated)	Real disposable income: (+) Inflation: (-) via real balance effects, ... but often (+) at first (flight from money) Unemployment: (-)
UNITED KINGDOM	Credit cost for durables and indirect wealth effects Elasticity: -0.5 to -1.0 But positive property income	Household net worth or liquid assets (and yield curve effects) Elasticity: 0.1 to 0.2	Financial constraint (debt level, affordability, hire purchase regulation)	Real disposable income: (+) Inflation: (-) via real balance effects, expectations errors on relative prices,...
ITALY	Credit cost for durables (elasticity about -0.5) But positive property income	Financial assets	Rarely included	Real disposable income: (+) net of the inflation tax on financial wealth (except for equities)
CANADA	Rarely included except for durables (e.g. cars) Positive property income	Liquid assets (real balance effect or buffer stock effect) not often included	NONE*	Real disposable income: (+) net of the inflation tax in most models Unemployment: (-)
AUSTRALIA	NONE*	Household net worth or liquid assets (real balance effect)	NONE*	Real disposable income: (+)
NETHER-LANDS	Credit cost and wealth effect (short/long-term rates)	Financial assets (elasticity about 0.2)	NONE*	Real disposable income: (+) (Expected) inflation: (-)
SWEDEN	..	..	..	..

NONE* = absent from most models and/or single equation studies. .. = not enough information available.
(+) or (-) = positive or negative effect of an increase of the explanatory variable or the evolution of the aggregate demand component under review.
Source: See Annex.

3921E.3

3843E.7

Table D

MEDIUM RUN PRICE ELASTICITIES OF DEMAND FOR TOTAL IMPORTS

	United States	Japan	Germany	France	United Kingdom	Italy	Canada	Denmark	Netherlands	Sweden
Estimates published after the mid-1970s										
Beenstock-Minford (1976)	-1.04	-1.21	-0.74	-1.31	...	-0.88	-2.50	n.a.	...	n.a.
Stern et al. (1976)	-1.66	-0.78	-0.88	-1.80	-0.65	-1.03	-1.30	-1.05	-0.68	-0.79
Gylfason (1978)	1.12	...	-1.36	-0.46	...	-0.32	...	n.a.	-1.65	n.a.
Geraci and Prewo (1980)	-1.23	-0.72	-0.60	-0.33	-0.79	n.a.	n.a.	n.a.	n.a.	n.a.
Goldstein-Khan (1978)	-1.12	n.a.	-0.25	n.a.	...	-0.45	-0.20	-0.42	n.a.	-0.84
Yoshitomi (1984)	-1.39	-0.25	-0.59	-0.78	-0.48	-0.40	-0.90		-1.40	n.a.
OECD (a) (1985) (b)	-0.8 -1.0	-1.5 -0.95	-0.75 -0.50	-0.70 -0.65	-0.7 -0.37	-0.6 -0.25	-1.1 -1.05	-0.8 -0.56	-0.5 -1.1	-1.1 -0.37
Memorandum item on previous estimates										
Houthakker-Magee (1969)	-1.03	-0.72	-0.26	...	-0.21	-0.13	-1.46	-1.66	...	-0.79
Adams et al. (1969)	-1.16	...	-0.85	-0.81	...	...	-0.62	n.a.	-0.24	n.a.
Armington (1970)	-1.73	-1.47	-1.48	-1.53	-1.38	-1.42	-1.30	-1.26	-1.13	-1.30
Taplin (1973)	-1.05	-0.81	-0.61	-0.39	-0.22	-1.03	-1.59	-0.85	-0.02	-0.76
Samuelson (1973)	...	...	-0.92	-0.79	...	-1.01	-1.29	-0.23	...	-0.80

Sources: M. Goldstein (1984) and original studies.

... indicates zero or wrong-signed coefficient on relative prices.

a) Manufactured goods and services.

3843E.7

3843E.6

Table D (continued)

MEDIUM RUN PRICE ELASTICITIES OF DEMAND FOR TOTAL EXPORTS

	United States	Japan	Germany	France	United Kingdom	Italy	Canada	Denmark	Netherlands	Sweden
Estimates published after the mid-1970s										
Beenstock-Minford (1976)	n.a.	-3.00	-1.90	-1.59	-1.47	-1.91	-1.00	n.a.	-2.10	n.a.
Stern et al. (1976)	-1.41	-1.25	-1.11	-1.31	-0.48	-0.93	-0.79	-1.28	-0.95	-1.96
Goldstein-Khan (1978)	-2.32	...	-0.83	-1.33	-1.32	-3.29	n.a.	-1.28	-0.95	-1.96
Gylfason (1978)	-0.62	-2.13	-0.38	...	-0.32	-1.91	...	n.a.	-0.88	n.a.
Amano et al.(a) (1981)	-0.32	-0.81	-0.29	-0.34	-0.08	-0.30	-0.33	n.a.	n.a.	n.a.
Yoshitomi (1984)	-1.23	-1.18	-0.82	-0.48	-0.53	-0.83	-0.19	n.a.	n.a.	n.a.
OECD (1985) (b)	-1.4	-1.3	-1.3	-1.6	-1.3	-1.3	-1.2	-1.3	-1.7	-1.7
Memorandum item on previous estimates										
Houthakker-Magee (1969)	-1.51	-0.80	-1.25	-2.27	-1.24	-1.12	-0.59	-0.56	...	-0.47
Adams et al. (1969)	-0.60	-0.71	-0.65	-1.06	-0.48	-0.25	-0.23	n.a.	-0.59	n.a.
Basevi (1973)	-1.44	-2.38	-1.68	n.a.	-0.71	-0.72	-0.59	n.a.	-2.39	-1.92
Samuelson (1973)	-1.13	-1.04	-1.12	-1.28	-1.28	-1.29	-1.10	-1.06	-1.07	n.a.
Hickman-Lau (1973)	-1.38	-0.50	-1.04	-1.09	-1.27	-0.93	-0.84	-1.28	-0.95	-1.99

Sources: M. Goldstein (1984) and original studies.

... indicates zero or wrong-signed coefficient on relative prices.

a) Unweighted average of (correctly-signed) estimates.

b) Manufactured goods only.

Table E

SHORT-RUN VERSUS MEDIUM-RUN PRICE ELASTICITIES OF DEMAND FOR IMPORTS AND EXPORTS: CROSS COUNTRY STUDIES

Authors	Number of major industrial countries	Variable	Short-run (0-6 months) price elasticity	Medium-run (2 years) price elasticity	Ratio of Medium-run to short-run elasticity	Time period (in years) for 50% of final price effect	Total length in years) of lag distribution
Beenstock and Minford (1976)	9	Imports	-0.50	-1.18	2.4	0.5-1.0	up to 5
"	8	Exports	-0.70	-1.73	2.5	0.5-1.0	up to 5
Goldstein and Khan (1978)	8	Exports	-0.76	-1.35	1.8	0.25	-
Deppler and Ripley (1978)	14	Imports	-0.50	-0.97	1.9	1.0	3.5
"	14	Exports	-0.80	-1.40	1.7	1.0	3.5
Yoshitomi (1984)	7	Imports	-0.17	-0.59	3.5	-	2
"	7	Exports	-0.24	-0.75	3.0	-	2
OECD INTERLINK (1985)	10	Imports:					
		-Manufact.	-0.20	-0.86	4.2	1.0	up to 3
		-services	-0.24	-0.78	3.0	0.5-1.0	1.5
		Exports:					
		-Manufact.	-0.20	-1.40	7.0	1.5	up to 3
		-services	-0.15	-0.50	3.0	0.5-1.0	1.5

Sources: M. Goldstein (1984) and original studies.

Table F

MEDIUM RUN ACTIVITY ELASTICITIES FOR TOTAL IMPORTS AND EXPORTS

1. TOTAL IMPORTS

	United States	Japan	Germany	France	United Kingdom	Italy	Canada	Australia	Denmark	Netherlands	Sweden
Total imports											
Goldstein-Khan (1976)	1.84	1.30	1.52	1.28	1.78	1.83	n.a.	n.a.	0.84	2.04	1.33
Wilson and Takacs (1979)	4.03	1.69	1.46	1.07	2.57	n.a.	1.87	n.a.	n.a.	n.a.	n.a.
Geraci and Prewo (1980)	1.53	0.77	1.42	1.57	2.24	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Yoshitomi (1984)	1.48	1.30	1.16	0.65	2.27	-1.38	-0.95	n.a.	n.a.	n.a.	n.a.
OECD (1985) (a)	2.00	1.60	1.70	1.70	1.80	1.70	1.50	1.60	1.60	1.50	1.60
Memorandum item on previous estimates											
Houthakker-Magee (1969)	1.68	1.23	1.85	1.66	1.45	2.19	1.20	n.a.	1.31	1.89	1.42
Samuelson (1973)	1.89	1.26	1.17	1.45	1.46	1.86	0.95	n.a.	2.38	1.56	1.13

a) Refers to manufactured imports only

2. TOTAL EXPORTS

	United States	Japan	Germany	France	United Kingdom	Italy	Canada	Australia	Denmark	Netherlands	Sweden
Total exports											
Goldstein-Khan (1978)	1.01	4.22	1.80	1.69	0.92	1.96	n.a.	n.a.	n.a.	1.91	n.a.
Deppler(a)(b) Ripley (1978)	1.32	1.45	1.11	0.70	0.90	1.12	0.69	n.a.	1.08	0.65	1.14
Balassa(c) (1979)	2.02	2.00	2.27	2.04	2.20	2.07	1.89	n.a.	1.82	1.91	1.93
Wilson and Takacs (1979)	1.18	1.50	1.11	1.35	1.06	1.31	0.93	n.a.	n.a.	n.a.	n.a.
OECD(d) (1985)	1.00	1.10	1.10	1.00	0.80	1.00	0.80	0.90	0.80	1.00	1.00
Memorandum item on previous estimates:											
Houthakker-Magee (1969)	0.99	3.55	0.91	1.53	1.00	2.68	1.41	n.a.	1.69	1.88	1.75
Basevi (1973)	0.92	1.62	1.33	n.a.	0.61	1.18	1.15	n.a.	n.a.	0.85	1.22

a) Refers to manufactured exports only.
b) Refers to cyclical changes in real income.
c) Refers to trend (permanent) real income.
d) Refers to market growth elasticities of manufactured exports only.

Table G

INVENTORIES EQUATIONS: ROLE OF THE MAIN FINANCIAL AND NON-FINANCIAL VARIABLES ACROSS COUNTRIES

VARIABLES	INTEREST RATE	BALANCE SHEET CONSTRAINTS	CREDIT AVAILABILITY	OTHER MAIN DETERMINANTS
GENERAL EFFECT	NEGATIVE	MIXED	NEGATIVE	MIXED
UNITED STATES	User cost of capital (real interest rate)	NONE*	NONE*	Output: (+) accelerator effect but buffer role due to unexpected variation in sales
JAPAN	Indirectly incorporated e.g. via index of production	NONE*	NONE*	Output: (+) accelerator effect
GERMANY	NONE*	NONE*	NONE*	Final demand: (+)
FRANCE	Opportunity cost of holding	NONE*	Cash flow shortages (rarely directly incorporated)	Final (expected) demand: (+) Import prices: (+)
UNITED KINGDOM	Opportunity cost of holding (real after tax rate) Gross interest payments	Positive effect of real liquid assets as a share of output	NONE*	Output: accelerator effect: (+) Import prices: (+)
ITALY	Opportunity cost of holding	..	Up to 50 per cent of inventories when relevant (e.g. 1975) but reduced by deregulation	Demand: accelerator effect: (+)
CANADA	User cost of capital or opportunity cost (real after tax return)	NONE*	NONE*	Output and expected sales: (+) But buffer role: (-)
AUSTRALIA	..	..	..	..
NETHER-LANDS	User and opportunity costs (short and long-term rates)	NONE*	Loan availibility constraints or ratio of actual to desired loans	Final demand: (+)
SWEDEN	..	..	..	..

NONE* = absent from most models and/or single equation studies. .. = not enough information available.
(+) or (-) = positive or negative effect of an increase of the explanatory variable or the evolution of the aggregate demand component under review.
Source: See Annex.

3921E.4

TABLE H

LIST OF NATIONAL AND INTERNATIONAL MODELS

Country	Models	Abbreviation (version)	Frequency*	Authority responsible
UNITED STATES	INTERLINK	OECD (85)	S	OECD
	MCM	MCM (82)	Q	Division of International Finance, Board
	"	MCM (84)	Q	of Governors (Federal Reserve System)
	DRI annual	DRI (82)	A	Data Resources Incorporated
	Chase	CHA (82)	Q	Chase Econometrics
	Wharton	WHAR (82)	A	Wharton School
	MPS	MPS (85)	Q	Federal Reserve System
JAPAN	INTERLINK	OECD (85)	S	OECD
	World model	WLD (82)	Q	Economic Planning Agency
	" (revised)	WLD (84)	Q	Economic Planning Agency
GERMANY	INTERLINK	OECD (85)	S	OECD
	Bundesbank	BBK (82)	Q	Bundesbank
	" (revised)	BBK (84)	Q	Bundesbank
FRANCE	INTERLINK	OECD (85)	Q	OECD
	Metric	MET (81)	Q	INSEE
	Copain	COP (81)	A	Direction de la Prévision
	Metric (revised)	MET (83)	Q	INSEE
	OFCE	OFCE (85)	Q	Observatoire Français Conjonct.
Economique				
	Bq. France (provis.)	BDF (86)	Q	Banque de France
UNITED KINGDOM	INTERLINK	OECD (85)	S	OECD
	HM Treasury	HMT (82)	Q	H.M. Treasury
	" " (revised)	MT (84)	Q	H.M. Treasury
	Bank of England	BK (84)	Q	Bank of England
	National Institute	NIESR (84)	Q	Nat. Inst. of Economic and Social
Research				
	LBS model	LBS (84)	Q	London Business School
	Liverpool	LIV (84)	A	Liverpool University
ITALY	INTERLINK	OECD (85)	S	OECD
	Bk. Italy (provis.)	BKI (86)	Q	Bank of Italy
CANADA	INTERLINK	OECD (85)	S	OECD
	RDXF	RDXF (82)	Q	Bank of Canada
	Candide	CAND (82)	A	Conseil Economique
	QFS	QFS (82)	Q	Ministère des Finances
	SAM	SAM (82)	Q	Bank of Canada
	SAM (revised)	SAM (85)	Q	Bank of Canada
	RDXF (revised)	RDXF (84)	Q	Bank of Canada
AUSTRALIA	RBII	RBII (84)	A	Reserve Bank of Australia
	AMPS	AMPS (86)	Q	Economic Planning Advisory Council
NETHERLANDS	FREIA	FREIA (82)	A	Central Planning Bureau
	MORKMON	MKM (85)	Q	...

TABLE I

DEGREE OF INDEXATION BETWEEN THE INTERVENTION RATE (IR) AND THE REPRESENTATIVE SHORT-TERM INTEREST RATE (IRS)

(Reduction coefficients: IR/IRS derived from the simulations and ranked in descending order)

Country (model)	Floating exchange rates	Fixed exchange rates	Comments
NET (Freia)	4.4	4.4	IR = Discount rate
USA (MCM 82)	3.3	2.9	IR = Discount rate IRS = 3-month Treasury bill rate
JAP (Wld 82)	1.4	1.6	IR = Discount rate IRS = Gensaki rate (certificates of deposit)
GER (BBk 82)	1.3	..	IR = Lombard rate IRS = 3-month money market rate
GER (BBk 84)	1.2	1.2	IR = Lombard rate IRS = 3-month money market rate
JAP (Wld 84)	1.2	1.2	IR = Discount rate IRS = Gensaki rate (certificates of deposit)
Memorandum item:			
FRA (MET 81)	5	3.7	IR = 3-month money market rate
FRA (MET 83)	..	2.8	IRS = Base rate in these particular
FRA (COP 81)	..	1.6	models*

* Movements in the French bank base rate (BR) have been confused with those of the IRS in a number of comparative studies. The surprising discrepancy in the coefficients exhibited by the French models may be explained by different assumptions on the degree of indexation of long term interest rates on short term rates, which affect the global cost of bank resources and hence the base rate of their loans.

8282E.2

Table J

THE IMPACT OF MONETARY POLICY WHEN ACCOMMODATING A FISCAL POLICY CHANGE*
(Output and price effects under different exchange rate regimes)

Country	Model	Output (A/N)*				Prices (A/N)*				Memorandum item: Interest rate change (A–N) (in absolute value)			
		Floating		Fixed		Floating		Fixed		Floating		Fixed	
		a)	b)	a)	b)	a)	b)	a)	b)	a)	b)	a)	b)
UNITED STATES	MCM 82	1.5	10.0	1.4	3.2	1.6	2.2	1.2	1.6	0.9	1.5	0.9	0.8
	OECD 85	1.3	2.3	1.4	2.7	2.0	2.7	1.5	1.5	1.5	2.1	1.5	2.3
JAPAN	Wld 82	1.1	1.0	1.1	1.4	1.2	1.0	1.0	1.0	0.2	0.2	0.2	0.6
	OECD 85	2.4	8.0	2.3	4.3	2.2	3.8	1.6	2.3	2.1	2.4	2.3	2.6
GERMANY	BBk 84	1.4	3.0	1.2	2.4	1.0	1.3	1.0	1.3	0.8	0.6	0.8	1.1
	OECD 85	1.2	2.0	1.3	1.4	2.0	-2.2	1.0	1.2	1.6	0.4	2.0	1.5
FRANCE	Met 81(c)(d)	1.1	1.5	1.0	1.0	-1.9	1.0	1.5	0.3	0.3	0.6	0.1	0.4
	OECD 85	1.3	2.3	1.3	2.0	1.3	2.6	1.0	1.3	0.8	1.0	0.8	1.0
UNITED KINGDOM	HMT 82	1.6	1.4	1.1	2.3	2.4	3.5	0.9	0.8	1.3	3.5	1.4	3.6
	OECD 85	1.0	1.1	1.1	1.0	1.3	1.2	1.0	1.0	0.4	0.8	0.7	0.6
ITALY	OECD 85	1.4	1.7	1.4	1.8	1.3	1.9	1.3	1.3	0.7	0.9	0.7	0.8
CANADA	RDXF 82	..	..	1.3	1.0	..	..	1.2	1.3	0.6	0.6	0.7	0.5
	OECD 85	1.4	2.2	1.3	1.4	1.6	2.8	1.1	1.2	0.8	1.8	0.8	1.2
AUSTRALIA	RBA 82	1.2	4.1	1.5	1.7	1.0	1.2	1.0	0.9	0.7	1.8	0.9	1.1
NETHERLANDS	Freia 82	1.2	8.7	1.1	14.8	2.6	3.4	1.0	0.9	0.1	0.3	0.1	0.3
DENMARK	Adam 84	1.0	..	1.6	..	..	..	..	1.0	..	..	..	..

* In order to measure the incremental impact of monetary policy in the case of a shift in fiscal policy, the figures for output (GDP) and prices corresond to the ratio (A/N) of fiscal policy effects under accommodation (A) and non-accommodation (N). The interest rate variation prevented by monetary policy accommodation (in absolute value) is presented as a memorandum item. All figures are rounded to the first decimal place.

a) Short-term. b) Medium-term.

c) For the country blocks of the OECD model, the short term in the case of the interest rate corresponds to the second year and not to the average of the first three years.

d) In the case of METRIC, the reference interest rate is in fact the bank base rate.

Table K

THE EXCHANGE RATE REGIME AND THE POLICY MIX*
(Output and price effects with or without monetary accommodation to fiscal policy)

COUNTRY	Model	Output (L/X)*				Prices (L/X)*				Memorandum item: % change in exchange rate(1)			
		A (accom.)		N (non acc.)		A (accom.)		N (non acc.)		A (accom.)		N (non acc.)	
		a)	b)	a)	b)	a)	b)	a)	b)	a)	b)	a)	b)
UNITED STATES	MCM 82	1.2	3.8	1.1	1.2	1.4	2.4	1.1	1.8	2.9	6.4	0.5	2.5
	OECD 85	1.0	0.9	1.1	1.1	1.0	1.1	0.7	0.6	0.6	2.3	-1.1	-0.6
JAPAN	WLD 82	1.6	1.9	1.5	2.7	3.5	2.2	3.1	2.2	6.3	7.5	4.9	5.7
	OECD 85	1.0	1.9	1.0	1.0	1.2	1.5	0.9	1.0	1.5	8.1	-1.3	-0.2
GERMANY	BBK 84	1.2	1.2	1.0	1.0	1.0	1.0	1.0	1.0	0	0	-0.3	-0.6
	OECD 85	1.1	1.2	1.0	0.9	1.0	1.0	0.5	-1.0	0.5	1.7	-1.6	-1.3
FRANCE	MET 81 (c)	1.2	1.5	1.1	1.0	-0.7	1.2	0.5	4.0	2.9	7.6	2.6	4.6
	OECD 85	1.0	1.1	1.0	1.0	1.0	1.8	0.7	0.9	0.7	3.3	-0.3	0.3
ROYAUME-UNI	HMT 82	1.4	0.4	1.0	0.6	2.4	3.9	0.9	0.8	5.1	6.7	-0.2	-1.1
	OECD 85	0.9	1.1	1.0	1.0	1.2	1.5	1.0	1.3	0.5	4.5	0.2	3.0
ITALY	OECD 85	1.0	0.6	1.0	0.6	1.3	2.3	1.3	1.9	1.1	4.7	0.2	1.7
CANADA	RDXF 82	..	..	1.0	0.8	..	..	0.9	1.2	..	..	-0.2	0.8
	OECD 85	1.0	1.5	1.1	1.0	1.4	3.1	1.0	1.4	1.3	8.2	0.1	1.7
AUSTRALIA	RBA 82	1.1	1.9	1.4	0.8	1.1	2.2	1.1	1.5	6.1	7.2	4.3	2.0
NETHERLANDS	Freia 82	1.1	1.2	1.0	2.0	3.7	6.1	1.4	1.6	3.6	9.8	0.6	1.3

* In order to assess the role of the exchange rate regime in the case of a change in the policy mix, the figures for output (GDP) and prices correspond to the ratio (L/X) of fiscal policy effects under floating (L) and fixed (X) exchange rates, when monetary policy accommodates (A) or not (N). The exchange rate variation, in the case of a restrictive shift in fiscal policy, is presented by a memorandum item. All figures are rounded to the first decimal place.

a) Short-term; b) Medium-term

Table L

OUTPUT/PRICE SPLIT
MONETARY CONTRIBUTION TO FISCAL POLICY

(For a 1% rise in nominal GDP, only the share of real GDP is given, with the remainder corresponding to the share of prices)

	Floating exchange rates		Fixed exchange rates	
	Short term(a)	Medium term(b)	Short term(a)	Medium term(b)
UNITED STATES				
MCM 82	0.8	0.6	0.9	0.5
MPS 85	0.8	0.0	0.9	0.4
OECD 85	0.6	0.4	0.7	0.7
JAPAN				
WLD 82	0.8	1.5	1.0	1.0
OECD 85	0.7	0.4	0.8	0.4
GERMANY				
BBK 84	0.9	0.6	0.9	0.6
OECD 85	0.5	0.3	1.0	0.8
FRANCE				
MET 81	2.3	1.0	0.0	0.0
OECD 85	1.0	0.4	1.0	0.6
UNITED KINGDOM				
HMT 82	0.3	0.0	2.0	1.9
HMT 84	0.3	0.1	..	..
OECD 85	0.4	0.6	1.0	0.0
ITALY				
BKI 85	0.4	0.4	0.2	0.6
OECD 85	0.7	0.1	0.7	0.5
CANADA				
RDXF 82	0.7	0.0	..	..
RDXF 85	0.7	0.3	0.6	0.5
SAM 85	0.3	0.0	..	..
OECD 85	0.4	0.2	0.8	0.4
AUSTRALIA				
RBA 82	1.1	0.8	1.0	2.0
NETHERLANDS				
FREIA 82	0.1	0.1	1.2	1.2

a) b) .. See Table C.

REFERENCES

Aizenman, Joshua and Jacob A. Frenkel (1985), "Optimal Wage Indexation, foreign Exchange Intervention, and Monetary Policy", American Economic Review, Vol. 75, No. 3, June, pp. 402-423.

Akhtar, M. (1983), "Financial Innovations and their Implications for Monetary Policy: An International Perspective" BIS Economic Paper No. 9, December.

_____ and E. Harris (1987), "Monetary Policy Influence on the Economy - An empirical Analysis", Federal Reserve Board of New York Quarterly Review, Winter, pp. 19-30.

Alogoskoufis, G. and C.A. Pissarides (1983), "A Test of Price Sluggishness in the Simple Rational Expectations Model: U.K. 1950-1980", Economic Journal, Vol. 93, pp. 616-28.

Amihud, Y. and Mendelson (1982), "The Output-Inflation Relationship: An Inventory-Adjustment Approach", Journal of Monetary Economics, Vol. 19, pp. 163-184.

Argy, V. and J. Salop (1983), "Price and Output Effects of Monetary and Fiscal Expansion in a Two-Country World Under Flexible Exchange Rates", Oxford Economic Papers, Vol. 35, No. 2, July, pp. 228-46.

Artus, P. (1985), "L'indexation des salaires : une optique de stabilisation macro-économique", Revue Economique, Vol. 36, No. 2, Mars, pp. 291-320.

Asikoglu, Y. (1986), "Macroeconomic Interdependence and Policy Co-ordination between the US and Europe - A Game - Theoretical Approach", Discussion Paper, No. 631, Queen's University.

Asako, K. (1982), "Rational Expectations and the Effectiveness of Monetary Policy with Special Reference to the Barro-Fisher Model", Journal of Monetary Economics, Vol. 9, pp. 79-107.

Atkinson, P.E. and J-C. Chouraqui (1986), "The Formulation of Monetary Policy: A reassessment in the Light of Recent Experience", OECD Department of Economics and Statistics Working Paper No. 32, , March.

Attfield, C., D. Demery and N.W. Duck (1981a), "Unanticipated Monetary Growth, Output and the Price Level in the U.K. 1946-1977", European Economic Review, Vol. 16, pp. 367-85.

_____ (1981b), "A Quarterly Model of Unanticipated Monetary Growth, Output and the Price Level in the U.K: 1963-1978", Journal of Monetary Economics, pp. 331-350.

_____ (1983), "The Influence of Unanticipated Money Growth on Real Output: Some Cross-country Estimates", Journal of Money, Credit and Banking, Vol. 15, No. 4, pp. 442-454.

Bailey, R.W., C. Bordes, M. Driscoll and M-O. Strauss-Kahn (1987), "Inértie des rythmes d'inflation dans les principaux pays européens", Economie Appliquee Vol. 40, No. 3, pp. 483-538.

Bank for International Settlements, Annual Reports, various issues.

Barro, R. (1977), "Long-term Contracting, Sticky Prices, and Monetary Policy", Journal of Monetary Economics, Vol. 3, pp. 305-16.

_____ (1977), "Unanticipated Money Growth and Unemployment in the United States", American Economic Review, Vol. 67, pp. 101-15.

_____ (1978), "Unanticipated Money, Output and the Price Level in the United States", Journal of Political Economy, Vol. 86, pp. 549-580.

_____ (1979a), "Second Thoughts on Keynesian Economics", American Economic Review, Papers and Proceedings, Vol. 69, pp. 54-59.

_____ (1979), "Unanticipated Money Growth and Unemployment in the United States: A Reply", American Economic Review, Vol. 69, pp. 1004-9.

_____ (1984), Macroeconomics, New York: John Wiley.

_____ and Z. Hercowitz (1980), "Money Stock Revisions and Unanticipated Money Growth", Journal of Monetary Economics, Vol. 6, pp. 257-267.

_____ and M. Rush (1980), "Unanticipated Money and Economic Activity", in Chapter 2 of Stanley Fisher (ed.), Rational Expectations and Economic Policy, NBER: Chicago, pp. 23-48.

Bean, C.R. (1984), "A Little Bit more Evidence on the Natural Rate Hypothesis from the U.K.", European Economic Review 25, pp. 279-292.

Blejer, M. and Leonardo Leiderman (1980), "On the Real Effects of Inflation and Relative-Price Variability: Some Empirical Evidence", Review of Economics and Statistics, pp. 539-543.

Bordes, C., M.J. Driscoll, J.L. Ford and A.W. Mullineux (1982), "Tests Econométriques de l'Hypothèse de Rationalité et de l'Hypothèse de Neutralité Structurelle : le cas de la France : 1963-1980", document de Travail, Université de Limoges.

Bordo, Michael David (1980), "The Effects of Monetary Change on Relative Commodity Prices and the Role of Long-Term Contracts", Journal of Political Economy, Vol. 88, No. 6, pp. 1088-1109.

Boschen, J.F. (1985), "Employment and Output Effects of Observed and Unobserved Money Growth", Journal of Money, Credit and Banking, Vol. XVII, No. 2, pp. 153-63.

Branson, W. and J. Rotemberg (1980), "International Adjustment with Wage Rigidity", European Economic Review, Vol. 13, pp. 309-37.

Buck, A.J. and B. Gahlen (1984), "The Real Effects of Price Variability in the Federal Republic of Germany, 1953-77", Economic Letters, Vol. 15, pp. 79-85.

Canarella, G. and Garston, N. (1983), "Monetary and Public Debt Shocks: Tests and Efficient Estimates", Journal of Money, Credit and Banking", Vol. 15, No. 2, pp. 199-211.

Carlton, D. (1986), "The Rigidity of Prices", American Economic Review 76, pp. 637-657.

Carns, F., and R. Lombra (1984), "Rational Expectations and Short-run Neutrality: A Re-examination of the Role of Ancticipated Money Growth", Review of Economics and Statistics, pp. 639-643.

Clinton, K. and J.C. Chouraqui (1987), "Monetary Policy in the Second half of the 1980s: How much room for manoeuvre", OECD Economics and Statistics Department Working Paper No. 39, February.

Coe, David T. and Francesco Gagliardi (1985), "Nominal Wage Determination in Ten OECD Economies", OECD Economics and Statistics Department Working Paper No. 19, March.

Cukierman, A. (1980), "The Effects of Wage Indexation on Macroeconomic Fluctuations: A Generalisation", Journal of Monetary Economics 6, pp. 147-70.

_____ and Paul Wachtel (1979), "Differential Inflationary Expectations and the Variability of the Rate of Inflation: Theory and Evidence", American Economic Review, Vol. 69, No. 4, September, pp. 595-609.

Demery, D. (1984), "Aggregate Demand, Rational Expectations and Real Output: Some New Evidence for the U.K. 1963.2-1982.2", Economic Journal, Vol. 94, pp. 847-862.

_____ and N.W. Duck (1984), "Inventories and Monetary Growth in the Business Cycle: Some Theoretical Considerations and Empirical Results for the U.K.", Manchester School, pp. 363-379.

_____, N.W. Duck and S.W. Musgrave (1984), "Unanticipated Money Growth, Output and Unemployment in West Germany:, Weltwirtschaftliches Archiv, Vol. 120, No. 2, pp. 244-255.

Dornbusch, R. (1976), "Expectations and Exchange Rate Regimes", Journal of Political Economy, Vol. 84, pp. 1161-76.

_____ and S. Fisher (1983), Macroeconomics, McGraw-Hill, Tokyo.

_____ (1984), The Open Economy: Implications for Monetary and Fiscal Policy", NBER Working paper, No. 1422.

Driscoll, M.J., J.L. Ford and A.W. Mullineux (1983), "The Gains and Losses to Predicting Nominal Income by Disaggregating via the New Classical Aggregate Supply and Ratioal Expectations Hypotheses", Empirical Economics 8, pp. 47-58.

_____, W. Kohler and A.W. Mullineux (1983), "Testing the Rational Expectations and Structural Neutrality Hypotheses: Some Econometric Results for Austria 1965.1-1979.4, Empirica, pp. 3-13.

_____, A.W. Mullineux and S. Sen (1983), "Money, Output, Rational Expectations and Neutrality: Some Econometric Results for the U.K.", Economica, Vol. 50, pp. 259-268.

_____ (1984), "Testing of the Rational Expectations and Structural Neutrality Hypothesis", Journal of Macroeconomics, Summer 1983, Vol. 5, No. 3, pp. 353-360.

Edison, H., J. Marquez and R. Tryon (1986), "The Structure and Properties of the Multicountry Model of the Federal Reserve Board", forthcoming Economic Modeling.

Enders, W. and B. Falk (1985), "A Microeconomic Test of Money Neutrality", Review of Economics and Statistics, pp. 666-669

Evans, Paul (1984), "The Effects on Output of Money Growth and Interest Rate Volatility in the United States", Journal of Political Economy, Vol. 92, pp. 204-222.

Fama, E. (1975), "Short-term Interest Rates as Predictors of Inflation", American Economic Review, June, pp. 269-82.

Feldstein, M. (1983), "Domestic Saving and International Capital Movements in the Long Run and the Short Run", European Economic Review, Vol. 21, pp. 129-151.

Fisher, I. (1930), The Theory of Interest, Macmillan, New York.

Fisher, S. (1977), "Long-term Contracts, Rational Expectations, and the Optimal Money Supply Rule", Journal of Political Economy, Vol. 85, pp. 191-210.

Fitzgerald, M.D. and G. Pollio (1983), "Money, Activity and Prices: Some Inter-country Evidence", European Economic Review, Vol. 23, pp. 279-314.

Foster, E. (1978), "The Variability of Inflation", Review of Economics and Statistics, Vol. 60, pp. 346-50.

Friedman, M. (1968), "The Role of Monetary Policy", American Economic Review 58, March, pp. 1-17.

_____ (1977), "Long-term Contracts, Rational Expectations and the Optimal Money Supply Rule", Journal of Political Economy, Vol. 85, pp. 191-210.

_____ and A.J. Schwartz (1982), "Monetary Trends in the United States and the United Kingdom, Chicago: University of Chicago Press.

Gale, W.A. (1985), "Temporal Variability of United States Consumer Price Index", Journal of Money, Credit and Banking, Vol. 13, pp. 273-99.

Garbade, K. and Wachtel (1978), "Time Variation in the Relationship between Inflation and Interest Rates", Journal of Monetary Economics 4, November, pp. 755-765.

Garner, C.A. (1982), "Tests of Monetary Neutrality for the United Kingdom", Quarterly Review of Economics and Business, Vol. 22, No. 3, pp. 81-95.

Gordon, R.J. (1971), "Steady Anticipated Inflation: Mirage or Oasis", Brookings Papers on Economic Activity 2, pp. 477-510.

_____ (1982), "Price Inertia and Policy Ineffectiveness in the United States, 1890-1980", Journal of Political Economy, Vol. 19, pp. 1087-117.

_____ (1984), "Wage-Price Dynamics and the Natural Rate of Unemployment in Eight Large Industrialised Nations", OECD Economics and Statistics Department Workshop on Price Dynamics and Economic Policy, 6th-7th September.

Gray, J. (1976), "Wage Indexation: A Macroeconomic Approach", Journal of Monetary Economics, 2, pp. 221-35.

Grubb, D., R. Jackman and R. Layard (1983), "Wage Rigidity and Unemployment in OECD Countries", European Economics Review, (March/April), pp. 11-39.

Hamilton, J. (1980), "Oil and the Macroeconomy Since World War II", Journal of Political Economy, Vol. 91, pp. 228-48.

Haraf, W.S. (1983), "Test of Rational Expectations -- Structural Neutrality Model with Persistence Effects of Monetary Disturbances, Journal of Monetary Economics, Vol. 11, pp. 103-116.

Helliwell, J. and T. Padmore (1985), "Empirical Studies of Macroeconomic Interdependence", in R. Jones and P. Kenen (eds) Handbook of International Economics, (Vol II), North Holland, Amsterdam.

_____ (1986), "Empirical Macroeconomics for Interdependent Economies: What Next? Brookings Institution Conference, March.

Hercowitz, Z. (1981), "Money and Dispersion of Relative Prices", Journal of Political Economy, Vol. 89, pp. 328-356.

_____ (1982), "Money and Price Dispersion in the United States", Journal of Monetary Economics, Vol. 10, pp. 25-37.

Hoffman, D. and D.E. Schlagerhauf (1982), "An Econometric Investigation of the Monetary Neutrality and Rationality Propositions from an International Perspective", Review of Economics and Statistics, Vol. LXIV, pp. 562-571.

_____ (1984), "Real Interest Rates, Anticipated Inflation and Unanticipated Money: A Multi-country Study", Review of Economic Studies, pp. 284-296.

Holden, K., D. Peel and J. Thompson (1985), Expectations: Theory and Evidence, Macmillan, London.

Holtham, G. (1986), "International Policy Coordination: How much consensus is there?", Brookings Discussion Papers on International Economies No. 50.

Horne, J. and I.M. McDonald (1984), "Rational Expectations, Gradual Price Adjustment and Monetary Policy in Australia", Australian Economic Papers, pp. 79-90.

Katsimbris, G.M. (1985), "The Relationship Between the Inflation Rate, its Variability, and Output Growth Variability: Disaggregated International Evidence", Journal of Money, Credit and Banking, Vol. XVII, No. 2, pp. 179-188.

_____ and S.M. Miller (1982), "The Relation between the Rate and Variability of Inflation: Further Comments", Kyklos 35, pp. 456-67.

_____ (1984), "The Over-time Relationship between Inflation and its Variability Once Again: A Rejoinder", Kyklos, Vol. 37, pp. 110-12.

Karni, E. (1983), "On Optimal Wage Indexation", Journal of Political Economy 91, pp. 282-92.

Keynes, J.M. (1937), The General Theory of Employment Interest and Money, Macmillan, London.

Kimbrough, K. and Koray (1984), "Money, Output and the Trade Balance: Theory and Evidence", Canadian Journal of Economics, Vol. XVII, No. 3, pp. 508-522.

King, R. and C.F. Plosser (1984), "Money, Credit and Prices in a Real Business Cycle", American Economic Review, Vol. 74, No. 3, pp. 363-380.

Knight, A. (1981), "Wilson Revisited: Industrialists and Financiers", Policy Studies Institute, Discussion Paper, No. 5, London.

Kormendi, R.C. and P.G. Meguire (1984), "Cross-regime Evidence of Macroeconomic Rationality", Journal of Political Economy, Vol. 92, No. 5, pp. 875-908.

Leiderman, L. (1980), "Macroeconomic Testing of the Rational Expectations and Structural Neutrality Hypothesis for the United States", Journal of Monetary Economics 6, pp. 67-82.

_____ (1983), "The Response of Real Wages to Unanticipated Money Growth", Journal of Monetary Economics, Vol. 11, pp. 73-88.

Levi, Maurice D. and John H. Makin (1980), "Inflation Uncertainty and the Phillips Curve: Some Empirical Evidence", American Economic Review, Vol. 70, No. 5, December, pp. 1022-1027.

Lilien, D. (1982), "Sectoral Shifts and Cyclical Unemployment", Journal of Political Economy, Vol. 90, pp. 777-93.

Litterman, R.B. and L. Weiss (1985), "Money, Real Interest Rates and Output: A Reinterpretation of Postwar U.S. Data", Econometrica, Vol. 53, No. 1, pp. 129-156.

Logue, D.E. and R.J. Sweeny (1981), "Inflation and Real Growth: Some Empirical Results", Journal of Money, Credit and Banking, Vol. 13, No. 4, November, pp. 497-501.

_____ and Willet (1976), "A Note on the Relation Between the Rate and Variability of Inflation", Economica, Vol. 43, May, pp. 151-158.

Lucas, R. (1975), "An Equilibrium Model of the Business Cycle", Journal of Political Economy, pp. 1113-1129.

Maarek, G. (1980), "Quelques relations statistiques simples entre la monnaie, les prix et l'activité", Cahiers Economiques et Monétaire No. 11, Banque de France, pp. 87-100.

Makin, J.H. (1982), "Anticipated Money, Inflation Uncertainty and Real Economic Activity", Review of Economic Studies, Vol. 64, pp. 126-134.

Marston, R. (1985), "Stabilization Policies in Open Economies", in R.W. Jones and P.B. Kenen (eds.), Handbook of International Economics, Vol. 2, (North Holland, Amsterdam), pp. 859-916.

Mayer, T. (1978), (ed.), The Structure of Monetarism Today, (Norton: New York).

McGee, R.T. and R.T. Stasiak (1985), "Does Anticipated Monetary Policy Matter", Journal of Money, Credit and Banking, Vol. 17, No. 1, pp. 16-27.

Merrick, J.J. (1983), "Financial Market Efficiency, the Decomposition of 'Anticipated' versus 'Unanticipated' Money Growth and Further Tests of the Relation Between Money and Real Output", Journal of Money, Credit and Banking, Vol. 15, No. 2, pp. 222-232.

Mishkin, F. (1982), "Does Anticipated Monetary Policy Matter? An Econometric Investigation", Journal of Political Economy, Vol. 90, pp. 22-51.

_____ (1982b), "Does Anticipated Aggregate Demand Policy Matter?", American Economic Review, Vol. 72, pp. 788-802.

Moosa, Suleman A. (1983), "The Double Whammy of Stagflation and Uncertainty", Kredit und Kapital 3, pp. 297-313.

Neftci, S.N. and T.J. Sargent (1978), "A Little Bit of Evidence on the Natural Rate Hypothesis from the U.S.", Journal of Monetary Economics 4, pp. 315-320.

Nelson, C.R. (1981), "Adjustment Lags Versus Information Lags: A Test of Alternative Experimentations of the Phillips Curve Phenomenon", Journal of Money, Credit and Banking, Vol. 13, No. 1, pp. 1-11.

Nickell, S. and S. Wadhwani (1987), "Myopia, the 'Dividend Puzzle', and Share Prices", Discussion Paper No. 272, Centre for Labour Economics, London School of Economics.

Niehans, J. (1987), "Generating International Disturbances", Working Paper, University of Berne.

Nugent, Jeffrey, B. and Constantine Glezakos (1984), "The Over-Time Relationship Between Inflation and its Variability Once Again", KYKLOS, Vol. 37, Fasc. 1, pp. 104-109.

_____ (1986), "Capital Mobility in the World Economy: Theory and Measurement", Carnegie-Rochester Conference Series on Public Policy 24, pp. 55-104.

OECD (1972), Monetary Policy in Japan, OECD Monetary Studies Series, Paris.

____ (1972b), Monetary Policy in Germany, OECD Monetary Studies Series, Paris.

____ (1973b), Monetary Policy in Italy, OECD Monetary Studies Series, Paris.

____ (1974a), Monetary Policy in France, OECD Monetary Studies Series, Paris.

OECD (1974b), Monetary Policy in the United States, OECD Monetary Studies Series, Paris.

____ (1975), The Role of Monetary Policy in Demand Management, OECD Monetary Studies Series, Paris.

____ (1979), Monetary Targets and Inflation Control, OECD Monetary Studies Series, Paris.

____ (1985), Monetary Policy and Exchange Rate Management, OECD Monetary Studies Series, Paris.

Okun, A.M. (1971), "The Mirage of Steady Inflation", Brookings Papers on Economic Activity 2, pp. 485-98.

_____ (1975), "Inflation: Its Mechanics and Welfare Costs, Brookings Papers on Economic Activity, pp. 351-401.

Pagan, A.R., A.D. Hall, and P.K. Trivedi (1983), "Assessing the Variability of Inflation", Review of Economic Studies L., pp. 585-596.

Pesaran, M.H. (1982), "A Critique of the Proposed Tests of the Natural Rate -- Rational Expectations Hypothesis", Economic Journal, Vol. 92, pp. 529-54.

Pitchford, J.P. (1985), "The Insulation Capacity of a Flexible Exchange Rate System in the Context of External Inflation", Scandanavian Journal of Economics 87, pp. 44-65.

Rice, G. Randolph (1983), "The Variance of Expected Inflation and the Rate of Inflation: Implications from Inter-Industry Wage Equations", Applied Economics 15, pp. 553-561.

Richardson, P. (1987), "A Review of the Simulation Properties of OECD's Interlink Model", OECD Department of Economics and Statistics Working Paper No. 42, July.

Saidi, N.H. (1980), "Fluctuating Exchange Rates and the International Transmission of Disturbances", Journal of Money, Credit and Banking, Vol. 12, No. 4, pp. 575-591.

Seater, J. (1982), "Are Future Taxes Discounted", Journal of Money Credit and Banking, Vol. XIV, pp. 376-89.

Sheehey, E.J. (1984), "The Neutrality of Money in the Short Run: Some Tests", Journal of Money, Credit and Banking, Vol. 16, No. 2, pp. 237-241.

Sheffrin, S.M. (1978), "Discriminating Between Rational Expectations Models: Some Evidence", Economic Letters, Vol. 1, pp. 205-210.

Smaghi, L.B. and P. Tardini (1983), "The Effectiveness of Monetary Policy: an Empirical Investigation for Italy (1966-1981)", Giornale Degli Economisti e Annali de Economia, No. 9-10, pp. 679-690.

Small, D.H. (1979), "Unanticipated Monetary Growth and Unemployment in the United States: A Comment", American Economic Review 69, pp. 996-1003.

Spivak, Avia, J. Weinblatt and B.Z. Zilberfarb (1985), "Wage Indexation and the Variability of Inflation - An Empirical Result", Economic Letters 17, pp. 331-333.

Symons, J.S.V. (1984), "Money and the Real Interest Rate in the U.K.", Manchester School, pp. 250-265.

Turnovsky, S.J. (1979), "On the Insulation Properties of Flexible Exchange Rates", Revue Economique 30, pp. 719-46.

Wasserfallen, W. (1984a), "Trends, Random Walks and the Phillips-Curve: Evidence from Six Countries", mimeo, Volkswirtschaftliches Institut.

_____ (1984b), "Internationally Integrated Capital Markets and the Effects of Monetary Policy on Real Interest Rates and Real Exchange Rates", mimeo, Volkswirtschaftliches Institut.

_____ (1985), "Forecasting, Rational Expectations and the Phillips-Curve, an Empirical Investigation", Journal of Monetary Economics, Vol. 15, pp. 7-27.

Wogin, G. (1980), "Unemployment and Monetary Policy under Rational Expectations: Some Canadian Evidence", Journal of Monetary Economics 6, pp. 59-68.

In April 1983, the Economics and Statistics Department initiated a new series of economic studies entitled ESD Working Papers.

The following titles have been circulated:

1. Use of Demand Elasticities in Estimating Energy Demand
   Utilisation des Elasticités de la Demande dans l'Estimation de la Demande de l'Energie

   Axel Mittelstadt

2. Capital, Energy and Labour Substitution: the supply block in OECD medium-term models
   Substitution du Capital, de l'Energie et du Travail : le bloc de l'offre dans les modèls à moyen terme de l'OCDE (épuisé)

   Patrick Artus

3. Wage Formation in France: sectoral aspects (out of print)
   Formation des Salaires en France : aspects sectoriels

   Patrick Artus

4. Service Lives of Fixed Assets (out of print)
   Durée de Vie Utile des Actifs Fixes

   Derek Blades

5. Resource Prices and Macroeconomic Policies: Lessons from Two Oil Price Shocks
   Prix des Ressources Naturelles et Politique Macro-Economique : Les Enseignements de Deux Chocs Pétroliers (épuisé)

   John Llewellyn

6. Output Responsiveness and Inflation: An Aggregate Study
   Souplesse de la Production et Inflation : Etude Globale

   David T. Coe and Gerald Holtham

7. The Determinants of Exchange Rate Movements (out of print)
   Les Déterminants des Mouvements des Taux de Change (épuisé)

   Graham Hacche

8. Simulated Macroeconomic Effects of a Large Fall in Oil Prices (out of print)
   Simulation des Effets Macro-économiques d'une Forte Baisse des Prix Pétroliers

   Flemming Larsen and John Llewellyn

9. Medium-Term Financial Strategy: The Co-ordination of Fiscal Monetary Policy
   Stratégie Financière à Moyen Terme : la Coordination des Politiques Monétaire et Budgétaire

   Jean-Claude Chouraqui and Robert Price

10. Price Dynamics and Industrial Structure: A Theoretical and Econometric Analysis
Dynamique des Prix et Structure Industrielle : Une analyse théorique économétrique (épuisé)

David Encaoua (with collaboration from Paul Geroski and Riel Miller

11. Evidence on Income Distribution by Governments (out of print)
L'Action Exercée par l'Etat sur la Redistribution du Revenu

Peter Saunders

12. Labour Force Participation: An Analysis with Projections
Taux d'Activité : Analyse et Projections

James H. Chan-Lee

13. The Demand for Money and Velocity in Major OECD Countries (out of print)
La Demande de Monnaie et la Vitesse de Circulation dans les Grands Pays de l'OCDE

A. Blundell-Wignall, M. Rondoni and H. Ziegelschmidt

14. The Conduct of Monetary Policy in the Current Recovery
La Conduite de la Politique Monétaire dans la Phase Actuelle de Reprise Economique

Paul Atkinson and Jean-Claude Chouraqui

15. Structural Budget Deficits and Fiscal Stance
Déficits Budgétaires Structurels et Orientation de la Politique Budgétaire

Patrice Muller and Robert W.R. Price

16. Monetary Policy in the OECD Interlink Model
La Politique Monétaire dans le Modèle Interlink

A. Blundell-Wignall, M. Rondoni, H. Ziegelschmidt and J. Morgan

17. Real Gross Product in OECD Countries and Associated Purchasing Power Parities (out of print)
Produit Brut Réel et Parités de Pouvoir d'Achat dans les pays de l'OCDE (épuisé)

Peter Hill

18. The OECD Compatible Trade and Production Data Base (out of print)
Base de Données Compatibles sur le Commerce et la Production de l'OCDE

Derek Blades and Wendy Simpson

19. Nominal Wage Determination in Ten OECD Economies
Détermination des Salaires Nominaux dans Dix Economies de l'OCDE

David T. Coe and Francesco Gagliardi

20. Profits and Rates of Return in OECD Countries
Profits et Taux de Rendement dans les Pays Membres de l'OCDE

James H. Chan-Lee and Helen Sutch

21. Real Interest Rates and the Prospects for Durable Growth
Taux d'Intérêt Réels et Perspectives de Croissance Durable

Paul Atkinson and Jean-Claude Chouraqui

22. Energy Prices: Trends and Prospects
Les Prix de l'Energie : Evolution et Perspectives

Axel Mittelstadt

23. Changes in the Composition of Output and Employment
Changements dans la Composition de la Production et de l'Emploi

Axel Mittelstadt and Françoise Correia

24. Labour Market Flexibility and External Price Shocks
Flexibilité du Marché du Travail et Chocs Extérieurs sur les Prix

F. Klau and A. Mittelstadt

25. Discrepancies Between Imports and Exports in OECD Foreign Trade Statistics (out of print)
Ecart entre les Importations et les Exportations dans les Statistiques du Commerce Extérieur de l'OCDE

Derek Blades and Marina Ivanov

26. Aggregate Supply in Interlink: Model Specification and Empirical Results

John Helliwell, Peter Sturm, Peter Jarrett and Gérard Salou

27. Commodity Prices in Interlink

Gerry Holtham, Tapio Saavalainen, Paul Saunders and Helen Sutch

28. Exchange Rates and Real Long-Term Interest Rate Differentials: Evidence for Eighteen OECD Countries

David T. Coe and Stephen S. Golub

29. Method of Calculating Effective Exchange Rates and Indicators of Competitiveness

Martine Durand

30. Public Debt in a Medium-Term Context and its Implications for Fiscal Policy

Jean-Claude Chouraqui, Brian Jones and Robert Bruce Montador

31. The OECD Compatible Trade and Production Data Base 1970-1983

Anders Brodin and Derek Blades

32. The Formulation of Monetary Policy: A Reassessment in the Light of Recent Experience

    Paul Atkinson and Jean-Claude Chouraqui

33. Mécanismes de Transmission et Effets Macro-Economiques de la Politique Monétaire en France : les Principaux Enseignements Econométriques

    Marc-Olivier Strauss-Kahn

34. Pure Profit Rates and Tobin's q in Nine OECD Countries

    James H. Chan-Lee

35. Wealth and Inflation Effects in the Aggregate Consumption Function

    G.H. Holtham and H. Kato

36. The Government Household Transfer Data Base

    Rita Varley

37. Internationalisation of Financial Markets: Some Implications for Macroeconomic Policy and for the Allocation of Capital

    Mitsuhiro Fukao and Masaharu Hanazaki

38. Tracking the US External Deficit, 1980-1985: Experience with the OECD Interlink Model

    Pete Richardson

39. Monetary Policy in the Second Half of the 1980s: How Much Room For Manoeuvre?

    Kevin Clinton and Jean-Claude Chouraqui

40. Tax Reform in OECD Countries: Economic Rationale and Consequences

    Bruce Montador, Brian Jones and Bob Hagemann

41. A Revised Supply Block for the Major Seven Countries in Interlink

    Peter Jarrett and Raymond Torres

42. OECD Economic Activity and Non-Oil Commodity Prices: Reduced-Form Equations for INTERLINK

    Gerald Holtham and Martine Durand

43. Import and Export Price Equations for Manufactures

    Richard Herd

44. Price Determination in the Major Seven Country Models in INTERLINK

    Ulrich Stiehler

45. International Investment-Income Determination in INTERLINK: Models for 23 OECD Countries and Six Non-OECD Regions

    David T. Coe, Richard Herd and Marie-Christine Bonnefous

46. Recent Developments in OECD's International Macroeconomic Model

    Pete Richardson

47. A Review of the Simulation Properties of OECD's INTERLINK Model

    Pete Richardson

48. The Medium-Term Macro-Economic Strategy Revisited

    Jean-Claude Chouraqui, Kevin Clinton and Robert Bruce Montador

49. Are Commodity Prices Leading Indicators of OECD Prices?

    Martine Durand, Sveinbjörn Blöndal

50. Private Consumption, Inflation and the "Debt Neutrality Hypothesis" The case of Eight OECD Countries

    Giuseppe Nicoletti

51. The Effects of Monetary Policy on the Real Sector: An overview of Empirical Evidence for Selected OECD Economies

    Jean-Claude Chouraqui, Michael Driscoll and
    Marc Olivier Strauss-Kahn

This paper offers an assessment of the current state of understanding about the macroeconomic effects of monetary policy, both at the conceptual level and in the light of recent experience of a number of OECD countries. The main focus of the paper is on the effects of domestic real sector variables (demand components, output, employment and the price level), with the distinction between the market-clearing and non-market-clearing theoretical frameworks used as a basis for the discussion of the reported empirical evidence. The paper also examines the international spillover effects of monetary policy, outlining the ways and extent to which foreign monetary policy influences the domestic economy. Some lessons for the conduct of monetary policy are drawn in conclusion.

* * * * *

Cette étude fait le point de l'état actuel des connaissances sur les effets macroéconomiques de la politique monétaire, tant d'un point de vue conceptuel que sur la base de l'expérience d'un certain nombre de pays de l'OCDE. L'essentiel de l'analyse est consacré aux effets de la politique monétaire sur les grandeurs réelles de l'économie (composantes de la demande, production, emploi et niveau des prix), les résultats empiriques présentés en la matière étant basés sur la distinction entres les deux approches théoriques d'équilibre des marchés par un ajustment lent ou rapide des prix. L'étude examine également les incidences internationales de la politique monétaire, et aborde notamment la question de savoir comment et dans quelle mesure les politiques monétaires pratiquées à l'étranger influent sur l'économie nationale. Quelques enseignements pour la conduite de la politique monétaire sont tirés en conclusion.