

BIS ECONOMIC PAPERS

No. 9 – December 1983

**FINANCIAL INNOVATIONS
AND THEIR IMPLICATIONS FOR
MONETARY POLICY:
AN INTERNATIONAL PERSPECTIVE**

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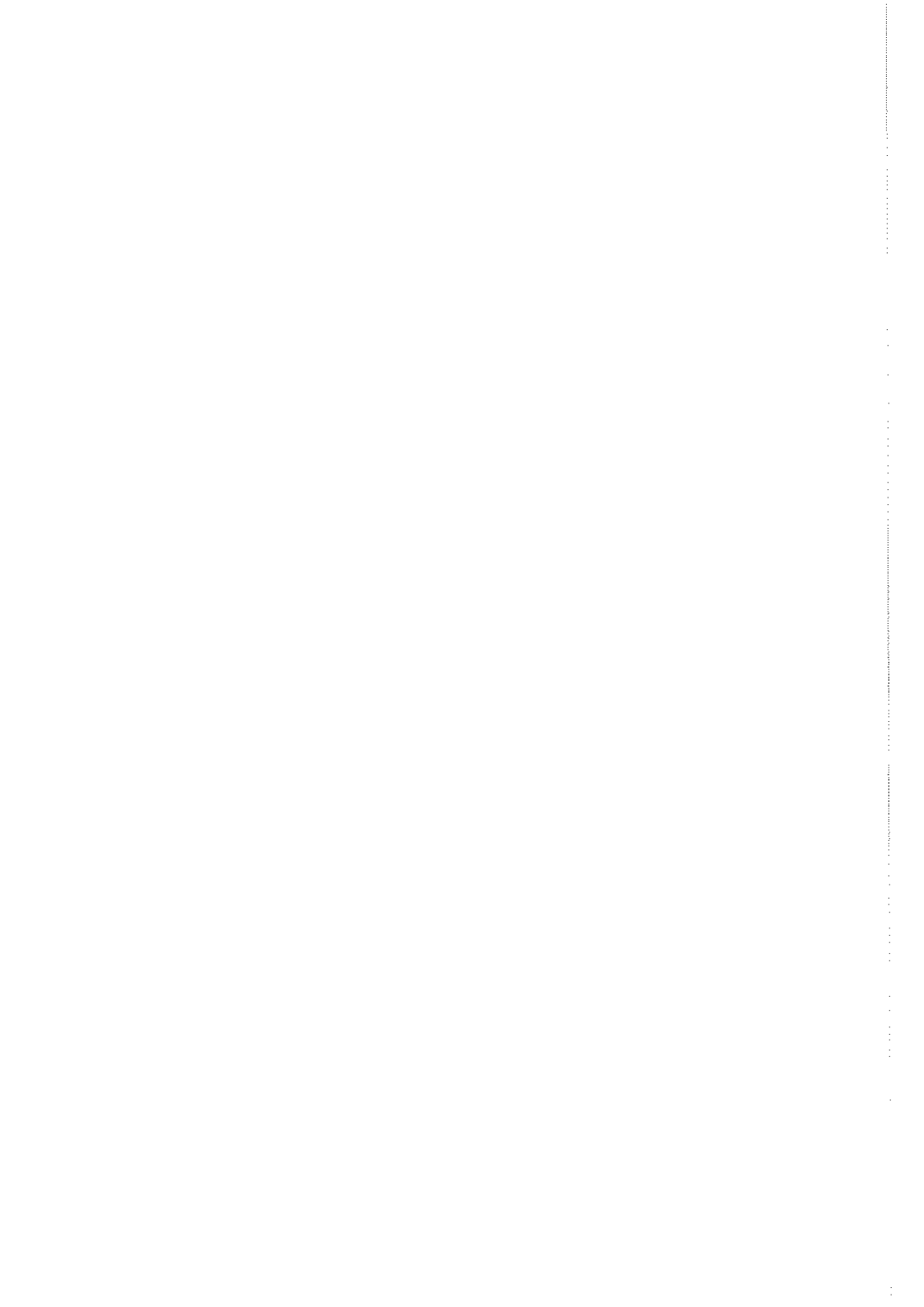


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**FINANCIAL INNOVATIONS
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**I.
Introduction**

This paper attempts to provide a broad and long-term perspective on recent changes in the banking system and financial markets and on their major implications for monetary policy in the larger industrial countries. The financial changes or innovations reviewed here cover a broad spectrum. Frequently, the term financial innovation is limited to new or altered financial instruments (i.e. deposit and cash management instruments) issued by banks and other deposit-taking institutions. In this paper the discussion of financial changes includes these types of innovations as well as issues of securities in money and capital markets and also changes in the market structure and institutions. Both the development of markets for new financial instruments and the expansion and deepening of markets for the pre-existing instruments are relevant in considering changes in the workings of the financial system. However, no attempt is made to be comprehensive in terms either of detailed changes or of country coverage. Rather, the study intends to provide a general perspective on

¹I am grateful to Alexandre Lamfalussy and Warren McClam for their advice and encouragement as well as comments on an earlier version of this paper. Helpful comments and criticisms from several other colleagues at the BIS as well as at various central banks are also acknowledged. Any errors of facts and interpretation remain, of course, my responsibility.

those changes that are broadly based across countries and entail potentially significant consequences for policy.

The discussion is carried out in terms of five broad categories of financial changes which seem to reflect the major long-term trends in the financial systems of industrial countries. These categories are:

- (1) the increasing use of interest-sensitive funds by banks and other financial institutions;
- (2) variable rate lending or borrowing and maturity shortening;
- (3) the growth of financial markets and of marketable financial instruments;
- (4) the changing shape of retail banking;
- (5) the diversification of sources of financial services.

These “super” changes subsume a myriad of changes in financial instruments and other innovations constituting the significant medium-term trends in the financial system. Needless to say, these trends are relevant for individual countries in varying degrees.

The process of financial change exerts significant influences on the empirical definition of money, the money supply process, the demand for money and the rôle of interest rates in the transmission of monetary influences to the rest of the economy. More generally, changes in the financial system raise questions about the meaningfulness of monetary and financial aggregates and may lead to shifts or (further) instability in the relationship of those aggregates to economic activity. This paper discusses these issues and the problems created by them for monetary policy targeting and monetary control. The paper also considers, albeit briefly, some implications of the changing financial environment for financial regulations and their relevance for monetary policy.

At the outset, it should be noted that the following analysis does not deal *explicitly* with changes in international financial markets. It would appear that a consideration of those changes would strengthen many of the conclusions regarding trends in various groupings discussed below. For example, interest-sensitive funding and variable rate lending/borrowing are very common features of the Euro-markets. Indeed, some of the new practices originated in those markets and were subsequently adapted by domestic financial markets.

II. Changes in the banking system and financial markets

This section presents an overview of the process of financial change in terms of the five general categories mentioned above, with a special emphasis on the period since around the mid-1970s. The groupings are intended to capture the main trends or durable elements of change which are altering or likely to alter the functioning of the financial system in significant ways. They are a part of a continuing process, but their pace and stage of development vary substantially relative to one another as well as between countries. Some, such as the use of interest-sensitive liabilities by financial institutions, are already highly developed, while others, such as new retail banking practices, are just beginning to emerge in most countries.

Taken as a whole, the financial changes since the early or mid-1970s have already had a significant effect on the way financial institutions fund their activities and, more broadly, on the process of financial intermediation. Meanwhile, the spectrum of financial instruments and practices available to businesses and households for making payments, for arranging loans and for investing and depositing funds has been widening rapidly in many countries. These and other developments discussed here reflect changes in the financial behaviour of economic agents and entail alterations in the size and composition of various monetary and credit flows at both the aggregate and the sectoral levels.³

1. Interest-sensitive funds

Since the early 1970s, banks and other financial institutions have come to rely increasingly on interest-sensitive funds to finance their

³ This paper does not deal, at least explicitly, with the causes of financial innovations. The widely identified factors include high and variable inflation and interest rates, the application of electronic technology, the internationalisation of banking and regulatory changes. For a broad perspective, see Akhtar (1983a). For a variety of other views, see Silber (1975, 1983), Kane (1981, 1982), Bank of England (1983), Howard and Johnson (1982), Kaufman (1983), Lamfalussy (1983), Volcker (1983a), West (1982) and Wojnilower (1982).

activities. Three interrelated factors have played a major rôle in this shift. First, commercial-bank *liability management* – the use of non-traditional or interest-sensitive sources of funds, such as borrowings in short-term financial markets, to finance loan demand and other activities – started in the 1960s and advanced rapidly in the early and mid-1970s, partly following the practices that were being developed in the Euro-markets.³ In recent years liability management received further impetus from high and volatile interest rates, the application of electronic technology and, in some cases, from the relaxation of interest rate regulations. It is now widely practised by banks and non-bank financial institutions utilising markets like those for repurchase agreements (RPs), certificates of deposit (CDs), Euro-dollars and commercial paper.

Liability management tends to reduce the rôle of conventional deposits while simultaneously increasing the rôle of ‘purchased’ funds in funding activities of financial institutions. Funds purchased from the generally anonymous markets are by their very nature more interest-sensitive than deposits. It is virtually impossible to put together precise statistics on the extent to which banks and other financial institutions have come to rely on non-traditional sources of funds. For the banking system, however, Table 1 provides some idea of the general trends in this area for six of the seven large countries. These figures are not comparable between countries, and for the United Kingdom, where they are based only on certificates of deposit, they clearly understate the extent of non-traditional funds. But they do indicate that in all six countries non-traditional sources of funds have become significantly more important relative to conventional deposits in recent years. Between 1976 and 1980 the ratios in the table rose particularly sharply – 50 per cent. or more – in the United States, the United Kingdom, France and Germany.

A second source of increases in the use of interest-sensitive funds is the practice of *cash management* by, or on behalf of, depositors.

³ See Goodhart (1982) and Kane (1979) for historical developments of liability management by banks.

Table 1
Commercial-bank funding from non-deposit (or non-traditional) sources

Country	1976	1978	1980	1982
	as a percentage of total deposits ¹			
United States a	11.5	17.3	21.8	26.4
b	31.5	34.5	49.9	59.9
Canada	31.5	34.7	32.0	36.0
Japan a	15.7	14.9	16.3	18.1
b	22.3	21.7	22.2	24.0
United Kingdom	8.1	8.8	9.4	12.9
France	9.2 ²	9.1	11.8	16.7
Germany	23.7	24.9	31.2	36.3

¹ The percentage ratios are based on end-year selective balance-sheet data and differ widely from country to country: for the United States, the first line (a) represents the ratio of all bank non-deposit borrowings to deposits, while the second line (b) adds large time deposits (\$ 100,000 or more) to borrowings to calculate that ratio; for Canada, the ratio of non-personal fixed-term and bearer term notes and debentures to Canadian dollar deposits of chartered banks; for Japan, under the first line (a) non-deposit funds consist of call money and bank debentures while under the second line (b) they also include bills sold, borrowed money and certificates of deposit; for the United Kingdom, the ratio of certificates of deposit to total deposits at monthly reporting banks; for Germany and France, the ratios are based on bank bonds held by non-banks. ² 1977.

Sources: *Federal Reserve Bulletin*; *Bank of Canada Review*; *Bank of Japan Economic Statistics Monthly and Annual Economic Statistics*; *Bank of England Quarterly Bulletin*; *Conseil National du Cr dit Statistiques Trimestrielles and Annual Reports*; *Bundesbank Monthly Report*.

Concern about potential earnings in a high-inflation environment has led businesses and households to seek interest-earning instruments while simultaneously attempting to economise on non-interest-bearing transactions balances. Stimulated by this rising demand and facilitated by the application of electronic technology, a number of innovations have taken place in the cash management field. Banks are offering various types of cash management packages (consolidated accounts, lock boxes, information retrieval systems, etc.) to businesses. Meanwhile, money-market mutual funds, savings accounts with chequing arrangements, debit cards and automated teller machines have promoted cash management at the household level (some of these developments are discussed below under retail banking). Most of these practices are very common in the United States, Canada and the

United Kingdom, but more recently they have also been spreading to other countries.⁴

Finally, the *relaxation of interest rate controls, especially on bank deposits*, has widened the scope for the use of interest-sensitive funds by financial intermediaries in the United States. Japan and, to a lesser extent, in France. (Other larger countries have not had any significant formal controls on deposit rates since at least the early 1970s.) In the United States, legislative initiative made it possible to offer money-market certificates in 1978, money-market deposit accounts in 1982 and super-NOW (negotiable order of withdrawal) accounts which are chequable in 1983, all bearing market-related interest rates. Moreover, Regulation Q ceilings (which are being phased out) were frequently circumvented through various innovations during the 1970s. Banks in Japan were authorised to issue certificates of deposit (CDs) in 1979. More generally, Japan gradually liberalised many interest rates during the 1970s, thereby allowing the development of interest-sensitive financial instruments. In France the thresholds above which deposit rates are free of controls were gradually lowered in terms of maturity and amount until late 1981, at which time part of the earlier change was reversed.

These factors and the associated increase in interest rate competition have led to a rise in the share of interest-sensitive liabilities of financial institutions. As Table 2 shows, the proportion of interest-bearing instruments in the broadly defined monetary aggregate (M_3) has risen in all larger industrial countries. In line with the more rapid financial changes in these countries, Canada, the United States and the United Kingdom recorded considerably larger increases than other countries.

⁴For a description and analysis of major developments in cash management practices and related innovations, see Porter et al. (1979), Hester (1981), Judd and Scadding (1982a) and Silber (1983) for the United States; Landy (1980), Borcham (1983) and Freedman (1983) for Canada; Fforde (1983) for the United Kingdom; Christelow (1981), Hirashima (1983) and Suzuki (1983) for Japan; and Euromoney (1983) and Bank for International Settlements (1983) for selected industrial countries. Also see references in footnotes 8 and 9.

Perhaps even more importantly, the share of instruments with market-related interest rates in M_3 has also gone up. The increase has been particularly sharp in the United States, where the share rose more than fivefold to nearly 61 per cent. in late 1982 from around 11 per cent. in late 1976. This drastic change in the composition of M_3 is entirely consistent with the factors noted above. (Of course, super-NOW accounts and money-market deposit accounts will further push up the share of market-related interest-yielding instruments in M_2 and M_3 during this year.) The relevant figures for the United States for selected years since 1976 are presented in Table 3 together with roughly comparable figures for Germany, Canada and the United Kingdom. For the other three countries reliable data are not available; in the case of Japan, however, the share of instruments with market-related interest rates is likely to have risen considerably since the introduction of certificates of deposit in 1979. One noteworthy feature of the table is that the proportion of M_3 which bears market-related interest rates is now much smaller in Germany than in the United States. This is somewhat surprising, since there are no deposit rate regulations in Germany; presumably this reflects the fact that cash management facilities and other innovations have not achieved a significant penetration in that country as yet.

2. Variable or floating rate debt and maturity shortening

In the last few years both borrowers and lenders have sought protection from the risk arising from volatile, generally high and unpredictable interest rates. Banks and other financial institutions have found it necessary to match increasing interest-sensitive liabilities by stepping up variable rate lending and by reducing the maturity of loan contracts. Meanwhile, large corporate borrowers have been placing market issues which have to compete with other forms of financial investments so as to be attractive to investors and at the same time meet the borrowers' needs with respect to liquidity, risk and maturity. All these efforts have led to a widespread use of (1) variable rate lending by financial institutions, (2) floating rate or other

Table 2
Share of interest-bearing instruments in the broadly defined money stock (M_3)

Country	1976	1978	1980	1982
	in percentages*			
Canada	78.2	80.1	84.3	85.7
France	63.5	65.2	67.0	66.2
Germany	66.0	64.6	66.5	68.5
Italy	91.0	92.1	92.8	93.1
Japan	85.7	85.9	88.3	89.2
United Kingdom	62.4	58.6	64.9	71.2
United States	76.3	78.0	80.0	84.1

* Based on seasonally adjusted end-year data; M_3 definitions differ substantially and the data in this table are, therefore, not fully comparable.

Sources: Bank of Canada *Review*; Conseil National du Cr dit *Statistiques Trimestrielles and Annual Reports*; Bundesbank *Monthly Report*; Banca d'Italia *Supplements to Bollettino*; Bank of Japan *Economic Statistics Monthly and Annual Economic Statistics*; *Financial Statistics* (United Kingdom); *Federal Reserve Bulletin*.

Table 3
Share of instruments with market-related interest rates
in the broadly defined money stock (M_3)¹

Country	1976	1978	1980	1982
	in percentages			
United States (percentage of M_2)	11.3 (1.1)	19.1 (6.3)	44.4 (34.3)	60.9 (52.4)
Germany ² (percentage of total non-bank liabilities of the banking system)	22.0 (41.8)	21.7 (43.1)	26.1 (47.6)	29.0 (49.8)
United Kingdom	62.4	58.6	64.9	71.2
Canada	78.2	80.1	84.3	85.7

¹ Based on average fourth-quarter seasonally adjusted data for the United States and on end-year data for other countries. ² Calculations exclude savings deposits at statutory notice from the numerator, since rates paid on those deposits tend to remain unchanged over long periods.

Sources: For the United States: Federal Reserve Statistical Release H.6 (508); elsewhere, the same as for Table 2.

unconventional issues by large borrowers in financial markets and/or (3) maturity shortening of bank loan contracts as well as of bond issues.

Variable rate bank lending is quite common in most industrial countries. In the United States 60–80 per cent. of new medium and long-term commercial and industrial bank loans have been on a floating rate basis during the last three years or so. The proportion of variable rate loans in medium-term bank lending to companies is believed to be even higher in the United Kingdom. Mortgage lending by the UK building societies has been historically on a floating rate basis. A major shift in this direction took place in US mortgage lending over 1979–82, although fixed rate mortgages appear to have regained a good deal of their earlier popularity in the first half of 1983.

Virtually all bank lending in Italy is on some type of variable or adjustable rate basis. In France the share of variable rate loans in business lending (generally linked to the prime rate) is in the range of 80–90 per cent., but less than 5 per cent. of mortgage loans are on that basis because of strong resistance from borrowers. In Germany the indexation of loan contracts is prohibited by law, but adjustable rate lending seems to be quite common; according to some estimates around one-half of all bank lending to the private sector is on an adjustable rate basis. Floating rates are also frequently used for medium-term bank loans in Canada.

Floating rate securities have also become prevalent in several countries over the last three or four years. Table 4 gives the share of such securities in total bond issues for France and Italy and in corporate bond issues for the United States for the period 1980–82. In all three countries this form of debt issue has increased relative to conventional issues. Moreover, in the United States other types of unconventional bonds such as zero coupon bonds, original issue discount bonds and convertibles were sharply higher in 1981–82 than in the preceding period.

The United Kingdom market has also experienced some floating rate and other unconventional issues in recent years. During 1981–82 the Government placed a number of index-linked securities in the market. Over the same period, several local authorities issued

Table 4
Variable or floating rate bonds

Country	1980	1981	1982	
	as a percentage of total issues ¹			
France	a	5.8	19.0	22.0
	b ²	3.7	14.1	16.8
Italy		64.2	54.0	81.4
United States	a	0.7	0.8	9.0
	b ²	0.7	0.8	6.4
	c ³	11.5	28.8	25.9

¹ Data for France and Italy include government issues, while United States data refer to corporate issues.
² Figures refer to the proportion of floating rate bonds issued by banks. ³ Figures refer to the share of unconventional bonds – zero coupon bonds, original issue discount bonds, floating rate issues and convertibles – in total corporate issues.

Sources: Conseil National du Crédit *Annual Reports*; Banca d'Italia *Annual Reports*; Salomon Brothers (United States).

“droplocks” which represent floating rate loans convertible into fixed rate when interest rates fall to a certain level. UK companies have not been very active in issuing floating rate securities, but new convertible issues accounted for almost 90 per cent. of their total bond issues in 1980–81. In the following year, however, they lost ground to the fixed-interest issues.

Between 1977 and 1982 bank loans as well as bond borrowings experienced a good deal of *maturity shortening* in several countries. Table 5 lists a number of relevant indicators for five of the seven larger industrial countries. For the United States, Germany and Italy, the evidence indicates considerable maturity shortening of both bank loans and bond issues. In France, by contrast, bank loan maturities seem to have lengthened on average over the last three or four years. The evidence for the United Kingdom is rather mixed. The maturity of new borrowings by industrial and commercial companies shortened during 1979–80 but lengthened sharply during the following two years. However, the UK personal sector’s long-term borrowings relative to its short-term borrowings have declined substantially from the 1977–78 level.

Table 5
Bonds, bank loans and maturity shortening:
Ratio of long-term to short-term debt¹

	1977-78	1979-80	1981-82
<i>United States</i>			
Bonds ² a)	n.a. ³	1.50	0.90
b)	n.a. ³	1.36	0.72
Bank loans ⁴	1.21	1.19	1.12
Debt of non-financial businesses ⁵	1.37	1.19	1.09
<i>Germany</i>			
Bonds ⁶	1.12	0.92	0.79
Bank loans ⁷	3.43	3.33	3.23
<i>France</i>			
Bank loans ⁸	1.78	1.97	1.95
<i>Italy</i>			
Bonds ⁹ a)	3.40	2.60	1.35
b)	2.45	1.46	0.88
Bank loans ⁸	0.77	0.80	0.73
<i>United Kingdom</i>			
Debt of industrial and commercial companies ¹⁰	0.68	0.50	2.19
Debt of personal sector ¹¹	3.93	2.69	2.61

¹ Not comparable between countries. ² Ratio of corporate bond issues with a maturity of 10 years or longer to those with a maturity of less than 10 years (line a) and ratio of corporate bond issues with a maturity of 20 years or longer to those with a shorter maturity (line b). ³ Not available on a comparable basis. ⁴ Ratio of total new industrial and commercial bank loans to new short-term (less than 1 year) industrial and commercial bank loans based on surveys among 48 large banks. ⁵ Ratio of total long-term debt of non-financial business corporations to short-term debt of these corporations. ⁶ Ratio of total bonds outstanding with an original maturity of over 4 years to those with a shorter maturity. ⁷ Ratio of long-term to short-term bank lending to the non-bank private sector based on year-end outstanding levels. ⁸ Ratio of total long-term bank lending to short-term bank lending based on year-end outstanding levels. ⁹ Ratio of total public and private-sector bonds outstanding to Treasury bills (line a) and ratio of total bonds outstanding with a maturity of over 4 years to those with a shorter maturity (line b). ¹⁰ Ratio of total new non-bank borrowing to new bank borrowing (which is generally in overdraft form, although it frequently remains outstanding for an indefinite period). ¹¹ Ratio of new borrowing for house purchases and other long-term loans to new bank borrowing (net of loans for house purchases) and credit by retailers.

Sources: United States - Salomon Brothers, *Federal Reserve Bulletin*, *Federal Reserve Flow of Funds Accounts*; Germany - Bundesbank *Monthly Report*; France - Conseil National du Cr dit *Annual Reports*; Italy - Banca d'Italia *Annual Reports and Bollettino*; United Kingdom - *Financial Statistics*.

3. Growth of financial markets and marketable financial instruments

Recent developments in financial markets are notable in at least three respects: (1) the already existing markets have expanded and deepened significantly; (2) new financial markets have emerged; and (3) secondary markets for many instruments have developed. All three

of these aspects are playing an important rôle in changing the functioning of the financial system. This section briefly reviews developments in financial markets and then looks at their consequences for the workings of the financial system.

Financial markets for *short-term instruments* have expanded substantially since around the mid-1970s. Perhaps the most impressive examples over the period from 1976 to 1982 are the 400 per cent. increase in the amount of Treasury bills outstanding in Italy and the nearly 330 per cent. increase in repurchase agreements in the United States. But many other short-term markets have also expanded at a much faster pace than nominal GNP, trade or other non-financial sector indicators. In the United States the outstanding amount of commercial paper and bankers' acceptances rose by about 225 per cent. over 1976-82. In Canada the outstanding amount of short-term paper climbed by 175 per cent. over the same period. In Japan the call-money market and the Gensaki repurchase agreements have developed significantly during the last six or seven years. Stimulated by the Bank of England's operating procedures, the supply of bank bills in the United Kingdom tripled over the two years to the last quarter of 1982.

The medium and long-term securities markets have also expanded rapidly in recent years. Table 6 shows increases in total bonds outstanding in the larger industrial countries. In all cases, the expansion has been substantially faster than that of nominal GDP in the OECD area, in part reflecting the fast pace of new or modified issues by the private sector and of public-sector issues to finance budget deficits. Particularly sharp increases in bond issues occurred in France, Italy, Japan and the United Kingdom. For Germany and the United States, the average in the table understates the growth of issue activity in certain sectors. For example, in Germany the amount of outstanding bank bonds with a maturity of four years or less rose by nearly 300 per cent. over the period 1976-82.

Many *new financial markets* have emerged since the early 1970s. These include, among others, markets for various types of unconventional bonds (e.g. floating rate bonds, zero coupon bonds,

Table 6
Expansion of domestic bond markets, 1976–82
Percentage change in outstanding amounts*

Canada	96.1
France	156.2
Germany	89.3
Italy	151.2
Japan	177.2
United Kingdom	153.4
United States	106.7
Memorandum items:	
1. International and foreign bond issues (percentage change)	112.5
2. Euro-currency market, gross size (percentage change)	245.4
3. OECD nominal GDP (percentage change)	70.6

* Includes foreign issues in domestic markets except in Canada and the United Kingdom.

Sources: OECD, *Financial Statistics and Main Economic Indicators*; Morgan Guaranty, *World Financial Markets*.

convertibles, commodity-linked bonds), markets for financial futures, options and stock index futures, and various types of mortgage financing securities. Some of these markets have already become highly developed, and many of them now exist in two, three or more industrial countries. The most innovative and startling new markets are those for financial futures, options and stock index futures. Financial futures have been trading in the United States since the mid-1970s and in the United Kingdom since last year. In the United States futures markets have expanded very sharply in the last few years. For example, the daily average volume of transactions in US Government bond futures is currently more than 1½ times the volume in the spot market. Trading in stock index futures, which started only last year, now represents more daily shares than the actual volume on the New York Stock Exchange.⁵

The growth in the size of various new and old financial instruments

⁵For details and further analysis see Arak and McCurdy (1979), Fitzgerald et al. (1982), Fitzgerald (1983a, b) and Businessweek (1983).

has been associated with a widespread development of *secondary markets*. In the United States and the United Kingdom, where secondary trading has been historically very common, many new instruments were followed by secondary markets (e.g. markets for various types of unconventional bonds), and the volume of transactions for the existing instruments expanded significantly. But secondary markets have become much more prevalent in other countries as well. For example, between 1976 and 1982 the volume of total bond transactions in the Japanese secondary market grew nearly sixfold.⁶ In Germany secondary market trading also showed a considerable expansion over that period. The recent development of the bank bond market in France has been accompanied by a fairly sophisticated secondary market where even small holders are able to participate. Similarly, the Treasury bill market in Italy has become highly developed over the last few years.

It is obvious from the foregoing overview that financial markets in virtually all major industrial countries have developed significantly in recent years. But the most rapid expansion seems to have occurred in the United States, where these markets were already highly developed by the early 1970s. Table 7 presents selected indicators of financial markets in that country to highlight the extent of overall financial development in recent years. One of the interesting features of this table is that over the period 1976–82 all indicators except two (corporate bonds and consumer instalment credit) showed a faster growth than nominal GNP. Of course, some of the growth in US financial markets reflects lending to other countries, but even so most indicators have advanced at a substantially faster pace than nominal world trade. Moreover, the table does not show the extent of development of various new instruments and practices.

⁶For further analysis of this point and other recent developments in the Japanese secondary market, see Bank of Japan (1982). Sources of information on financial-market developments are far too numerous to list here. It may be worth noting, however, that in all industrial countries, developments in financial markets are regularly discussed in many publications by central banks (e.g. annual reports and periodic bulletins), commercial banks and other financial institutions.

Table 7
 US financial markets: Selected indicators
 Percentage increase in outstanding levels

	1976-82	1980-82
Large time deposits	182.5	29.0
Repurchase agreements	327.3	37.0
Money-market funds	822.5	201.0
Euro-dollars included in liquidity ¹	656.5	84.9
Bankers' acceptances	242.7	41.0
Commercial paper	214.0	33.7
Corporate bonds	55.7	11.8
Treasury debt: marketable	109.2	41.4
Treasury bills	90.1	44.3
Federal and federally-sponsored credit agencies	133.7	25.6
New York Stock Exchange (trading volume)	191.0	43.9
Financial futures (trading volume) ²	-	109.0
Mortgage	86.2	12.5
Consumer instalment credit	77.0	9.5
Total credit-market debt	94.1	20.1
Credit-market debt of financial sectors	153.0	26.8
Memoranda:		
US nominal GNP	78.0	16.1
Euro-dollars (gross)	241.1	41.9
World trade (nominal exports)	84.8	- 9.5

¹ Termed L in US monetary statistics. ² Not comprehensive; based on foreign exchange futures and futures in Treasury bills, bonds and notes.

Sources: *Federal Reserve Bulletin*; *Federal Reserve Flow of Funds Accounts*; *IMF Financial Statistics*; Morgan Guaranty, *World Financial Markets*; *The Banker*, April 1982 and April 1983.

On the whole, financial markets in most other countries have not grown as fast as those in the United States, and, with the possible exception of the United Kingdom, they are considerably less developed. However, significant changes have occurred in recent years, and many more appear to be on the way. In addition to domestic forces in individual countries, there are important *international linkages* at work. These linkages are becoming increasingly stronger, in part as a result of the application of electronic technology and new communication systems. Given that the interaction between domestic and international or Euro-currency markets has been and continues to be an important source of changes in the financial systems of many

countries, the stronger international financial linkages are likely to bring further changes in domestic financial markets.

The most significant consequences of recent and continuing financial market developments are those resulting from the growth in *marketable credit instruments*, i.e. the rise in direct financing or financial intermediation through markets. In financial-market intermediation, unlike financial institution intermediation, the risk is borne by the ultimate lenders or owners of claims and the liquidity is provided by the maturity of claims and secondary markets. Also, market intermediation usually results in a smaller gap between supply and demand prices (closer to the textbook perfect competition case) than under financial institution intermediation. This implies a reduced rôle for non-price elements and an increased rôle for interest rates in transmitting monetary effects.

The marketability of instruments provides the potential for high liquidity, so that holders may treat these instruments as effective substitutes for transactions instruments. However, this high liquidity may come at the risk of price loss, in that the obligation may have to be cashed at a lower price than paid for it. The price risk can be reduced, of course, by holding instruments which are indexed or bear floating rates.

The growth in marketable credit instruments and, more generally, the development of financial markets mean that more funds move through the anonymous and impersonal price mechanism as opposed to private channels. This may tend to encourage a short-term investment horizon and to discourage long-term investment decisions, in part because the lenders are more likely to withdraw their funds if the rate of return on alternative assets rises.

Another important aspect of recent financial-market developments is the emergence of markets for financial futures, options and stock index futures. These markets have brought higher liquidity and new ways to hedge risk, but they have also increased speculative activity. It is much less costly to speculate in financial futures markets than in cash markets. There are no advance payments involved and the small amount of margin makes it easy to move large amounts of funds in

these markets. This type of speculation would also seem to have the potential for pushing the prices of some instruments out of line with those of others.

Finally, recent changes in financial markets, together with those in the banking system, have brought a great diversity of marketable and non-marketable financial instruments. This has led to a significant shift in the composition of financial assets held in virtually all countries. The proliferation of new instruments has also enhanced the capacity of individual financial institutions to advance credit to potential borrowers and the ability of individual borrowers to find potential sources of funding. Concurrent with these developments, there appears to have been an increase in the capacity of the whole financial system to extend credit. This reflects at least partly the fact that major changes in the pattern of sectoral financial flows, with generally slowing real growth since the early 1970s, have led to a larger share of wealth being held in marketable financial assets or in financial instruments with more competitive prices than before.

Table 8 gives some calculations based on total credit owed by non-financial sectors (i.e. financial claims against those sectors) relative to nominal GNP and M_1 for five of the seven large industrial countries for which such data are available.⁷ Except in Italy, the ratios of total credit to nominal GNP (i.e. the amount of credit required per unit of nominal output) and to M_1 (i.e. the amount of credit available per unit of transactions balances) are now higher than in the early 1970s. Moreover, the rate of expansion of total credit relative to GNP and to M_1 appears to have accelerated since the early or mid-1970s. This reflects a more generalised process of financial deepening and widening in most countries than had previously taken place, which implies, among other things, substantial changes in the pattern of resource allocation (e.g., possibly, a move towards more efficient mobilisation of private savings) and in the relationship between money, credit, prices and economic activity.

⁷ See McClam (1980) for a historical analysis of the relationship between M_1 , total credit and GNP in the United States.

Table 8
Total credit relative to nominal GNP and M_1 ¹

	Annualised percentage change			Average levels	
	1967-72	1972-77	1977-82	1972	1982
Canada					
Nominal GNP	0.4	-0.8	3.0	2.2	2.4
M_1	1.9	2.7	8.2	19.7	33.3
Germany					
Nominal GNP	0.8	2.8	3.7	1.4	1.9
M_1	2.2	1.7	4.2	9.0	12.0
Italy					
Nominal GNP	2.4	-0.5	-0.5	1.2	1.1
M_1	-3.3	2.3	1.8	2.3	2.8
Japan					
Nominal GNP	3.3	2.6	4.6 ²	1.5	2.0 ³
M_1	-0.2	3.3	6.4 ²	4.8	7.2 ³
United States					
Nominal GNP	-0.1	0.3	1.3	1.4	1.6
M_1	1.9	4.2	3.8	7.1	10.4

¹ Ratios of total credit owed by non-financial sectors (i.e. total financial claims against those sectors) to nominal GNP and to M_1 ; not comparable between countries owing to institutional and other differences. ² Based on data up to end-1981. ³ 1981 levels.

Sources: For GNP and M_1 - BIS Data Bank; for total credit - Statistics Canada *Financial Flow Accounts*; Bundesbank *Monthly Report*; unpublished data from Banca d'Italia; Bank of Japan *Flow of Funds*; Federal Reserve *Flow of Funds Accounts*.

4. Changes in retail banking

The current wave of innovations in retail banking is relatively new. Developments in this area have lagged behind those in wholesale banking (e.g. cash management packages for corporations) and in financial markets. Recently, however, one or more of the core elements of retail banking - payment services for households and small businesses, deposits or investments by them and lending to them - have been undergoing substantial changes in most countries, reflecting the application of electronic technology, heightened competition among banks as well as between banks and non-banks, and the demand for higher-yielding assets and for more sophisticated financial services. In

addition, in many countries banks and non-banks are expanding or entering into ancillary services, such as insurance, pension funds and travel services for retail customers.

In the last two or three years, *the application of new technology* to retail banking, especially in the payments field, has advanced considerably in virtually all industrial countries. The use of ATMs (automated teller machines), cash dispensers and bank cards, and the effecting of automatic transfer payments and retrieval of basic account information by individuals has become fairly common in many countries. Most of these services are quite far advanced in the United States, Japan and Canada. Experiments with point-of-sale terminals, "home banking" and "financial supermarkets" are under way in several countries; if fully successful, these would have substantial consequences for the future of retail banking.⁸ Meanwhile, considerable efforts are being made to lower the cost and accelerate the flow of information to and from customers.

As at the wholesale banking level, stimulus to retail banking innovations has come not only from the application of new technology but also from changing financial regulations, increased competition within the financial industry and from higher demand for interest-earning assets by retail customers due to their greater concern about potential loss of earnings at a time of high inflation and interest rates. Not surprisingly, some of the higher-yielding financial instruments and sophisticated payment services that had become available to large businesses are also beginning to be offered to small customers. In addition, other financial services tailored to the needs of households and small businesses are also tending to make an appearance. All this is changing the nature of retail deposits, payment services, lending and, more generally, the whole business of retail financial services.

⁸ For details of the application of technology to retail banking see Frazer and Vittas (1982), Retail Banker International (1982), Hopton (1983), Schroeder (1983), Deygas (1983), Fukai (1983) and Yoshida (1983). Of course, in the last few years all financial publications have carried articles on the application of electronic technology to banking and finance.

Deposit instruments bearing market-related rates of interest are now commonly available to retail customers in the United States, the United Kingdom and Canada. Similar developments are under way in other countries as well. Deposit rates in the United Kingdom, Canada, Germany and Italy have been unregulated for some time, but the competitive pressure to move them with money-market rates did not exist until recently. Judged from the relative constancy of rates on small deposits, it still does not exist in Germany and Italy. In several countries retail depositors have been increasingly making payments by using instruments which yield market-related rates. In the United States instruments like the super-NOW (negotiable order of withdrawal) accounts, money-market mutual funds, money-market deposit accounts and cash management or "sweep" accounts are available for this purpose. Some forms of money-market mutual funds are also being offered in France and the United Kingdom.⁹ In Canada, bank accounts which offer both chequing privileges and a market rate of interest on a balance above some specified limit have been available since 1981. Clearly, retail deposits are becoming more interest-sensitive almost everywhere.

Increases in interest-sensitive deposits go hand in hand with *reductions in the holdings of cash* and lower-yielding transactions balances. The application of payments technology is moving the retail banking business in this direction, even though in many cases the motivation for the use of new technology is to reduce the cost of money transmission services. Over time this economising on cash and conventional transactions balances at the retail level could push the financial system further towards a "zero balance" situation where there are no significant amounts of currency and below-market-rate transactions balances. However, at this time it seems that any move in that direction is likely to be rather gradual.

The application of new technology and other changes in retail banking may bring increases in the *amount of credit available* to

⁹See Lewis (1982) and Py (1983) for France and Stopp (1983) for the United Kingdom.

individuals and households. So far this has not happened to any significant extent. The scope for consumer lending, at least for non-mortgage finance, appears to be considerable in most countries. The clear leader in this area is the United States, where consumer credit, excluding housing loans, now accounts for around 22 per cent. of personal consumer expenditure, a substantially higher proportion than in other larger industrial countries. For example, the corresponding figure for the United Kingdom is below 10 per cent. and for France only about 3 per cent.

The retail banking business appears to be moving towards much greater emphasis on *ancillary services* such as insurance, travel services, real estate brokerage, stockbroking, financial advisory services and so on.¹⁰ In some countries, such as Germany and the United Kingdom, banks are already involved in most ancillary services, while in others, such as Canada, Japan and the United States, regulations do not allow bank entry in most of these services. However, in the United States, with financial regulations currently under review and heavy non-bank entry into all types of retail financial services, banks are likely to be authorised to engage in at least some of the ancillary services. In fact, they have already entered into some of these services through indirect channels. The trend towards diversification in retail financial services is also apparent in the efforts to provide a "financial supermarket" with a one-stop service for all financial needs. One consequence of all this might be increased funding of a broad range of retail activities and larger amounts of credit available to individuals and other retail customers.

5. Structural changes in the supply of financial services

The historical distinctions among various classes of financial institutions and between financial and non-financial businesses have been partly due to regulations and partly due to economic factors

¹⁰ For recent developments and prospects in this area, see Frazer and Vittas (1982, 1983), Vittas and Frazer (1983), Cocheo (1983) and Rose (1982).

which separated the services offered. These distinctions have been gradually weakening over the years. In the last few years the weakening trend appears to have quickened. Financial services offered by bank and non-bank financial intermediaries and, in some cases, by non-financial institutions have become increasingly indistinguishable in a number of industrial countries.

In the United States thrift institutions (savings and loan associations and savings banks) now seem to be active in virtually all the financial services offered by banks. Money-market mutual funds are offering a close substitute for bank deposits. Diversified financial concerns like Merrill Lynch and American Express have recently moved into parts of the banking business. In addition, some non-financial firms like Sears, Roebuck and Company are beginning to offer an array of financial services of the kind normally offered by financial institutions.¹¹ Meanwhile, banks have attempted to circumvent regulations on the prohibition of certain activities, and in some cases regulations have been changed to allow competition on equal terms between banks and non-banks. A practically complete review of financial regulations is now under way and is expected to determine, among other things, the new basis for distinguishing financial services offered by various types of financial and non-financial firms.

Similar structural changes are appearing in other countries as well. In the United Kingdom building societies have entered into many areas of normal banking business, while clearing banks are now active on a large scale in the mortgage loans market.¹² Recently investment management groups have been attempting to set up money-market funds. In Canada non-bank financial firms such as insurance, loan and trust companies are expanding into products and services which compete with many bank services.

¹¹ For historical and prospective structural changes in the US financial industry see Moran (1982), Savage (1982), Laub and Hoffman (1983), Rose (1982), Rosenblum and Siegel (1983), Solomon (1982b) and Volcker (1983a).

¹² See Fforde (1983), Boleat (1983) and Richardson (1983).

In Japan securities firms are now offering some short-term instruments (e.g. the government bond fund) which compete with certain forms of bank deposits. These firms are also looking for regulatory changes that would permit them to deal in cash management accounts and certificates of deposit. Meanwhile, the amendment of the Banking Law in 1982 permitted banks to deal in securities subject to a special arrangement, and some of them are now engaged in the over-the-counter sale of government bonds.

As yet there has been no significant change in the structure of the German financial industry. However, the slump in savings deposits between 1979 and 1981 (part of that slump reflected a shift to higher-yielding bank bonds) caused considerable concern within the German savings banks organisation about potential future losses of deposits. Consultations have been held to gear interest on savings accounts more closely to market rates in order to avoid potential disintermediation. Thus there would seem to be some room for further competition within the financial industry.

The move towards a blurring of distinctions among various groups of financial institutions has been associated with relaxation of regulations and increasing competition within the financial industry and, more broadly, in the market place. This has tended to weaken the quasi-monopolistic position of banks, encouraging them, on the one hand, to adjust interest rates more quickly and, on the other, to look elsewhere to maintain their rôle in the financial intermediation process.

III.

Monetary policy implications

The range of issues affected by the ongoing changes in the financial system is very broad. This section attempts to focus only on those issues which are closely connected with the conduct of monetary policy. In particular, in the context of larger industrial countries, it examines the extent of influences on the three main bases of policy – the definition of money supply and the money supply process, the behaviour of

money demand, and the transmission mechanism of monetary policy – and the significance of those influences for monetary targets and control. Towards the end of the section there is a brief review of the relevance of financial regulations for monetary policy in a changing financial environment.

1. Definition of money and the money supply process

The recent financial changes are making it much more difficult to measure or define a given monetary aggregate and also to draw the demarcation line between various aggregates. These problems are not new in that the degree of “moneyness” (i.e. means of payment or transactions content) and of liquidity (i.e. the extent to which an instrument can be sold or redeemed at short notice with minimum costs and without significant price loss at some unknown future time) of various financial instruments which are used as bases for measurement cannot be identified precisely. Nevertheless, given some conceptual arbitrariness, most countries have distinguished financial instruments in terms of either moneyness or liquidity in constructing statistical measures of money. The moneyness or liquidity content of various instruments no doubt changes over time, but in the past such changes were generally gradual and were dealt with by periodic redefinitions of monetary aggregates.

However, for some countries the difficulties stemming from the current wave of financial innovation may turn out to be substantially more significant than in the past, and the conventional procedure of redefining may not be adequate to deal with the problem. An important reason for this is that financial instruments with both investment features (i.e. bearing market-related interest rates) and transactions features are becoming increasingly common; in some cases, both features are more or less equally powerful. Examples of such instruments include, in the United States, NOW accounts, super-NOW accounts, overnight repurchase agreements (RPs) and Euro-dollars, money-market funds and money-market deposit accounts, and in Canada, the United Kingdom and the United States, bank deposits which combine features of both savings and chequing

accounts either directly or through automatic transfers. These and other similar instruments no longer allow a meaningful distinction between narrow and broad aggregates, at least in the three countries mentioned above.¹³

The problems of defining broader aggregates are virtually as serious as those for narrow aggregates and appear to be quite common in most of the larger countries. The spectrum of liquid financial instruments has become very wide and cannot be distinguished in terms of their liquidity content. They include a broad array of non-marketable instruments issued by banks and other financial intermediaries and numerous marketable financial instruments issued by financial institutions, non-financial firms and governments. Many marketable instruments are now considerably more liquid than before, reflecting more developed secondary markets and a shortening of maturities at the time of issue.

Not surprisingly, the definitions of M_2 and M_3 and the distinction between them (which was rather vague to begin with) have become less meaningful, as certain financial instruments with roughly comparable liquidity content are not included in either M_2 or M_3 . These problems are well known in the United States and the United Kingdom, where such concerns are partly reflected in the publication of broader liquidity measures (L in the United States and PSL_1 and PSL_2 in the United Kingdom).¹⁴ But they are quite common in other countries as well. In Japan new products like the comprehensive bank account at the Bank of Tokyo (which resembles cash management accounts in the United States) and the medium-term government bond funds are likely to distort the meaning of M_2 and M_3 . In France the recently established money-market mutual funds compete with certain instruments included in M_2 and are reducing its meaningfulness. In Germany, under pressure from high interest rates, there was a

¹³ See Bank of Canada (1983), Higgins and Faust (1983), Wenninger and Sivesind (1979), Simpson and Porter (1980), Fforde (1983) and Volcker (1983b).

¹⁴ See Artis and Lewis (1981) and Morris (1982) as well as the references mentioned in footnote 13.

considerable shift during 1980 and 1981 from lower-yielding (potential) savings deposits into higher-yielding bank bonds with a maturity of less than four years. Some of these bank bonds are close substitutes for instruments included in M_3 , but unlike the latter they are not subject to reserve requirements. Since the targeted concept "central-bank money" is based on M_3 , the 1980-81 shift artificially lowered the growth of both aggregates. Similarly, the meaning of German M_3 is also distorted, albeit to a lesser extent, by non-bank deposits of German residents at foreign branches and subsidiaries of German banks and with building and loan associations, neither of which are currently included in that aggregate. Finally, in Italy the growth of Treasury bills led to a significant disintermediation of bank deposits during 1978-81.

Another source of complications for defining money is that the proliferation of various types of financial instruments has been associated with declining transactions costs of shifting from one instrument to another. The decline in transactions costs, in turn, has contributed to widening the spectrum of financial instruments that can be used for making payments and/or for providing different grades of liquidity at any given period. This process is continuing and makes it difficult to determine, on an ex ante basis, the degree of moneyness and/or liquidity of various financial instruments. The problem is further complicated by the fact that the extent of moneyness and liquidity is also influenced by the thrust of policy; for example, a tight monetary policy which pushes up interest rates may tend to encourage the use of certain investment instruments for transactions purposes.¹⁵

¹⁵The new "Divisia aggregation" approach attempts to deal with the degree of moneyness or liquidity by calculating the contribution of each financial asset to money services, assigning higher weights for greater contributions. Research in this area is at an early stage and many difficulties would have to be overcome before this approach could be implemented. More importantly, the Divisia approach does not seem to be any more suitable for identifying the degree of moneyness on an ex ante basis than the current simple sum approach. For applications of the Divisia approach see Barnett (1980), Barnett and Spindt (1982), Porter and Offenbacher (1982), Cockerline and Murray (1981) and Mills (1983). For more detailed comments on this approach, see Bennett (1982).

The difficulties of defining money reflect the increased ability (actual and potential) of financial institutions and other economic agents to create and sell or market a large number of liquid financial instruments. In other words, the process through which the supply of various monetary aggregates becomes available is undergoing changes with a general tendency towards more elastic money or liquidity. Broadly, there are two influences on the supply of money or liquidity: that stemming from changes in various currency and reserve ratios at a given level of interest rates, and that linked *directly* to interest rate movements.

The financial changes have put upward pressures on the size of the money and reserve multipliers – relations of various monetary or liquidity aggregates to monetary base and/or bank reserves. As discussed in the preceding section (II-1 and II-4), cash management and other innovations are tending to reduce the public's currency holdings and lower-yielding transactions balances relative to total deposits or financial assets. This view is supported by Tables 2 and 3 and in other recent studies.¹⁶ In any case, the declining currency holdings and transactions balances with lower reserve requirements entail, *ceteris paribus*, higher money and reserve multipliers.

Upward pressures on the money and reserve multipliers are also caused by the fact that the *effective* reserve ratio against any given category of deposits tends to fall as the public shifts funds into substitute instruments with no reserve requirements or lower reserve requirements; some examples of such instruments are money-market funds in the United States and to a lesser extent in France, Treasury bills in Italy, short-term bank bonds in Germany and building society deposits in the United Kingdom. One way to look at the significance of this influence is to compare changes in the money and reserve multipliers underlying the broadest aggregate (e.g. M_3 or liquidity) with those underlying M_1 . In recent years, for most larger countries, the

¹⁶ See, for example, Bank for International Settlements (1983) on recent trends in the use of currency and M_1 balances in the seven larger industrial countries. Also see Batchelor (1983), Trundle (1982) and Howard and Johnson (1982) on the UK experience and Tatom (1982) on the behaviour of the currency ratio in the United States.

money and reserve multipliers at the broadest level seem to have risen faster than those at the M_1 level. For example, between end-1980 and end-1982 in the United States the reserve multipliers for M_3 deposits and non-cash liquidity rose by 10.4 per cent. and 11.2 per cent. respectively, compared with only a 4 per cent. rise in the reserve multiplier for M_1 deposits.

The exact nature and size of movements in various currency and reserve ratios are uneven and unpredictable, especially over the short term. Over the medium term, however, the direction of these changes is clearly towards enlarging the money and reserve multipliers. Therefore, the supply schedules for both the narrow and broad monetary aggregates are tending to shift to the right, i.e. the financial system is willing to provide higher amounts of transactions and other balances at a given level of interest rates, although, because of the continuing unpredictable nature of financial innovations, it has become more difficult than before to locate the positions of those schedules.

As far as interest rate influences are concerned, the money supply appears to be becoming more responsive to *interest differentials* between borrowing and lending rates. As discussed above (Section II), the proportion of deposits at banks and other financial intermediaries which bear market-related rates has risen substantially in recent years. Therefore, the financial intermediaries' willingness to issue credit (i.e. create purchasing power or money) is now more directly linked to spreads on interest rates charged on loans and paid on deposits. A similar argument also applies to non-deposit financial instruments relevant for measuring money or liquidity at the broader level, i.e. those marketable financial instruments which are either included in the broadly defined monetary aggregates or potentially belong in them. Such instruments are issued to finance actual and/or potential credit which is responsive, *ceteris paribus*, to the cost of raising funds relative to lending rates.

To the extent that the financial system is becoming more competitive than before, borrowing and lending rates may adjust very quickly without any significant effects on the spread, except perhaps

over the very short term. In this sense, the *general* level of interest rates may move a good deal without substantial effects on the supply of money, however defined.

2. *The demand for money*

In most countries the process of financial change appears to be having significant effects on the demand for both the narrow and broad monetary aggregates. The medium-term trend in the demand for transactions balances (M_1) required to finance a given level of output is downward. However, the shifts vary in size and are uneven and unpredictable, making the M_1 demand functions unstable over time. The demand for broader aggregates is under two opposing influences. On the one hand, the shifts out of some lower-yielding financial assets into higher-yielding financial instruments are putting upward pressures on the demand for those broader aggregates in which the higher-yielding instruments are included. On the other hand, there is a proliferation of new financial instruments with market-related interest rates outside the conventionally defined broad aggregates which closely substitute for financial assets included in those aggregates: the demand for these new instruments is putting downward pressures on the demand for broad aggregates. These influences operate unevenly over time and entail a higher degree of instability of demand, at least over the short run.

For five of the seven larger industrial countries there is considerable evidence of shifts or instability in the money demand functions since the early or mid-1970s. Table 9 summarises the available recent evidence for the United States, the United Kingdom, Canada, Japan and Italy. The quantity as well as the quality of evidence reported here differs between countries, but most of the studies use reduced-form estimation with a few key independent variables like income, one or more interest rates and some type of dynamic adjustment term for taking account of lags in effect. With the exception of M_1 demand functions in the United States and Canada, the demand for various aggregates appears to have been quite unstable and exhibits poor out-of-sample performance over the last few years. Also, in virtually all

Table 9
Recent evidence on money demand shifts or instability*

Study	Money definition	Findings
<i>United States</i> Goldfeld (1976)	M_1 & M_2	Downward shift in the demand for M_1 during 1974–76; no evidence of a shift in the demand for M_2 .
Judd and Scadding (1982a)	M_1 & M_2	Survey of evidence on the stability of money demand since 1973; M_1 shift during 1974–76 widely recognised due to financial innovation, but no evidence of any shift in M_2 .
Simpson and Porter (1980) Wenninger et al. (1981) Lindsey et al. (1981) Dotsey et al. (1981)	M_1	Downward shift during 1979–80 or 1979–81, largely due to financial innovations.
Porter and Offenbacher (1982)	M_1	Persistent overprediction by the standard money demand functions in the post-1973 period.
Hein (1982)	M_1	Refutation of the evidence of a shift in M_1 during 1980.
Redecki and Wenninger (1983)	M_1	Downward shift in 1981 and upward shift in 1982.
Judd (1983)	M_1	No upward shift in 1982.
<i>United Kingdom</i> Artis and Lewis (1981)	M_1 & M_3	Survey of earlier studies and new evidence on the demand for M_1 and M_3 ; substantial evidence of a breakdown of M_1 and M_3 functions during 1971–73; M_1 functions shown to be unstable over 1978–80; M_3 functions unstable throughout the 1970s; changes in the financial system recognised as a source of instability.
Butter and Fase (1981)	M_3	General instability of M_3 between 1972 and 1976.
Allen (1981)	M_1 & M_3	M_1 functions wander off path after 1976; upward shift in M_1 during 1980–81.
Trundle (1982)	Currency in circulation	Downward shift over 1979–82.
Trundle (1983)	M_1	Poor forecasting performance over 1970–81, although coefficients appear to be stable.

Table 9 (continued)

Study	Money definition	Findings
<i>Canada</i> White (1976)	M_1	General demand instability reflected in a number of small shifts in the early 1970s.
Landy (1980)	M_1	Evidence of a downward shift in 1976, largely caused by financial innovations.
Boughton (1981)	M_1 & M_2	M_1 shift in 1974 but no serious evidence of a shift in M_2 over the 1970s.
Bank of Canada (1983)	M_1	Based on changes in financial arrangements and internal research, the Annual Report notes M_1 shifts in 1976–77 and 1980, and a breakdown of the relationship between M_1 and economic activity during 1981–82.
Lucas (1983)	M_1	Downward shift around 1976 and instability over the post-1976 period.
<i>Japan</i> Bank of Japan (1978)	M_2	Uncertain and doubtful about the establishment of a durable money demand function in the changing financial system of Japan; analysis consistent with out-of-sample instability of money demand estimates.
Boughton (1979)	M_1 & M_2	No significant shift in M_1 but a possible shift in the M_2 function around 1977.
Boughton (1981)	M_1 & M_2	No significant shift in M_1 but a possible shift in the M_2 function around 1977.
Christelow (1981)	M_2	Evidence on the financial innovation experience is consistent with instability of the M_2 function during 1979–80.
Bank of Japan (1983b)	M_2	Downward shift in 1982.
<i>Italy</i> Boughton (1979)	M_1 & M_2	Unsatisfactory estimates as well as unstable functions for both aggregates.
Calliari et al. (1981)	M_3	Instability in 1973–75.
Butter and Fase (1981)	M_2	Poor out-of-sample predictions in 1977–78.
Caranza et al. (1982)	M_1 , M_2 , M_3 & deposits	Estimates indicate considerable structural instability in the demand for broader aggregates, especially for M_2 and deposits, over the post-1979 period.

* This table is not designed to be comprehensive; its main purpose is to give some indication of the evidence on the stability of money demand since around 1973, especially over the last three or four years.

cases the evidence is consistent with the view that changes in the financial system have played a substantial rôle in causing or enhancing the money demand instability. Although there is little, if any, published econometric evidence on the *recent* behaviour of money demand in France and Germany, the M_2 function in France and the M_3 function in Germany are believed to have been characterised by somewhat increased instability during 1980–82.

One important aspect of the recent estimates of the money demand functions is that they exhibit considerably larger prediction errors over the short run – that is, over periods of one or two quarters – than before. This is true even for those demand functions which appear to have remained relatively stable over the long run, e.g. the M_2 function in the United States.¹⁷ Of course, the short-run behaviour of money demand has always been considerably less stable and more unpredictable than the long-run behaviour. It would seem, however, that recent financial changes have greatly reduced our already limited understanding of short-run variations in money demand.

By its very nature, the empirical evidence on the short-run as well as on the long-run behaviour of money demand is rather imprecise. Frequently, after a certain amount of experimentation with different specifications and lag distributions, one can find satisfactory or stable estimates based on an *ex post* analysis of data, but those estimates may or may not tell us much about the *ex ante* behaviour. From a policy perspective, the usefulness of money demand estimates lies not so much in their in-sample stability as in their out-of-sample predictive powers. Judged in this latter sense virtually all money demand functions have exhibited a poor performance in recent years, and any case for their recent stability seems to be overstated.

Over the last few years the demand for money, especially at the broader level, has become less sensitive to the general level of interest rates. The share of financial instruments with market-related rates in monetary aggregates has risen over time, and the trend is continuing.

¹⁷ See, for example, Lindsey (1982) on the recent short-term performance of the M_1 and M_2 demand functions in the United States.

The yield or return on those instruments tends to rise or fall with the rise or fall in market rates, leaving the differential unchanged. Consequently, there is no incentive to shift into or out of instruments the return on which moves in line with the general level of interest rates. This view is fairly broadly accepted, although at this stage there is very little evidence on the quantitative significance of the shift in interest elasticity of money demand.¹⁸ Table 10 gives some illustrative estimates based on the standard money demand formulation. In most cases these estimates appear to be consistent with the view that interest elasticity of money demand has been declining over time. Note that in some cases the interest rate coefficient yields the wrong sign over the 1976–82 period.

To summarise the main arguments on the supply of and the demand for money, their behaviour has been marked by unpredictable shifts in recent years. In many countries these shifts have been frequent and uneven over time, with the result that both money demand and money supply have been highly unstable. In addition, the increasing use of instruments with market-related interest payments is making the demand for money, especially for broader aggregates, less sensitive to the general level of interest rates. In terms of the Hicksian IS-LM schedules,¹⁹ this implies that the LM schedule – which represents various combinations of real expenditures and interest rates at the equilibrium levels of the demand for and supply of money – is shifting unpredictably to the right or to the left and its slope is becoming

¹⁸ See, among others, Davis (1982), Goodhart (1982), Lindsey (1977, 1982) and Solomon (1982a). Of course, some implicit interest payments (in the form of subsidised services, etc.) on deposits with zero or low fixed interest rates have been made all along, but such payments have been generally well below market rates and have adjusted rather slowly to the latter. In the United States, for example, estimates of the *average* implicit interest rates on demand deposits range from 30 per cent. to 75 per cent. of market rates and have been quite rigid at least over the short term. Judd and Scadding (1982b) review the relevant evidence and conclude that financial changes and deregulation are likely to reduce interest elasticities of M_1 and M_2 significantly.

¹⁹ Despite its significant limitations the IS-LM framework is helpful in summarising the main arguments on the money supply, the money demand and the transmission mechanism. On limitations of the IS-LM framework, see Laidler (1978).

Table 10

Illustrative estimates of interest elasticities of the demand for M_2 or M_3 based on the standard money demand function¹

		1968-76	1976-82
United States	1	-0.13	-0.06
	2	-0.11	-0.10
Japan		-0.07	-0.002 ²
Germany		-0.04 ³	-0.02 ²
France		-0.04 ²	-0.03
United Kingdom		-0.05 ²	-0.06 ²
Italy	1	-0.04 ²	-0.14
	2	-0.06 ²	0.16 ²
Canada		-0.01 ^{2,3}	0.24

¹ The regression equations were specified as $\ln(M/P) = a_0 + a_1 \ln y + a_2 \ln RS$; where M = nominal money balances (M_2 for the United States, Japan, France and Canada, M_3 for Germany, the United Kingdom and Italy), y = real GNP/GDP, P = GNP/GDP deflator, RS = short-term interest rates (Treasury bill rate for the United States, the United Kingdom and Canada; call-money rate for Japan; interbank rate for Germany; secondary market rate on public-sector bonds for France and Italy). All regressions were based on quarterly data. Estimates on the second line for the United States and Italy are obtained from the standard stock adjustment specification:

$$\ln \left(\frac{M}{P} \right) = b_0 + b_1 \ln y + b_2 \ln RS + b_3 \ln \left[\frac{M_{t-1}}{P} \right]$$

where t refers to the current period. This specification provides nonsense results (i.e. $b_3 \geq 1$ or $b_3 \leq 0$, etc.) for other countries either over 1968-76 or 1976-82 or both. ² Not significantly different from zero at the 5 per cent. level. ³ Based on data for 1969-76.

steeper. And over the short to medium term, the shape or slope as well as the location of that schedule are more difficult to determine now than in the past.

3. Interest rates and the monetary policy transmission mechanism

The financial changes in recent years have greatly enhanced the rôle of interest rates in transmitting monetary policy effects to the economy (or at least they will do so over time). Historically, monetary policy influences have worked partly through interest rates and partly through "credit rationing" or non-price elements. The latter have consisted primarily of interest rate ceilings and usury laws and various types of balance-sheet constraints on financial intermediaries (e.g.

official or institutional bank credit limits for specific sectors). Over the years the credit-rationing elements have been gradually weakening, and recently the wave of financial changes has substantially reduced the significance of that transmission channel for monetary policy in most countries.²⁰ At this stage, non-price constraints on credit availability no longer appear to be an important channel for transmitting monetary policy effects in the United States, the United Kingdom, Canada and Germany.

A great many of the financial changes discussed in Section II have contributed to the weakening of non-price credit-rationing mechanisms while simultaneously strengthening the rôle of interest rates. In particular, these include interest sensitivity of bank deposits and other non-marketable financial instruments, the growth and development of financial markets and of marketable financial instruments, changes in financial regulations (especially those concerning interest rates) and the development and integration of international financial markets. Together all these factors have greatly increased competition within the financial industry and the rôle of market forces in determining financial and credit flows. As a result, changes in interest rates, regardless of their origin, tend to spread very quickly over the whole range of financial assets and liabilities.

This shift in the transmission channels of monetary policy has important implications for the behaviour of economic agents in the non-financial sectors. In particular, it is likely to alter their savings and spending behaviour. In the new environment, the effects of monetary policy or interest rate changes on the economy may turn out to be quite different from that in the past. Specifically, it is one of the main arguments of this paper that for a number of reasons, to be discussed below, interest elasticities of various components of final demand are likely to increase *over time*. If this does turn out to be the case, it would effectively counter or at least moderate the view expressed by some

²⁰ For a historical perspective on the rôle of credit availability vis-à-vis interest rates see Davis (1980), Wójnilower (1980) and Bingham (1983). On the changing rôle of interest rates in the transmission mechanism, see among others, Davis (1981a), Gramley (1982) and Bank for International Settlements (1983).

economists that the shift in transmission channels has weakened the ability of monetary policy to influence the economy.²¹ This view assumes that interest elasticities of final demands are low and that they will continue to be so in the future. Thus, in the absence of non-price credit-rationing mechanisms, a higher level of real interest rates is needed than before to achieve a given degree of restraint over aggregate demand.

Several arguments tend to favour the proposition that interest rate elasticities of various components of final demand would rise over time. Firstly, the decline in various sources of market imperfections, the increased use of marketable financial instruments and, more generally, the increased competition in the financial system mean that any changes in interest rates spread rather quickly (or at least with substantially shorter lags than before) to a larger set of economic agents. Non-price credit-rationing mechanisms prevent the flow of credit to some sectors and shelter others from various interest rate or price effects, thus reducing the rôle of interest rates. With the weakening of credit-rationing mechanisms, the interest rate effects will be directly felt by most economic agents, thus tending to push up the average interest elasticities of private demand.

Secondly, the increased competition in the financial market-place implies a higher degree of interest rate variability or risk, and this, together with deregulation or relaxation of interest rate controls, has contributed to raising the average level of interest rates.²² A higher average level of interest rates means that interest costs as a proportion of total costs would entail larger effects for any given change in interest rates.

Thirdly, as discussed earlier, changes in the financial system have

²¹ See Wojnilower (1980), Davis (1981a), Gramley (1982) and Pierce (1982).

²² For evidence of greater interest rate fluctuations in recent years, see Bank for International Settlements (1983), Bank of Japan (1983b), Bundesbank (1983), Evans (1981), Hoehn (1982), Johnson et al. (1981), Roley and Troll (1983), Rosenblum and Strongin (1983) and Truman et al. (1981). It is, of course, very difficult to separate the extent of variability due to changes in the financial system from that due to other factors such as inflation.

led to a higher degree of substitutability of various types of financial assets, so that any changes in interest rates immediately alter the rate of return on the whole range of financial assets relative to physical assets. This would tend to increase the total extent of interest rate influence, because financial assets have become more substitutable with each other but not with physical assets, i.e. the investment choice is between money and financial assets on one side and physical assets on the other side, rather than, for instance, among money, bonds, other financial assets and physical assets. Put differently, the composition of financial assets has changed in such a way that they act much more like a *single* category relative to physical assets.

Fourthly, some indirect effects of interest rates on the domestic economy would now seem to be larger than before. For example, the greater integration of domestic and international financial markets means that even a small change in domestic interest rates would induce, *ceteris paribus*, changes in exchange rates which would tend to reinforce the direct effects of interest rates on aggregate demand.

Finally, the *net* effect of extensive use of variable rate lending or borrowings is likely to be favourable for interest elasticities of expenditures. Of course, if *all* loans and market borrowings were to be on a floating rate basis and if *all* prices were to become fully flexible, the interest elasticity of demand would tend to be lower than under a fixed rate system. In this case, incomes of all borrowers and lenders would adjust upwards immediately in response to any change in interest rates, i.e. "real" rates facing both borrowers and lenders would remain constant at all times. In fact, however, the financial system is moving towards a mixed arrangement with both fixed and floating rate elements. And, as in the past, all prices will not be entirely flexible – some prices adjust very quickly, others only slowly and still others not at all over the short to medium term. In this type of environment, many economic agents would no doubt feel that interest rate movements would be mutually offsetting over time, and, as a result, they may tend to become less sensitive to those movements. In other words, the incentive to wait for lower rates is reduced. However, for the economy as a whole this effect is not likely to be very large as long as borrowers

are uncertain about the timing of future changes in interest rates and about the speed of adjustment in their own prices and incomes.

On the other hand, the increase in variable loan contracts and floating rate market borrowings implies a much larger impact on costs than before as interest rates on both old and new loans and market borrowings rise in line with changes in market rates. Borrowers are likely to be sensitive to such rather large increases in costs unless their incomes are quick to increase accordingly. Specifically, borrowers' sensitivity to interest rates would decline, or at least remain essentially unchanged, if prices of their products adjust *pari passu*, i.e. simultaneously and proportionately to interest rate changes on bank loans and other borrowings. But borrowers' sensitivity to interest rates would tend to rise if prices of their products adjust less than proportionately and at a significantly slower speed than interest rate changes. Given that in most non-financial sectors prices and therefore borrowers' incomes adjust, on average, rather slowly – i.e. “real” rates facing borrowers are not constant at all times – the increased use of floating rate lending or borrowings may tend to put upward pressures on interest elasticities of expenditures.

The upshot of the preceding comments is that the emerging variable or floating rate system is likely to increase, on average, interest elasticities of various demand components. It is true, nevertheless, that under certain circumstances a highly developed variable rate system would tend to reduce the sensitivity of particular borrowers to interest rate changes. There are some other factors associated with the new financial environment which may tend to work in the same direction. For example, given that market-based intermediation increases the risk involved in long-term investment decisions, the efforts by borrowers to avert the increased risk may encourage a short-term investment horizon and/or may lead to less investment than before at a given interest rate.

However, the balance of considerations seems to be strongly in favour of the view that interest elasticities of various *aggregate* demand components would rise over time. The process of deregulation of interest rates and of financial innovation has been apparent since the

early 1970s. Of course, in some countries (e.g. Canada and Germany) interest rates had been free of any significant official controls even before that time. The timing and speed of financial changes have differed substantially from one country to another, although they have become more widespread over the last few years. Accordingly, the size and timing of the shift in interest rate elasticities of expenditures would most likely differ among countries, and in many cases the upward movement may be rather gradual, either because of the relatively moderate pace of financial changes or because economic agents adjust only slowly to the new financial environment.

In any event, interest elasticities of demand are likely to be in a transition phase towards higher levels at present. In terms of the IS-LM schedules, this means that the downward slope of the IS schedule – which indicates combinations of aggregate expenditures and interest rates at the equilibrium levels of intended saving and investment – is becoming somewhat more flattened. But note that the arguments presented here also indicate that during the transition period short-run shifts in that schedule are likely to be more unpredictable than before.

There is only a rather limited amount of empirical evidence on the effects of interest rates on various components of demand over the recent period. In addition, even where such evidence is available, it does not necessarily focus on the effects of changes in interest rates in recent years. Given these limitations, the recent evidence nonetheless suggests that in some countries the responsiveness of private consumption (savings), inventory stock investment and investment spending on housing and other things is now higher than in the past.²³

The appendix to this paper provides a further insight into the recent empirical relationship of interest rates to economic activity. Specifically, it reports some preliminary econometric estimates for

²³ See, for example, Akhtar (1983b), Irvine (1981), Gylfason (1981) and Koskela and Viren (1982). There is also some unpublished research by the OECD on investment demand functions which appears to be consistent with this view. Incidentally, note that quite apart from financial changes and deregulation, factors such as changes in marginal or average tax rates may be affecting interest elasticities of demand. The analysis in this paper does not deal with these factors.

several industrial countries, which focus on recent effects of interest rates on total private demand. On the whole, these results are favourable to the hypothesis advanced here. They indicate that in Germany, Japan, the United States, Italy and possibly the United Kingdom interest elasticities of private demand are likely to have risen after 1976–77. The upward transition appears to be gradual, taking place over several years, rather than a shift over a given quarter or a year.

Putting aside for the moment the problems of a transition phase, the flattening of the IS schedule implies that for any given change in the money supply, i.e. a shift in the LM schedule, the interest rate change would be smaller and the change in aggregate expenditures would be larger than before. However, as noted above, the process of financial change is steepening the slope of the LM schedule, which implies that shifts in the IS schedule would produce, *ceteris paribus*, larger changes in interest rates and smaller changes in aggregate demand than before. Thus, taken together, the steepening of the LM schedule and the flattening of the IS schedule suggest that, at the end of the current transition phase, economic activity may turn out to be more responsive to monetary policy – assuming that monetary policy is still capable of shifting the LM schedule in an identifiable fashion (and that may be a significant assumption) – and less responsive to fiscal policy than in the past.²⁴

4. Monetary control problems and targeting

The problems discussed above (sub-sections III-1, III-2 and III-3) have aggravated monetary control difficulties and have made it more troublesome to interpret changes in monetary variables and to assess the effects of monetary policy on the economy. Monetary control is

²⁴If the concept of money itself becomes obsolete – the so-called “moneyless” or “zero-balance” economy in which currency and below-market rate transactions balances play no rôle – the monetary authorities would not be able to work with an identifiable money supply schedule. See Davis (1982) and Niehans (1982). In that case, higher interest elasticities of aggregate demand would have no special significance for the rôle of monetary policy. Clearly, we are very far away from this type of “moneyless” economy.

being undermined by the increased difficulties of identifying and measuring monetary aggregates, by the greater instability and unpredictability of the demand for money and of the money supply process – in part reflecting the shifts in the currency and reserve ratios – and by the declining interest elasticity of money demand. The unpredictable shifts or movements in money demand and/or money supply make it very difficult, if not impossible, to adhere to any quantitative targets over a given policy horizon, especially if that horizon is less than one year. Meanwhile, because of the lower interest elasticity of money demand, changes in interest rates are now less effective than before in controlling money stock, but the extent and speed of decline in this effectiveness is far from clear.²⁵

The monetary control problems are more serious over a time horizon of one or two quarters than over longer periods. In part, this is purely statistical, because if the control target is an average over the medium term, say a year, shortfalls and overshoots tend to cancel out to some extent. There are, however, some more fundamental reasons due to financial changes which make the long-run monetary control problems less serious. The longer-term trends in money demand and money supply are more clear than their short-term movements. For example, various currency and reserve ratios and the demand for transactions balances are clearly moving downwards over time. This means that the margin of error from any medium-term target can be reduced by choosing maximum or minimum values based on the long-term trend.

In addition, even though the short-term effectiveness of interest rates in controlling money stock is being reduced because of the declining interest elasticity to money, over longer periods changes in interest rates continue to influence money stock through their effects on economic activity. The declining trend in the interest elasticity of money demand is likely to continue, and accordingly short-run

²⁵In recent years, the literature on the consequences of financial changes for monetary control has been increasing rapidly. The following recent contributions are worth mentioning: Cagan (1979), Artis and Lewis (1981), Goodhart (1982), Bryant (1982), Corrigan (1983a), Davis (1982), Lindsey (1982), Allen (1981) and Meek (1982).

monetary control will become even more difficult in the future. After the current wave of financial changes is over or at least settles down to a normal evolutionary pace, given the low interest elasticity of money demand, changes in interest rates would most likely exert little or no influence on money stock over the short term, but they would continue to control it over the medium term through their effects on economic activity. Also, at that time the medium-term relations underlying money demand and money supply might stabilise, but short-term variations are likely to remain a serious problem, although perhaps less so than at present.

The increased instability and unpredictability of the money demand functions and the actual or potential changes in the transmission mechanism of monetary policy have made it much more problematic to formulate intermediate objectives and to interpret the significance of movements in monetary variables for the economy. To repeat, in terms of the language of the IS-LM framework both schedules are now more unpredictable and less stable than before and, over time, the slope of the LM schedule is becoming steeper while that of the IS schedule is becoming flatter. More broadly, all of the major relations among monetary variables (e.g. various definitions of money, credit and interest rates) and between monetary and non-monetary variables (e.g. money and economic activity, money and prices, interest rates and economic activity, etc.) are undergoing substantial changes. Consequently, the difficulties caused by the process of financial change for targets and interpretation of monetary policy are more or less equally serious, *ceteris paribus*, for all monetary variables.²⁶

²⁶There is a vast amount of literature on the subject of alternative targets for monetary policy, and in the wake of recent financial innovations this literature has been growing at a geometric pace. Many recent studies have discussed in detail the advantages and disadvantages of alternative monetary policy targets as well as most of the problems for monetary targeting arising from changes in the financial system. For some recent contributions on this subject see Axilrod (1982), Bryant (1980), Cagan (1979, 1982), Davis (1981b, 1982), Dennis (1983), Hester (1982), Kane (1983), Griffiths and Wood (1981), Gordon (1983), Modigliani and Papademos (1980, 1982), Meek (1982), Friedman (1982), Mayer (1982), Silver and Fackler (1982/83), Wenninger (1982/83), Savage (1980), Walsh (1983), Tobin (1983), Lindsey (1982), Freedman (1981) and Volcker (1983c).

The problems stemming from financial changes clearly highlight the fallacy of using any single variable as the sole or main target for monetary policy. In a world of changing financial arrangements, the breakdown of earlier empirical relations is inevitable, and the meaning and significance of monetary variables (i.e. M_1 , M_2 , bank credit, short-term interest rates, etc.) change over time. In these circumstances, monetary policy must be guided by a more complex set of information based on several or most monetary variables rather than a simplistic rule based on a single monetary variable.²⁷ Once the process of financial changes slows down sufficiently and new relations between monetary and non-monetary variables become established, it may be possible to reduce the set of information on which policy decisions are based. Even at that time, however, the desirability of using any one variable as the sole target would continue to be questionable, as it has been in the past. Moreover, in the new, more diversified and developed financial arrangements, the substitutability among various financial assets is likely to be higher than before, making it more difficult for a single variable to represent the thrust of monetary conditions.

The recent financial changes have also highlighted the problems of pursuing short-term targets for monetary aggregates. As discussed above, those changes have weakened the already loose and uncertain short-term relations between monetary aggregates and economic activity and also increased the difficulties of controlling aggregates over a short time horizon. It would appear that the pursuit of short-term targets for monetary aggregates may continue to be unfeasible even after the current wave of financial innovations has passed. Even putting aside the problems of defining and measuring money and of the short-run instability of money demand, the existing monetary techniques, as noted above, will not be able to control aggregates over the short term.

5. Financial changes, regulations and monetary policy

In the free-market industrial economies financial regulations are

²⁷ See Hester (1982) for a detailed discussion of this point. See also Davis (1981b) and Lamfalussy (1981).

generally designed to promote, preserve or at least be consistent with the following main objectives:

- (a) a competitive environment for the provision of financial services;
- (b) the safety and soundness of the payments mechanism and more generally of the financial system;
- (c) the protection and fair treatment of customers of financial services;
- (d) the need for efficiency and balance in the conduct of monetary policy.

In practice, these objectives are frequently in conflict with one another, and regulations attempt to weigh and balance the conflicts in a way that is consistent with the public interest. The recent financial changes, discussed in Section II, have greatly influenced the structure of the financial industry and the ability of existing regulations to fulfil these objectives. In particular, they have significantly sharpened the conflicts between various objectives. For example, competition in the provision of financial services has increased substantially in recent years, but several factors associated with the innovation process, such as the increased risk in the market-based intermediation process and lower profit margins resulting from the reduction in spreads between the cost of obtaining funds and lending rates, have also weakened the stability and soundness of the financial system.²⁸ Similarly, as discussed above, financial changes have caused significant problems for the conduct of monetary policy. Under these circumstances, the need to adjust regulations in order to maintain a balance in the regulatory objectives is obvious.

Regulations that bear directly on the conduct of monetary policy include reserve requirements, interest rate controls or ceilings, discount-window mechanisms and various types of balance-sheet

²⁸ For various arguments which suggest that structural changes may be weakening the stability of the financial system, see Akhtar (1983a), Davis (1981a), Goodhart (1982) and Fforde (1983). For discussions of the direction of new regulations in the US context, see Corrigan (1983a, b), Volcker (1983a, d) and Federal Reserve Bank of Minneapolis (1983).

constraints such as capital ratios and lending limits or guidelines. Of course, some of these regulations are also essential for other objectives, e.g. the use of the discount window in the case of financial distress. Many instances of the effects of financial changes on these regulations have been mentioned in this paper. To repeat just one example, in many countries the shift to financial instruments with lower or no reserve requirements over the last two or three years has led to reductions in the effective reserve ratios, thus influencing the money supply process. Similarly, in recent years innovations have circumvented deposit rate ceilings in the United States, Japan and France (countries with significant regulations in that area), leading to a complete dismantling of deposit rate regulations in the case of the United States.

There seems to be little doubt that in most industrial countries some regulations bearing directly on the conduct of monetary policy will need to be modified over time. In a changing financial environment, the existing regulations become inconsistent with the efficient conduct of monetary policy. This seems to have happened, or is happening to a greater or lesser degree, in the United States, the United Kingdom, Japan, France, Italy and possibly in other countries as well. However, even disregarding the conflicts between the various objectives of financial regulations, the optimum level of such regulations is difficult to determine at this time, because the financial system is still in a transition phase. Meanwhile, the process of re-examination of financial regulations is under way in many countries, but the exact nature of changes in those regulations and their consequences for monetary control are quite uncertain.

IV. Conclusions

This paper has attempted to pursue certain common themes and issues across countries without losing sight of the substantial differences in their experience. Given that the ground covered is wide-

ranging and complex, it has not been possible to do full justice to many aspects of financial changes and their implications. For the same reason, it is difficult to set forth only one or two definite conclusions. In what follows, I offer five tentative conclusions or observations on recent experience with financial changes, some of which are explicit and others implicit in the above analysis.

The first, rather obvious, observation is that while there are substantial differences in the overall pace of financial innovations between the larger industrial countries, all of them have been experiencing a noticeable degree of change in their financial systems. In general, the pace of innovations has been slower in continental European countries (Germany, France and Italy) than elsewhere. However, this is somewhat misleading in an attempt to understand various specific developments. The crucial differences between countries seem to concern the direction and timing of particular changes. For example, the cash management type of innovations have been much slower to develop in France and Italy than in several other countries, but developments in variable rate bank lending and floating rate issues in these two countries have been faster than in most other countries. Similarly, all countries seem to have experienced a significant degree of change and development in financial markets.

The second observation concerns the definition of money. The problems of identifying and measuring various monetary aggregates (e.g. M_1 , M_2 , M_3 , etc.) have been greatly publicised in the United States, the United Kingdom and Canada. However, for the broader aggregates these problems are quite widespread and have become more serious in all countries because of recent financial changes. In fact, it is no longer clear that M_2 or M_3 are significantly more meaningful, at least potentially, in France and Germany than they are in the United States and the United Kingdom.

The third conclusion or observation is already clearly spelled out in the previous section, namely that in a changing financial environment it is inappropriate to use any one monetary variable as the sole or even the primary guide for monetary policy. Financial changes tend to make the existing relations between monetary and

non-monetary variables much more unstable and unpredictable than before. In these circumstances, monetary policy decisions must be based on a careful analysis of many variables rather than the uncertain or unpredictable behaviour of any one monetary variable. This conclusion applies just as much to monetary aggregates as to interest rates or other monetary indicators. Of course, the single variable strategy is questionable even when there are no financial innovations, because dynamic relations between monetary and non-monetary variables have always been rather loose and difficult to predict.

The fourth conclusion is that financial changes have made the already weak short-run (one to two quarters) control over monetary aggregates completely ineffective. Moreover, given the present operating procedures, this situation is likely to persist for a long time. The short-run control difficulties reflect the increased instability and unpredictability of money demand and money supply and the declining interest elasticity of money demand. It is possible that eventually, when the major financial changes have taken place, the behaviour of money demand and money supply will become somewhat more stable. However, even then the low interest elasticity of money demand will not permit effective short-run control over monetary aggregates. This implies that the monetary authorities may find it difficult, if not impossible, to pursue short-term intermediate targets for monetary aggregates.

The final tentative conclusion deals with the ability of monetary policy to influence economic activity and prices. Some economists have argued that financial innovations and deregulation in recent years have weakened the ability of monetary policy to influence the economy because they have reduced the effectiveness of non-price credit-rationing mechanisms in transmitting monetary changes. In the absence of non-price elements, so the argument goes, interest rates have to move much more than before to yield a given change in aggregate demand. This view is based on the notion that interest elasticities of various expenditure components have been low in the past and *assumes* that they will continue to be that way in the future.

This paper takes issue with this view and argues that in the new

financial environment interest elasticities of private demands are likely to rise over time. Both analytical aspects and *some* recent empirical evidence (see Section III-3 and Appendix) tend to favour this proposition. Given higher interest elasticities of various demand components, monetary policy may turn out to be even more effective than before, provided it is still capable of identifying and shifting the money supply schedule.

Appendix **Interest rates and economic activity**²⁹

This appendix reports some preliminary empirical estimates which attempt to examine changes in the relationship between interest rates and economic activity. Specifically, we look at the hypothesis (advanced in the main text) that ongoing changes in the financial system may be increasing the rôle of interest rates in influencing economic activity.

The following general equation is the starting point for our estimates:

$$PD = F(Z, R, X) \quad (1)$$

where PD is the private demand for consumption and investment. Z represents the income-based influences on private demand, R is the long-term interest rate and X is a portmanteau variable which captures all other one-time or permanent influences. In this general form equation (1) is consistent with any macro-economic model in which consumption and investment are postulated as functions of actual and expected incomes (from labour services or sales of products), interest rates and other important variables. Thus, for example, Z may be based on a combination of the accelerator model of investment and the absolute or permanent income hypothesis underlying consumption.

For estimation purposes, we modify (1) as:

$$PD_t = a_0 + a_1 Z + a_2 R + a_3 RD + u \quad (2)$$

²⁹This appendix is based on joint research by M.A. Akhtar and G.E.J. Dennis.

where PD and Z are expressed in constant prices, u is a random error term and RD is an interest rate shift parameter which appears under X in (1) – all other X-type influences are assumed to be insignificant. In this equation, both a_2 and a_3 bear on the hypothesis that interest rate influences on economic activity may have increased in recent years. The specification of RD may influence the results in two respects:

- (1) its own coefficient, a_3 , may turn out to be statistically significant with either positive or negative sign;
- (2) it may influence the size and significance of the coefficient of R, a_2 , by improving the empirical specification.

The second influence is particularly relevant where the change is gradual and shows up only slowly in upward or downward shifts in the coefficient of R, which means the change is not large enough, in a given period, to be captured by the shift variable. In any case, both influences would indicate whether or not the size of interest rate effects on economic activity has changed.

Two further considerations seem to be relevant in interpreting the coefficients of R and RD in equation (2). Firstly, if “real” interest rates hold constant (i.e. $R - \text{inflation rate} = 0$) the coefficient of R may simply refer to the Phillips curve relation between inflation and unemployment, provided private output and unemployment are perfectly correlated. However, given that the assumption of constant “real” rates is not relevant to the real world experience, the coefficient of R would capture long-term interest rate influences on private demand, although those influences may contain some inflation effects if the behaviour of long-term interest rates is influenced by actual or expected inflation rates. Secondly, the reduced form tests of equation (2) estimate the IS curve, and therefore the shift parameter, by assuming that the LM curve stays put when in fact financial changes are steepening it. The steepening of the LM curve may make it difficult to capture any shift in interest rate effects. If, for example, that steepening is more than sufficiently large to offset the effect of the flattening of the IS curve on the economy, the coefficient of RD, a_3 , may turn out to be positive. Of course, the estimated a_3 may be positive for other reasons such as the fact that RD acts as a proxy for price inflation

or that financial changes are actually reducing the interest elasticity of expenditures. Needless to say, estimates of equation (2) are not able to discriminate among these various possibilities.

Using natural logarithms of annual data from 1962 to 1982, we estimated equation (2) for the United States, Japan, Germany, France, the United Kingdom and Italy. The empirical proxy for Z is based on total income or demand. However, given that Z incorporates private consumption and investment, the current period values of both PD and Z are endogenous. This problem can be avoided by using predetermined (i.e. past or expected) values of Z , and this procedure is used in our estimates. We tried current and one-year lagged values of interest rates and experimented with interest rate shift parameters for several different periods beginning in the early 1970s. The experimentation with shift variables for various time periods is in line with the fact that the timing and speed of deregulation and other financial changes have differed substantially between countries.

Table 11 reports some of the results which incorporate interest rate shift parameters from 1977 to 1982. (Empirical definitions of the variables are given in the notes to the table.) By conventional statistical criteria, these results are quite good. The overall regression fits are very close with high R^2 s and low standard errors, and the estimates are generally free of any serious autocorrelation problems. The income and interest rate variables yield intuitively plausible coefficients and, in virtually all cases, are statistically significant at the 95 per cent. confidence level.

On the whole, these results are favourable to the hypothesis under consideration. For Japan and Germany the interest rate shift variables for the period 1977–82 are highly significant, with a negative sign suggesting that the interest rate effects on private demand have become stronger since around the mid-1970s. In addition, the use of shift variables pushes up the size and significance of the coefficient of R . For the United States and Italy the 1977–82 interest rate shift dummy is also highly significant, but it has a positive sign apparently contradicting the hypothesis. However, the use of that dummy significantly increases the absolute size of the coefficient of the main

Table 11
Interest rate effects on economic activity
Dependent variable: Private domestic demand (PD_t)

	Intercept	Z	R	RD	SE	\bar{R}^2	DW	
<i>United States</i>	1.	- 3.32 (2.01)	1.25 (9.89)	- 0.168 (- 2.32)	-	0.032	0.975	1.51
	2.	- 3.54 (2.47)	1.27 (11.58)	- 0.236 (3.48)	0.024 (2.63)	0.028	0.981	1.95
	3.	- 4.62 (3.32)	1.35 (12.72)	- 0.272 (4.27)	0.024 (2.91)	0.024	0.984	2.32
<i>Japan</i>	1.	0.81 (3.00)	0.96 (55.12)	- 0.209 (2.80)	-	0.034	0.994	1.05
	2.	0.57 (2.28)	1.00 (50.22)	- 0.281 (4.05)	- 0.027 (2.72)	0.029	0.995	1.47
<i>Germany</i>	1.	0.20 (0.40)	0.99 (23.77)	- 0.139 (2.52)	-	0.032	0.976	1.13
	2.	- 1.70 (2.29)	1.15 (18.93)	- 0.240 (4.30)	- 0.034 (3.11)	0.026	0.984	1.52
<i>France</i>	1.	- 0.85 (1.29)	1.07 (19.89)	- 0.101 (- 2.12)	-	0.018	0.996	1.80
	2.	- 0.82 (1.23)	1.07 (19.38)	- 0.087 (1.66)	- 0.004 (0.66)	0.018	0.995	1.85
<i>United Kingdom</i>	1.	- 4.30 (1.88)	1.40 (6.48)	- 0.212 (2.45)	-	0.032	0.938	1.74
	2.	- 4.79 (1.94)	1.44 (6.21)	- 0.219 (2.46)	- 0.005 (0.59)	0.032	0.935	1.76
<i>Italy</i>	1.	- 0.72 (0.68)	1.07 (10.63)	- 0.109 (1.85)	-	0.046	0.952	1.63
	2.	- 1.61 (1.59)	1.18 (11.75)	- 0.290 (3.14)	0.041 (2.37)	0.041	0.962	2.32

¹ PD_t = sum of real private consumption, real total (private and public) investment and real inventory stock investment, where subscript *t* refers to the current period; Z = lagged values of the sum of PD and public-sector consumption specified as [(0.5)Z_{t-2} + (0.5)Z_{t-3}] for the United States, France and the United Kingdom, as [(0.5)Z_{t-1} + (0.3)Z_{t-2} + (0.2)Z_{t-3}] for Italy and as Z_{t-1} for Germany and Japan; R = long-term interest rates specified as [(0.5)R_t + (0.5)R_{t-1}] for all countries. RD = interest rate shift dummy with 1 times R from 1977 to 1982 and zero elsewhere. ² All estimates are based on the ordinary least squares technique using natural logarithms of annual data from 1962 to 1982. Summary statistics are listed as SE = standard error of estimate, \bar{R}^2 = adjusted R-squared, and DW = Durbin-Watson statistic. ³ The third regression for the United States incorporates an oil shock dummy (with 2 in 1974, 1 in 1979 and 1980 and 0 elsewhere) which is statistically significant at the 95 per cent. confidence level.

interest rate variable. Clearly, the sum of the two interest rate coefficients is substantially higher with the 1977–82 shift variable than without it. Of course, as noted above, the positive coefficient of the shift variable is subject to some other interpretations and may not necessarily reflect the effects of financial changes.

For the United Kingdom and France, the interest rate shift dummies reported in Table 11 are not statistically significant at the 90 per cent. or higher confidence levels. They also do not appear to have a significant effect on the coefficient of R . However, for the United Kingdom an interest rate shift dummy from 1979 to 1982 yields results somewhat more favourable to the hypothesis. The counterpart regression with the altered dummy is:

$$\begin{aligned}
 PD_t = & -5.73 + 1.53 Z - 0.246 R - 0.001 RDA: \\
 & (2.28) \quad (6.48) \quad (2.77) \quad (1.27) \\
 SE = & 0.031; \quad \bar{R}^2 = 0.940; \quad DW = 2.03
 \end{aligned}$$

where RDA is 1 times R_t from 1979 to 1982 and zero elsewhere. The interest rate shift variable has a negative sign, although it is significant only at a very low confidence level. In addition, the coefficient of R is now higher than before.

Finally, it may be worth noting that, judged in terms of the interest rate variable, the results reported in Table 11 are better than in many earlier studies based on data up to the early 1970s; some of those studies were unable to obtain even the right sign for the interest rate coefficient. This suggests that the significant estimates of interest elasticities may reflect, at least in part, the use of the post-1973 data which is influenced by several major national and international developments including financial innovations and deregulation. The fact that a straightforward reduced-form equation yields plausible estimates for the interest rate variable may be viewed as partial evidence that new factors, financial innovations or other influences, have increased the interest rate effects or at least have made it easier to estimate them.

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