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**THE CHANNELS OF MONETARY
TRANSMISSION: LESSONS FOR
MONETARY POLICY**

Frederic S. Mishkin

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ABSTRACT

This paper provides an overview of the transmission mechanisms of monetary policy, starting with traditional interest rate channels, going on to channels operating through other asset prices, and then on to the so-called credit channels. The paper then discusses the implications from this literature for how central banks might best conduct monetary policy.

Frederic S. Mishkin
Federal Reserve Bank of New York
33 Liberty Street
New York, NY 10045
and NBER

I. Introduction

Monetary policy is now at center stage in discussions about how to promote sustainable growth and low inflation in the economy. Fiscal policy has lost its luster as a tool to stabilize the aggregate economy because of doubts about the ability to time fiscal policy actions to obtain desirable stabilization outcomes as well as concerns about budget deficits. The result is that both economists and politicians in recent years advocate that the stabilization of output and inflation be left to monetary policy. The economics profession has also become more supportive of price stability as the long-run primary goal for a central bank. Indeed, in recent years we have seen central banks in many countries pursuing a strategy of raising interest rates proactively in order to prevent an increase in inflation arising from an overheated economy. In order to be successful in such an enterprise, the monetary authorities must have an accurate assessment of the timing and effect of their policies on the economy, thus requiring an understanding of the mechanisms through which monetary policy affects the economy.

In this paper, I provide an overview of the transmission mechanisms of monetary policy and give my perspectives on the rapidly growing literature on this topic. I first start with the traditional interest rate channels, go on to discuss channels operating through other asset prices, and then discuss the so-called credit channel which has been receiving a lot of research attention in recent years. Understanding these transmission mechanisms is important not only in their own right, but also because they have important lessons for monetary policy which I will draw out in the concluding part of the paper.

II. Traditional Interest Rate Channels

I start the overview of the monetary transmission mechanism with interest-rate channels because these have been a standard feature in the literature for over fifty years and are the key monetary transmission mechanism in the basic Keynesian ISLM textbook model which has been a mainstay of teaching in macroeconomics.

The traditional Keynesian ISLM view of the monetary transmission mechanism can be characterized by the following schematic showing the effects of a monetary expansion:

$$M \uparrow \Rightarrow i_r \downarrow \Rightarrow I \uparrow \Rightarrow Y \uparrow \quad (1)$$

where $M \uparrow$ indicates an expansionary monetary policy leading to a fall in real interest rates ($i_r \downarrow$), which in turn lowers the cost of capital, causing a rise in investment spending ($I \uparrow$), thereby leading to an increase in aggregate demand and a rise in output ($Y \uparrow$).

Although Keynes originally emphasized this channel as operating through businesses' decisions about investment spending, later research recognized that consumers' decisions about housing and consumer durable expenditure also are investment decisions. Thus, the interest rate channel of monetary transmission outlined in the schematic above applies equally to consumer spending in which I represents residential housing and consumer durable expenditure.

An important feature of the interest rate transmission mechanism is its emphasis on the real rather than the nominal interest rate as that which affects consumer and business decisions. In addition, it is often the real long-term interest rate and not the short-term interest rate that is

viewed as having the major impact on spending. How is it that changes in the short-term nominal interest rate induced by a central bank result in a corresponding change in the real interest rate on both short and long-term bonds? The key is sticky prices, so that expansionary monetary policy which lowers the short-term nominal interest rate also lowers the short-term real interest rate, and this would still be true even in a world with rational expectations. The expectations hypothesis of the term structure, which states that the long interest rate is an average of expected future short-term interest rates, suggests that the lower real short-term interest rate leads to a fall in the real long-term interest rate. These lower real interest rates then lead to rises in business fixed investment, residential housing investment, consumer durable expenditure and inventory investment, all of which produce the rise in aggregate output.

The fact that it is the real interest rate that impacts on spending rather than the nominal rate provides an important mechanism for how monetary policy can stimulate the economy, even if nominal interest rates hit a floor of zero during a deflationary episode. With nominal interest rates at a floor of zero, an expansion in the money supply ($M \uparrow$) can raise the expected price level ($P^e \uparrow$) and hence expected inflation ($\pi^e \uparrow$), thereby lowering the real interest rate ($i_r \downarrow$) even when the nominal interest rate is fixed at zero, and stimulating spending through the interest rate channel above: i.e.,

$$M \uparrow \Rightarrow P^e \uparrow \Rightarrow \pi^e \uparrow \Rightarrow i_r \downarrow \Rightarrow I \uparrow \Rightarrow Y \uparrow \quad (2)$$

This mechanism thus indicates that monetary policy can still be effective even when nominal interest rates have already been driven down to zero by the monetary authorities. Indeed, this

mechanism is a key element in monetarist discussions of why the U.S. economy was not stuck in a liquidity trap during the Great Depression and why expansionary monetary policy could have prevented the sharp decline in output during this period.

Taylor (1995) has an excellent survey of the recent research on interest rate channels and he takes the position that there is strong empirical evidence for substantial interest rate effects on consumer and investment spending, making the interest-rate monetary transmission mechanism a strong one. His position is a highly controversial one, because many researchers, for example Bernanke and Gertler (1995), have an alternative view that empirical studies have had great difficulty in identifying significant effects of interest rates through the cost of capital. Indeed these researchers see the empirical failure of interest-rate, monetary transmission mechanisms as having provided the stimulus for the search for other transmission mechanisms of monetary policy, especially the credit channel.

III. Other Asset Price Channels

A key monetarist objection to the ISLM paradigm for analyzing monetary policy effects on the economy is that it focuses on only one asset price, the interest rate, rather than on many asset prices.¹ Monetarists envision a transmission mechanism in which other relative asset prices and real wealth transmit monetary effects onto the economy. Recognition of these other channels is a feature of macro models built by Keynesians such as Franco Modigliani who also

¹For example, see Meltzer (1995).

see these other asset price effects as being critical to the monetary transmission mechanism. There are two key assets besides bonds that receive substantial attention in the literature on the transmission mechanism -- foreign exchange and equities.

Exchange Rate Channel

With the growing internationalization of economies throughout the world and the advent of flexible exchange rates, more attention has been paid to monetary policy transmission operating through exchange rate effects on net exports. Indeed, this transmission mechanism is now a standard feature in the leading textbooks in macroeconomics and money and banking. This channel also involves interest rate effects because when domestic real interest rates fall, domestic dollar deposits become less attractive relative to deposits denominated in foreign currencies, leading to a fall in the value of dollar deposits relative to other currency deposits, that is, a depreciation of the dollar (denoted by $E \downarrow$). The lower value of the domestic currency makes domestic goods cheaper than foreign goods, thereby causing a rise in net exports ($NX \uparrow$) and hence in aggregate output. The schematic for the monetary transmission mechanism operating through the exchange rate is thus:

$$M \uparrow \Rightarrow i_r \downarrow \Rightarrow E \downarrow \Rightarrow NX \uparrow \Rightarrow Y \uparrow \quad (3)$$

This exchange rate channel plays an important role in how monetary policy affects the domestic economy as is evident in recent research, such as Bryant, Hooper and Mann (1993) and Taylor

(1993).

Equity Price Channels

There are two channels involving equity prices that are important to the monetary transmission mechanism: these involve Tobin's q theory of investment and wealth effects on consumption.

Tobin's q Theory. Tobin's q Theory provides a mechanism by means of which monetary policy affects the economy through its effects on the valuation of equities (see Tobin (1969)). Tobin defines q as the market value of firms divided by the replacement cost of capital. If q is high, the market price of firms is high relative to the replacement cost of capital, and new plant and equipment capital is cheap relative to the market value of business firms. Companies can then issue equity and get a high price for it relative to the cost of the plant and equipment they are buying. Thus investment spending will rise because firms can buy a lot of new investment goods with only a small issue of equity.

On the other hand, when q is low, firms will not purchase new investment goods because the market value of firms is low relative to the cost of capital. If companies want to acquire capital when q is low, they can buy another firm cheaply and acquire old capital instead. Investment spending will then be low.

The crux of this discussion is that a link exists between Tobin's q and investment spending. But how might monetary policy affect equity prices? In a monetarist story, when the money supply rises, the public finds it has more money than it wants and so tries to reduce the

holdings of money by increasing their spending. One place the public can spend more is in the stock market, increasing the demand for equities and consequently raising their prices. A more Keynesian story comes to a similar conclusion because it sees the fall in interest rates stemming from expansionary monetary policy making bonds less attractive relative to equities, thereby causing the price of equities to rise. Combining these views with the fact that higher equity prices ($P_e \uparrow$) will lead to a higher q ($q \uparrow$) and thus higher investment spending ($I \uparrow$) leads to the following transmission mechanism of monetary policy:

$$M \uparrow \Rightarrow P_e \uparrow \Rightarrow q \uparrow \Rightarrow I \uparrow \Rightarrow Y \uparrow \quad (4)$$

Wealth Effects. An alternative channel for monetary transmission through equity prices occurs through wealth effects on consumption. This channel has been strongly advocated by Franco Modigliani and his MPS model, a version of which is currently in use at the Board of Governors of the Federal Reserve System -- see Modigliani (1971). In Modigliani's life-cycle model, consumption spending is determined by the lifetime resources of consumers, which is made up of both human capital, real capital and financial wealth. A major component of financial wealth is common stocks. When stock prices rise, the value of financial wealth increases, thus increasing the lifetime resources of consumers, and consumption should rise. Since we have already seen that expansionary monetary policy can lead to a rise in stock prices ($P_e \uparrow$), we then have another monetary transmission mechanism:

$$M \uparrow \Rightarrow P_e \uparrow \Rightarrow \text{wealth} \uparrow \Rightarrow \text{consumption} \uparrow \Rightarrow Y \uparrow \quad (5)$$

Housing and Land Price Channels. Both of the wealth and Tobin's q channels described above allow for a quite general definition of equity. The Tobin q framework applies straightforwardly to the housing market where housing is equity. An increase in house prices, which raises their prices relative to replacement cost, leads to a rise in Tobin's q for housing, thereby stimulating its production. Similarly, housing and land prices are an extremely important component of wealth and so rises in these prices increase wealth, thereby raising consumption. Monetary expansion which raises land and housing prices through the mechanisms described above thus leads to a rise in aggregate demand. Therefore the monetary transmission mechanism also operates through the land and housing price channels.

IV. Credit Channels

Dissatisfaction with the conventional stories about how interest rate effects explain the impact of monetary policy on expenditure on long-lived assets has led to a new view of the monetary transmission mechanism that emphasizes asymmetric information in financial markets.² There are two basic channels of monetary transmission that arise as a result of information problems in credit markets: the bank lending channel and the balance-sheet

²Information problems also refer to problems created by costly verification and enforcement of financial contracts. Costly enforcement and verification are closely related to asymmetric information because the existence of asymmetric information is one of the major reasons why the verification and enforcement of financial contracts are so costly.

channel.³

Bank Lending Channel

The bank lending channel is based on the view that banks play a special role in the financial system because they are especially well suited to solve asymmetric information problems in credit markets. Because of banks' special role, certain borrowers will not have access to the credit markets unless they borrow from banks. As long as there is no perfect substitutability of retail bank deposits with other sources of funds, then the bank lending channel of monetary transmission operates as follows. Expansionary monetary policy, which increases bank reserves and bank deposits, increases the quantity of bank loans available. Given banks' special role as lenders to classes of bank borrowers, this increase in loans will cause investment (and possibly consumer) spending to rise. Schematically, the monetary policy effect is

$$M \uparrow \Rightarrow \text{bank deposits} \uparrow \Rightarrow \text{bank loans} \uparrow \Rightarrow I \uparrow \Rightarrow Y \uparrow \quad (6)$$

An important implication of the credit view is that monetary policy will have a greater effect on expenditure by smaller firms that are more dependent on bank loans than it will on large firms that can directly access the credit markets through stock and bond markets without going through

³Excellent recent surveys of the credit channel literature can be found in Bernanke and Gertler (1995), Cecchetti (1995) and Hubbard (1995).

banks.

Doubts about the bank lending channel have been raised in the literature.⁴ There are reasons to suspect that the bank lending channel in the United States may not be as powerful as it once was. First is that the current U.S. regulatory framework no longer imposes restrictions on banks which hinder their ability to raise funds. Prior to the mid-1980s, certificates of deposit (CDs) were subjected to reserve requirements and regulation Q deposit rate ceilings, which made it hard for banks to replace deposits that flowed out of the banking system during a monetary contraction. With these regulatory restrictions abolished, banks can more easily respond to a decline in bank reserves and a loss of retail deposits by issuing CDs at market interest rates that are not required to be backed up by required reserves. Second, the decline of the traditional bank lending business which is occurring worldwide (see Edwards and Mishkin (1995)) means that banks are playing a less important role in credit markets, rendering the bank lending channel less potent.

Balance-Sheet Channels

Even though the bank lending channel may be declining in importance, it is by no means clear that this is the case for the other credit channel, the balance-sheet channel. The balance-sheet channel also arises from the presence of asymmetric information problems in credit markets. The lower the net worth of business firms, the more severe the adverse selection and moral hazard problems are in lending to these firms. Lower net worth means that lenders in

⁴For example, see Ramey (1993) and Meltzer (1995).

effect have less collateral for their loans, and so losses from adverse selection are higher. A decline in net worth, which raises the adverse selection problem, thus leads to decreased lending to finance investment spending. The lower net worth of business firms also increases the moral hazard problem because it means that owners have a lower equity stake in their firms, giving them more incentive to engage in risky investment projects. Since taking on riskier investment projects makes it more likely that lenders will not be paid back, a decrease in business firms' net worth leads to a decrease in lending and hence in investment spending.

Monetary policy can affect firms' balance-sheets in several ways. Expansionary monetary policy ($M \uparrow$) which causes a rise in equity prices ($P_e \uparrow$) along lines described earlier raises the net worth of firms and so leads to higher investment spending ($I \uparrow$) and aggregate demand ($Y \uparrow$) because of the decrease in adverse selection and moral hazard problems. This leads to the following schematic for one balance-sheet channel of monetary transmission:

$$M \uparrow \Rightarrow P_e \uparrow \Rightarrow \text{adverse selection } \downarrow \text{ \& \text{ moral hazard } } \downarrow \tag{7}$$

$$\Rightarrow \text{lending } \uparrow \Rightarrow I \uparrow \Rightarrow Y \uparrow$$

Expansionary monetary policy which lowers nominal interest rates also causes an improvement in firms' balance sheets because it raises cash flow, thereby reducing adverse selection and moral hazard problems. This leads to the following schematic for an additional balance-sheet channel:

$$M \uparrow \Rightarrow i \downarrow \Rightarrow \text{cash flow } \uparrow \tag{8}$$

\Rightarrow adverse selection \downarrow & moral hazard $\downarrow \Rightarrow$ lending $\uparrow \Rightarrow I \uparrow \Rightarrow Y \uparrow$

An important feature of this transmission mechanism is that it is nominal interest rates that affect firms' cash flow. Thus this interest rate mechanism differs from the traditional interest rate mechanism discussed earlier in which it is the real rather than the nominal interest rate that affects investment. Furthermore, the short-term interest rate plays a special role in this transmission mechanism because it is interest payments on short-term rather than long-term debt that typically have the greatest impact on firm cash flow.

A related mechanism involving adverse selection through which expansionary monetary policy that lowers interest rates can stimulate aggregate output involves the credit rationing phenomenon. As demonstrated by Stiglitz and Weiss (1981), credit rationing occurs in cases where borrowers are denied loans even when they are willing to pay a higher interest rate. This is because individuals and firms with the riskiest investment projects are exactly the ones who are willing to pay the highest interest rates since, if the high-risk investment succeeds, they will be the primary beneficiaries. Thus, higher interest rates increase the adverse selection problem and lower interest rates reduce it. When expansionary monetary policy lowers interest rates, less risk-prone borrowers are a higher fraction of those demanding loans and thus lenders are more willing to lend, raising both investment and output, along the lines of parts of the schematic above.

A third balance-sheet channel operates through monetary policy effects on the general price level. Because debt payments are contractually fixed in nominal terms, an unanticipated rise in the price level lowers the value of firms' liabilities in real terms (decreases the burden

of the debt) but should not lower the real value of the firms' assets. Monetary expansion that leads to an unanticipated rise in the price level ($P \uparrow$) therefore raises real net worth, which lowers adverse selection and moral hazard problems, thereby leading to a rise in investment spending and aggregate output as in the schematic below.

$$M \uparrow \Rightarrow \text{unanticipated } P \uparrow \Rightarrow \text{adverse selection } \downarrow \quad (9)$$

$$\& \text{ moral hazard } \downarrow \Rightarrow \text{lending } \uparrow \Rightarrow I \uparrow \Rightarrow Y \uparrow$$

The view that unanticipated movements in the price level has important effects on aggregate demand has a long tradition in economics: it is the key feature in the debt-deflation view of the Great Depression espoused by Irving Fisher (1933).

Household Balance-Sheet Effects

Although most of the literature on the credit channel focuses on spending by business firms, the credit channel should apply equally as well to consumer spending, particularly on consumer durables and housing. Declines in bank lending induced by a monetary contraction should cause a decline in durables and housing purchases by consumers who do not have access to other sources of credit. Similarly, increases in interest rates cause a deterioration in household balance-sheets because consumers' cash flow is adversely affected.

Another way of looking at how the balance-sheet channel may operate through consumers

is to consider liquidity effects on consumer durable and housing expenditures -- found to have been important factors during the Great Depression (Mishkin (1978)). In the liquidity-effects view, balance-sheet effects work through their impact on consumers' desire to spend rather than on lenders' desire to lend. Because of asymmetric information about their quality, consumer durables and housing are very illiquid assets. If as a result of a bad income shock consumers needed to sell their consumer durables or housing to raise money, they would expect a big loss because they could not get the full value of these assets in a distress sale. (This is just a manifestation of the "lemons problem" described by Akerloff (1970) which helped stimulate research on the credit channel.) In contrast, if consumers held financial assets (such as money in the bank, stocks, or bonds), they could easily sell them quickly for their full market value and raise the cash. Hence, if consumers expect a higher likelihood of finding themselves in financial distress, they would rather be holding fewer illiquid consumer durable or housing assets and more liquid financial assets.

A consumer's balance sheet should be an important influence on his or her estimate of the likelihood of suffering financial distress. Specifically, when consumers have a large amount of financial assets relative to their debts, their estimate of the probability of financial distress is low, and they will be more willing to purchase consumer durables or housing. When stock prices rise, the value of financial assets rises as well; consumer durable expenditure will also rise because consumers have a more secure financial position and a lower estimate of the likelihood of suffering financial distress. This leads to another transmission mechanism for monetary policy operating through the link between money and equity prices:

$$M \uparrow \Rightarrow P_e \uparrow \Rightarrow \text{financial assets} \uparrow \quad (10)$$

\Rightarrow likelihood of financial distress $\downarrow \Rightarrow$ consumer durable and housing expenditure $\uparrow \Rightarrow Y \uparrow$

The illiquidity of consumer durable and housing assets provides another reason why a monetary contraction which raises interest rates and thereby reduces cash flow to consumers leads to a decline in spending on consumer durables and housing. A decline in consumer cash flow increases the likelihood of financial distress, which reduces the desire of consumers to hold durable goods or housing, thus reducing spending on them and hence aggregate output. The only difference between this view of cash-flow effects and that outlined in schematic (8) is that it is not the unwillingness of lenders to lend to consumers that causes expenditure to decline, but the unwillingness of consumers to spend.

Financial Crises

An extreme form of the credit channels described above provide an important route for monetary policy effects on the economy via a financial crisis. A financial crisis is a disruption to financial markets that sharply and severely increases asymmetric information problems of the type described above, so that financial markets are no longer able to efficiently channel funds to those who have the most productive investment opportunities. The result is a sharp contraction in economic activity. The asymmetric information theory of financial crises which has been outlined in Bernanke (1983) and Mishkin (1991, 1994) suggests that contractionary monetary policy can play an important role in producing financial crises. Mishkin (1994)

outlines five factors that can promote a financial crisis: 1) increases in interest rates, 2) stock market declines, 3) an unanticipated decline in the price level, 4) increases in uncertainty, and 5) bank panics.

Our earlier discussion shows how contractionary monetary policy can lead to asymmetric information problems that cause a contraction in the economy as a result of the first three factors. A monetary contraction which raises interest rates increases adverse selection because economic agents who are willing to take bigger risks and therefore to pay the higher interest rates will be the ones most anxious to borrow. In addition, the higher interest rates which reduce firms' cash flow hurt their balance sheet position, which increases moral hazard and adverse selection problems, making it less likely that markets will be willing to lend to them. Monetary contraction also produces a decline in stock prices which lowers the net worth of firms, again increasing adverse selection and moral hazard problems in credit markets. Monetary contraction can also produce an unanticipated decline in the price level which, because debt is denominated in nominal terms, leads to a debt-deflation scenario, as in Fisher (1933), in which the resulting decline in firms' net worth increases adverse selection and moral hazard problems. Thus, our analysis of the credit channels above shows how monetary policy can lead to a financial crisis which is an extreme case of increased asymmetric information problems, and thereby lead to a sharp economic contraction.

The last two factors promoting financial crises can also be stimulated by contractionary monetary policy. A recession, which can result from contractionary monetary policy, typically results in increased uncertainty about the payoffs from debt contracts, thus making it harder to screen out good from bad credit risks. The increase in uncertainty therefore makes information

in financial markets even more asymmetric and the adverse selection problem worse, which impedes lending and thus causes a decline in economic activity. Monetary contraction can also promote bank panics because, as we have seen, it can lead to a deterioration in firms' balance sheets that causes bank loans to go sour. Because depositors may not be able to discriminate between banks that have made good versus bad loans, they rush (run) to the banks to withdraw their funds. The resulting contraction in deposits and the desire of banks to increase their reserves relative to deposits to protect themselves from the deposit withdrawals then leads to a multiple contraction in loans and deposits, as is so well described in Friedman and Schwartz (1963), that promotes other bank failures and leads to a bank panic. As we saw earlier, banks have a special role in the financial system because they are so well suited to solve asymmetric information problems in credit markets. The decline in the number of banks and in their sources of funds to make loans reduces the ability of the financial system to solve adverse selection and moral hazard problems in credit markets, thereby causing a reduction in investment and a decline in economic activity.

As documented in Mishkin (1991), most financial crises in the U.S. have begun with a sharp rise in interest rates, a stock market crash, and an increase in uncertainty arising after the start of a recession, all of which are promoted by contractionary monetary policy. With worsening business conditions and uncertainty about their banks' health, depositors then began to withdraw their funds from the banks, leading to bank panics. In the episodes with the worst financial crises, an unanticipated decline in the price level induced by monetary contraction would then set in, which would lead to debt-deflation and cause a further deterioration of firms' net worth. We thus see how monetary contraction can produce a sequence of events that lead

to a sharp increase in adverse selection and moral hazard problems and a resulting financial crisis. A financial crisis then provides another route for how monetary policy can affect the economy.

V. A General Assessment

In the above sections, I have outlined the different channels of the monetary transmission mechanism. How should we view their relative importance?

Although some researchers, such as Taylor (1995), see traditional interest rate channels operating through the cost of capital as extremely important in the monetary transmission mechanism, many others do not. A recent survey on business fixed investment spending (Chirinko (1993)) concludes that the response of investment to price variables tends to be small and unimportant relative to quantity variables. It is certainly true that macroeconomic models have been developed which have large interest rate effects, but those who have worked with these models often find that small changes in specification reduce these interest rate effects substantially.

However, even though traditional interest rate channels may not be that important, we have seen that credit channels of monetary transmission provide additional ways in which changes in interest rates can have an important impact on aggregate demand. Indeed, proponents of credit channels see them as amplifying and propagating conventional interest rate effects.⁵ Since credit and lending are not independent driving forces in the economy but rather responses

⁵For example, see Bernanke and Gertler (1995).

to monetary policy, the existence of credit channels does not imply clearcut timing relationships between aggregate credit aggregates and real variables. Thus, time-series tests of the relative forecasting ability of credit aggregates, as in Ramey (1993) and Meltzer (1995), are unlikely to shed light on the validity of credit channels.

There are three reasons to believe that credit channels are an important part of the monetary transmission mechanism. First, there is a large body of cross-section evidence which supports the view that credit market imperfections of the type crucial to credit channels do indeed affect firms' employment and spending decisions.⁶ Second, there is evidence, such as that found in Gertler and Gilchrist (1994), showing that small firms which are more likely to be credit constrained are hurt more by tight monetary policy than are large firms which are unlikely to be credit constrained. Third, and maybe most compelling, the asymmetric information view of credit market imperfections at the core of the credit channel analysis is a theoretical construct that has proved to be highly useful in explaining many other important phenomena. For example, the asymmetric information view of credit market imperfections explains why many of our financial institutions exist and why our financial system has the structure that it has.⁷ In addition, the credit channel analysis outlined here provides a coherent explanation of the sequence of events that occurs during a typical financial crisis and explains why financial crises are so damaging to the economy.⁸ The best support for a theory is when it is found to be useful in a wide range of applications. By this standard, the theory supporting the existence of credit

⁶For example, see the survey in Hubbard (1995).

⁷For example, see Gertler (1988) or Mishkin (1995), chapter 9.

⁸See Bernanke (1983) and Mishkin (1991).

channels as important elements of the monetary transmission mechanism has much to recommend it.

An important feature of the credit channels is their emphasis on the ways in which monetary policy affects the economy through other asset prices besides interest rates. Furthermore, the discussion of such additional channels as the exchange rate, Tobin's q , wealth and housing and land prices provides additional reasons why other asset prices play such an important role in the monetary transmission mechanism.

VI. Lessons for Monetary Policy

What useful implications for how central banks might best conduct monetary policy can we draw from the above assessment of the channels of monetary policy transmission? There are four lessons that I would draw from our understanding of the monetary transmission mechanism.

- 1. It is very dangerous to always associate monetary policy easing or tightening with a fall or a rise in short-term nominal interest rates.**

Because most central banks use short-term nominal interest rates, typically the interbank rate, as the key operating instrument for monetary policy, there is a danger that central banks and the public will focus too much on short-term nominal interest rates as an indicator of the stance of monetary policy. Indeed, it is quite common to see statements which always associate

monetary tightenings with a rise in the interbank rate and monetary easings with a decline in the rate. This view is highly problematic because movements in nominal interest rates do not always correspond to movements in real interest rates and yet, as we have seen, it is typically the real and not the nominal interest rate which is an element in the channel of monetary policy transmission. For example, as pointed out in Mishkin (1981), during the late 1970s in the United States, short-term nominal interest rates were high, but real interest rates were extremely low, even negative. Similarly, during the contraction phase of the Great Depression in the United States, short-term interest rates fell to near zero and yet real interest rates were extremely high. Short-term interest rates which are near zero, therefore, do not indicate that monetary policy is easy if the economy is undergoing deflation, as was true during the contraction phase of the Great Depression. Indeed, as shown in Friedman and Schwartz (1963), the period of near zero short-term interest rates during the contraction phase of the Great Depression was one of highly contractionary monetary policy rather than the reverse.

- 2. Other asset prices besides those on short-term debt instruments contain important information about the stance of monetary policy because they are important channels of the monetary policy transmission mechanism.**

As we have seen in this paper, research in monetary economics has come a long way in understanding that other asset prices besides interest rates have major effects on aggregate demand. The view that other asset prices such as stock prices, foreign exchange rates, housing

and land prices are an important part of the monetary transmission mechanism is held by both monetarists, Keynesians, and neo-Keynesians. Although there are strong disagreements among economists about which channels of monetary transmission are the most important -- which is not surprising given that economists, particularly those in academia, always like to disagree -- they do agree that other asset prices play an important role in the way monetary policy affects the economy.

The view that other asset prices besides short-term interest rates matter has important implications for monetary policy. When we try to assess the stance of policy, it is critical that we look at other asset prices besides short-term interest rates. For example, if short-term interest rates are low or even zero and yet stock prices are low, land prices are low, and the value of the domestic currency is high, then monetary policy is clearly very tight and not easy.

3. Monetary policy can be highly effective in reviving a weak economy even if short-term interest rates are already near zero.

One common view is that when a central bank has driven down short-term nominal interest rates to near zero, there is nothing more that monetary policy can do to stimulate the economy. The channels of monetary policy described here as well as empirical research on the U.S. experience during the Great Depression when interest rates on short-term Treasury bills were near a floor of zero indicate that this view is demonstrably false.⁹ Expansionary monetary policy to increase liquidity in the economy can be conducted with open market

⁹E.g., Friedman and Schwartz (1963) and Romer (1992).

purchases which do not have to be solely in short-term government securities. This increased liquidity helps to revive the economy by raising the general price level expectations and by reflating other asset prices which then stimulate aggregate demand through the channels outlined here. Therefore, monetary policy can be a potent force for reviving economies which are undergoing deflation and have short-term interest rates near a floor of zero. Indeed, because of the lags inherent in fiscal policy and the political constraints on its use, expansionary monetary policy is the key policy action that is required to revive an economy experiencing deflation.

- 4. Avoiding unanticipated fluctuations in the price level is an important objective of monetary policy, thus providing a rationale for price stability as the primary long-run goal for monetary policy.**

In recent years, central banks have been putting greater emphasis on price stability as the primary long-run goal for monetary policy. Several rationales have been posited for this goal, including the undesirable effects of uncertainty about the future price level on business decisions and hence on productivity, distortions associated with the interaction of nominal contracts and the tax system with inflation, and increased social conflict stemming from inflation. Not only do public opinion surveys indicate that the public is very hostile to inflation, but also a growing body of evidence suggests that inflation leads to lower economic growth.¹⁰ The discussion here of the monetary transmission mechanism provides an additional reason why price stability is so

¹⁰For example, see Fischer (1993).

important. As we have seen, unanticipated movements in the price level can cause unanticipated fluctuations in output, an undesirable outcome. Particularly important in this regard is that price deflations can be an important factor leading to a prolonged financial crisis, as occurred during the Great Depression. An understanding of the monetary transmission mechanism thus makes it clear that the goal of price stability is desirable because it lowers the uncertainty about the future price level. Thus, the price stability goal implies that a negative inflation rate is at least as undesirable as too high an inflation rate. Indeed, because of the threat of financial crises, central banks must work very hard to prevent price deflations.

The research on the monetary transmission mechanism outlined in this paper has been very useful in helping monetary policymakers understand how their policies affect the economy. This information not only is of interest in its own right, but also as we have seen, provides important guidance to monetary policymakers in their conduct of policy and how they may best avoid the mistakes of the past.

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