The Preparation of Monetary Policy

Essays on a Multi-Model Approach

by
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Acknowledgements

CONTENTS

1   INTRODUCTION AND OVERVIEW

1.1   Outline of the chapter

For a central bank to achieve its ultimate objective(s), it would be preferable to know in detail how monetary policy affects non-financial activity, that is inflation and real output. In practice, however, the central bank only has imperfect knowledge of the exact interactions that take place within various chains of the monetary transmission mechanism, but has (subjective) probability distributions in mind. The leitmotiv of this book is that this uncertainty should have implications for the preparation of monetary policy. Our goal is to translate the intricate interactions between various endogenous and exogenous variables (policy instruments) into simple relationships. These could then serve as guidelines for and legitimation of specific forms of monetary policy. Or, to put it differently, the degree of transparency of monetary policy and the successful use of rules in conducting monetary policy may be said to, *inter alia*, depend on the ability of the central bank to establish such relationships empirically. We study some of these relationships in subsequent chapters. The purpose of this chapter is to clarify some important theoretical concepts in order to illustrate the interrelationships between the following chapters.

The next section contains a general description of important concepts used in the formulation of monetary policy. This provides us with the necessary tools to discuss in more detail the various channels through which monetary policy decisions affect policy targets in section 3. It is concluded from this section that there exists considerable ambiguity regarding the various transmission channels actually operating in the economy. Economic theory provides us with some basic notions, but the transmission mechanism in practice is determined by structural, behavioural and institutional factors. Given this uncertainty, a general framework for preparing a strategy of monetary policy is proposed, in section 4. Our hypothesis is that, since the transmission mechanism is too complex to be adequately described by a single large structural model designed to answer all questions, the policy maker should also rely on a complementary range of models, dealing with specific chains in the transmission mechanism. This provides him flexibility in addressing specific questions and in allowing new information to be processed and evaluated in a relatively short span of time. The subsequent chapters of this book contain illustrations or case studies of this approach; the choice of subjects is motivated in section 5.

1.2   Monetary policy - some conceptual issues

Final objectives of economic policy are stated in terms of variables deemed to influence directly the welfare of individuals and society. We denote the latter variables as *ultimate-target variables*; they are pursued in their own right as final goals of economic policy. The volume of output, aggregate employment and the price level are often regarded as ultimate target variables. Stability of the price level is naturally associated with monetary policy, since it is generally accepted that inflation in the long run is a monetary phenomenon. In recent years, this fairly general statement has been sharpened considerably, to the extent that monetary authorities throughout the world are now moving to adopt medium- to long-run price stability as their primary goal (Kahn, 1996). The latter statement needs some clarification.[1] First, the fundamental reason to pursue price stability is that inflation is economically and socially costly. This hypothesis is by now fairly well documented (see, for example, Barro, 1995; Fischer, 1981, 1994; Fischer and Modigliani, 1978), and will not be discussed here. The costs of inflation depend on the institutional structure of the economy, in particular the tax system and especially the taxation of capital, and on the extent to which the inflation rate has been anticipated.[2] Second, the primary reason for making price stability the goal of monetary policy as conducted by an independent central bank is the inflationary bias inherent in monetary policy (Cukierman, 1992; Walsh, 1993; Debelle and Fischer, 1994; Fuhrer, 1997). This notion has its roots in the 'time inconsistency' literature, as developed by Kydland and Prescott (1977) and Barro and Gordon (1983). The thrust of this argument is that monetary policy makers who pursue price stability as well as employment growth could end up with a higher inflation outcome, with no better employment outcome, than one that is solely focussed on price stability (Sijben, 1992). Third, in stating, as we do, that price stability should be the final objective of monetary policy, it is important to be clear about what is meant by price stability, as it can have different interpretations with different implications.

Defining price stability

Monetary policy could target a constant price level, a zero inflation rate, an upward drifting price level or a low but nonzero rate of inflation (Bernanke and Mishkin, 1997; Fischer, 1994, 1996; Goodhart and Viñals, 1994). An advantage of a price level target is that it keeps uncertainty about price levels

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[1] Goodhart and Viñals (1994); Okina (1995); Fuhrer (1997).
[2] See Feldstein (1996) for a calculation of the economic costs of inflation in the US implied by the interaction of the tax system and inflation.

in the distant future smaller than it would be with a zero inflation target, which entails base drift. The chief disadvantage is that it puts greater strains on monetary policy, because variations in the inflation rate are required to reverse the effects of previous shocks on the price level. There are in addition several reasons for aiming for a small positive inflation rate in stead of a zero rate. First, the true rate of inflation is below the measured rate, due to measurement problems (Debelle, 1997). Second, as Akerlof, Dickens and Perry (1996) point out, if nominal wages are rigid downward, then reductions in real wages will involve less employment loss when brought about through inflation. Very low inflation therefore effectively reduces real-wage flexibility and may worsen the allocative efficiency of the labour market.[3] Third, with a zero targeted inflation rate, there is a greater chance of deflation. As pointed out in the literature on financial crises, persistent deflation can create serious problems for the financial system (Fisher, 1933; Bernanke and James, 1991; Mishkin, 1991). Fourth, the lower bound of zero on the nominal interest rate that arises because cash carries a zero nominal interest rate imposes problems for monetary policy with a zero targeted inflation rate (Summers, 1991). If the expected inflation rate is zero, it is very difficult to engineer a negative short-run real interest rate (which may be needed during recessions). These arguments lead us to conclude that price stability is best interpreted as achieving and maintaining a low and stable rate of inflation. Correspondingly, in this book, we define the inflation rate as the ultimate target variable for monetary policy, which is in line with the actual practice followed by most if not all central banks.

Acknowledging that a low level of inflation should be the central goal of monetary policy, however, does not imply that monetary policy should ignore output movements.[4] Although it is widely, though not universally, accepted that there is no permanent trade-off between price stability and economic growth[5], this does not apply in quite the same way to the short run (Papademos and Modigliani, 1990; Brunner and Meltzer, 1976). Econometric studies in the US and elsewhere establish the existence of a short-run trade-off between inflation and growth (Gordon, 1990; Romer,

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[3] In contrast, price level stability is a device to stabilise economies with coordination failures. More specifically, downward wage rigidity provides a break against runaway deflation. It is thus a feature of labour markets that stabilise the economy against extreme outcomes by reducing deflationary expectations and permitting real interest rates to fall (Akerlof, Dickens and Perry, 1996, pp. 51/52).

[4] See Romer and Romer (1996) for a discussion of the institutional settings of the central bank most conducive to realising monetary stability.

[5] Fair (1996), working with data from thirty countries, finds that functional forms for price and wage equations that imply the possibility of a long-run Phillips curve tradeoff on the whole perform better than those implying no tradeoff. For recent research on the contrary, see Bullard and Keating (1995).

1996).[6] When an economy is hit by an inflationary shock, for example, the decision on how quickly to return to the trend rate of price increase does have implications for the level of output in the transition period. The implication is that the monetary authority is also interested in the effects its policy decisions elicit in the short term on real economic activity. This motivates the frequent use in this book of the concept of non-financial activity, which comprises inflation as well as real output.

Monetary policy makers have at their disposal certain *operational targets* of economic policy; i.e. variables that are directly under the control of the monetary authorities, who have some discretion regarding the selection of particular variables to use as operational targets. The monetary authority faces a basic choice between selecting a 'price' or a 'quantity' as its primary operational target. In particular, it can choose either a short-run market interest rate (such as the overnight rate, i.e. the rate at which commercial banks lend immediately available funds to each other), or the amount of a central bank liability (such as base money). Both variables are potential operational targets.[7] None of them is directly related to economic welfare. The purpose of controlling them is simply to influence other variables which are more directly related to welfare. To achieve these operational targets, central banks have at their disposition certain sets of *instruments*, especially reserve requirements, standing facilities and open market operations. In most countries the actual instrument is the change in the central bank balance sheet that results in the desired change in a very short-term market interest rate. The latter functions as an operational target. This target could be the overnight rate, but also 1 to 3 months interest rates. Below we will use the label instrument in a rather broad sense, pertaining to the operational target as well as the actual instruments available to achieve these targets.

Intermediate variables are like operational targets in the sense that they have no direct significance for social and economic welfare; their main importance (and the reason why the monetary authority may attempt to target

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[6] Early theoretical explanations of the existence of a short-run Phillips curve include expectational errors (assuming adaptive expectations; Phelps,1967; Friedman, 1968). Under rational expectations, Lucas (1973) argued that a short-run trade-off between inflation and output was the result of signal processing errors of economic agents (confusion by buyers and sellers about the meaning of changes in nominal prices). It could not be exploited for policy purposes. In contrast to this new classical approach, other explanations argue that monetary policy influences real activity because of the existence of sticky wages and prices. Recent research has produced models that explain these nominal rigidities as the outcome of optimizing behaviour, see Ball, Mankiw and Romer (1988); Mankiw and Romer (1991). This line of inquiry also provides evidence that the curvature of the Phillips curve depends on the level of inflation rates (Fischer,1996; Akerlof, Dickens and Perry,1996).

[7] Once one of the two is selected as the primary actual operational target, the other cannot be controlled precisely. Only in a non-stochastic system is the setting of price variables the dual of fixing quantities and vice versa (Papademos and Modigliani, 1990; Bryant, Hooper and Mann, 1993).

these variables) lies in the alleged relationship with the ultimate target variable. The main difference between operational and intermediate variables is that while the former are narrowly controlled by the policy maker, the latter can not generally be influenced with great precision. This is because intermediate variables are determined by the behaviour of private sector agents as well as of policy makers. The question then naturally arises as to why the policy maker should target an intermediate variable instead of directly focussing on realising the ultimate target.[8] In other words, why transform the making of monetary policy into a two-stage procedure? In the first stage of this procedure policy makers determine the value of the intermediate target chosen that would be consistent with achieving their ultimate target.[9] In the second stage the central bank acts to achieve this projected value of the intermediate target.[10] This two-stage procedure is a reaction to the dynamic and stochastic environment in which the policy maker operates. As elaborated by, e.g., B. Friedman (1990, 1996), Groeneveld et al. (1996) and Sijben (1977), the fact that policy actions and their economic effects are separated both by time and by behavioural process (see sections 3 and 4) implies that grounding monetary policy on intermediate targets provides a coherent way of taking the consequences of (unavoidable) unexpected developments into account. A second argument for a role for intermediate targets is in using them as signals to the public about monetary policy intentions and thus as instruments to influence inflation expectations (Bernanke and Mishkin, 1992; Poole, 1994).

A final class of variables is the *indicator, or information, variables* (Burger, 1971; B. Friedman, 1990). They can be defined as having information value regarding the impact of operational targets on the outcomes of ultimate target variables, but are not themselves an object of control (as was the case for intermediate variables). Indicator variables can include variables that, in another context, may be viewed as an intermediate target. For example, the growth rate of the money stock can be viewed as an intermediate target, but it can also be seen as an indicator of the potential strength of actual demand in the economy. Other indicator variables are those that convey information about the future evolution of the economy. They include, among other things, variables relating to the current and future level of real economic activity (leading and coincident indicators) and

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[8] There exists a lively and as yet unresolved debate about the advisability of targeting intermediate variables, see for example M. Friedman (1959, 1968, 1982); Kareken, Muench and Wallace (1973); Waud (1973); B. Friedman (1975, 1977, 1990, 1993, 1994); Bryant (1980, 1983); McCallum (1985, 1990).

[9] Thereby *implictly assuming that the choice of intermediate target is already made*. This choice will be discussed shortly.

[10] In the second stage of this procedure, the policy maker aligns his operational target to the desired outcome of the intermediate target. This is realised with the instruments the central bank has at its disposition.

expectational indices, including expectations derived from financial variables and from surveys. Some of the chapters of this book are devoted to the analysis of various indicator variables.

The task facing policy makers is then to choose particular intermediate targets and information variables and to develop procedures for intertemporal variation of these targets such that the economy is most likely to attain the best feasible combination of time paths for the ultimate-target variable. The way in which policy makers resolve the issues of choice and variation of intermediate targets constitutes the *monetary strategy*. The monetary strategy followed manifests itself in *monetary policy* decisions, i.e. decisions concerning the choice of and intertemporal variation in operational targets such as to achieve the projected outcome for the intermediate target variable.

Regarding the choice of intermediate target, a voluminous literature developed.[11] It becomes apparent from this literature that the optimal choice depends in part on the nature of disturbances influencing the economy. In actual practice, central banks target monetary aggregates (for example, the Bundesbank prior to the start of stage three of EMU), the exchange rate (De Nederlandsche Bank until January 1999), or expected inflation (Bank of England). In addition, the Federal Reserve does not target intermediate variables, but instead uses an eclectic strategy (Feldstein and Stock, 1994). In the latter strategy, a variety of information variables is used for monetary policy purposes, with different weights placed on different variables depending on the particular circumstances. For a recent discussion of intermediate monetary targeting, see Estrella and Mishkin (1996) and Poole (1994). The experience in the Netherlands with intermediate targeting of the exchange rate is discussed in a subsequent chapter of this book. The same applies to the use of expected inflation as an intermediate target, which is the central tenet of the so-called 'direct' (an unfortunate terminology) inflation targeting strategy (Svensson, 1996; Green, 1996; Bernanke and Mishkin, 1997).[12] See Ball (1997) for an evaluation of various monetary policy rules.

A monetary strategy is thus the foremost important element of any monetary policy. But a prerequisite for a successful monetary strategy is an understanding of the relationship between operational targets and ultimate target variables (Romer and Romer, 1996). A shorthand commonly used to describe the complex chains of behavioural causation between these two

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[11] See Papademos and Modigliani (1990) and Bryant, Hooper and Mann (1993) for a theoretical discussion and an empirical evaluation, respectively. See also the study by the European Monetary Institute regarding the monetary policy strategy of the ESCB (EMI, 1997).

[12] In an inflation-targeting strategy, the monetary policymaker announces a target or a target range for future inflation. A change in the current policy stance is indicated if projected inflation over a medium-term horizon falls outside the announced range. Thus, in contrast to its name, direct inflation targeting is in fact an intermediate targeting procedure (Svensson, 1996).

types of variables is that of the *monetary transmission mechanism*. This mechanism can be seen as a dynamic process through which monetary policy decisions (i.e. the deployment of instrument variables) are transmitted into the ultimate policy objective (Taylor, 1995). There are many different views of the monetary transmission mechanism. These views differ in the emphasis they place on money, credit, interest rates, exchange rates, asset prices or the role of commercial banks and other financial institutions. Given the primary objective of this book - to present an analysis of interactions that take place in different chains of the monetary transmission mechanism - it is clear that we must discuss this mechanism in more detail.

1.3   The monetary transmission mechanism

A description of the various channels through which monetary policy decisions may affect the ultimate policy target, that is, the monetary transmission mechanism, is useful for several reasons. The most obvious is that such knowledge is important for a successful conduct of monetary policy (M. Friedman, 1969; Sijben, 1977). Moreover, the transmission mechanism describes how private-sector agents respond to the policy actions of the monetary authorities, and how the monetary authorities and the private sector then interact. Important factors conditioning the behaviour of economic agents (and the policy maker, for that matter) are institutional and structural factors, in particular those determining the functioning of markets, the financial behaviour of firms and financial intermediaries and the composition of their balance sheets (Mankiw and Romer, 1991; BIS, 1995). These factors are not constant, but subject to ongoing change. Moreover, economic agents operate in an uncertain environment, so that their decisions are based on expectations regarding factors relevant for those decisions, such as the behaviour of the monetary policy maker.[13] The strategy followed by the monetary policymaker must take these kind of changes and expectations into account. The fact that the monetary authority interacts with a changing environment implies that the chains of the monetary transmission mechanism actually form a circle, with the circle being closed by linking the movements in the ultimate target variable back to the instrument variable through a policy rule or reaction function (Taylor, 1995, 1996). Knowledge of the transmission process can thus have an important bearing on the monetary strategy (Mishkin, 1996). More specifically, if the outcome with respect to the ultimate target variable differs from that which the monetary policy authority had projected, there might have to be a revision of the strategy (Freedman, 1996).[14] It is therefore useful to discuss this transmission process

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[13] *For a discussion of uncertainty in a monetary economy, see Hoogduin (1991).*
[14] Of course, revision of the strategy is not the first action to be taken by the policy maker.

in more detail.

There exist different views of the monetary transmission mechanism (see Mishkin, 1995, for an overview). It consists of several channels, all of them interlinked and each of them comprising of several stages. Central to these different views are alternative conceptions regarding the structural and institutional factors mentioned above, more specifically the functioning of credit, labour and product markets. To illustrate the working of the monetary transmission mechanism and the role of these factors, we consider it useful, for presentational purposes, to highlight the following elements:[15]

1. the influence of changes in the instrument variables on the cost of finance;
2. the influence of changes in the cost of finance on expenditure decisions of private-sector agents, i.e. on non-financial activity;
3. the passthrough of changes in non-financial activity to output and inflation (in particular the split between real activity and inflation).

Before discussing these elements in more detail, we make three observations. First, underlying this division of the transmission mechanism into separate stages, is the conception that markets do not necessarily clear instantaneously. If, on the other hand, markets did always clear, a change in the instrument variable would immediately lead to a compensating change in the price level, without having consequences for output, and maintaining the classical dichotomy. Second, in addition to the nominal rigidites just mentioned, we explictly allow for the possibility of real rigidities, by exploring the relations between a change in the instrument variable of monetary policy and non-financial activity under credit market imperfections. The latter are a result of asymmetric information between lenders and borrowers (Stiglitz and Weiss, 1981; Bernanke, 1983; Bernanke and Blinder, 1988). To position these observations in macroeconomic theory, new classical or real business cycle theory would reject both kinds of rigidities, 'traditional' Keynesian economic theory would accept nominal but does not mention real rigidities, and new Keynesian economics would accept both nominal and real rigidities (Mankiw and Romer, 1991). Third, it is more or less generally accepted that changes in the instrument variable in the long run only affects prices, so that money is neutral in the long run (see the second section). Possible short run barriers to full and immediate nominal adjustment ('nominal' rigidities) are not inconsistent with this view. Whether the same applies to situations in which supply and demand do not come together because of market failures ('real rigidities'), is not clear. The

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Confronted with persistent differences between projections and actual outcomes, the policy maker will first change his policy instruments. If this is not succesful in aligning projection and outcome, revision of stategy becomes an option.

[15] The transmission mechanism is a dynamic process, in that it represents a sequence of events taking place at successive moments in time. The ordering below reflects the timing of this sequence.

literature on credit market imperfections, for example, does not address this issue, because of the basically static nature of the analysis.[16] Usually it is (implicitly) assumed that these real rigidities are not long-run phenomena, implying long-run money neutrality.

Examining the first stage

The presumption underlying this element is that the monetary authority exercises power over economic behaviour of private-sector agents by influencing the financial (opportunity) cost relevant for the spending decisions of these agents. The typical operational target used by central banks is the overnight rate, which the central bank broadly determines through its influence on bank reserves (Crockett, 1994). According to BIS (1994), the passthrough from these overnight rates to short-term market interest rates is fairly complete in most industrialised countries. We take this to imply that the central bank can, for all intents and purposes, control the short-term market interest rate (see also Wellink, 1990; Bernanke and Blinder, 1992; Mauskopf, 1990; Blinder, 1997). However, the level of short-term market interest rates affects only a proportion of the financing of expenditure of households and firms. The private sector also finances part of its spending at longer-term rates on the capital market as well as through financial intermediaries (and through other means like retentions and equity issues), and the cost of borrowing from these sources is only indirectly influenced by the current level of money market rates. Important determinants of the impact of changes in the instrument variable (the overnight rate) on the cost of finance thus include:

- the substitutability between different forms of finance;
- the passthrough of changes in market interest rates to bank lending and deposit rates;
- the impact of changes in short-term interest rates on long-term interest rates.

The substitutability between different forms of finance and the responses to market rates of lending charges applied by financial institutions is to an important extent dependent on the functioning of credit markets. In a neo-classical financial environment without frictions and asymmetric information, that is, a world in which the Modigliani-Miller (1958) theorem holds, agents in the private sector can, at market interest rates, borrow and lend whatever amounts are necessary to achieve their desired spending patterns (Purvis, 1992). The absence of information imperfections between

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[16] This issue could have important policy implications. If real rigidities do not vanish in the long run, and monetary policy consequently is non-neutral in the long run, this is a new element in the discussion regarding central bank independence. As this discussion is beyond the scope of this book, we will not take it up here.

suppliers and users of funds implies that the substitutability between internal and external financing sources and between different forms of external finance, such as intermediated and non-intermediated credit, is perfect (BIS, 1994). In this case, financial intermediaries play a purely passive role in the monetary transmission process, namely the channeling of short-term saving to longer-term investment projects. If bank assets and liabilities have identical characteristics to other borrowing and saving instruments, such as bonds, then bank and non-bank instruments will trade at the same price (assuming risk neutrality). The passthrough between market interest rates and bank rates is immediate and complete (Dale and Haldane,1993). Financial prices in this perfect capital market allocate financial quantities optimally. In this case, interactions between financial variables and non-financial activity can be reduced and simplified to interactions between interest rates and non-financial activity (Mauskopf, 1990; Mankiw and Romer, 1991).

An alternative view is that financial prices do not clear the credit market. This view of the transmission process is also known as the credit channel.[17] In this case the efficient functioning of the market for credit is hindered by asymmetries in information between borrowers and lenders, and in principal-agent problems (Oliner and Rudebusch, 1996). These problems lead to endogenous and varying credit conditions which help to shape the transmission of monetary policy decisions through the economy. As recognised by, *inter alia*, Kashyap, Stein and Wilcox (1993) and Dale and Haldane (1993), this uncertainty generates a potential important role for financial intermediaries which specialise in gathering and distilling agent-specific information. The implication is that financial intermediaries, usually banks, play an unique role in the monetary transmission process, acting as an interface between the policy decisions of the central bank and non-financial activity. Decisions of financial institutions regarding the size of their balance sheet and the yields paid on their assets and liabilities in this case play an active role in the transmission of monetary policies. Because financial institutions obtain a portion of their funds from instruments subject to reserve requirements, open market operations, which alter the quantity of reserves, may affect the opportunity cost of funds to those institutions beyond their impact on market interest rates. That is, financial quantities (the availability of credit) play an important role in the transmission mechanism. In this view of monetary transmission the impact of changes in market rates (price) on the cost of finance (which is price- as well as quantity-related) is dependent on (BIS, 1994, 1995):
- the behavioural characteristics of the economy, expressed in e.g. the

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[17] For an extensive discussion of this channel see, for example, B. Friedman (1983); Bernanke (1983, 1993a,b); Kashyap and Stein (1994); Hubbard (1994b); Bernanke, Gertler and Gilchrist (1996); Friedman and Kuttner (1993); Bernanke and Gertler (1995).