Monetary Policy and Financial Stability

Monetary Policy and Financial Stability:

Challenges before and after the Global Financial Crisis

By

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FOREWORD BY JOHN H. WOOD[1]

There was a time when we thought we knew what central bankers ought to attempt, based on the experiences of the quarter-century-long Great

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Moderation beginning in the early 1980s, which was price stability that fortunately was conducive to financial stability as well as to stable economic growth. Even those with continuing attachments to the Phillips Curve (or Taylor Rule) trade-off placed considerable stress on the beneficial effects of price stability. Belief in this (in hindsight, overly abstract) monetary policy had already been weakening before the shock (?) of the collapse of the housing bubble in the new century. Financial failures and government bailouts were becoming more frequent as price stability improved, and the apparent failure of the financial markets in 2008-2009 demonstrated needs for wider central bank models and responsibilities.

So should central bankers expand their models to account for the causes and effects of changes in asset prices? These were considered during the stock boom of the late 1920s, and Chairman Greenspan's "irrational exuberance" of the late 1990s, although central bankers failed to consider (or even be aware of) the housing threat leading up to 2006.

These complications are not easy to accomplish with the precision required for constructive policies, particularly when it is not obvious that financial disturbances are in fact exogenous "shocks" from outside the system. They may be endogenous outcomes of the ordinary functioning of the financial markets, in which case the recent government interferences with markets have been misplaced, including the increased incentives to take risks arising from government-backed insurance schemes, forced capital requirements, and Too-Big-To Fail. There is a question, the author states, of how much risk the government and central bank can shoulder without raising unacceptable economic and social costs. What is needed for a more robust, stabilizing, financial system is more risk-bearing by decision-makers, that is, the realization of genuine, incentive-and-information-driven, markets.

This book explores these issues in the context of financial-market performance in recent decades. A principal conclusion is that the unwinding of bubbles and episodes of financial stress are too frequent and costly to be dismissed as exogenous shocks of little consequence to forward-looking stabilisation policy, so that academic researchers and central bank practitioners should ask whether and how policy should intervene when financial stress inevitably arises. The task of delivering economic stability requires a firm grasp of how to help markets become more robust.

—John H. Wood

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CHAPTER 1

INTRODUCTION

> ***"Over a long life in the midst of changing markets, (regulatory stances and infrastructures),*** *has brought to bear a rare combination of analytic vigor, clarity of writing, and a breadth of experience.* ***All of that is immensely valuable for those of us involved in the unending quest for understanding the shifting roles of money and financial practices as we seek to reconcile growth and stability."*** [emphasis added]
> —Paul A. Volcker[2] (2008), on Peter L. Bernstein, p. xiv.

National economic policymaking has customarily been restricted (in various ways) due to economic interdependence, especially between Europe and the United States. Such interdependence has been predominantly more confining in the sphere of monetary policy. Monetary linkages between financial markets have reduced the ability of individual monetary authorities to conduct an independent monetary policy. In particular, financial markets operating in fixed exchange-rate regimes or common-currency areas (as for example, the Eurozone) are linked by a high degree of capital mobility which limits the control of any individual monetary authority over its money supply and interest rates (see for example, Shambaugh, 2004). Specifically, since capital movements tend to be promptly responsive to relative interest rate incentives, a change in monetary policy in any one market induces offsetting capital flows which modify the domestic impact of such a policy. Moreover, economic interdependence stirs offsetting capital flows that transmit the impact of any change in monetary policy from one country to another.

Capital mobility, thus, poses a significant threat to monetary independence. In fact, an overall loss of control over the domestic economic environment effectuates due to the mere openness and economic interdependence. As

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[2] Chair of the Federal Reserve (08.1979-08.1987),
Chairman of the Economic Recovery Advisory Board (02.2009 – 01.2011),
Co-Chairman **Federal Reserve Board Centennial Advisory Council**
(https://www.federalreserve.gov/aboutthefed/centennial/centennial_advisory_council.htm).

Prof. Helmut Schlesinger (1987), Vice-President of the Deutsche Bundesbank at the time, explicitly remarks: "International cooperation, aided by financial and geo-political measures has become an indispensable feature of the world we live in today. (...) However, there are certain intrinsic limits which must be heeded. The sound foundations that support stability and the market economy as engines of economic development, must not be weakened in any country, nor may any of the principles that underpin the flexible structuring of economic policy be put at risk." (Speech in Paris, August 28, 1987). Therefore, economic coordination among interdependent economies caters distinct benefits in recovering greater control over the domestic economy; however, possibly at the price of making concessions to partner countries (for an extensive discussion see Kokores T., 1989, Rodrik, 2000). The gains from coordination can be regrouped into two categories, namely macroeconomic stability, and economic efficiency.

The workings of the financial system provide matching of labour to capital, allow savers and borrowers to defer consumption or bring it forward, and enable agents to share, and trade, risks. Therefore, the more efficient the system, the more effective this functioning will be. In fact, a poorly functioning system will back wasteful schemes and shun worthy ones, trap people in the present, heap risk on them and slow economic growth, thus putting finance in a dilemma. "A sophisticated and innovative financial system is susceptible to destructive booms; but a simple, tightly regulated one will condemn an economy to grow slowly" (*The Economist*, April 5, 2008, p. 15).

In the apparent absence of a simple answer to what is 'best' in all circumstances, a number of interrelated issues must be addressed in the current analysis, in order to define what could be the most appropriate way to formulate monetary policy. Issues to be addressed include: the objectives that monetary policy attempts to accomplish, the ways the latter is achieved, their pertinent presentation to the general public, the strategic role of money growth in the conduct of monetary policy, the internationalisation of financial markets and their effect in the efficiency of macroeconomic policy instruments and of relevant institutional arrangements. Also, the lessons from the Euro, the task or tasks that a central bank should undertake in its role as protector of the value of money and all nominal obligations nationally and internationally, and, last but not least -essentially, an investigation of how recent developments in academic research and central banking practice have changed our answers to these questions.

Ample evidence warrants that there is no single response to these questions that is applicable to all central banks and all time periods. Distinct countries face distinct opportunities, that are nevertheless interdependent. Since Keynes' (1923) *A Tract on Monetary Reform*, economists have known that a country's potential gain from the choice of monetary arrangements depends on the choices that other countries make.

In particular, the period since the early 1980s has been decisive for the evolution of monetary theory and practice. As far as the practice is concerned, the crucial factor has been the very success of numerous central banks to acquire and maintain credibility for low inflation, and, over several years, improve the stability of inflation and output relative to potential. Indeed, it is accepted that central banks can and should primarily use monetary policy to maintain low inflation over time. Such commitment to price stability renders monetary policy more successful in stabilizing employment over the business cycle. Moreover, greater transparency is also accepted to enhance the effectiveness of monetary policy. With respect to the theory, the decisive improvement has been the introduction and wide acceptance of rational expectations in models of monetary policy, as it mainly enabled the incorporation of forward-looking elements of aggregate demand and price-setting in the latter, which also enabled the understanding of the success of monetary policy in practice.

However, different views have been expressed about the various specific channels through which monetary policy actions are transmitted to the real economy (in particular, into changes in real gross-domestic-product, GDP) and inflation), which are complicated and still imperfectly understood. Therefore, a relatively clear knowledge of this transmission process is vital for the appropriate conduct of monetary policy.

Chapter 2 begins with a broad overview of the main channels of the transmission of monetary policy proposed in the extant literature, followed by a discussion of the factors that may alter these transmission channels or affect their relative importance. Furthermore, the analysis is followed by a concise, penetrating, analytical presentation identifying the channels of monetary transmission mechanism.

Monetary policy can have an impact on asset prices and exchange rates because of the effect it has on financing conditions in the economy, especially due to its impact on expectations. Interest-rate and financial asset-price changes influence saving, spending and investment decisions of households and firms. A fall in asset prices tends to cause strong effects on

spending, while the consequent change in debt-to-asset ratios hampers debt repayment for households and firms. Similar effects can arise when general sentiment deteriorates about the ability to service debts in the future. However, certain direct effects of monetary policy on aggregate spending are not captured by the transmission via the traditional interest-rate or exchange-rate channels, and they, consequently, focus mainly on the critical role credit markets have in the transmission of monetary policy actions.

As emphasized in most of the surveys cited in *Chapter* 2 (according to the so-called lending view), monetary policy actions create two effects, namely one that focuses on bank loans and another on borrower balance-sheets. In both, capital market imperfections that enable certain firms instead of others to obtain financing, determine the effectiveness of monetary policy. Since changes in credit conditions are not reflected only in interest-rate levels, it is important to understand the ways in which credit-market imperfections determine the macroeconomic equilibrium, as well as the channels of the transmission of monetary policy decisions to the real economy.

Monetary policy authorities, essentially an independent central bank, can influence economic developments through control of the supply of the monetary base. Changes in the money supply stir, in the long run, changes in the general price level, yet not the level of employment and real income. Milton Friedman's uncontested famous quote applies, in that 'inflation is *ultimately* a monetary phenomenon' (Friedman, 1970, p. 24). Price stability enhances the potential for economic growth and supports higher living standards. This is effected mainly by improving the transparency of relative prices, reducing inflation risk premia in interest rates and distortions of tax and social security systems, avoiding unnecessary hedging activities, increasing the benefits of holding cash, preventing the arbitrary redistribution of wealth and income and, eventually, by contributing to financial stability. Through the effort to maintain price stability, a central bank contributes to broader economic goals (see, for example, ECB, 2011, pp. 55-57).

Chapter 3 demonstrates that the theory and practice of monetary-policy conduct are closely interrelated and thus continuously influence each other. It provides a concise analysis of how the main features of monetary policy frameworks implemented by major central banks (after the collapse of the Bretton Woods fixed-exchange-rate system in the early 1970s) were affected by prevailing academic views of the time; on the contrary it also evaluates how contemporary academic work reflected the experiences of monetary authorities. Certain features of policy frameworks proved to be more persistent, such as the emphasis on longer-term price stability, while

others were eventually rather short-lived. The emphasis on longer-term price stability constitutes an essential feature of sound monetary policy, thus, being currently reflected in the policy frameworks of all major central banks. Nonetheless, the pertinent distinct operational tools employed to deliver the aforementioned goal are still a matter of debate, due mainly to considerable differences in the structure of distinct national real and financial sectors, as well as the associated policy challenges.

Chapter 3 consequently gives a review of the nature and origins of the key elements of the apparent consensus before the 2008-09 global financial crisis, i.e. the considerable convergence in theory and practice of monetary policy in the last thirty years leading to 2009. The latter includes an account of the components of the consensus theory of monetary policy, reflecting the emergence of the explicit interest-rate policy. Then follows a concise presentation of the prevailing model of monetary policy that constituted the main workhorse model most central banks used as a guide to monetary policymaking, in unison until prior to 2009.

It is important to emphasize that the stability of the financial system promotes the smooth functioning of the payment systems and the effective transmission of monetary policy, thus, ensuring that the primary monetary policy objective of achieving and maintaining price stability is reached. Furthermore, a robust financial system enhances the resilience of the economy to shocks of various sources, also having an effect on the overall performance of the economy.

It is also necessary to discuss to what extent risk can be shouldered by a central bank while ensuring its asset soundness, although a specific evaluation of risks attached to individual assets goes beyond the scope of this study. It has been pointed out, however, *that when the public sector and a central bank shoulder private-sector credits in an extremely large amount*, as may have been the case in facing the 2008-09 global financial crisis, *such behaviour might be at quite a substantial social cost that would erode the mechanism of capitalism* (Oda and Okina, 2001, pp. 334).

Therefore, consequently, *Chapter* 4 explores the relationship between financial stability, deflation, and monetary policy. The discussion starts by reviewing major issues concerning the definition of financial stability/instability, then addressing financial stability and price stability and continues to analyse the interrelation between monetary policy and asset prices, as well as the consequences of financial distress for asset price fluctuations and banking crises.

Bubbles in asset prices create distortions to nearly all economic decisions. Wealth effects create rapid expansions in consumption followed by vast collapses. Increases in equity prices enable firms to finance new projects, causing a boom in investment, followed by a bust. In addition, fiscal revenue rises in a booming economy, and thus encourages cuts in taxation and increases in expenditure. After the consequent inevitable slump in asset prices such fiscal policy actions are politically difficult to reverse. Therefore, asset price bubbles can create volatility in consumption, investment, financial intermediaries' solvency, and fiscal policy.

Furthermore, the flow of information may be disrupted, and price discovery may be impaired during periods of financial distress. The increased uncertainty that characterizes the disruption in the information flows results in high-risk spreads and a reluctance to purchase assets. It is, therefore, of particular importance for understanding financial instability to investigate the entailing risks.

In addition, the effects of shocks interfering with the flow of information in various parts of the financial system span from higher interest rates to problems in the banking sector and increases in uncertainty, to asset-market effects on balance-sheets. The recent economic turmoil gives credence especially to the last two. Financial instability, in the absence of any remedial action, can produce a severely adverse impact, not only in the functioning of financial markets, but also on the overall prospects of a country's economy.

To sum up monetary policy authorities face the central concern of finding and evaluating ways to prevent financial instability. In this endeavour one, first, needs to understand the nature of financial instability and the effect it may impose on the macroeconomy. Severe boom-and-bust cycles can lead to severe destabilisation in both inflation and output in an economy. Consumption is affected as well as investment, fiscal policy, and the survival of financial intermediaries. Most importantly, the down-side risks that they pose are significant. Since central bankers undertake a form of risk-management of the economic and financial system, they are bound to address these risks. This is the scope of the analysis presented on *Chapter* 5 namely to illustrate the extent that the extant literature provides a coherent way for understanding all these intricate issues that did not appear to be so widely and obviously alarming, or even dramatic at the time of the recent global financial crisis.

In connection to *Chapter* 5 follows *Chapter* 6 that concentrates on whether and how monetary policy should respond to asset price bubbles. The appropriate response, if it is considered appropriate to give any response at all, has been a matter of extensive debate during the two decades before the global financial crisis (initiating roughly during 1994-2000 with the U.S. stock-market boom and expanding with the subsequent recession). It is vital, however, to make the distinction, on which both academics and central banking practitioners agree, that in the aftermath of the bursting of a bubble, monetary policy needs to be conducted in a way that counters the adverse consequences brought forward. Therefore, we do not address the important issue of how monetary policy can enhance the recovery of an economy that has already fallen into a post-financial-crisis recession, which has been of major concern to both academics and policymakers in the aftermath of the recent global financial and economic turmoil, and the European sovereign debt crisis.

As financial crises and economic contractions tended historically to follow periods of explosive asset-price growth, it is argued that monetary policy can restrain the adverse effects that financial instability may impose on the economy overall, just by attempting to defuse asset-price booms at a relatively early stage. However, how likely it is that asset prices eventually collapse, leading also to a macroeconomic decline, may depend on the underlying reason of their appreciation.

According to the traditional view, a reaction of monetary policy to asset-price misalignments is justified *only* when asset prices are known to provide useful information about the future course of inflation. So long as monetary policy maintains price stability, it promotes financial stability as well. This view holds that financial crises (or simply the apex on the accumulation of "financial imbalances") need to be tackled by lender-of-last-resort practices or regulatory policies. Nevertheless, any attempt to evaluate the appropriate monetary policy response to asset price bubbles, should not fail to consider primarily the explicit objectives of monetary policy, and its ultimate aim to promote public welfare by fostering economic prosperity.

However, the traditional view has been (at least partially) criticised by several economists. Since asset price movements lead to macroeconomic fluctuations affecting prices and employment, the monetary authorities are bound to be concerned with the former. Yet, several crucial issues need to be addressed before a monetary policy response. *Chapter* 6 analyses in a critical way such questions, as whether monetary policy should react directly to asset prices or, even, whether asset prices need to appear in some

form in a reaction function a central bank uses as a guide for monetary policy.

Furthermore, when policymakers face large fluctuations in asset prices, but muted inflation expectations, concerns arise on whether inflation is measured accurately, as well as whether price stability is ensured. It is debated whether asset prices should be considered when defining price stability, and, generally, whether asset prices may play a significant role in the conduct of monetary policy. Additionally, even though it is widely accepted that asset prices offer (even partially) useful information to monetary policymakers in the short-term, views are mixed about whether they bear any strong link to the primary indicators of monetary policy (output gaps and inflation forecasts).

The debate pins down to whether price stability is sufficient to foster overall financial stability, or whether a trade-off exists (at least in the medium run). If the latter is the case, it is questioned whether monetary policy should exercise its influence on counter asset price bubbles when they grow (before forecasts to inflation are affected) or respond to their effects after they unwind. The conventional view before the global financial crisis accepted that asset price misalignments are difficult to recognise and that central banks should act just against the adverse consequences of a bubble unwinding. The opposite view advocated the merits of the so-called 'pre-emptive' monetary policy. The latter is conducted as financial imbalances accumulate with the aim to forestall the potential adverse consequences in the aftermath of a crisis, especially since low and stable inflation is thought to possibly mask threats to the economy that weaken the financial system, and which cannot be captured by an output gap measure.

Prior to August 2007, academic economists as well as monetary policymakers viewed the advances in monetary economics (in both theoretical and applied research) as forming a somewhat unified and well-defined "science of monetary policy". A consensus had emerged among central banking practitioners with respect to most elements of monetary policy strategy, and in OECD countries monetary policy had been highly successful in establishing low levels and low variability of inflation, in addition to a decline in output volatility. The period from the early 1980s onwards, rightfully earned the title of the "Great Moderation".

Chapter 7 provides a concise account of the outbreak of the financial turmoil in 2007, the global financial crisis that spurred from the former, and the collapse in trade and economic activity in 2008 that followed the default

of Lehman. The sequence and severity of such events have led to a rethinking of monetary policy frameworks. For early elaborate contributions to this debate see for example, Fahr *et al.* (2011), Bean *et al.* (2010) and Mishkin (2011a).

As Wood (2015) notably remarks with reference to the United States:

> "The responses of government were as memorable as the decline itself, and perhaps more dramatic. They included massive stimulus packages, record peacetime budget deficits, and the acceleration of the Federal Reserve's transformation from central bank to fiscal adjunct … The development is inefficient as well as undemocratic. The Fed's power to print money is being used to direct resources to underperforming firms and unproductive activities in ways that interfere with payments and markets, undermining the competitive system in the process" (Wood, 2015, p. 146).

The bursting of the crisis brought forward the considerable limitations of the existing economic and financial models, providing obvious lessons for macroeconomic and finance research and posing unprecedented challenges to central banks. Central-bank policy responses have equally been of an unprecedented extent and manner, involving the exploitation of non-standard measures beyond the (mainly uncontested at the time) changes in a "policy" interest rate. Following the exposition in the previous chapter, *Chapter 8* gives a brief account of the unconventional measures taken by central banks in the aftermath of the crisis in their effort to address the deep recession of 2008-09 that followed (dubbed the 'the Great Recession'). Early accounts held that "a full assessment of the effectiveness of non-standard policies deployed by monetary and fiscal authorities will have to wait until the world's major economies have completely recovered" (Fahr *et al.*, 2011, p. 49).

Non-standard attempts in the conduct of monetary policy since the emergence of the financial crisis in August 2007 comprise a variety of central bank interventions by altering the size and composition of their balance-sheets to varying degrees. Such interventions span from credit-easing measures to support or improve the transmission of the monetary policy stance in the presence of market impairments, to operations so as to provide counterparty "funding reassurance" (ECB, 2015a, p. 61), as well as large-scale security purchases to cater for vital monetary policy accommodation while short-term nominal interest rates are at their effective lower bound. In this context, *Chapter 9* attempts a critical evaluation of the unconventional measures taken by central banks.

Near-zero short-term interest rates in advanced economies since 2009, render central banks unable to provide economic stimulus through a further cut in rates. A further challenge relates to financial stability as lower interest rates lead to a shift to higher leverage, riskier assets. The possibility of the stirring of bubbles is eminent since, in their quest for yield, investors reduce bank capital, while banks are unable to reduce deposit rates to the extent of low lending rates. This effect may also be exacerbated by central bank stance of (varied) asset purchases so as to prop the economy at the effective lower bound. As for example Ball *et al.* (2016) stress, this lower bound problem may not be short-lived, and, in fact, be common in the next decades. It is argued whether there is more that central banks can do to provide stimulus when rates are near zero and, furthermore, whether policies exist that may lessen future constraints from the lower bound.

The practice of monetary policy, in a range of countries, has been profoundly impacted by the global financial crisis. As argued in Blinder *et al.* (2017), "due to the speed and force of developments in financial markets and, more broadly, of the economy, monetary policymakers rarely had the luxury of performing extensive *ex ante* analyses of prospective changes in their responsibilities, instruments, or communications; necessity has often been the mother of invention" (Blinder *et al.* 2017, p. 3). Eventually, the question remains whether such changes are temporary policy responses in the aftermath of the financial crisis, or whether they reflect a clear permanent shift in the practice of monetary policy. It even remains arguable when and to what extent central banks have completed their 'exit' from the policies induced by the crisis, and prolonged by both subsequent European sovereign debt crisis.

The study is organised in nine *Chapter*s clustered in three Parts as follows: *Chapter* 1 is the introduction. Then follows *Part I*, which presents an overview of the state of monetary policy and consists of two chapters, *Chapter* 2, and *Chapter* 3. Then *Part II* analyses and critically reviews the central banks' assessment and reaction to asset price bubbles. It includes three chapters, *Chapter* 4, 5 and 6, and represents an extensive analytical review of the relevant literature. *Part III* comprises *Chapter* 7, that gives a brief account of the recent crisis and *Chapters 8*, and *9*, an account and critical evaluation of the non-standard monetary measures used.

PART ONE:

THE STATE OF MONETARY POLICY: AN OVERVIEW

CHAPTER 2

THE TRANSMISSION MECHANISM OF MONETARY POLICY

2.1 Introduction

The design of monetary policy and the achievement of the mandated and implicit objectives of a central bank are, in essence, determined by the transmission process of the chosen monetary impulses to the economy under consideration; in the case of the design of monetary policy, in forecast terms, and in the case of the implementation, in actual time. Even deciphering the past is vital for the monetary authorities, as the majority of empirical work is undertaken by using methods based in variants of time series analysis. The vast amount, intensity, and uniqueness with respect to time and entity of the choices taken by economic agents, in addition to the strategic interaction between the latter, are some of the factors that increase the complexity of the context that monetary policy is penetrating in order to have a desired effect on the economy. This chapter begins with an overview of the monetary transmission mechanism followed by a discussion of the main channels of the transmission of monetary policy proposed in the extant literature.

2.1.1 The Role of Monetary Policy and the Benefits of Price Stability

The monetary transmission mechanism reveals how monetary policy exerts its influence on the economy and it is based on the institutional premise that the central bank is the monopoly supplier of the monetary base, namely it is the sole issuer of banknotes and bank reserves. It is under this monopoly that it can primarily affect money market conditions and steer short-term interest rates. In the short run, this monetary-policy induced change in money-market interest rates sets in motion several mechanisms and actions by economic agents that ultimately influence the evolution of economic variables, such as output or prices. This process is complex, and although its basic features are well known, the extant literature does not provide a

clear and uncontroversial view of all the aspects involved. However, in the long-run, the long-run neutrality of money is a widely accepted and empirically validated proposition in economics.

In the long run, namely after all adjustments in the economy have passed through, a change in the quantity of money in the economy (all other things being equal) will not produce permanent changes in real variables, such as real output or employment. Yet it will indisputably be reflected in a change in the general price level. A change in the quantity of money in circulation ultimately represents a change in the unit of account (and hence in the general price level) that leaves all other variables unchanged. This general principle underlies all standard macroeconomic reasoning and theoretical frameworks. Real income or the level of employment in the economy in the long run is essentially determined by real (supply-side) factors[3]. In the long run, inflation is ultimately a monetary phenomenon, in that the central bank cannot influence economic growth by changing the money supply[4]. In this sense, it is the longer-term trend in prices or inflation that can be controlled by the central bank (see, for example, ECB, 2011, pp. 55-56).

A vast array of theoretical and empirical research has confirmed that the costs of inflation and deflation are substantial. Yet, in a regime of price stability, these costs are insignificant and more difficult to detect empirically. Consequently, it is now widely accepted (see for example ECB, 2011, pp. 56-57; García-Herrero *et al.*, 2001) that price stability helps to increase economic welfare and the growth potential of an economy.

2.1.2 The Benefits of Price Stability

The objective of price stability refers to the general price level in the economy and involves the avoidance of both persistent inflation and

[3] These include population growth, technology, the preferences of economic agents, and all aspects of the institutional framework of the economy (notably property rights, tax policy, welfare policies, and other regulations determining the flexibility of markets and incentives to supply labour and capital and to invest in human capital).

[4] Indeed, prolonged periods of high inflation are typically associated with high monetary growth. While other factors (such as variations in aggregate demand, technological changes, or commodity price shocks) can influence price developments over shorter horizons, over time their effects can be offset by some degree of adjustment of the money stock (ECB, 2011, p. 56).

deflation. Price stability contributes to the achievement of high levels of economic activity and employment in several ways.

First, under price stability economic agents may easier distinguish essential changes in relative prices (that is, individual goods' or services' price movements) from changes in the general price level. In such an environment, people may essentially relate price movements to changes in the "relative scarcity" of individual goods and services that result from changes in the supply of and demand for those goods and services. This allows the market to allocate resources more efficiently. Through this efficient allocation of resources, price stability contributes to an increase in household wealth and, thus, the productive potential of the economy.

Second, under price stability creditors tend not to demand an "inflation risk premium" to compensate them for the risks associated with holding nominal assets for extended periods. By reducing such risk premia in the real interest rate, the credibility of monetary policy contributes to the efficiency of resource allocation in capital markets, thereby increasing incentives to invest. This, in turn, promotes economic welfare.

Third, the credible maintenance of price stability also makes it less likely that individuals and firms will divert resources from productive uses to hedge against inflation. In a hyperinflationary environment, for example, there is an incentive to hoard real goods because they retain their value better than money or certain financial assets in such circumstances. However, hoarding goods is not an efficient investment decision and therefore inhibits economic growth.

Fourth, since tax systems do not usually adjust tax rates and social security contributions for inflation, under both inflation and deflation, they may create exacerbated perverse incentives that distort economic behaviour. Such real costs are absent under price stability.

Fifth, when price trends change in unpredictable ways, in both inflationary and deflationary environments, a substantial and arbitrary redistribution of wealth and income effectuates (redistributing, for example, wealth from creditors to debtors). Thus, an environment of stable prices helps maintain social cohesion and stability.

Sixth, inflation is essentially a tax on cash holdings, since -under inflation- households have an incentive to use cash less frequently in order to reduce transaction costs that arise because individuals must visit the bank (or Automatic Teller Machines) more often to withdraw cash.

Seventh, lack of price stability is also reflected in sudden revaluations of financial assets, which may undermine the soundness of banking-sector balance-sheets and reduce household and corporate wealth. Conversely, if monetary policy credibly maintains price stability, it may safeguard against the incurrence of both inflationary and deflationary shocks to the real value of nominal assets. In this way, price stability-oriented monetary policy makes an important contribution to financial stability.

The arguments above suggest that by maintaining price stability a central bank makes a significant contribution to the achievement of broader economic objectives (see for example ECB, 2011, p. 56-57), such as high levels of economic activity and better employment prospects, as well as higher living standards[5].

2.2 Conventional View of the Monetary Transmission Mechanism

Since the central bank is the monopoly issuer of base money (i.e. banknotes and bank reserves), it has the ability to influence short-term interest rates, which form the first step in the standard monetary policy transmission channel; with the final step being the effect of policy on inflation and economic activity. The implementation of monetary policy, however, necessitates that the central bank initially determines what level of money market interest rates is required to achieve the target. Subsequently, the central bank steers short-term money market rates to the desired level by signalling its monetary policy stance through its policy rate decisions and by managing the liquidity situation in the market.

The classical textbook treatment of monetary policy focuses on how household portfolios are influenced by central bank actions. The portfolios of households ultimately include “bonds”, basically a term that encompasses all kinds of financial assets that are not used for purchases, and money (the asset used for transactions). Pertinently, money can be more than just a currency (checking accounts being the obvious substitute to be included in narrow measures of money).

[5] This is consistent with a large body of empirical studies for a variety of countries that point to a negative relationship between inflation and growth (ECB, 2011, p. 57). A permanent increase in inflation outweighs any short-term gain in nominal income and eventually leads to a permanent decline in real income.

The money supply is assumed to be under the central bank's control. If the central bank can control either of the two types of assets in household portfolios, then the central bank can control their relative prices by adjusting the relative supply of the two types of assets. Under the simplifying assumption, that transaction-facilitating assets do not pay interest, it follows that the relative price of money and bonds is the nominal interest rate. After relaxing the aforementioned assumption, if it holds that transaction accounts pay interest, then the central bank is able to affect the spread between the latter interest rate and the interest rate on assets with no transactions services.

The conventional view on monetary economics rests on two fundamental assumptions, irrespective of the assumption that transaction accounts pay interest or not. First, there must be a well-defined asset called money that is essential for transactions. Second, the monetary authority must be able to control the supply of money (with some precision over intermediate horizons). Historically, when the assets used for transactions were restricted to demand deposits and cash, it was evident how this control was effected. Namely, the central bank has been able to determine how much currency came into circulation, since it was the sole entity that could create currency.

In addition, the ability of banks (and other financial institutions) to establish checking accounts was in essence limited by the requirement that banks hold reserves for those accounts. Through its control over the rules regarding reserves (under the workings of a fractional reserve system), the monetary authority indirectly controls the noncurrency component of transaction balances. Typically, the central bank decides both the amount of reserves that must be held against a given level of transaction balances, as well as the types of assets that can be used as reserves. If the central bank views that more money is essential to the economy, it increases the amount of money available to banks that can be used as reserves; an example includes trading reserves against other bank securities. It is through lending and crediting the checking accounts of the borrowers who receive the money, that banks lever reserves. In this framework, banks' willingness to lend matters only to the extent that it affects the creation of transaction-facilitating assets, i.e. deposits.

Interest rates respond in a rather predictable way, after the supply of transaction accounts has been adjusted due to the central bank's reserve injection (see for example Kashyap and Stein, 1997, pp. 2-3). As more transaction balances become available to households, the valuation of those balances falls and holding money becomes cheaper than before - i.e.