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Economics and Business

Chair of “History of Economic Thought and Policy”

**THE IMPACT OF THE RULES VS DISCRETION DEBATE ON CENTRAL
BANKING AND THE HISTORY OF MONETARY THEORY:**

**A JOURNEY FROM MONETARISM TO THE RECENT PRACTICES OF
UNCONVENTIONAL POLICY**

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Academic Year

2019/2020

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ABSTRACT

It is clear that the practice of central banking has seen a long evolution since the years of Keynesianism; with the advances of Friedman and Lucas a new side of monetary policy was discovered, and since then there has been a greater understanding of the effects and mechanisms underlying monetary policy. However, central banking has not always followed the principles dictated by monetary theory, and even though both kept evolving over time, they did not necessarily evolve together. Sometimes monetary theory wasn't followed to full extent by central banks, leading to mistakes being made at some points, but also leading to the resolution of real world problems, which the theory couldn't yet get a grasp of. The examples illustrated in this thesis outline a range of such situations and show how different central banks, operating in different or similar contexts, led to a variety of outcomes, which did not necessarily conform with the theory. By now, there are examples of both theoretical developments put into practice: the rules-based approach, with the period of the Great Moderation, and the unconventional and much more discretionary quantitative easing approach, with the upcoming of the global financial crisis. Both methods seem to have brought good results, relative to the context outlining them: the first managed to provide stable prices and economic growth in a period characterized by relatively few exogenous and endogenous shocks, the second on the other side provided support to a completely opposite situation, characterized by the financial crisis.

INTRODUCTION

Monetary policy is one of the key instruments that policymakers can rely on when dealing with the instability of the economic system. As many other fields in economics, monetary theory too has seen many changes throughout the years and has ever since offered an open field for debate on how it should be conducted. The most basic concept in monetary theory is found in the quantity theory of money: such equation describes the relation between the amount of money in an economy, the velocity of money and the price level and output; thanks to it, economists understood how the quantity of available currency in an economic system has a direct influence on the well-functioning of it, which was true from the early stages of civilization, when communities moved away from barter to prefer money exchange, and still holds true today, the main difference being that economists have understood how and why this mechanism occurs and have developed many different theories to manipulate it. This thesis will begin by briefly analyzing such theories to then look at how they have been implemented and refined. Starting from the ideas developed by Keynesian economists, I will then move on to outline the rise of monetarism and the importance of the Lucas critique, here considered for the changes that it has brought, together with Friedman's monetarism, in the field of central banking. It was after the contributions of these economists that monetary theory and practice took a different path from the one that was followed before. During the Keynesian period of macroeconomic policy, discretion was the main approach through which central banks would implement monetary policy, and it relied on the instincts and beliefs of policymakers, who, using all of the information available, would adapt the policy on a 'day-to-day' basis, relative to the changes in the economic conditions. After the development of monetarism and the contributions by Lucas (1976), followed by Kydland and Prescott (1977), which gave grounds to the rational expectations theories, economists started to believe that the best way to implement policy was rather to have a rule which would predetermine how and by how much policymakers should alter the money supply and the interest rates. This led to a decades long debate over which of the approaches is the best, namely, the *Rules vs Discretion* debate, and led economists to rethink and reinvent monetary policy, both through the contributions of the theoreticians and the practical innovations of central banks. Central banks, over time, have experienced new issues which monetary theory was unable to fully explain, and have been pressed to adapt themselves to practical problems which weren't foreseen. This forced them to adopt unusual, often controversial, measures in order to prevent an economic collapse. One of such measures is *quantitative easing*, a very discretionary policy type that by definition goes in contrast with the rational expectations theory and, according to monetarism and its deriving theories, couldn't produce optimal outcomes in real life. The US experience, since the downturn of pure monetarism, saw various stages of monetary policy,

presenting periods of strict adherence to the macroeconomic theory that had developed through time, alternated with periods of pragmatism. After the introduction of quantitative easing by Japan in 2001, the practice of central banking saw a detachment from the theory that accompanied it since the 70s, then the Great Recession and the United States' response confirmed it: in some occasions, central banking had become a totally different practice from monetary theory, aimed at resolving contingent problems regarding the real economy, regardless of the effects that such policies may have on the long-run. After the end of the Great Moderation, the 'high tide' of rules-based policy, and once the great financial crisis outbreak, there has been a prevalence between central banks around the world to approach the recession in a pragmatic way, probably the most pragmatic: quantitative easing. As discussed in this thesis, such actions are not compatible with the theories of rational expectations that have determined much of policy since the 70s, which puts forward a discrepancy between monetary theory and central banking. We will see how central banks developed a way to merge the teachings of theory with the practicality of unconventional policy, and analyze what were the stages that brought central banking to take a different path from monetary theory.

I will take into consideration three different realities, which are the US, the Eurozone and Japan, analyzing the theories they have adopted since the decline of monetarism, through the 80s, 90s and up to the Great Recession, and investigating how and whether or not the practice of central banking has taken a step away from monetary theory. In particular, this will be done by examining how could central banks implement a policy such as quantitative easing after it had been reached a consent regarding the ineffectiveness of it, given the rational expectations theory and its implications.

CHAPTER 1:

AN INTRODUCTION TO THE DEBATE

WHAT ARE THE BASICS OF MONETARY POLICY IMPLEMENTATION?

Historically, the main objective of central banks was to obtain price stability, which meant to have a low level of inflation over the long-run and a low volatility. Over the years, some central banks started to see monetary policy as a mean to lower the level of unemployment too, such as the *dual mandate* of the Federal Reserve, but, after the new theories developed during the 70s, there has been a disagreement amongst economists on whether central banks should only concern about price stability. The assumption over which all central banking and monetary theory are constructed is that money matters, meaning that changes in the money supply of a country have direct effects on its economy, a belief that is commonly recognized today, but that was object of debate before and during the development of the ideas of J. M. Keynes. More specifically, changes in the money supply will have effects on the interest rate, affecting how much money economic agents choose to spend or invest, and on the level of inflation. With the different theories arise also the differences concerning to what extent money matters and how it affects the economy: the most common definition is the one in which the quantity of money directly affects the level of prices, given the acceptance of the quantity theory of money, but does not influence the level of employment; this is not true for the Keynesian school of thought, which attributes both variables as dependent on the level of money supply.

The main way in which central banks implement monetary policy is through the use of open market operations (OMO). This tool consists in the central bank purchasing or selling financial instruments, usually in the form of government securities, such as short-term bonds, therefore influencing the amount of bank reserves and the level of interest (Hopper, 2019). There are two types of policy: expansionary and contractionary. The first one is implemented by purchasing securities, therefore decreasing the level of interest rate, which will disincentivize people to hold their money in bank deposits while promoting spending and investments: by purchasing financial assets, the central bank is going to deposit money into the commercial banks, which is synonym to increasing the money supply, thus lowering the cost for borrowing money, namely, the interest rate, as there is more available. The reason why central banks can easily do this operation as much as it needs to, is because central banks don't need to actually have the funds necessary to purchase bonds, as they can just

generate more money, which before was literally referred to the act of printing more money, while today is not necessarily that way, for example because of the wide use and acceptance of digital currency. Contractionary policy works the opposite way of expansionary policy: the central bank issues government securities to commercial banks or investors in general, which is going to lower the total funds available for banks to lend, thus increasing the interest rate, making bank deposits more convenient, as they will pay back a greater amount of money.

The central bank can take into account different measures as indicators of the money supply: currency is the most basic element that makes up the monetary base of a country, but is not enough to exhaustively reflect the amount of money in the economy, so central banks will most likely consider monetary aggregates, the main concern being how to choose which monetary aggregate to use as reference for conducting monetary policy.

THE KEYNESIAN SCHOOL OF THOUGHT

In 1936, J. M. Keynes published his *General Theory of Employment, Interest and Money*, a highly divisive publication which, whether considered revolutionary or just a failed attempt at describing the economy, certainly influenced deeply the approach that economists take into understanding the dynamics and mechanisms that make it up. Before Keynes' contributions, political economy was mostly inclined towards the *laissez-faire* ideas developed since the writings of Adam Smith; these implied, above all, that unemployment could only be a temporary state of the economy. In his work, Keynes proposed a different approach to policymaking, which stepped away from the classical *laissez-faire* one and was characterized by state intervention, bringing concern about the classical belief that the economy would stabilize at full employment, since the evidence of the time suggested that it wouldn't. In fact, Keynes argued that when left on its own, the economy would struggle to go back to a full employment state of equilibrium and that most of the times government intervention would be necessary; as a matter of policy, fiscal policy was generally considered more effective in the sense that it would be more direct on affecting the aggregate demand. In terms of monetary policy, the Keynesian school is often associated with a rejection of it as an effective tool for contrasting the adverse effects of a shock, however, it is agreed upon that monetary policy is not considered a useless tool by the

economist: while fiscal policy was necessary to regulate the economic cycle over the short-run, monetary policy would be used to keep constant the rate of interest over the long-run.

The main difference between the classical school and the Keynesian one is the adoption or rejection of the quantity theory of money, i.e. the Fisher equation.

The equation is the following:¹

$$M_d V = P Y$$

Where:

M_d = money demand

V = velocity

P = price level

Y = output

In equilibrium we can consider money supply (M) to be equal to the money demand, hence:

$$M V = P Y$$

From a monetary point of view, any changes in the money supply must have a parallel effect on one of the other three variables of the equation, and we can see how, on the right hand side, are present the two main preoccupations of central banks and monetary policy: prices (price stability) and output (which is closely related to employment).

For classical economists, increases in the monetary base had no real effects on the economy, given by the acceptance of Say's law, which asserted in its most raw form that supply creates its own demand, hence that interest rate would be determined by savings and investments, rather than by the money market: Say (1803) argued that a producer who would start producing a good, would immediately also increase his demand for other goods, because in a system based on the division of labour, each good is produced to be exchanged with other goods. This implied that in the long-run, supply and demand would always be in equilibrium, making money just the medium through which this dynamic took

¹ For further analysis see “*Macroeconomics*” by Mankiw (2016), pp. 293.

place. Classical economists considered velocity of money and output to be constant, hence, given the Fisher equation $MV = PY$, any change in the money supply M would bring a parallel change in just the price level. Keynes (1936) opposed to this belief and introduced the concept of liquidity preference, describing the preference of economic agents on how to hold their wealth, based on their future expectations. Since expectations are not constant, the liquidity preference of agents may vary at any given time, and with changes in this variable, velocity will no longer be constant, as people will change their purchasing habits. With none of the four variables being fixed it is easy to see how a change in the money supply may well bring a change in output.

Keynes (1937) proposed the idea that the level of output is not a constant factor, as Say's law implied, but that instead it depends on effective demand (*Figure 1*). He argues that when liquidity preference increases, agents are willing to save more, hence increase their stock of cash (inactive balances), which directly affects the velocity of circulation of money, translating in a change in the price level. However, the amount of money in an economy does not differ on the basis of liquidity preference: even with an increased liquidity preference, the amount of cash available in the economy remains the same; what can change instead is the premium, namely, the interest rate, that induces people to save. Ultimately, the interest rate, together with expectations about the prospective yield of assets, affects the amount of investments, which according to Keynes will be very volatile, as they depend on uncertain judgements of economic agents: prospective yield of the assets and liquidity preference. This is in clear contrast with the classical theory, which instead reversed the order in which factors affected each other, saying that changes in savings and investments would affect the interest rate.

Now for the theory of effective demand, Keynes explained that it represented the point of intersection of the two curves of aggregate demand and aggregate supply, which differ from the classical supply and demand curves in that they represent the entrepreneurs' expectations for costs and earnings, related to the number of workers employed. Investments, which are one of the two components of aggregate demand, depend heavily on the expectations of entrepreneurs, and so does the level of employment, which is dependent on the effective demand. Hence, in order to increase employment, investments must be brought up, and this can be done by leveraging on aggregate demand, therefore, a policy that aims at increasing the level of employment should find methods to increase the aggregate demand. In Keynes' theory, fiscal policy has the main role of increasing the aggregate demand, while what the central bank can do is to keep the interest stable and low over time, in order to encourage investments, leaving most of the policy responsibilities to fiscal policy (Roncaglia, 2005).

THE NEOCLASSICAL SYNTHESIS

The Neoclassical synthesis was born as a consolidation of the general equilibrium theory together with the concepts expressed by Keynes' *General Theory of Employment, Interest and Money*. The first step towards the rising of this current of thought was taken in 1937, when J. Hicks first introduced the IS-LM model (*Figure 2*): a representation of the relation between interest and savings and liquidity preference and money supply; the article has ever since been a milestone in the study of economics, but while it is still taught as a tool for learning, its use by policymakers has widely decreased after the development of monetarist theories. The IS-LM model is quite straightforward and with it is possible to understand how changes in interest rate may affect output production and vice versa; it has been very useful in predicting the consequences of a change in one of the variables and has helped decision making in the process of choosing suitable policy. For example, a level of production that is too low will cause the economy to suffer from unemployment, so one way in which the central bank can stimulate production is to allow businesses to spend and invest more, like by lowering the level of interest; in such cases the IS-LM model proves itself to be very useful, as it gives the central bank an unclouded depiction of the economy, making it clear to understand what to do in whatever case (Snowdon and Vane, 2005). The model is at the base of discretionary policymaking: until the 1960s the way most central banks applied monetary policy was by adopting a *stop-and-go* approach, where the bank would increase or decrease the money supply depending on the state of the economy and future predictions. For example, if the economy was about to enter a recession, people would rather save money for the future, than spend or invest, which would lead aggregate demand to go down, leading to a decrease in output and unemployment. In such cases, what the policymakers would do is increase the money supply, lowering short-term interest rates, in order to incentivize economic agents to borrow more, and thus spend and invest more, giving a reason for producers to keep producing. This can be translated as a shift of the LM curve to the right, corresponding to a lower interest rate (on the y-axis) and a higher GDP (on the x-axis). The opposite applies when an economy is "over-heating", i.e. when the increase in spending and aggregate demand causes prices to increase too quickly, creating inflationary concerns. In such cases the central bank would need to shift the LM to the left, by increasing the interest rates. Under a discretionary approach, central banks would switch back and forth between the *stop* and *go* phase, based on the future previsions of policymakers; this can be referred to as the *art* of policymaking, which makes monetary policy rely heavily on the policymakers' beliefs and instincts.

One very important concept that the IS-LM model introduces is that of a *liquidity trap*, which most basically refers to the event in which, perhaps during a recession, the interest rate level has reached levels so low, that it is inconceivable to lower it further, thus making monetary policy useless to stimulate the economy. Keynesian economics proposed that in such cases, the only tool that could spark the economy is fiscal policy. The reasons why lowering the interest rate to zero or below is considered ineffective is that, when interest rates are already very low, hence securities prices are already high, the public won't expect such prices to rise further, disincentivizing the investment, as people will prefer to remain liquid. People will develop a preference for liquidity and will prefer to hold as much liquid cash as possible, so to have something certain to hold on to. Because of this, even if the central bank decides to drastically lower the level of interest, people will still abstain from spending, consolidating the state of idleness of the economy.

One big shortcoming of the Neoclassical Synthesis is the failure to take into account inflation, which at the time wasn't the main concern of mainstream economics, but soon became a very concrete one. In fact, the main drawback of the IS-LM model is its inability to account for changing prices, making the model only useful to understand the effects that changes in money supply will have on output (on the x-axis) and employment. Nowhere on the model is described the condition of the price level, therefore, a central bank that makes of price stability its main objective will find the model useless. When Hicks developed such model, pragmatism was the most common way of conducting monetary policy, and much attention was given to lowering the unemployment level, forgetting about the problem of inflation, which in fact represented the state of the US economy during the 50s and 60s. This is in fact reflected in Hicks' model, and, while it may be very useful from the point of view of a pragmatic policymaker, who aims at keeping employment high, it finds no purpose to the policymaker concerned with the problem of rising inflation.

- *The Phillips Curve* -

Phillips (1958) is one of the most important contributions to the development of discretionary policy, introducing the concept of the Phillips curve (*Figure 3*). This model described a trade-off between inflation, expressed as rate of change of wages, and unemployment and outlined the limitations of monetary policy, or at least discretionary monetary policy. It is based upon empirical studies which reflected the relationship between unemployment and the rate of change of money wages, taking into consideration the years 1861-1957 in the United Kingdom.

The relation was expressed using the following formula, showing an inverse relationship between the two variables:

$$W = -0.9 + 9.638 (U)^{-1.394}$$

Where:

W = nominal wages

U = unemployment

When unemployment would decrease, inflation would increase and vice versa, and any attempt of increasing or decreasing the money supply would produce a parallel effect on one of the two sides. The most remarkable concept that the Phillips curve suggests is that policymakers have to ‘choose’ on which aspect of the economy to focus on, having to accept the trade-off described in the model. This is clearly what happened during the 50s and 60s, when Keynesianism was the predominant school of thought amongst many economies, which led policymakers to push the unemployment level as low as possible, viewing the rising inflation as a fair price to pay for it. In fact, the model would be interpreted so that a permanent low level of unemployment could be achieved in the real economy by tolerating a permanent level of high inflation (Snowdon and Vane, 2005). The Phillips curve provided a useful tool for predicting inflation which filled a gap that existed within Keynesian macroeconomic theories. The model would be used throughout the 60s to predict inflation levels given the targeted unemployment levels and would contribute to the use of discretionary policies as it gave something more concrete on which to rely when predicting future inflation, thus making discretion look more appealing.

M. FRIEDMAN AND MONETARISM

The most relevant contribution to the debate on whether monetary policy is an effective tool was given by Milton Friedman, founder of the monetarist school of thought. After the rising unemployment and rising inflation that accompanied the discretionary policies put in act until the end of the 1970s, economists started to question whether discretion was in fact a successful method to approach the implementation of policy. The period of *stagflation*, originated by the application of New-Keynesian

policies, was incompatible with the concept described by the Phillips curve, and led economists to develop new theories that could describe such phenomenon.

Friedman (1968) believed that, while holding true in the short-run, the Phillips curve was incorrect in describing how inflation and unemployment interacted in the long-run. In his model, Phillips took into account nominal wages as an indicator of inflation, which is where Friedman believed that the model was imprecise. Friedman argued that it is real wages that economic agents are really interested in, so the model should focus on them. Because of this, the assumption that wages would remain stable creates a fallacy in Phillips' model: it is crucial to keep into account inflation expectations because, according to them, economic agents will negotiate differently, increasing or decreasing nominal wages together with increased or decreased expectations. This will modify Phillips' original equation for describing the rate of change of wages, which are now real wages, adding the variable of the expected rate of inflation²:

$$W = f(U) + P^e$$

According to Friedman, the long-run model should show a vertical curve, meaning that as much as inflation could change, the level of unemployment would remain the same, stabilizing at its natural rate (NRU). The new model updated by Friedman will be called the *expectations-augmented Phillips curve* (Figure 4). Friedman and monetarists maintained that any attempt at improving the long-run state of unemployment using discretionary policy methods would be useless, causing just an increase in inflation; Goodhart (1989) condenses this concept very clearly: he explains that by applying discretionary policies while wrongly assuming inflexible expectations, and by being pressured by external forces (like politics), central banks are likely to implement overly expansionary monetary policies, which will only lead to a higher level on inflation and same level of unemployment that a monetarist approach could offer.

The way in which monetarism works differently from more Keynesian implementations of monetary policy, i.e. discretionary policy, is that it seeks to make policy something that could be intended as *automatic*, or predetermined: monetarists' first approach is to define a medium to long-term target for money supply growth, and aim to reach the given level over the years through a regular increase in the money stock, calculated using tools such as Friedman's *k-percent* rule. This rule in particular asserts that money stock should increase by a specific percentage every year, limiting the power of the central

² The formula is borrowed from "Modern Macroeconomics" by Snowdon, B. and Vane, H.R (2005).

bank to inject or cut liquidity according to its discretion. This straight away implies that the work of a central banker will be much less involved than what it used to be, and that decisions will be very limited to what the pre-set rules allow. Monetarists believe that allowing for a consistent growth level will minimize the volatility of inflation over the long-run, making monetary policy not anymore a ‘cure’ for inflation, but a method for prevention. In fact, this current of thought became popular right when the United States, like other nations, was hit by a severe increase in the inflation level, with peaks reaching almost 15% of inflation rate level in the beginning of the 1980s.³ Another crucial factor necessary for monetarism to be efficient is the independence of the central bank, which is necessary for two main reasons: the increased level of bureaucracy that a dependency from governments involves would only make the work of policymakers more difficult, as it would increase the lag between the changes in the economic conditions and the response by the central bank (especially in emergency situations, the ability of central banks to intervene quickly can make a big difference on the success of the policy). The second reason, which is also the one more stressed on by monetarist economists, is that the influence of the government would interfere with the policymakers’ decisions, inclining them to implement a policy based not only on beliefs about the state of the economy, but also based on incentives of political parties to promote a policy over another, for example to gain more recognition by voters.

Friedman’s contributions directly challenged the Keynesian practice of working on the aggregate demand and established a revival of the quantity theory of money, which instead was not accepted by the later works of Keynes. Friedman believed that the overemphasized concern on short-run achievements by Keynesian policy was too ambitious to be actuated in practice, given the multiple lags and uncertainties that policy is subject to. These included the evaluation of policymakers over how to intervene (which was often based on a degree of uncertainty), the transition from the evaluation to the implementation of policy, which necessarily implied lags, leading to an uncertain outcome of the policy (Roncaglia, 2005). Monetarism saw a return to the classical acceptance of the quantity theory of money, and with it, the belief that monetary policy should be aimed at the long-run stabilization of prices.

³ Data for inflation was gathered from the website of Federal Reserve Economic Data (FRED).

- The Lucas Critique -

Probably the most famous and influential attack to the neoclassical theories derived from Keynes is to be found in the argument proposed by economist R. Lucas (1976). Based on the concept of rational expectations put forward by Muth (1961), Lucas developed a theory on the foundations that expectations are fundamental in the development of a policy and must be taken into account. Broadly speaking, the concept that Lucas conveyed is that it is foolish to have a policy, that aims to predict the effects of a change in economic variables, to rely on relations observed in historical data as a prediction tool. More precisely, this means that a relation such as that between inflation and unemployment does not necessarily hold true all the time, and most importantly, a change in economic policy will most certainly have an effect on the given relation, possibly negating it. The reason why this occurs is given by the rational expectations theory: a rational and informed public will make expectations about the future of monetary policy and will try to predict what the central bank will do and act accordingly. This is how the Lucas critique was formulated and how it directly criticized the Phillips curve. Basically, any attempt to exploit the model for future predictions, would alter the model and make it fallacious: any attempt to alter one of the two variables will inevitably affect investors and firms' future forecasts for them, who will therefore act in a different way from that which economists will predict. Given this reasoning, Lucas came to the conclusion that not only the Phillips curve doesn't hold true in the long-run, as Friedman already proposed, but neither does in the short-run, since any modification to the existing policy would alter the public expectations. The model could only hold true if the economy would remain untouched, i.e. monetary policy wouldn't be conducted, but this is obviously not the case.

Kydland and Prescott (1977) analyzed how, if true, the rational expectations theory would seriously undermine the use of discretionary policies and always lead to suboptimal solutions. The main argument is that a policymaker who chooses the optimal policy on a 'day to day' basis, only considering the current state of the economy, will leave out all the aspect of future expectations which will indeed also shape how economic agents operate in the present. If central banks act in a pragmatic way, economic agents will have to make up their own expectations about future inflation levels, which policymakers will not be able to predict, and incorporate in their policy models. Only by setting a predetermined rule can policymakers influence forward expectations of economic agents, and therefore design better policies. Kydland and Prescott then arrive to the conclusion that policy must be dependent on self-enforcing rules, which do not allow policymakers to later change their minds and with them the policy. Probably the most famous example is the analogy of government insurance

against flood disasters: suppose there is a free land where it is possible to build new apartments, but in that specific area there is an elevated risk of flooding, which makes it hazardous to build. The government puts forward a policy that only guarantees limited refund to individuals who decide to build there, but the people know that if a flood was to occur, the government (a benevolent government) would not maintain its early position, and instead fully refund the victims of the disaster. This brings to a suboptimal solution, because people will build in the dangerous area, putting the government in a situation of uncertainty (Tabellini, 2005).

CHAPTER 2:

THE RULES VS DISCRETION DEBATE

HOW IT ALL STARTED

Following the contribution of Friedman and Lucas, a debate unfolded on whether monetary policy should be conducted using discretion or rules. The main problem that monetarist economists found regarding discretionary policy is the time inconsistency problem, which regards the concept that expectations play a crucial role in determining monetary policy and must be taken into account when choosing a policy; when expectations are different from what policymakers took into account, then the policy will be ineffective.

After the period of stagflation, the United States policymakers started to accept the theories of monetarism, adopting intermediate monetary aggregates, such as M2 and M3, as to target the growth of the monetary base, having as its main objective the lowering of inflation. Monetarism then saw a downturn by the end of the 70s, as empirical evidence suggested an unstable trend for velocity⁴, which

⁴ For a deeper understanding of the matter consult Goodhart (1989), 318-322.

Goodhart (1989) suggests that there may be various reasons for the unsteadiness of velocity. It could have been first attributed to the high interest rate volatility, during the period 1979-82, which econometricians failed to predict, leading to a high fluctuation in asset prices, hence a higher demand for money. However, the hypothesis was not so solid once velocity kept declining even after interest rate became more stable, after 1982. Other reasons may include the underestimation of the elasticity of response of demand for money balances with respect to changes in inflation or nominal income, the increased competition within the financial system or the “massive increased in the value of non-human wealth”.

was in direct opposition with the theory. Since the beginning of his mandate, started in 1979, Federal Reserve Chairman Paul Volcker continued with the premise of fighting inflation, but in a much more pragmatic way: firstly, he went back to an interest rate driven policy approach, substantially rising interest rates, leading the economy to escape the concern of rising inflation, by the mid-80s. During this period, inflation remained stable, oscillating between 2 and 4 percent on average. Following Paul Volcker's retirement, in 1987 started the period known as the *Great Moderation*, in which the United States enjoyed a relatively long period of stable inflation and a stable growth with a lowered output volatility.

Before the Paul Volcker mandate and the period of Great Moderation, Friedman himself proposed a rule to follow when assessing the way in which the monetary base should be increased over time, namely, the *k-percent rule*. In a very essential way, Friedman suggests that the money supply should grow each period by a predetermined fixed rate k , and central bankers should not be allowed to interfere with this activity (needless to say that it is crucial that the rate must be publicly announced and known to everybody in order to avoid the time-inconsistency problem). The rule was conceived to achieve price stability and, in order to decide what value should be given to k , Friedman argued that it should be equal to the percentage growth of GDP. Friedman's rule leaves very little room for discretion, aiming at creating a solid foundation for price stability, but it has to deal with the fact that it is very susceptible to exogenous shocks: the risk of altering the GDP may critically undermine the well-functioning of the policy. From the Fisher equation we get that the growth rate of the money supply plus the growth rate of velocity is equal to the growth rate of price levels plus the growth rate of GDP:

$$\Delta M + \Delta V = \Delta P + \Delta Y$$

From here we obtain that

$$k = \Delta M = \Delta P + \Delta Y - \Delta V$$

Given the definition of Friedman's rule we can assume $\Delta P = 0$, since the main objective is for prices to remain stable over time, so:

$$k = \Delta Y - \Delta V$$

Now it is easier to address why Friedman's *k-percent rule* would struggle to sustain short-run stability: it would take as little as a deviation from the given GDP growth or velocity growth to make k either

unable to provide enough supply of money or, on the other side, to be too generous and paradoxically risking to increase the level of inflation.⁵

Tobin (1998) argues about how a rule “blind to actual economic events and outcomes”, such as Friedman’s *k-percent* rule, cannot bring efficient results to the actual economy. A rule is fundamental in a hypothetical world where central bankers have access to complete information: in such case, a well-designed rule may not even need adjustment, or human intervention, but that is clearly not the case. In situations where information is missing and the economy is in a state of emergency, policymakers cannot fully rely on the functioning of the rule, therefore discretion is the only remedy. However, this was not enough to justify the use of discretion, which, as Kydland and Prescott (1977) already put forward, can only lead to suboptimal solutions, which is more simply illustrated by the *time inconsistency* problem.

- The Time Inconsistency Problem -

The main argument that economists appeal to when criticizing discretionary policy is that of the time inconsistency problem: as outlined in the previous section, one problem that arose during the Rules vs. Discretion debate is the fact that, by definition, discretion will never be consistent, meaning that the choices that might seem optimal today, may be damaging tomorrow. Kydland and Prescott (1977) analyzed how a central bank will very hardly find the optimal policy if it bases its decision upon the current state of the economy, and, by doing so in each period and considering each separately, it will lead to deteriorating outcomes in the long-run. Central banks that follow discretionary habits will be very vulnerable to any influence that comes from outside of the bank itself and, if given the opportunity, they will likely react to such influences by adjusting the money supply. For example, taking into consideration the concept of bank independence, if a central bank is not fully independent from the government in terms of decision making, the central bank will suffer the pressure of politics and political events, such as upcoming elections, which will induce it to make wrong decisions just to influence the popular opinion. With the monetary authorities publicly announcing their intentions and long-run plan, they will deliberately tie their hands to change such policy in the future, as they would incur in a loss in credibility leading up to a reputational equilibrium.

⁵ The algebra is based on Salter (2014)

Because with discretion the public (a rational public) cannot rely on what the central bank promises it, it will adopt different expectations from normal, undermining the effectiveness of the policy itself. A rational public knows about a central bank's commitment to keep inflation at a steady level over the long-run, but also knows that, while inflation takes more time to adjust (because the new money takes time to get into circulation), in the short-run the central bank can affect the level of unemployment in order to satisfy the short-run preferences of the public itself, but endangering the well-being in the long-run. This is just an illusory attempt at establishing social welfare, and a rational and informed public will recognize it, thus it will adjust its inflationary expectations for the long-run and will mess up the monetary policy effects. When economic agents expect a certain policy to be implemented in the future, they will operate accordingly, so not in the way that policymakers predicted them to. This quickly becomes a paradox because if policymaker try to predict agents' expectations, we can say that agents in turn will predict it too. This detail is able of compromising the whole theory behind discretionary policy, and even though it sometimes might have worked, it is doomed to always be uncertain, and almost never the optimal choice. Rules determined policies are the simplest way to obviate the problem of expectations because they allow the smallest amount of interference as possible in the economy, relative to the money supply. If any variation in the policy making is capable of affecting agents' decisions, then a standardized policy, governed by a predetermined rule which clearly states how the monetary base will evolve through the years, will prevent the public's expectations to be unrealistic and unpredictable.

- *The Taylor Rule* -

Following the steps of Kydland and Prescott, and inevitably Lucas and Friedman, economist John Taylor (1993) proposed a different method for operating monetary policy, which still relied on the use of a predetermined rule to control the magnitude of the monetary increase. In opposition to the *k-percent* rule, Taylor's rule doesn't set the money supply as the target of focus. Instead of this, it aims at pegging the short-run interest rate, which is dependent on the conduct of open-market operations. Compared to the rule developed by Friedman, Taylor's rule is slightly more sophisticated and allows for more variation to occur; while the rate *k* that is established in the former is a fixed value, that only depends on the output and velocity of circulation, thus not able to contrast any deviation from the standard values in the short-run, the target proposed by Taylor takes into account short-term variations in the inflation and output level, so whenever such variables deviate from their original value, the monetary authorities precisely know how to react to the changes. This may seem as a discretionary

approach, since the interest rate will be altered following any economic shock, but in reality it takes away all the discretion that was once allowed, as policy makers cannot choose anymore the ‘right’ interest level based on their assumptions (not to say that they must be wrong, but certainly influenced by so many factors that hardly make it the long-run optimal choice), but will essentially consult an *instructional manual* which will tell them what to do.

Usually the formula of the Taylor rule takes this form:⁶

$$r = r^* + 0.5 (i - i^*) + 0.5 (y - y^*)$$

Where:

r = nominal interest rate

r^* = real interest rate

i = inflation rate

i^* = target inflation rate

y = GPD growth rate

y^* = long-term GPD growth rate

Together with the Taylor rule many other variants were developed, some of which found application during the Great Moderation period that characterized the United States from the late 80s through the whole 90s decade. In fact, Taylor’s rule found much success during the 90s, and many economists agree that it has been the basis for good monetary policy conduct during those times; it provided practicality, while also guaranteeing a solid framework in which the Federal Reserve could operate, guiding the policymakers’ actions, and preventing them from misusing their discretionary powers.

The Taylor rule provided for a “renewed interaction and communication between academic and central bank economists” (Asso, Khan and Leeson, 2007, pp. 23). In fact, as Asso, Khan and Leeson (2007) argue, the rule was able to describe past policy while providing guidance about the future, which reflected the priorities of central banks. Also, the rule wasn’t meant to be followed mechanically, it

⁶ For a more in-depth analysis of the Taylor rule and variant rules, see Salter (2014).

provided boundaries within which to operate in order to avoid the suboptimality of discretion, but allowed for monetary policy to be “adjusted to deal with special factors” (Taylor, 1993, pp. 197).

CHAPTER 3:

THE EVOLUTION OF MONETARY POLICY AFTER FRIEDMAN

After the fall of monetarism, monetary policy saw a long period of changes and innovation which delineated the two decades before the Great Recession. Discretionary policy was reestablished completely just once, by the Federal Reserve of Paul Volcker, but then has been replaced by the more rule-based approach of Chairman Alan Greenspan. The Greenspan mandate was characterized by the reliance on the Taylor rule, but it still allowed some degree of pragmatism to be implemented by policymakers (Asso, Khan and Leeson, 2007). Mishkin (2007) identified nine principles that make up the way policy was conceived during this period: they were born as a consolidation of the Rules vs. Discretion debate and provided encounter points, which served as a foundation upon which to outline the evolved practice for central banking. The nine principles are: 1) inflation is always and everywhere a monetary phenomenon; 2) price stability has important benefits; 3) there is no long-run tradeoff between unemployment and inflation; 4) expectations play a crucial role in the determination of inflation and in the transmission of monetary policy to the macroeconomy; 5) real interest rates need to rise with higher inflation, i.e., the Taylor principle; 6) monetary policy is subject to the time-inconsistency problem; 7) central bank independence helps improve the efficiency of monetary policy; 8) commitment to a strong nominal anchor is central to producing good monetary policy outcomes; 9) financial frictions play an important role in business cycles. He then goes on to argue that, even though the nine scientific principles exist, when it is time to apply the science of monetary policy to the real world, policymakers are also required to involve the *art* of policymaking, i.e. “judgement that is informed by economic theory and data, but that is less explicitly tied to formal models or algorithms” (Mishkin, 2007, pp. 20).

Many of the principles directly borrow from the theory of monetarism and from the advances made by Lucas: the crucial role of expectations, the inexistence of a long-run tradeoff between inflation and unemployment and the recognition that “inflation is always and everywhere a monetary phenomenon”

(Mishkin, 2007) are some of the assumptions that make up the New Consensus. The contributions of Kydland and Prescott (1977) are also taken into account, as it is acknowledged that central banks may be subject to the time inconsistency problem.

UNITED STATES: THE NEW CONSENSUS

Following the events of the early 1980s, the new theories that have gained ground between economists slowly started to be seen under an eye of suspicion. As stated in the previous chapter, one crucial element that served as a basis for monetarism was the relation between money and nominal incomes. When, in the second half of the decade, the relation proved to be not so strong, the validity of the theory suffered some damage.

Pure monetarism had one big fallacy, it focused too much on the long-run benefits of a rule policy, but overlooked the risks that dismissing the possibility of using discretion may cause in the short-run. By committing to a target, monetary authorities are very much discouraged from deviating from the rules applied⁷, and therefore may choose to abstain from operating discretionarily even in cases of upcoming emergencies. In fact, it is possible to see a trade off between the two main currents of thought that raised in macroeconomic theory: the first one, neo-Keynesian theory, provided for the stabilization and well-functioning of the economy in the short-run, adjusting on real time events to push the economy forward, like ‘putting a band-aid’ where and when the economy suffered some shock. This was considered harmful, in the long-run, by monetarists, who predicted an increase in price levels volatility and, in general, an unstable economic system, thus defining monetarism as a theory that gave up that ‘illusory’ balance in the short-run in order to enjoy a better economy in the long-run. After the empirical evidence of the unstable relation between money and nominal incomes, many monetary authorities around the world chose to go back to a more discretionary type of policy, but of course it would have been irrational to completely go back to discretion, ignoring the reasons why monetarism became notorious in the first place.

After the mandate of Chairman Paul Volcker ended in 1982, a new line of thought, called the New Consensus, spread among economists, and provided for some encounter points of both practices, rules and discretion, and sought to exploit the benefits that each one taken individually could offer, but restraining the drawbacks that each one inevitably brought. The principles of the New Consensus can

⁷ See the reputational equilibrium that Goodhart (1989, pp. 296) refers to.

be seen put in practice throughout the decades of the Great Moderation, starting in 1987, when the Federal Reserve, with Chairman Alan Greenspan, discontinued the practice of announcing publicly its target for inflation, however, the main focus of maintaining it as low as possible was kept alive. Following a method based on the Taylor rule, after the 1990-91 recession, the Federal Reserve didn't proceed in substantially decreasing the interest rate straight away; instead it chose to do so over a longer period of time, first lowering it by 2% until 1991, from the average 8% it was in 1990, then lowering it further to 3% by the end of 1992. This allowed unemployment to rise up to 7.8% in June 1992, but also kept inflation down to an average of 3% in the two years following 1991. The Fed then increased the interest rate again in 1995 due to another inflation scare.⁸ It is clear how, under the administration of Chairman A. Greenspan, the Fed confirmed the belief in the theories stating that complete discretionary policy isn't what's best for the economy.⁹ A mix of monetarist assertions developed by Friedman and the old practices of discretion are now put into action. On one side it is recognized the importance of setting inflation targets and the focus on the long-run, but, in opposition to what Friedman advocated, the target is not the money supply, rather interest rate are used as the tool used for conducting policy. Standards for the achievements of monetary policy also seem to have changed, as central banks are willing to bear a higher level of unemployment in order to have a more solid price stability over the long-run; this is in part justified by the fact that in the long-run unemployment will stabilize at its natural level. During those times, central banks have also developed the tendency towards transparency, which is what would then become *forward guidance*, which is the practice of periodically, publicly announcing the future monetary policy intentions and present state. This was, and is still being done, in order to have a better and more precise impact on economic agents' expectations, in order to know better how to incorporate them in the policy decision making. Also, by publicly announcing policy decisions, the central bank will be more disincentivized from deviating from such policy.

In 2001 the US economy faced a mild recession which only lasted 8 months; during the period of the Great Moderation there has already been another recession of similar proportions, between year 1990 and 1991, but this time the Federal Reserve reacted in a different way. By January 2001, the interest rate in the US was equal to 5.5%, in March the nation entered the recession and for the following 8 months the central bank proceeded to lower the rate of interest by about 0.5% each month, reaching the lowest level of 1.58% by November, when the recession was declared over. Later on, the rate was decreased further to 1.25%, stabilizing it there for the next nine months, and only after a further

⁸ Information about the actions of the Federal Reserve comes from Goodfriend (2007).

⁹ For a deeper knowledge of the actions put forward by the Greenspan mandate, see Goodfriend (2015).

decrease in December 2002, which brought it down to 0.75%, the Federal Reserve increased it back (*Figure 5*). The actions taken by the policymakers this time did not conform to the rules based behavior that preceded the recession; one reason for this could be the fear of a bigger recession than what it actually has been, probably also powered by the late terrorist attack of September 11, 2001. Taylor (2015), who was very pleased in the direction the economy had taken until then, was very concerned with the sudden change of path of the Federal Reserve, ultimately arguing that such move might have been one of the main causes that led to the 2008 global financial crisis. The interest rate was drastically lowered: comparing 1997 with 2003, respectively, when the inflation rate was at 2%, interest rate was equal to 5.5%, while again when inflation was at the 2% level in 2003, the interest rate was now set at 1%. Taylor described that “this departure brought on a search for yield and excesses in the housing market which, along with a regulatory process which departed from rules for safety and soundness, led to the financial crisis” (Taylor 2015, pp. 6). It is still unsettled whether Taylor was right about the housing bubble burst; Goodfriend (2007) argues that the Greenspan mandate proved the effectiveness of one major New Consensus principle: the successful control of inflationary expectations and the establishment of credibility for low inflation will increase the effectiveness of monetary policy as a tool to help withstand recessions. In fact, he goes on to say that credibility is what enabled the Fed to cut interest rates in 2001, in order to counteract deflationary concerns and prevent a greater recession than what it would have been. In relation to Taylor’s argument that the Fed was too slow to reestablish a rule-based regime, Goodfriend recalled that the New Consensus implied a slower return to the rule policy after a shock, as he put it: “the Greenspan Fed demonstrated another practical principle of the new consensus: flexibility in moving inflation back to target after a shock” (Goodfriend, 2007, pp. 54).

EUROZONE: FROM THATCHERISM TO THE BIRTH OF THE EU

Together with the rise of monetarism in the United States that characterized the start of the 1980s, also the United Kingdom chose to pursue a similar path in order to contrast the creeping inflation that they experienced during the 70s, which reached peaks as high as 22.7%.¹⁰ On May 4, 1979, Margaret Thatcher was elected Prime Minister of the United Kingdom and made clear her decision to adopt a monetarist approach in order to deal with the problem caused by inflation; straight away the Bank of

¹⁰ Data for inflation was gathered from the website of Federal Reserve Economic Data (FRED).

England operated to increase the level of the money supply growth. However, while the United States were able to enjoy a prosperous economy after ‘defeating’ the problem of creeping inflation by the mid 80s, in the United Kingdom the situation was not analogous. With the strong inclination towards monetarism and the adoption of a monetary target, the Bank of England was capable of lowering the inflation to acceptable levels, but did not avail of all the benefits that the United States were able to enjoy. The very tight monetary (and fiscal) policy caused a fall in aggregate demand, which ultimately resulted in a rise in unemployment, which was, in fact, the main concern regarding the economics under Thatcher. The level of unemployment hit shockingly high numbers, reaching a maximum of almost 12% in the middle of 1984¹¹, leading the country into entering a recession which persisted through most of the decade.

In 1990 the Bank of England saw a change in the way of conducting policy, stepping away from pure monetarism and going back to the control of short-term interest rates. By the beginning of the 1990s, England suffered from another increase in prices, as inflation rose again in the first two years, peaking at 8%; this was due to an expansionary monetary policy aimed at providing emergency liquidity to a series of 25 small commercial banks that were close to failure in the previous years. The move chosen by the central bank showed its side effects, as the nations faced higher levels of inflation until 1993, however it managed to bring it down to acceptable levels by 1994, when the price level remain fairly stable, with an approximate inflation rate of 2% for the rest of the decade. The lower level of inflation came together with the initiation of the policy of inflation targeting, by the Bank of England, starting in October 1992 (Balluck, Galiay, Ferrara and Hoggarth, 2016). On May 6, 1997, the Bank of England was granted both operational and instrumental independence¹², an institutional change that surely showed its effects on UK’s economy; in fact, starting in 1997, Great Britain entered a period referred to as the NICE decade (Non-Inflationary Consistently Expansionary growth): ten years of price stability, which allowed the economy to enjoy inflation levels just below 2% over most of the decade, with an average of 1.6%. This, in a way, is how the Great Moderation was ‘reflected’ in the United Kingdom, representing a period of great economical conduct, with an average GDP growth of 3% (McCafferty, 2017), however, the period of welfare was later undermined by the failure of Lehman Brothers in 2008 and the consequent crisis.

On June first, 1998, the European Central Bank was born, taking in charge the monetary policies that regulate the countries in the Eurozone. In the first years in the life of the ECB, the institution made

¹¹ Data obtained from the Office for National Statistics (UK) (2020) through the website *Statista.com*.

¹² This means that the central bank is responsible for the successful reaching of the inflation target, while having the freedom of choice relative to what tools to use in order to achieve it.

clear its intentions to take a step away from pure inflation targeting, while inclining towards targeting of broad monetary aggregates, but the main focus of the institution was still to pursue price stability. The first objective of the new central bank was to establish credibility and transparency, as by then it was commonly recognized that those were two necessary characteristics for an efficient conduct of policy. In December 1998, the ECB made public and clear its intention regarding inflation and announced its standard for price stability: “Price stability shall be defined as a year-on-year increase in the Harmonized Index of Consumer Prices (HICP) for the euro area of below 2%. Price stability is to be maintained over the medium term” (ECB Governing Council, 1998). One aspect that made it easier for the European Central Bank to immediately gain credibility about its commitment to price stability is the structure of the union itself, which made it difficult for the central bank to switch policy abruptly, since in order to do so it would first need to consult all the participating countries and have them all agree to a change. In January 1999, the ECB made a statement that in order to pursue price stability, it will focus to have a constant growth of the monetary aggregate, which in this case was chosen to be M3. The value initially chosen by the central bank was to have a constant growth of 4.5%. Starting in 2001, the growth rate that was set for M3 started accelerating, reaching levels way above the standard set, with a record of 10.9% by December, and 6.6% by December of the following year. The risk that this posed regarding inflation was real, so the ECB renewed its monetary policy in 2004, establishing an inflation targeting accompanied by the publication of inflation forecasts by the central bank, allowing for a greater level of transparency, i.e. forward guidance (Constancio, 2018).

It is possible to see how transparency and forward guidance had become a widely recognized principle for central banking over the years. Based on the principles that expectations of economic agents must be taken into account when designing a policy, policymakers understood that the most direct way of knowing what such expectations would be and how to control them in favor of the policy is to establish a state of credibility, through which the central bank can communicate with the public in order to make it have the same amount and quality of information that central bank has. This is not exactly what Lucas and Kydland and Prescott thought when bringing forth the concept of rational expectations, arguing that a rule-based approach would be the solution to such problem; the revolutionary arguments of the latter allowed for a change in the conduct of policy, but central banks, over the years, have been able to understand such concepts and elaborate other ways to address rational expectations. This does not mean that transparency and forward guidance can replace rules, but they certainly strengthen the policy in charge.

JAPAN AND UNCONVENTIONAL MONETARY POLICY: THE 2001 JAPANESE RECESSION

Following a great macroeconomic conduct during the 1980s, by the end of the decade Japan enjoyed a level of inflation at around 2.20%, having managed to slow it down from the average 5.10% of the first three years of the decade, and a GDP growth of about 4.4% per year. As the information about the inflation levels that Japan used to have may suggest, the Bank of Japan's main concern during the 1980s was how to achieve price stability, a common complication during that period: the oil crisis that hit the country by the end of the 1970s pushed the BoJ into regularly increasing the interest rate starting early in 1979, a maneuver that would later reveal a relative increase in overall prices. The problem of creeping inflation that Japan experienced during those years was a rather new one and required quick responsiveness by the central bank. With this in mind, the BoJ started to raise the interest rates in the beginning of the decade using conventional methods, and within three years it managed to diminish the inflation rate by 3.4 percentage points.¹³

By the end of the 1980s, the stock market bubble and property prices collapsed, pushing the Japanese economy towards a period of idleness which lasted the whole decade; this ultimately put the country through an intense period of unemployment and consequent deflation. The Bank of Japan reacted by cutting the interest rate level from 1991 to 1995, but from then, the situation only got worse, as many financial firms had either to declare failure, or were rescued by the BoJ following an intense series of loans and lends.¹⁴ Following an apparent recovery between 1995 and 1996, where the growth rate exceeded levels of 3%, by November 1997, two major commercial banks declared failure, intensifying the stress that the economy had to bear due to the banking crisis; the growth rate decreased again, even showing a negative growth record in the year 1998. Ito and Mishkin (2004) describe how the new policy regime that governed the Bank of Japan from 1998 failed in assessing the gravity of the situation which led the central bank to try a more rules-based policy characterized by positive interest rate, which is what happened in August 2000. The central bank probably was so much concerned about credibility that it shifted the focus away from what the economy needed in that moment: more liquidity.

By the start of the 2000s, Japan was deep into the recession, and it is right then that the country implemented what is referred to as unconventional policies. Still continuing to cut the interest rates, by 1998 the level was very close to zero, which already is something reserved for extreme measures; finally the Bank of Japan decided to set the interest level to zero (ZIRP) in 2000, saying that the policy

¹³ Information about actions of the Bank of Japan and inflation data are obtained from Itoh, M., Koike, R. and Shizume, M. (2015).

¹⁴ A list of such chronology is available in Kuttner (2010).

would reign until deflationary concerns would be over; after an apparent recovery, Japan decided that it was time to terminate the ZIRP policy, in the time of the spring of 2000 (Ito, 2006). While the strategies put into action seemed to have worked, the economy started slowing down again, with deflation catching on, this is why, in the same year, the BoJ announced the initiation of the policy of quantitative easing.

- Unconventional Monetary Policy –

Japan was the first nation to define the concept of quantitative easing and is one of the most famous examples to first adopt unconventional monetary policy. The way in which QE is different from conventional tools for implementing monetary policy is that its main focus is not anymore the interest rate, but to find any means possible to still inject liquidity into the economy, since the rate was already at the zero level. What central banks often do is rely on longer term treasuries or asset-based securities, since buying short-term debt would not lower further the interest rate, so that at least the central bank is still able to get more money circulating into the economy, also, the tools used include the purchase of financial assets on the secondary market, with paying made possible by the creation of more money which will land in commercial banks' deposits. Put in this way, the distinction between traditional methods of monetary policy and non-traditional ones is not so clear, but one needs to bear in mind the quantity of liquidity that QE would supply to the economy and the effect that it can have on people's mind: if lower interest rates won't push economic agents into borrowing and thus spending more money, maybe having directly more money supply will do so. This will also have an effect on long term risk return, making agents more willing to make new investments (Ito, 2006).

The concept of quantitative easing is incompatible with the rational expectations hypothesis proposed by Lucas and developed by Kydland and Prescott. An operation like that of quantitative easing is the complete opposite of a rules based policy, in the sense that it is a drastic approach that involves a massive injection of liquidity and is aimed to be used only in specific situations; its frequent use would inevitably lead to hyperinflation, hence its incompatibility with a standardized rule formula. Because of the inflationary risks associated with QE and its very immediate effects, if we take for true the rational expectations hypothesis proposed by Lucas, it is impossible to assume that an informed public will not be influenced by such policy implementation and will not create inflationary expectations about the future, which, as exhaustively described by Kydland and Prescott, would impair the effectiveness of said policy.

CHAPTER 4:

MONETARY POLICY IN THE RECENT YEARS

UNITED STATES' RECOVERY FROM THE GREAT RECESSION

The 2008-09 recession that hit the United States and, together with them, the rest of the world, has put many economies under great pressure, challenging the beliefs that economists used to have with respect of certain policies and measures.

When Lehman Brothers declared bankruptcy, in September 2008, it was clear that the world had entered deeply into a recession. In the United States, the Federal Reserve quickly adopted a pragmatic way to deal with the situation, and promptly proceeded to lower the interest rate from about 5% to nearly zero, by December of the same year. As the Federal Reserve lowered its target for the federal funds rate, hitting the zero-lower bound, it already needed to find more far-reaching ways of providing liquidity to the commercial banks, which led the central bank to take action using unconventional policy tools, namely, quantitative easing. The Fed started purchasing government bonds and mortgage-backed securities, lowering longer term interest rates and doubling the monetary base by the end of 2008 and, by the first quarter of 2015, injecting liquidity for a total of more than three trillion dollars in total assets added in the Fed's balance sheet.¹⁵ Together with QE, the Federal Reserve used forward guidance in order to better shape economic agents' expectations and to keep under control deflationary fears from the public, which could have risked an increase in the real interest rate, making the already extreme policy of QE useless (Hetzel, 2017). Smith and Becker (2015) analyze how forward guidance may help to lower long-term interest rates by leveraging on expectations, when short term interest rates have already hit the zero-lower bound; however the practice is not always a certainty, because the central bank must have enough credibility and have demonstrated already to pursue also in the future the statements that it made in the past. If the transparency of the central bank is effective in managing expectations, then it is intuitable that a mixture of both policies, forward guidance and quantitative easing, may have the ability to strengthen one another: QE would concretely increase the money supply and incentivize spending and economic activity, and forward guidance would keep under control the altered expectations that a policy like QE might bring forth.

¹⁵ Data obtained from Schulze (2017).

It is generally accepted that the policies put in charge by the then Chair of the Federal Reserve B. Bernanke have been a success in terms of minimizing the damage that the crisis could have delivered. As shown in *Figure 6*, the maneuver undertaken by the Fed didn't revive the problem of creeping inflation; in fact, the average inflation rate from 2010 to 2015 was of 1.68%, hitting a maximum of 3.9% in September 2011. However, some economists, such as Taylor, considered discretion as one of the main causes of the crisis and believe that it could have been prevented by the use of a wiser policy in the years that preceded the event. This does not imply that discretion wasn't a good strategy in dealing with the direct effects of the crisis, but it asserts that it probably wouldn't even have been necessary if a more rule-determined policy would have been put in action in the years before. As outlined in the previous sections, Taylor (2014) was not happy with the works that the Federal Reserve had done before 2007: while also criticizing the way in which the government implemented fiscal policy, Taylor argued that the shift toward discretion in monetary policy started between 2003 and 2005, when the Fed drastically reduced the interest rate compared to the previous years and going even below the 2% level of inflation, is one of the main reasons that led the economy to be under such pressure in the following years. Indeed, this is what Friedman believed too when promoting the idea of monetarism and, in a sense, warned policy makers about the detrimental effects that discretion could bring in the long-run. As Taylor advocates, lower interest rates incentivized risk taking and irrational investments, which eventually led to a rapid increase in demand for homes and a subsequent inflation increase of about 7%, reaching a level of about 14% per year in 2004-2005, before the housing bubble collapsed in 2007. However, the most relevant critique coming from Taylor is about the decision of the Federal Reserve to continue with the pragmatic approach even in the years after the Great Recession.

The policy of quantitative easing was terminated in October 2014 and, while it is certain that it helped the nation in recovering from the crisis, it is questionable whether the extension of such program for so many years could contribute to future instabilities, which could ultimately lead to another recession. Since then, monetary policy in the United States seems to have forgotten about the period of Great Moderation, and never quite fully went back to such rules-based approach, this also because of the difficulty for the Federal Reserve to go back to the inflation target of 2%, established since January 2012. In fact, since 2008 until June 2017, headline PCE inflation showed an average of 1.2%, well below the designated target (Hetzl, 2017).

EUROPE'S RECOVERY FROM THE GREAT RECESSION

Similarly to the United States experience, Europe too dealt with the recession by substantially lowering the interest rate and increasing the money supply straight away after the start of the recession. Starting with the use of conventional monetary policy, the short-term interest rate quickly reached the zero-lower bound, meaning that, like the US, the ECB had to rely on non-traditional monetary approaches. The main tool that the central bank used was the initiation of a 3 years long term refinancing operation, in which it provided commercial banks with liquidity, requesting the refinance only after a three years period; the amount of cash provided was a little over 1 billion Euros. Compared with the actions taken by other central banks, such as the Fed or the Bank of England, the total increase in the monetary base by the ECB was far less, as a percentage of GDP. In the United States the monetary increase until 2012 accounted for as much as 22.1% of the GDP, in Japan it accounted for 37.3% of the GDP, while in Europe it was equal to just 3.5% of the gross domestic product (Pronobis, 2014). It is clear that in the Euro Area the intervention of the central bank through unconventional policy has been much more moderate, an approach that economists like Taylor might consider smarter, even considering the emergency situation. However, compared to the US, growth in the Eurozone has been lower over the decade following 2008: in the year span 2009-2019, GDP growth in Europe averaged 1.13%, while the US had an average of 1.85%¹⁶, also by looking more in depth in the years after the termination of quantitative easing, which go from 2015 to 2019, the average GDP growth was higher in the US, even if more slightly, showing the average figure of 2.42%, compared with Europe's 2.31%.

The story in England is slightly different from the rest of Europe. As said previously, the Bank of England used quantitative easing in a much more aggressive way, having greater fears for deflation. Contrary to what happened with the European Central Bank, the Bank of England acted in a way that conformed much more with what other central banks have done, increasing the monetary base by 26.3% of the value of the GDP. After having lowered the interest rate from a value of 5% to a lowest of 0.5%, by the end of 2008 the UK's economy found itself into a liquidity trap, which eventually led the BoE to turn towards unconventional policy, in March 2009 (Kay, 2011). After the Lehman Brothers collapse unemployment rose from 5.7% to 7.6%, hitting a highest of 8.1% in 2011, however, inflation remained relatively stable, decreasing by 1.56% from 2008 to 2009, but then increasing again up to 2.49% in 2010 and again hitting the highest 3.86% in 2011.¹⁷ It is clear that the UK didn't experience

¹⁶ Data obtained from the Bureau of Economic Analysis (BEA) (2020) and the International Monetary Fund (IMF) (2020) through the website *Statista.com*.

¹⁷ Data obtained from International Monetary Fund (IMF) (2020) and Office for National Statistics (UK) (2020) through the website *Statista.com*.

the problem of deflation with the same magnitude that other economies had to deal with, such as the US or Japan, this, in part, may be thanks to the NICE period that characterized monetary policy in the decade right before the crisis. In fact, other economies, such as the US or Japan, experienced a period of pragmatism in the years preceding the crisis, and in the end suffered more from deflation compared to the United Kingdom.

JAPAN'S MEASURES AGAINST DEFLATION

The Bank of Japan officially ended the quantitative easing program in 2006, after the economy started showing a steady recovery from the 2001 recession. The transition from quantitative easing to more traditional monetary policy saw the BoJ deciding to stick to a low interest rate of 0.4% for the rest of 2006 and 0.75% for 2007. After the Lehman Brothers shock, Japan's economy was already weak, and as the entire world was now entering a major recession, the Japanese economy was about to enter the same situation it just came out of; this was a hard time for the central bank, in that it already had a very low interest rate and had to prepare for another major crisis. The Bank of Japan had nothing to do but decrease the interest rate level again, initially reducing it by 0.2%, and then reducing it further to reach the zero-lower bound, with a value of 0.1%, in December 2008. In October 2010, the BoJ actuated the plan of comprehensive monetary easing (CME), which consisted in the "reduction of the policy rate, clarification of the policy time horizon, and establishment of an asset purchase program" (Momma & Kobayakawa, 2014, pp. 85), focusing on lowering the risk premium and long-term interest rate. The point of "clarification of the policy time horizon" was a particular one, in fact, it was not the first time that the central bank encountered problems of 'miscommunication', for example when first establishing its target for inflation, after 2006, the BoJ put forward a statement that left many open doubts amongst the public regarding the intended inflation boundaries that it had set, referring to them as "an approximate range between 0 and 2 percent" (Momma & Kobayakawa, 2014), which allowed people to believe that the bank was willing to have negative inflation levels. The BoJ soon clarified its statement, but this time around it made it its objective to be clear and establish a stronger transparency for the public. So, the central bank specified that it would have continued with the zero-interest rate policy (ZIRP) until inflationary signs would have shown, allowing for some hope for price stability. In terms of operations, the BoJ proceeded with the purchase of financial assets for a target of 35 trillion

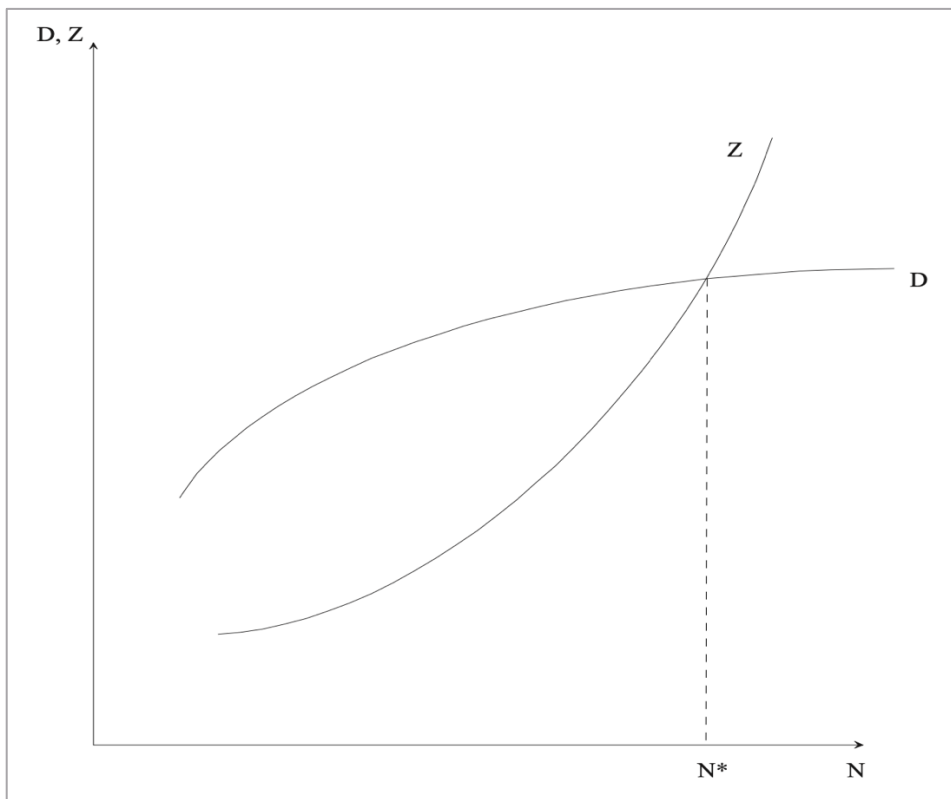
Yen, focusing on securities with a maturity of up to two years, in order to decrease long-term interest rates.

In 2013 the Bank of Japan initiated the program of quantitative and qualitative easing (QQE), which differed slightly from its predecessor in that it still focused on large scale purchases of government securities, to inject liquidity and lower long-term interest rates, but also aimed at controlling inflationary expectations, in order to make the policy more effective and lower real interest rates. Such concept is not totally new, in fact, it is monetarist economists who argue that the stabilization of expectations, through commitment of the central bank, is crucial to a good policy. Kuroda (2017), the current Governor of the Bank of Japan, explained: “the challenge for the Bank of Japan therefore was to come up with concrete policy measures – derived from economy theory – that could be implemented in practice. The answer that the Bank came up with was QQE.” As Kuroda stated, QQE had a strong correlation with monetary theory, the policy consisted of two main principles: a strong commitment to work on inflation expectations and large-scale JCP purchases, so to lower long-term interest rates. With the big issue of deflation that Japan was into, public expectations for future inflation were very low, and even with low nominal interest rates, aggregate demand wouldn’t increase, so a commitment for the future regarding the policy of quantitative easing is what could have increased inflationary expectations, leading economic agents to prefer to spend in the present, rather than in the future. In September 2016, the Bank of Japan announced its commitment to keep expanding the monetary base “until the year-on-year rate of increase in the observed CPI exceeds 2 percent and stays above the target in a stable manner” (Kuroda, 2017). As of 2019, the Japanese economy seems to have benefit from the policy actions actuated since 2013; the unemployment rate is around 2.41%, and never going higher than 3% since May 2017, however the inflation rate hasn’t yet exceeded the 2% target level, hitting a highest of 0.98% in 2018.¹⁸ This data suggests how unconventional monetary policy tools and pragmatism affect different economic variables compared to rules-based policies: while a rule is very helpful in achieving price stability and maintaining a high stability of growth, unconventional policy is directed more towards the more Keynesian objective of monetary policy, which is lowering unemployment, regardless of the effects on inflation. However, it is clear, at least for Japan, that price stability was always kept in mind while actuating such policies, and the inflationary concerns of QE don’t arise so quickly in a period of deep recession.

¹⁸ Data obtained from International Monetary Fund (IMF) (2020) and World Bank (2019) through the website *Statista.com*.

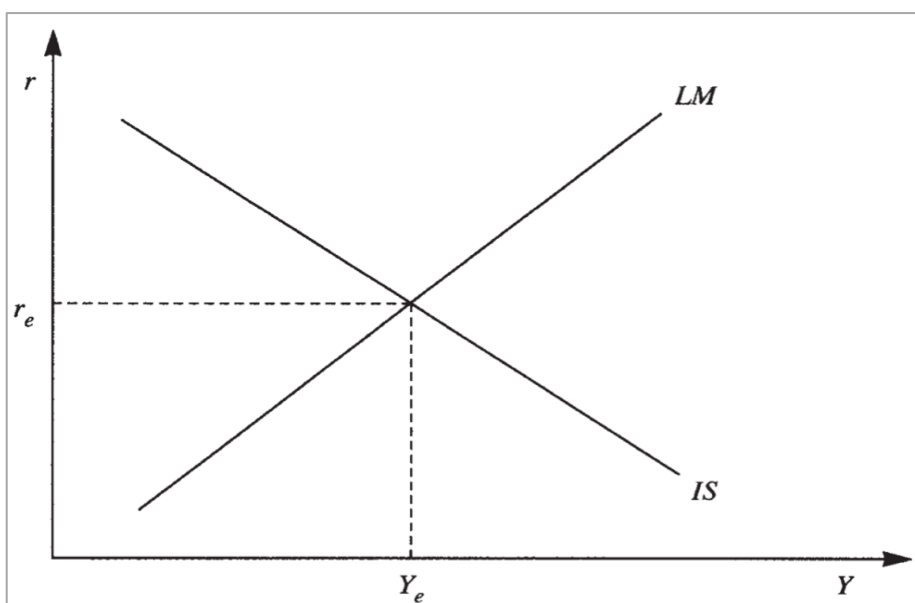
CONCLUSION

The history of monetary policy displays how it can be very difficult to find a policy that fits every situation and that can respond effectively to the wide variety of issues that the economy has to face. It is clear that the developments made over the decades in monetary theory are far from forgotten and have heavily shaped how central banking has been practiced ever since the birth of the theories. Even though central banking and monetary theory were more closely related before the start of the 2000s, the practice of unconventional policy has adapted to conform with some of the major principles taught by the theory. The analysis conducted in this thesis may suggest that there is room for both rules and discretion to the hands of policymakers, in fact, the most common scenario is the one in which one is applied, but without completely negating the other. This is clearly seen with the Japan experience, which implemented quantitative easing in 2001 and then improved it to qualitative and quantitative easing, which was still pragmatic, but drew much more from the theory. However, Japan is not the only example and a trend can be seen of central banks merging theory with pragmatism. Maybe rational expectations are not completely compatible with quantitative easing, but, depending on the economic context as well as the policymakers' ability of controlling and understanding economic agents' expectations, policies of forward guidance and transparency may be the mean that holds such policy together. In fact, economic context is crucial to the implementation of the right policy: the examples examined in this thesis show how a rules-based approach works best in a situation of relative stability, as during the Great Moderation, and, in the eventuality that no shocks occur in the economy, it should be sustained as the ordinary approach to policymaking. However, since shocks do occur, discretion must then be applied in order to restore the economy from higher levels of unemployment and deflation. That is where the *art* of policymakers must come into action: understanding the situation and knowing which kind of policy to apply, which certainly requires adherence to a rule, but also a level of experience and intuition. After the contributions of Friedman (1968), Lucas (1976) and the developments of Kydland and Prescott (1977), monetary policy saw a long journey which ultimately brought to the divergence between central banking and monetary theory. However, the two have managed over time to find a previously refused congruency, often dictated by the contingent needs of the real economy.

Figure 1: Effective Demand

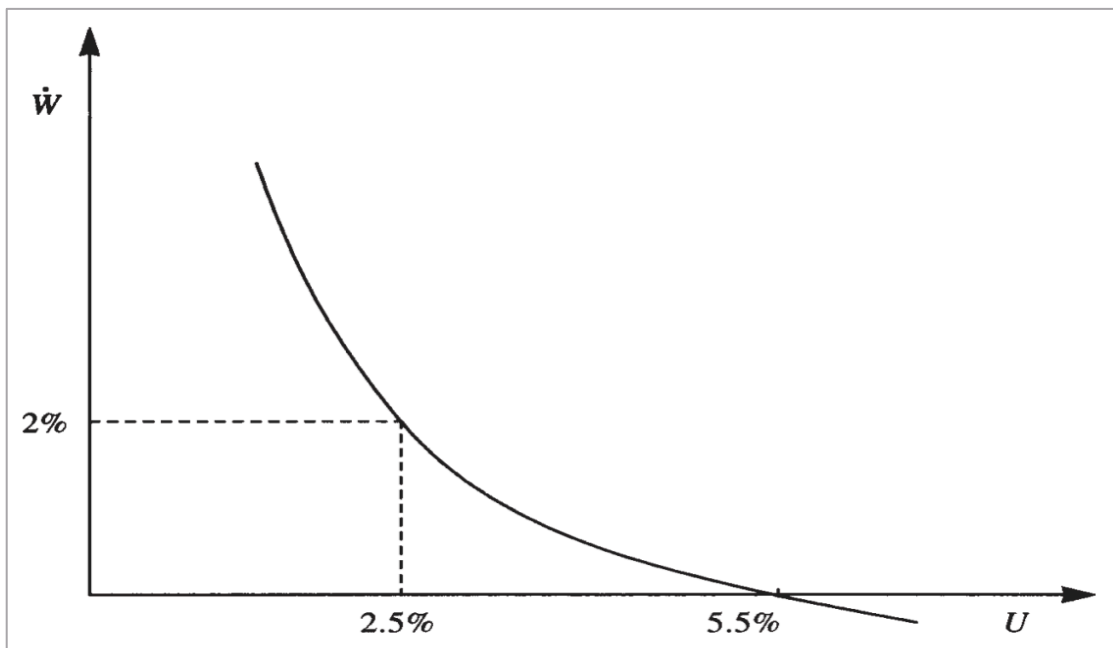
D = Aggregate Demand; Z = Aggregate Supply; N = Number of Workers

Borrowed from: Roncaglia, A. (2005). *"The Wealth of Ideas – A History of Economic Thought"*

Figure 2: The IS-LM Model

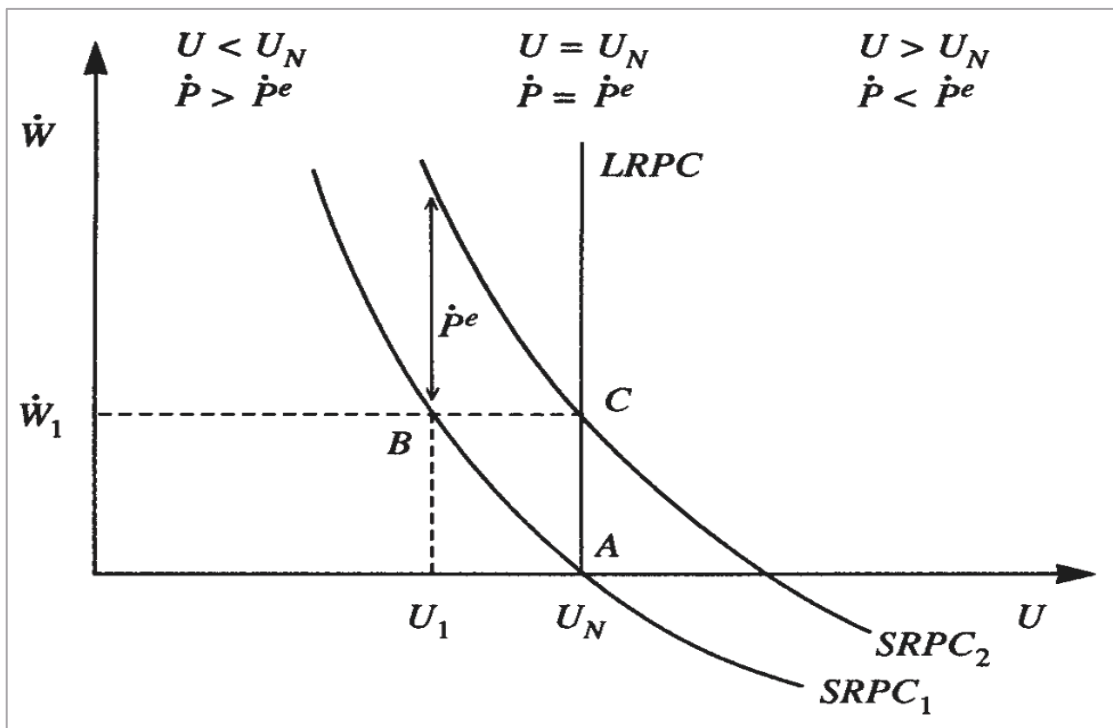
Borrowed from: Snowdon, B. and Vane, H.R. (2005). *Modern Macroeconomics*.

Figure 3: Phillips Curve



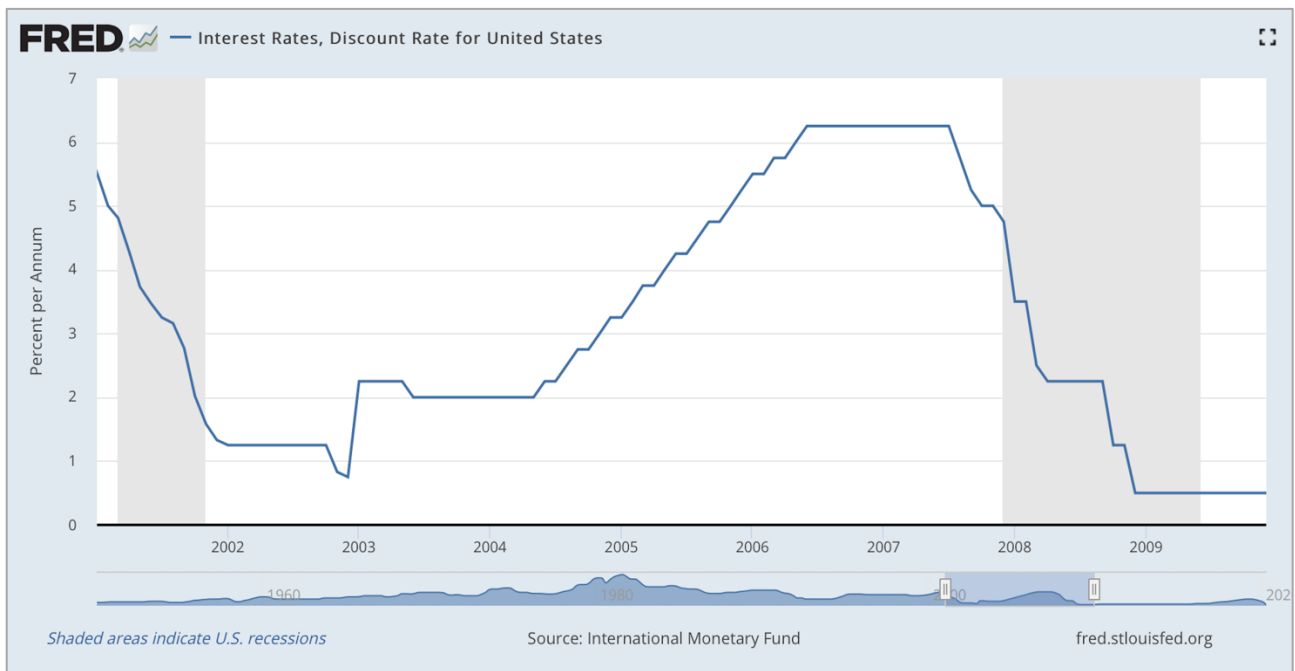
Borrowed from: Snowdon, B. and Vane, H.R. (2005). *Modern Macroeconomics*.

Figure 4: Expectations-augmented Phillips Curve



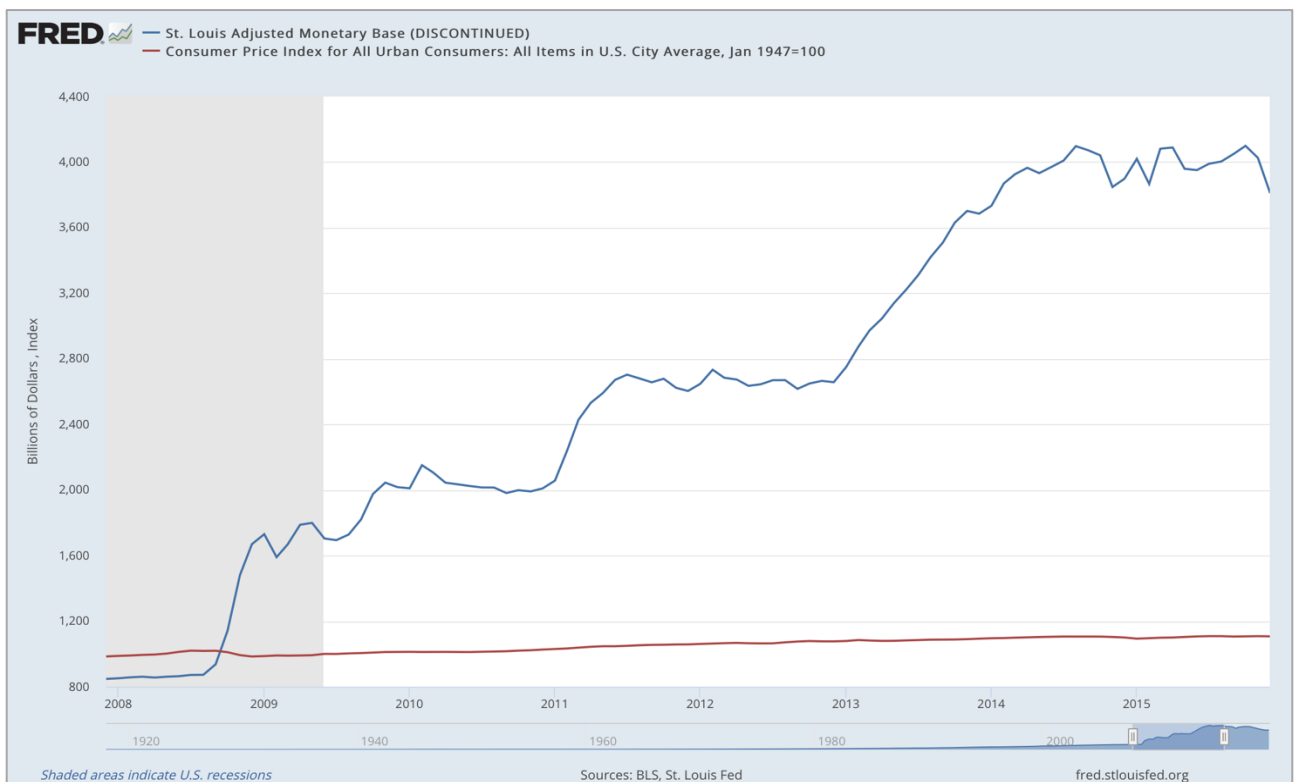
Borrowed from: Snowdon, B. and Vane, H.R. (2005). *Modern Macroeconomics*.

Figure 5: interest rate for the US in the period 2001-2009



Data obtained from the Federal Reserve Economic Data (FRED) website.

Figure 6: money supply and inflation level for the US in the period 2008-2016



Data obtained from the Federal Reserve Economic Data (FRED) website.

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