

The Evolution of Phillips Curve Concepts and Their Implications for Economic Policy

GERGŐ MOTYOVSZKI

Central European University, 2013 Winter Trimester

History of Economic Thought, Term Paper

In this paper I endeavor to follow through the evolution of the Phillips curve. As the main relation capturing the interaction of nominal and real variables, it has serious implications for demand management economic policies. Depending on the prevailing school of macroeconomic thought the different versions of the Phillips curve implied either the lack of classical dichotomy and effective demand policies (Keynesianism and neoclassical synthesis), something in between (monetarism) and exactly the opposite (new classical and RBC theories). The concepts of monetary neutrality, price flexibility and money being a veil had come full circle from the classical era until the new classical school. Today's New Keynesian consensus is again a step towards effective demand side policies and the lack of monetary neutrality, albeit in a more sophisticated form. The consensus concerning the policy implications of today's mainstream New Keynesian school has built a lot on previous classical-like schools in its prescription of rule based policies aiming for stabilizing the economy around its long run equilibrium.

keywords: Phillips Curve, inflation, unemployment, NAIRU, natural rate hypothesis, adaptive expectations, rational expectations, policy ineffectiveness, new classical economics, new Keynesian economics

JEL classification: J51, E24, E31, E58

INTRODUCTION

The concept of the Phillips curve has been the centerpiece of macroeconomics ever since it was born in the late 1950s. It provides the link between nominal variables, like price and wage inflation, and the real economy. In other words, it shows how changes in nominal income are decomposed into changes in prices and quantities. We can also think of this relation as representing the supply side of the economy, that how pricing decisions and real economic activity interact with each other in the production process.

Therefore, the nature of the Phillips curve fundamentally determines that how the interaction of demand and supply in the economy will affect nominal and real variables, so it is of crucial importance for economic policymakers to be aware of the true nature of this relation. Provided policymakers are capable of influencing aggregate demand in the economy, then depending on the behavior of aggregate supply, as captured by the Phillips curve, their actions can have radically different consequences on real output and inflation.

However, the concept of the Phillips curve has gone through a quite serious evolution process since it was born. In a quest for better understanding of the macroeconomy and to provide answers for previously unexpected economic phenomena (like the Great Inflation of the 1970s), new schools of macroeconomic thought had sprung alive and all of them came forward with its own version of the Phillips curve. The policy implications of the different versions range from the possibility of activist policy fine tuning of the real economy to the other extreme where demand management policies are totally ineffective in altering real variables. The former offers a stable trade-off between inflation and unemployment to be exploited by policymakers while the latter implies no trade-off at all. They also tell different stories about the pain and speed of disinflationary policies. Underlying

these different implications lie diverse assumptions on the role and nature of inflation expectations as well as nominal rigidities (i.e. price stickiness).

In this paper my aim is to guide the reader through the milestones of this evolutionary process and describe the main features, implications and underlying assumptions of the different Phillips curve concepts. A better knowledge of this progression is key to understand the different schools of macroeconomic policies that why they were pursued at their time and why certain events in economic history happened the way they did.

In order to demonstrate the differences of each concept, I will use the unified framework of aggregate supply-aggregate demand analysis (even if it was not used at the time) (Mishkin, 2007). The structure of the paper follows a chronological order. Section 1 introduces the pre-1950s theories of how real demand and supply interact in different setups of price stickiness: I show the two extremes of the classical school and orthodox Keynesianism. Section 2 deals with the birth of the Phillips curve and its incorporation into the IS-LM model of demand in the context of the neoclassical synthesis. Section 3 describes the monetarist “counter-revolution” and the natural rate hypothesis. Section 4 is about the New Classical school and their rational expectations hypothesis while Section 5 offers an insight to the idea of the New Keynesian Phillips Curve which can be considered as the current mainstream theory. Finally, I conclude.

1. CLASSICAL DICHOTOMY VS KEYNES

1.1. Classical view

The prevailing consensus of the 19th century was that wages and prices adjusted in a perfectly flexible manner to clear all markets at all times. One famous result of this assumption was Say's Law which could be summarized as “supply always creates its own demand” through the instantaneous adjustment of prices (S.N., 2010). Therefore real output is determined by the supply side of the economy, which in turn depends on factors of production like labor and capital and their productivity. Any change in demand will only result in an immediate change in the price level, leaving real variables unchanged. In the context of the AS-AD framework this means that the aggregate supply curve is vertical at a point which we can call potential output or long run steady state output while shifts in the negative sloping AD curve along the vertical AS will only cause changes in the price level.

Another aspect of this view is the so called *classical dichotomy*. This essentially means that the economy can be fully separated into a real and a nominal sector without any interaction between the two (S.N., 2010). In other words, nominal variables and shocks (like an increase in the money supply) have no effect on real variables whatsoever. Since real output is determined exclusively by real fundamentals of the supply side, changes in monetary policy (that is, in the quantity of money) can have no effect on real demand, the latter having to equal the static supply. Therefore any monetary policy induced change in nominal demand will fully be translated into changes only in the price level and not in real output. This is called as the neutrality of monetary policy.

It should be noted, however, that the main figures of classical political economy, like Adam Smith, David Ricardo and John Stuart Mill were first and foremost concerned with *long run economic growth* and not short run business cycle fluctuations for which the Phillips curve were thought relevant later. In the long run their assumptions of flexible prices and monetary neutrality are considered as plausible even today. Despite this general curiosity for long run growth, however, there were a few early inquiries into the relation of inflation and unemployment, namely by David Hume (1752), Henry Thornton (1802) and Irving Fisher (1926) (cited by Humphrey, 1985).

1.2. Orthodox Keynesianism

The Great Depression of 1929-1932 had shaken the foundations of the classical view. It was impossible to explain such a huge drop in real output by only changes in the economy's supply capacity. It is at this time, when a British economist, John Maynard Keynes emerged and suggested that real economic activity in the short run is driven by demand as opposed to supply potential. According to him, the main reason behind this is that prices are sticky and perfectly fixed in the short run, therefore changes in demand will translate into changes in real output while leaving the price level unchanged. Firms are willing to produce any volume of output that was demanded at the fixed price level. In the context of our AS-AD framework, this means that the aggregate supply curve is horizontal at the fixed price level while the negatively sloped demand curve can shift alongside it (S.N., 2010).

Classical dichotomy and monetary neutrality therefore no longer hold, since changes in nominal variables like the money supply, by shifting nominal demand, will fully be channeled into real variables while leaving the price level constant. Monetary policy is therefore no longer neutral and can have real effects.

In a sense, we can see that this is exactly the opposite of the classical world of supply driven real output, perfectly flexible prices and monetary neutrality with its vertical AS curve. However, we should also see that the two views are not entirely incompatible with each other, since the analysis of Keynes primarily concerns the short term behavior of the macroeconomy which has more to do with cyclical fluctuations, while classical economists had talked about mostly the long run and steady state relations. Keynes did not exclude the possibility of real output returning to potential supply after the adjustment of prices, but he dismissed the importance of such analysis as "in the long run we are all dead" (S.N., 2010, p.498).

In addition, although sticky prices made demand management economic policies effective in real terms, this did not necessarily mean a substantial departure from monetary neutrality for Keynes. Of course, as long as the change in money supply by monetary policy can affect demand, it will be embodied in the change of real output rather than the price level, and it is in this sense that monetary neutrality and classical dichotomy are abolished. However, Keynes doubted the ability of monetary policy to affect demand in the first place. This was due to his assumptions of very low interest elasticity of investment (investment trap) and/or high interest elasticity of money demand (liquidity trap). This means that changes in the money supply will not affect interest rates that much and/or changes in interest rates will have little effect on investment, and therefore on real output. In the context of the IS-LM model of aggregate demand this means a very steep IS curve and a flat LM curve. Hence, the conclusion of Keynes was to use fiscal policy for demand management instead of monetary policy (S.N., 2010).

2. THE BIRTH OF THE PHILLIPS CURVE AND THE NEOCLASSICAL SYNTHESIS

Until now there was no relation between prices and real output. Either one or the other was fixed and changes in aggregate demand were channeled exclusively into one of them while leaving the other unchanged. However, the Phillips curve captures exactly this relationship: how is inflation (the change in price level) connected to changes in real economic activity, what is the relation or correlation between them. Based on the previous two schools of thought we would say: nothing.

But that was not what A. W. Phillips found in his 1958 seminal paper. In its original formulation the Phillips curve is a statistical equation fitted to annual data of percentage changes in nominal wages and the unemployment rate in the United Kingdom for 1861-1957. The result was a downward sloping convex curve which intersected the horizontal axis at some positive level of

unemployment (Phillips, 1958). In other words – if we take wage inflation and the inverse of unemployment as proxies of price inflation and real output, respectively – there is a positive relationship between inflation and real economic activity. So, unlike in the classical or in the Keynesian economy, the AS curve has a positive but finite slope, which corresponds to the negatively sloped Phillips curve. Changes in aggregate demand shift the AD curve alongside a positively sloped AS curve, thereby generating the positive relation between output and inflation.

The interpretation of this result was as follows. When the labor market is in equilibrium, there is no pressure on nominal wages to change (we are at the horizontal axis at the equilibrium value of unemployment¹). As aggregate demand increases in the economy, there will be excess demand for labor which will cause the unemployment rate to fall below its equilibrium value and which will also put upward pressure on nominal wages, and in turn, on prices. As excess demand situation comes to an end, unemployment returns to its equilibrium level and wages and prices become stable again² (Humprey, 1985).

The negative slope of the Phillips curve (the positive slope of AS) is the result of excess demand for labor manifesting itself *both* in a lower unemployment rates (increasing real output) and in higher wage inflation. The increase in demand is neither exclusively captured by price increases, nor by output growth, as in the case of the classical or the Keynesian school. The explanation for this at the time was the *money illusion* phenomenon resulting in relatively sticky wages. Workers suffering from money illusion falsely perceive an increase in their nominal wages as an increase in their real wage even if prices rose at the same or even higher rate. Therefore, as nominal wages increase, workers will supply more labor while firms, in response to falling real wages, will demand more labor resulting in falling unemployment (S.N., 2010).

When incorporated into the fixed price IS-LM framework of Hicks (1937), the original Phillips curve contributes to a certain form of “refined Keynesianism” where prices are not entirely sticky (positive AS), hence they respond to changing demand, and yet demand management policies also have real effects. Therefore classical dichotomy does not hold. This is the era of the neoclassical synthesis.

Neoclassical synthesis is in effect a compromise between the pre-Keynesian neoclassical (mainly microeconomic) theory and Keynesian macroeconomics. While accepting most of the Keynesian features of nominal rigidities and hence effective demand policies in short run macroeconomics, the synthesis maintained that in the long run the economy settles to a steady state best described by the neoclassical theories. There was also a compromise in the fact that the main elements of the above macroeconomic framework were – unlike Keynesian macro – being tried to be placed upon microeconomic foundations by the famous economists of the time, like Samuelson, Solow, Modigliani, Hicks and Tobin. However, the mechanism determining prices and wages had not become grounded on firm micro foundations as the empirically stable, but ad hoc Phillips curve was satisfactory for everyone (Blanchard, s.a.).

Hence, in the next 20 years up until the late 1960s a general consensus prevailed among economists and policymakers that the Phillips curve represents a stable tradeoff between inflation and unemployment, offering a menu of policy options for short run business cycle management. E.g. this

¹ The level of unemployment consistent with labor market equilibrium is positive, since there is some *frictional unemployment* even if there is no excess demand for or supply of labor and when wages are stable. This is due to frictions in the labor market such as transactions costs (Humprehy, 1985).

² Assuming that firms set prices with a constant markup over their nominal unit labor costs and also assuming constant labor productivity, then changes in nominal wages pass 1 for 1 into changes in price inflation.

implied that by generating and *maintaining*³ excess demand with monetary or fiscal policies, unemployment can be permanently lowered below its equilibrium value at the cost of higher inflation (Humphrey, 1985). The only remaining task for demand policies is to choose a point along the Phillips curve which is the most desirable mix of inflation and unemployment in terms of social costs.

Demand policies were thought capable of moving the economy *along* the Phillips curve, but not of *shifting* the curve itself. The latter could be done by microeconomic structural (supply side) policies. The main shift variables considered in the era which could improve the Phillips curve trade-off were productivity, profits, monopoly power and unemployment dispersion. Among these most were redundant, already being captured by the excess demand proxy (unemployment). Unemployment dispersion, however seemed to be verified empirically (Humphrey, 1985).

3. EXPECTATIONS AUGMENTED PHILLIPS CURVE AND THE NATURAL RATE HYPOTHESIS

By the 1970s the original Phillips curve started to perform quite badly. It could not explain the observed stagflation in the developed world: increasing unemployment and accelerating inflation at the same time. That is when Milton Friedman (1968), the father of the monetarist school and Edmund Phelps (1967) pointed out some serious misspecification in the original Phillips curve.

Their argument was that labor market equilibrium is determined by *real* as opposed to *nominal* wages. They also argued that expectations matter a lot, so *expected* real wage is the right variable to look at. As expected real wage change equals the difference between nominal wage inflation and expected price inflation, the original Phillips curve (stated in terms of nominal wage inflation) should be appended by an inflation expectations term. The argument was that workers are concerned with the real purchasing power of their wages and thus take expected price inflation into account when agreeing on their nominal wages. However, they cannot be fooled permanently, i.e. that there can be no money illusion forever. Eventually they will perceive price inflation correctly, and demand higher nominal wages thereby restoring the real wage as well as unemployment to its original level. This implies that when inflation expectations are fully realized, there is no trade-off between inflation and unemployment.

As to when exactly inflation expectations are fully realized, the theory of Friedman and Phelps was the following. Expectations are formed adaptively based on an error correction mechanism by which expectations are adjusted by some fraction of the previous forecast error. This means that expected inflation is backward-looking, it is a “geometrically declining weighted average of all past rates of inflation with the weights summing to one” (Humphrey, 1985, p.11).

Their third innovation to the original Phillips curve was the respecification of the excess demand variable. Previously proxied by the inverse of the unemployment rate, excess demand was now defined as the *gap* between the so called *natural rate of unemployment* and actual unemployment. The natural rate prevails when inflation expectations are fully realized and incorporated into nominal wages, hence the real wage is stable at its equilibrium level. The natural rate of unemployment is therefore compatible with any inflation rate, provided it is stable and neither accelerating, nor decelerating (so that expectations are not wrong). This, again, points to the lack of long-run stable trade-off between inflation and unemployment. Deviations from the natural rate of unemployment are only possible when there is unexpected, surprise inflation to which economic agents’ expectations

³ In the neoclassical synthesis, without maintenance of the expansionary policies (and excess demand), the economy would converge back to its original long run equilibrium and would not remain at the socially desired point. With continuing demand stimulus, however, it is possible to keep the economy permanently under its equilibrium unemployment rate.

adapt only with some delay, and which therefore is capable of temporarily altering the real wage. According to Friedman and Phelps, the natural rate of unemployment cannot be influenced by demand side policies, it is determined by structural features of the labor market (Mankiw, 1990).

The expectations augmented Phillips curve and the natural rate hypothesis described above had serious implications for macroeconomic policy. The main result was that trade-off is between *unexpected* inflation and the unemployment *gap*, which trade-off, by the nature of adaptive expectations, can only be temporary and available only on the short run. Once expectations fully adjust to observed inflation, the real wage is restored and unemployment converges back to its natural level at the new inflation rate. The trade-off therefore vanishes in the long run, and the Phillips-curve becomes vertical at the natural rate of unemployment. The short run Phillips curve still has a negative slope, but as expectations adjust, it shifts along the long run Phillips curve. Hence, trying to reduce unemployment below its natural rate at the cost of higher inflation is possible in the short run, but the unemployment effect disappears over time while higher inflation remains. The only way to keep unemployment permanently below its natural rate is to continuously surprise economic agents with extra inflation, thereby keeping unexpected inflation constant. This leads to forever accelerating inflation. In other words, the long run trade-off is between the *rate of acceleration* of the inflation rate and the unemployment gap. This is the accelerationist hypothesis (Humphrey, 1985).

Interpreting the expectations augmented Phillips curve in the AS-AD framework, we still have a positively sloped short run AS curve (SRAS), but now the “long-run” is also relevant and does not fade into the distant future, represented by a vertical long run AS curve (LRAS). Following a demand shock the AD curve shifts out along the positively sloped SRAS raising output and inflation in the short run (this is a move northwest along the short run Phillips curve). However, as expectations adjust, and the nominal wages are increased, the AS curve shifts up along the new AD curve (the Phillips curve shifts up) causing falling real output (increasing unemployment) and increasing inflation. This could provide an explanation to the stagflation observed in the 1970s.⁴

The monetarist Phillips curve is therefore a return to the neoclassical theories in the sense that classical dichotomy holds in the long run, and once inflation expectations adjust, monetary policy is again neutral. Demand fluctuations will eventually only affect prices but not real output. It is still Keynesian, however, in the sense that demand policies can influence output in the short run while the inflation surprise still persists. We could say that these are more or less the same results as in the case of the neoclassical synthesis, yet the message of monetarism was substantially different and more anti-Keynesian. While accepting the *potency* of demand management policies in the short run, it was firmly against the use of activist fine-tuning and instead was a proponent of non-activist policy. Friedman argued, that since any influence on real output can only be temporary while causing lasting effects on inflation, it is better not to exploit this short run trade-off and just to leave the economy to itself at the natural rate of unemployment. Since this rate is consistent with any rate of inflation, it is best to concentrate only on stabilizing inflation at low levels by keeping the growth of money supply constant⁵ (Mankiw, 1990).

⁴ Stagflation can also be explained by explicit supply shocks shifting the Phillips curve outwards (like oil price shocks). They will be incorporated later but monetarists used inflation expectations as the only shift term in the Phillips curve equation. The most famous of those later incorporations is the “triangle model” by Robert J Gordon (2011) who built supply shocks in to the Phillips curve (cost-push inflation) in addition to inflation expectations (built-in inflation) and the output gap/excess demand term (demand-pull inflation).

⁵ Monetarism also differed from previous Keynesian type theories in finding monetary policy to be the more effective tool in influencing demand than fiscal policy. According to monetarists, the LM curve is steeper and the IS curve is flatter (just the opposite of Keynes's assumptions) (S.N., 2010).

This provided the theoretical basis for monetary policy having price stability as its primary objective. It also explained that monetary policy is neutral in the long run and is unable to divert unemployment away from its natural rate permanently. Trying to exploit short run trade-offs would only result in higher inflation. This had a huge influence on the monetary policy of the post 1970s era. Central banks should then choose the targeted inflation rate. If the current inflation rate and inflation expectations were not in line with this target, the monetarist theory implied that they can only be lowered through restricting aggregate demand and creating excess supply in the economy, i.e. the sacrifice ratio is positive: disinflation will have real costs, since inflation expectations can only be lowered if monetary policy surprises economic agents by lowering actual inflation which in turn is only possible through restricting demand (Humphrey, 1985). Monetary policy cannot affect inflation expectations directly if they are formed in an adaptive manner. This was demonstrated spectacularly in the 1980s, the era of Volcker disinflation when the Fed could only break inflation by pushing the US economy into a severe recession.

4. RATIONAL EXPECTATIONS

Despite its success in explaining several phenomena of its time, the monetarist view came under heavy criticism, mostly due to its adaptive expectations assumption. By being entirely backward-looking, it implies that people fail to take into account all available information about the future, which is not rational. Under accelerating inflation and adaptive expectations, economic agents would systematically underestimate actual inflation (even if it is announced in advance) which is highly unlikely. Rather, it is more plausible to assume that they recognize (or listen to) what the policy is doing, and change their expectations accordingly. In other words, expectations are subject to the Lucas-critique (Lucas, 1976), whereby we cannot assume every relation in the economy (including the formation of expectations) to remain the same in the face of a change in policy. Rather it is better to assume that economic agents use all available information when forming their expectations. This is the theory of rational expectations which states, that forecasting errors cannot have any systematic component, they are entirely random, and hence expectations are correct *on average*. The result is that economic agents cannot be surprised systematically (Muth, 1961).

This result is the centerpiece of the New Classical school of macroeconomic thought. As for its policy implications it is a stricter and more extreme version of monetarism, while qualitatively remaining almost the same. The New Classical Phillips Curve – just like Friedman’s – provides a trade-off between inflation and unemployment only as long as inflation is a surprise; otherwise the Phillips curve is vertical and demand side policies have no real effects (Lucas, 1972 & Lucas 1973). The only difference is that it is much harder to surprise economic agents if they form their expectations rationally. While in the monetarist framework with adaptive expectations even rule-based policies can generate unexpected inflation, it is not possible in the New Classical school, and the speed of adjustment in expectations is also much faster following a forecast error (Humphrey, 1985). Systematic, rule-based policies therefore are unable to affect real variables, and even the effect of non-systemic policy is very short lived (Sargent & Wallace, 1975). Hence, the conclusions of Friedman regarding the price stability objectives of monetary policy are strengthened.

Another important difference to monetarism is the real cost associated with disinflation. As rational expectations are forward-looking, it is possible for the monetary authority to influence them directly by announcing say a zero-inflation policy. Economic actors are able to incorporate this information instantly into their expectations, therefore the economy can move downwards along the vertical long run Phillips curve without deviating from the natural rate of unemployment and creating

huge real loss in terms of lower output. The sacrifice ratio is zero if the policy can effectively guide expectations (Mankiw, 1990).

In this respect the ability of policymakers to credibly commit themselves to a low inflation policy is key. In other words, the public must believe their announcement. Kydland and Prescott (1977) and Barro and Gordon (1983) showed that only rule based policies are capable of doing that as opposed to discretionary policies. Under discretion policymakers try to maximize social welfare at the given period, which includes finding a bundle of inflation and unemployment along the short run Phillips curve. In order to be on a lower positioned Phillips-curve they might try to convince the public to lower their expectations and once the public believes them, try to exploit the short run trade-off by generating surprise inflation. This is the time inconsistency problem of discretionary policy. However, the rational public is aware of this and uses this information when forming expectations, that is, it cannot be convinced by the central bank to lower expectations, which is also why it cannot be surprised by the central bank. The result will be that inflation will be what the central bank would have chosen, but unemployment will not change at all. Therefore, under discretion inflation cannot be lowered under a certain level as central banks are unable to commit themselves credibly, while unemployment remains the same and in fact no trade-off will exist. A way to credible commitment and to eliminate this inflation bias without higher unemployment is to implement rule-based policies which tie the policymakers hands (like taking unemployment out of their objective function). Thereby policymakers can make use of the zero sacrifice ratio. This is one of the key policy implications of the new classical theory and rational expectations.

The new classical school is therefore an almost complete return to the original classical ideas. Classical dichotomy is almost never violated (at least for long) along the vertical Phillips curve which renders demand policies mostly ineffective. Of course, the economy can move along short run Phillips curves, too, but only as a result of purely random and unpredictable shocks (and not in response to systematic policy moves). Also, deviations from the vertical Phillips curve and the natural rate of unemployment, apart from being purely random, are very short-lived. This, however, was clearly at odds with the observed business cycles which the new classical theory could not explain in its original form, which lead to the development of the Real Business Cycle theory which is an even stronger return to classical economics (S.A., 2010).

Previously potential output or the natural rate of unemployment (NAIRU)⁶ were thought to be fairly constant or only changing in the long run as a result of slowly changing real structural fundamentals. Deviations from this level were possible due to nominal rigidities or irrational expectations. Under the new classical theory rational expectations came in and only sticky prices remained as a channel through which unanticipated shocks could push the real economy out of long run equilibrium. Since the implied random fluctuations did not fit the observed business cycles, the RBC theory (King et al, 1988) came up with a radically new explanation. They suggested to throw away even the price stickiness assumption and to return to the classical notion of perfect price flexibility. In this setup classical dichotomy is fully restored. Therefore demand fluctuations and monetary policy can have no real effects at all, they will only cause changes in the price level: money again becomes a “veil”. There is no possibility of output deviating from its potential level, hence the Phillips curve is totally vertical at the rate of NAIRU. RBC theory therefore breaks with the view that economic fluctuations are deviations of actual output from its potential, long-run level. According to their explanation the business cycle is the result of the fluctuations of potential output, the supply side itself, which is not that stable as previously thought, but rather can be influenced in the short run, too, by productivity shocks. TFP shocks are persistent which then can explain the observed business

⁶ which was also called NAIRU, standing for the non-accelerating inflation rate of unemployment

cycles. The long run anchor for real output is the steady state supply capacity which prevails when all shocks have died away. In the Phillips curve framework this means a fluctuating but always vertical Phillips curve.

5. THE NEW KEYNESIAN SYNTHESIS

RBC models proved surprisingly successful in predicting business cycles, although they were unable to replicate certain moments of the observed data. In addition, the highly unrealistic assumption of perfectly flexible prices, and the neutrality of monetary policy as a consequence, was clearly at odds with reality (Christiano et al, 1998). Based on these criticisms a new consensus started to emerge which we call the New Keynesian school of macroeconomics and which is regarded as the current mainstream in the field.

New Keynesian theory adopts the dynamic stochastic general equilibrium RBC models with their complex microeconomic foundations and rational expectations but rejects the idea of totally flexible prices and instantaneously clearing, perfect markets (Clarida et al, 1999). It reintroduces nominal rigidities and also market frictions⁷, thus monetary neutrality vanishes: nominal variables once again are able to affect real ones. The combination of nominal rigidities and rational expectations might seem to be the same as the pre-RBC new classical school: only purely random, unexpected shocks can have real effects and perfectly anticipated ones will leave the economy at its potential output. However, by adopting the RBC model as a core of its own, the New Keynesian theory accepts that potential output itself can fluctuate around its long run steady state value in response to persistent shocks. In this sense it is a combination of the early new classical theories, where potential supply was more or less fixed, and the RBC models where potential supply is subject to shocks. Therefore in New Keynesian models the supply side of the economy behaves exactly as in the RBC models: this is the so called natural or flexible price equilibrium, which is consistent with potential output, or in other words the normal supply capacity. However, actual real variables will deviate from their flexible price value for an extended period due to nominal rigidities and the persistence of shocks.

The New Keynesian Phillips Curve derived from these models states that inflation is a positive function of future expected inflation and the so called output gap which is the deviation of actual real output from its (changing) potential level (Clarida et al, 1999). Therefore, due to nominal rigidities monetary policy is once again effective, being able to increase the output gap (reduce unemployment under its natural rate) at the cost of higher inflation. However, because of rational expectations, the economy always reverts back to its flexible price potential output once the shocks die away and prices adjust, hence exploiting the inflation unemployment tradeoff is not possible in the long run where monetary neutrality sets in again. That is why the policy implication of the New Keynesian theory is also to follow rule based policies and to try not to push the economy above its potential supply – just as in the case of the new classical school. The main difference, however, is that there is scope for activist fine tuning as opposed to the non-activist policy prescription. By having an effect on the real economy, monetary policy can facilitate the adjustment process back to the economy's potential following a shock which opened up the output gap. As long as central banks use their influence on the real economy for closing the output gap and not for trying to open it up, it is a desirable thing and will not have inflationary consequences in the long run, since a closed output gap is compatible with stable inflation. The only thing monetary policy still has no effect on in the short run is potential output itself, which is determined by the supply side of the economy.

⁷ In a microeconomically founded model market frictions, like monopolistic competition are needed so that certain economic agents have pricing power which allows the modeling of nominal rigidities.

The only dilemma monetary policy still faces, is when the so called *divine coincidence* (Blanchard and Galí, 2005) does not hold. This means that shocks are such that they affect inflation only through the output gap: negative output gap creates disinflationary pressure and expansionary monetary policy moves both inflation and the output gap up, thereby creating no dilemma as to what to do. However, certain shocks can have an opposite effect on the output gap and inflation (e.g. cost push shocks) which poses a dilemma to central bankers. In this case divine coincidence no longer holds, and inflation and output gap cannot be stabilized at the same time. The trade-off is now between stabilizing one or the other. Whichever the central bank chooses, the economy will eventually converge back to steady state: inflation comes back to target and the output gap closes. It is only the adjustment path which will be characterized differently. In this case it depends on society's and policymakers' preferences which one to choose. This can remind us to the era of the original Phillips curve. Policymakers of the time faced a trade-off between inflation and unemployment and wanted to choose an optimal mix of the two, while today's central bankers might face a trade-off between stabilizing the output gap and inflation and are given the chance to have priority over either one of them.

SUMMARY

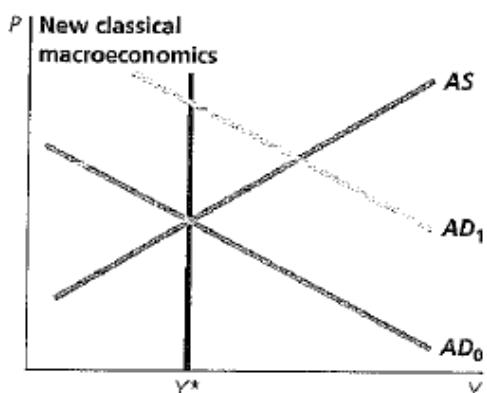
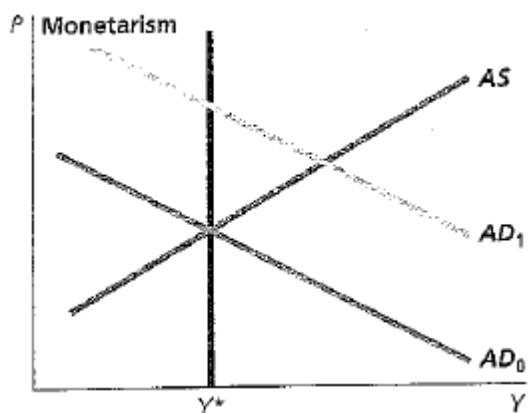
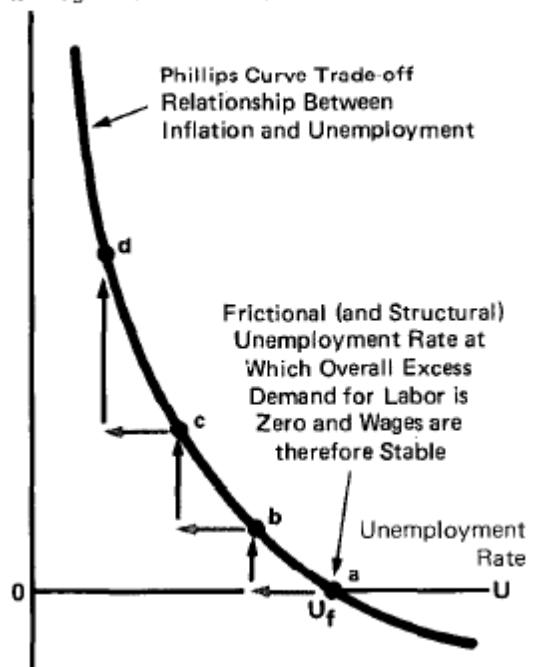
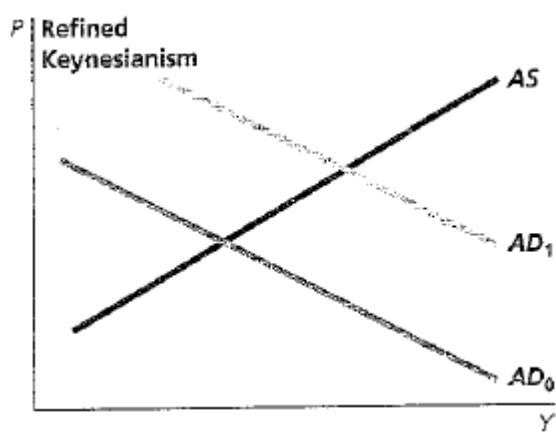
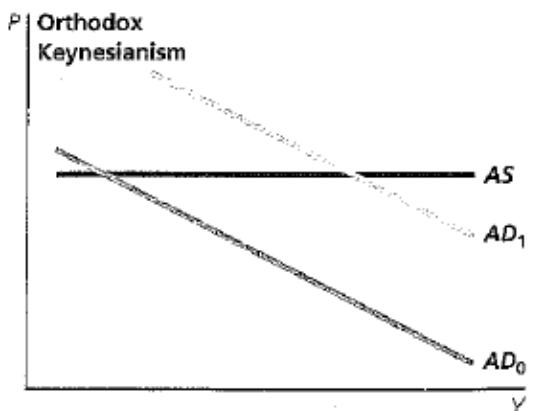
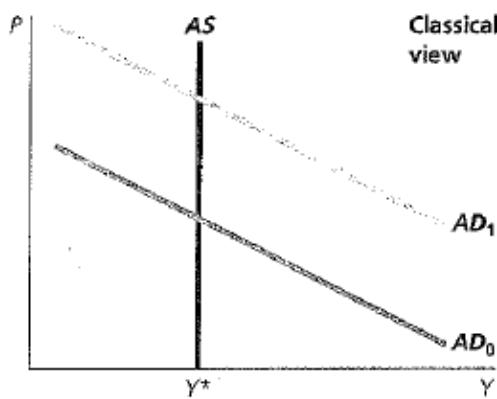
In this paper I endeavored to show how the macroeconomics profession has come full circle since it was born regarding the relationship of nominal and real variables. Starting from the failure during the Great Depression of the neoclassical theory where prices were perfectly flexible, classical dichotomy held and demand side policies had no effect on the real economy, Keynes was proposing exactly the opposite of this: under sticky prices classical dichotomy no longer holds and it is demand which determines real output. Activist demand management policies can be effective and indeed are desirable. The following years saw a synthesis of the two opposing views, but remained dominated by the Keynesian ideas concerning the short run. It was Milton Friedman who took a large step towards the resurrection of policy neutrality when he pointed out in the natural rate hypothesis that only unexpected inflation affects real output, and after expectations adjust, demand side policies loose traction and classical dichotomy is restored. He was against trying to exploit the short run trade-off as it is not stable, and proposed the non-activist policy prescription. In the following period the tendency to move back towards the classical ideas intensified as the concept of rational expectations and the return of perfectly flexible prices made their way to the new classical and RBC theories, bringing back almost perfect classical dichotomy, making money again a "veil" and thereby making the case for non-activist policy. The New Keynesian synthesis is again a modification back towards Keynesian ideas with the adoption of nominal rigidities rendering demand side policies once again effective. Despite this however, policies should only aim at stabilizing the economy around its natural, flexible price equilibrium; trying to push the economy away from this can only be temporary and therefore is undesirable.

The above evolution of ideas was demonstrated through the different concepts of the Phillips curve, which is the main relation trying to capture the interaction of nominal variables and the real economy. At each milestone in its evolution it was appended and improved in some aspects. These modifications were mostly an attempt to explain previously not experienced economic phenomena like the Great Inflation of the 1970s or to improve the fit of the curve to reality. Once thought of as the ultimate and unchanging menu of policymaker's available options to choose between inflation and unemployment, and having been rendered useless thereafter, the Phillips curve, albeit in its modified more sophisticated version, once again seems to be a useful guide for policymakers.

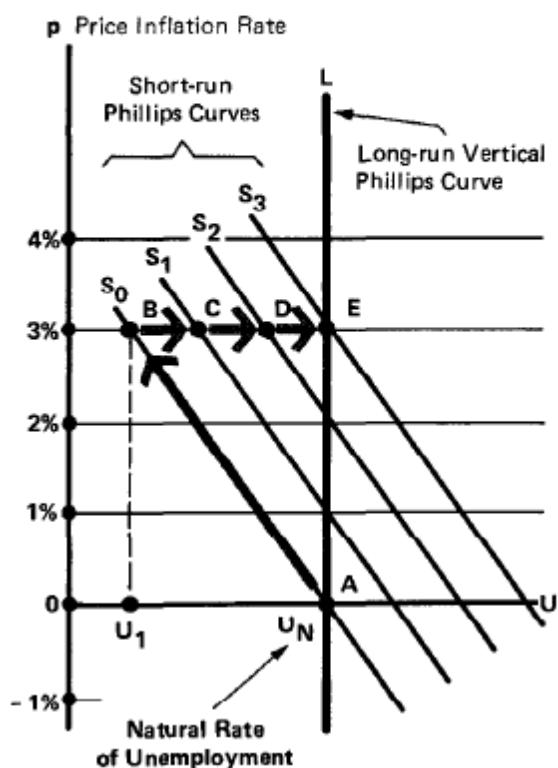
REFERENCES

- Barro, R. J., & Gordon, D. B. (1983).** A Positive Theory of Monetary Policy in a Natural Rate Model. *Journal of Political Economy*, 91(4), 589-610.
- Blanchard, O. J. (sine.anno.).** Neoclassical Synthesis. *mimeo - MIT*.
- Blanchard, O., & Galí, J. (2005).** Real Wage Rigidities and the New Keynesian Model. *NBER Working Paper Series*, No. 11806.
- Christiano, L. J., Eichenbaum, M., & Evans, C. L. (1998).** Monetary policy shocks: what have we learned and to what end? *NBER Working Paper Series*, No. 6400.
- Clarida, R., Galí, J., & Gertler, M. (1999).** The Science of Monetary Policy: A New Keynesian Perspective. *Journal of Economic Literature*, 37(4), 1661-1707.
- Friedman, M. (1968).** The Role of Monetary Policy. *American Economic Review*, 58(1), 1-17.
- Gordon, R. J. (2011).** The History of the Phillips Curve: Consensus and Bifurcation. *Economica*, 78, 10-50.
- Hicks, J. R. (1937).** Mr Keynes and the “Classics”; a Suggested Interpretation. *Econometrica*, 5(2), 147-159.
- Hoover, K. D. (2008).** Phillips Curve. *The Concise Encyclopedia of Economics*.
- Humphrey, T. M. (1985).** The Evolution and Policy Implications of Phillips Curve Analysis. *Federal Reserve Bank of Richmond Economic Review*, (March/April), 3-22.
- King, R. G., Plosser, C. I., & Rebelo, S. T. (1988).** Production, Growth, and Business Cycles. I. The Basic Neoclassical Model. *Journal of Monetary Economics*, 21, 195-232.
- Kydland, F., & Prescott, E. (1977).** Rules Rather than Discretion: the Inconsistency of Optimal Plans. *Journal of Political Economy*, 85(3), 473-492.
- Lucas, R. E. (1972).** Expectations and the Neutrality of Money. *Journal of Economic Theory*, 4, 103-124.
- Lucas, R. E. (1973).** Some International Evidence on Output-Inflation Trade-offs. *American Economic Review*, 63, 326-334.
- Lucas, R. E. (1976).** Econometric Policy Evaluation: A Critique. *Carnegie-Rochester Conference Series on Public Policy*, 1(1), 19-46.
- Mankiw, N. G. (1990).** A Quick Refresher Course in Macroeconomics. *Journal of Economic Literature*, 28, 1645-1660.
- Mishkin, F. S. (2004).** *The Economics of Money, Banking and Financial Markets* (7th ed., p. 622). New York, NY: Addison-Wesley.
- Muth, R. F. (1961).** Rational Expectations and the Theory of Price Movements. *Econometrica*, 29(3), 315-335.
- Phelps, E. (1967).** Phillips Curves, Expectations of Inflation and Optimal Unemployment Over Time. *Economica*, 34, 254-281.
- Phillips, A. W. (1958).** The Relationship between Unemployment and the Rate of Change of Money Wages in the United Kingdom 1861-1957. *Economica*, 25(100), 283-299.
- Sargent, T., & Wallace, N. (1975).** Rational Expectations, the Optimal Monetary Instrument and the Optimal Money Supply Rule. *Journal of Political Economy*, 83(2), 241-254.
- Sine Nomine. (2010).** A pocket guide to the history of macroeconomic thought. *Universiteit van Amsterdam - course materials for Monetary Economics*, Fall 2010, 498-501.

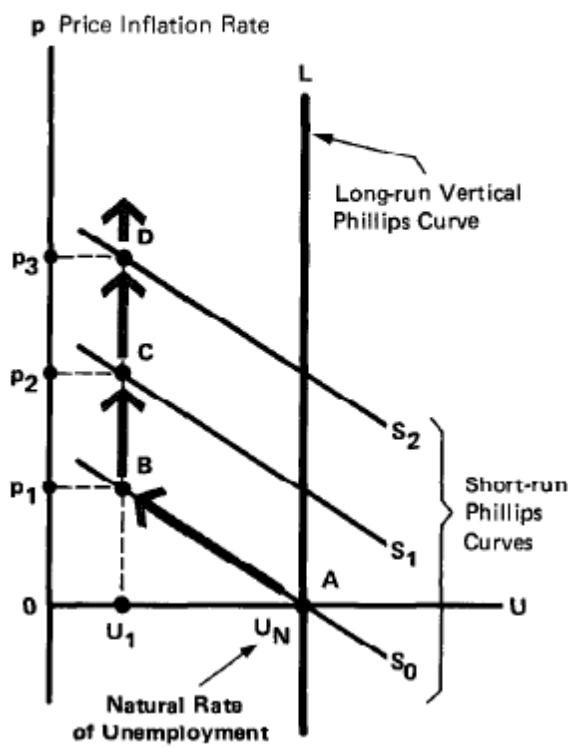
APPENDIX – FIGURES (sources: Humphrey [1985] and S.N. [2010])



THE NATURAL RATE HYPOTHESIS AND ADJUSTMENT TO STEADY-STATE EQUILIBRIUM



THE ACCELERATIONIST HYPOTHESIS



COSTLESS DISINFLATION UNDER RATIONAL EXPECTATIONS AND POLICY CREDIBILITY

