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Dynamic Monetary Theory and the Phillips Curve with a Positive Slope

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ABSTRACT: Don Bellante and Roger W. Garrison (1988) compared two alternative explanations of monetary dynamics: those based on a vertical long-run Phillips curve and those derived from analysis of Hayekian triangles. The authors concluded that the only factor differentiating the two models is the "process" whereby the initial cause is converted into the final "neutral" effect. This article refutes that conclusion. To do so, it suffices to demonstrate that the long-term effect of monetary policy is never neutral. While it is true that after the boom and bust the economy returns to the natural rate of unemployment, the crucial point is that the "natural rate" at the end of the cycle is quite different from the one evident at the start. This requires an "Austrian" Phillips curve with a positive slope.

KEYWORDS: monetary dynamics, Phillips curve, unemployment, business cycle

JEL CLASSIFICATION: B25, E24, E32, E58, N12

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INTRODUCTION

Don Bellante and Roger W. Garrison (1988) use a vertical long-run Phillips curve and Hayekian triangles to illustrate two alternative explanations of dynamic monetary theory. The conclusion the authors reached is that it is only the "process" whereby the initial cause is converted into the ultimate "neutral" effect that distinguishes the two approaches. This article challenges that conclusion on the grounds that monetary policy is never neutral in the long run. While it *is* true that the economy returns to the natural rate of unemployment after a boom-bust cycle, the post-boom "natural rate" is not the same as the one that preceded the cycle. This implies a long-term Phillips curve with a positive slope, consistent with Austrian business cycle theory.

In Part I we summarize the traditional debate over the Phillips curve as it relates to dynamic monetary theory. In Part II we outline the Bellante-Garrison argument based on the relationship between Hayekian triangles and the Phillips curve. In Part III we explain why the effect of monetary policy is not neutral in the long term, and why this supports a theoretical model with an upward sloping Phillips curve. In Part IV we close with the implications of the study.

PART I: THE DEBATE OVER THE PHILLIPS CURVE.

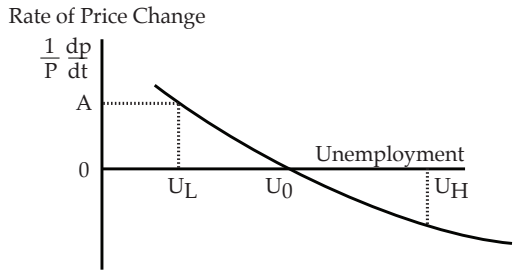
The empirical work of Alban William Housego Phillips (1958) initiated one of the most important debates in modern macroeconomics and politics. A Phillips curve describes the relationship between consumer price inflation and unemployment at various stages in an economic cycle. The Keynesian Phillips curve with a negative slope, shown in Figure 1, illustrates the tradeoff policy makers allegedly face. They may choose a low level of unemployment, U_L, as long as they accept a higher level of prices. Alternatively, when price inflation becomes the dominant problem, they can diminish its acceleration, even to the point of deflation. However, in that case they necessarily have to accept a higher level of unemployment: U_0 for inflation zero, U_H for deflation. This tradeoff implies a negatively sloped Phillips curve.

Phillips' (1958) analysis of empirical data was invoked to support the Keynesian policy prescription: counter-cyclical application of

quantitative easing which capitalizes on the non-neutral impact of monetary policy in the short run.

Phillips' tradeoff hypothesis was questioned from three distinct perspectives. The first category involved the theoretical challenges mounted by monetarists led by Milton Friedman, and Austrian economists led by Friedrich Hayek. The second challenged the broader validity of the model, inferring that its applicability to North America allegedly demonstrated by Samuelson-Solow (1960) was a special case.[1] The third was evidence of simultaneous high unemployment and high inflation, the phenomenon known as "stagflation." As Milton Friedman himself pointed out, "stagflation" "rendered somewhat ludicrous the confident statements that many economists had made about 'trade-offs,' based on empirically-fitted Phillips curves." (1975, p. 50)

Figure 1. The Keynesian Phillips Curve



These challenges produced what Milton Friedman (1977) called the monetarist counter-revolution. The monetarist alternative

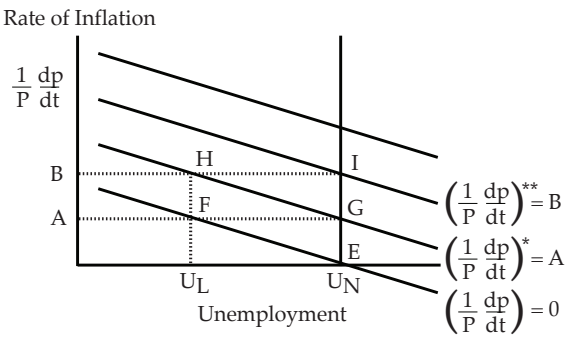
[1] It was generally inferred that the work on the North American economy by Paul Samuelson and Robert Solow (1960) gave credence to a Phillips curve with a negative slope. However, their own work supported criticism of this inference: they acknowledged that the Phillips curve trade-off in the U.S. economy offered only short-run benefits at best, exhibited instability over many periods they examined, and was frequently upward-sloping (i.e., for many periods higher inflation appeared to cause higher unemployment rather than lowering it). (Samuelson and Solow, 1960, pp. 188–190)

acknowledged the validity of Keynesian manipulation of the money supply in the short term but considered the implication of a vertical Phillips curve. This research highlighted the distinction between the effect of monetary policy in the short and long terms, as well as the difference that exists between nominal and real variables. The results emphasized the importance of the neutrality of money in the long term and monetary policy lags (Friedman, 1961). They also prompted speculation over the existence of a "natural" rate of employment and theories of adaptive expectations and inflation acceleration.

The vertical "monetarist" Phillips curve is presented in Figure 2. Starting from point E, let us assume that the economy in question has never experienced inflation. Under these conditions, and assuming a process of adaptive expectations, the most reasonable outcome is an expectation of zero inflation in period 1.

The curve representing the expected inflation rate determines the level of unemployment, e.g. U_N (natural rate). However, if policymakers resolve to diminish the level of unemployment in the economy, for example to U_L, using sufficiently expansive monetary policy, this would generate a price increase at a rate of $A=\frac{1}{P}\frac{dP}{dt}$ (point F).

Figure 2. Expectations-Adjusted Phillips Curve



Any attempt to maintain an unemployment rate lower than U_N can only succeed if the economy is subjected to inflation at an increasing rate. This is necessary in order to keep the inflation rate permanently above the level agents anticipate, based on previous experience.

Friedman called this reasoning "the acceleration hypothesis," a hypothesis originally proposed by Hayek (1978 [1958]).[2] This way of approaching the problem quickly led to the conclusion that the level of employment was a function of inflation not anticipated by economic agents or, more rigorously, the difference between the current unemployment rate and the natural rate of unemployment is a function of the "rate of unanticipated inflation."

Chicago economists concluded that the Keynesian Phillips curve may be effective in the short term when the rate of inflation is not factored into decisions made by economic agents. However, if expansionary monetary policy continues, its impact will tend to be negated by adaptive expectations. In the long run, therefore, unemployment would remain "stuck" at the "natural rate," implying a vertical Phillips curve.

The logic behind this reasoning depends on the assumption that, in the long term, agents will correctly anticipate the inflation rate unless they are "surprised" by continuously accelerating inflation. If monetary stimulus is not used to thwart the expectation that a constant rate of inflation is the objective, then the expected rate of inflation will converge with observed value $\left(\frac{1}{P}\frac{dP}{dt}\right)^{*}=\left(\frac{1}{P}\frac{dP}{dt}\right)$.

[2] See Chapter XXI, in *Studies of Philosophy, Politics and Economics* (1978). However, Hayek questioned the practical validity of the acceleration hypothesis. "First, such inflation, in order to achieve the goal aimed at, would have to *accelerate* constantly, and accelerating inflation would sooner or later reach a degree that makes all effective order of a market economy impossible. Second, and more important, in the long run such inflation inevitably creates much more unemployment than the amount it was originally designed to prevent." Elsewhere he wrote: "The chief conclusion I want to demonstrate is that the longer the inflation lasts, the larger will be the number of workers whose jobs depend on a *continuation* of the inflation, often even on a continuing *acceleration* of the rate of inflation—not because they would not have found employment without the inflation, but because they were drawn by the inflation into *temporarily* attractive jobs, which after a slowing down or cessation of the inflation, will again disappear." (Hayek, 1979, pp. 11–13) The latter quotation is also relevant in the context of the argument presented in Part III.

When this is the case, the relationship is expressed by a Phillips curve which is a vertical line at the point where the natural rate of unemployment (U_N) occurs.

The economic policy consequence of this analysis is obvious: active manipulation of the money supply to continuously reduce unemployment is doomed to fail in the long term because it will either launch the economy on a path of rampant inflation (if an attempt is made to successively "surprise" economic agents by accelerating inflation rates) or fail to reduce unemployment below its "natural level" (if a constant rate of inflation is maintained).

The monetarist version of the Phillips curve was simultaneously rejected and reinforced by the work of Robert Lucas of the University of Chicago, Thomas Sargent of the Hoover Institution, and others who became known as New Classical macroeconomists. (See especially Lucas and Sargent [1978]) Essentially, the modifications they advocated were a shift from the concept of adaptive expectations to one of rational expectations, and acceptance of the neutrality of money (in both the short and long term) as a key assumption. If agents form their expectations rationally, there is no reason to assume that they can be fooled by inflationary policy in either the long or the short term. Under this assumption, the real and positive effects on employment in the short term disappear and the Phillips curve is vertical, irrespective of whether the long or short-term consequences are involved.

PART II: THE BELLANTE-GARRISON COMPARISON

Bellante and Garrison (1988) compared monetarist work on the Phillips curve with the dynamic monetary theory of Friedrich Hayek, illustrated by Hayekian triangles (Hayek, 1931). Following Hicks (1967, p. 203), they pointed out that Hayek's theory was the dominant alternative to those of Keynes until it was eclipsed by Friedman's monetarist theories. From that point on, monetarist theories were regarded as the main alternative to Keynesianism.

> In general, Monetarists have taken comfort in the Knightian view that the structure of capital, particularly the inter-temporal structure, can be safely ignored, and that theories in the Austrian tradition, which make use of such concepts as "roundaboutness" and "stages of production," are especially misguided. (Bellante and Garrison, 1988, p. 210)

If John Bates Clark (1924) and Frank Knight (1934, 1944) provided the Chicago School with its theory of homogeneous capital, it was in the work of Carl Menger (1871) and Eugen von Böhm Bawerk (1889) that the implications of a theory of heterogeneous capital originated. Austrian capital theory highlights the fundamental differences between the two approaches (Garrison, 1990).

It is true that coincidental similarities arise between Hayek and Friedman. The most obvious is recognition that rigidities in labor markets prevent perfect and instantaneous market adjustments to monetary distortions. Both also reject the presumption of rational expectations, which would otherwise allow agents to anticipate monetary policy and avoid the "surprise" effect in both the short and long terms. But these similarities only serve to highlight the differences that arise from the distinct capital theories the Austrian and Chicago schools use to explain the process that ultimately produces a "neutral" impact.

Bellante and Garrison (1988, p. 219) enumerate the similarities as follows:

> Five points of commonality are noteworthy: (1) Both theories can be fully squared with the kernel of truth in the quantity theory of money. (2) Both theories deal with disequilibrium phenomena, but neither denies that equilibrating forces dominate in the end. (3) Both hinge in a critical way on the distinction between short-run effects and long-run effects. (4) Both involve a market process that is necessarily, or endogenously, self-reversing. Monetary disturbances cause certain kinds of distortions in market signals. These distortions give rise in the short run to movements in certain prices and quantities, movements which in the long run create market conditions for counter-movements in those same prices and quantities. (5) *With appropriate qualifications (about what constitutes the long-run) both theories are characterized by monetary disturbances whose short-run effects are non-neutral but whose long-run effects are neutral*" (emphasis added).

Bellante and Garrison (1988) also point out that the "long term" in the Hayekian approach needs to involve a lapse of time sufficient for the relationship between capital and labor to be realigned *after* mal-investments of capital have been liquidated.

More fundamentally, Bellante and Garrison (1988) explain that in the last phase of the adjustment process, the economy enters a period of crisis and depression. But over time, only a portion of the capital stock can be reallocated to satisfy demand consistent with

the new structure of capital. Eventually, after this restructuring and the elimination of distortions, the new capital structure again reflects genuine resource availabilities, namely the actual supply and demand of loanable funds. Bellante and Garrison (1988, p. 217) concluded:

> Abstracting from the capital that is lost forever as a result of the credit expansion and from possible long-run effects on the distribution of income, the rate of interest and the corresponding structure of production will return to the level and configuration that characterized the economy before the credit expansion.

This is precisely the neutrality problem Garrison addressed in the model he presented in *Time and Money*. (2001; see also the discussion in Ravier, 2011a)

Bellante and Garrison imply that the non-neutral effect in the long run is limited to the structure of production. They consider the post-bust structure of production a function of interest rates that have returned to their pre-boom level and a reduced capital stock. But the credit market cannot be disassociated from the structure of production, as Hayek explained in his correspondence with Keynes in the thirties. The realignment of the credit market with the new structure of production requires real interest rates that are higher than their pre-boom level. Bellante and Garrison (1988) should therefore have seen that Friedman and the monetarists were wrong about the neutrality of money, especially in the very long term.

PART III: THE POSITIVE SLOPE OF THE PHILLIPS CURVE

As Bellante and Garrison (1988) remind us, Friedman acknowledged that irresponsible monetary policy would eventually lead to an increase in the natural rate of unemployment. Two of Friedman's papers (1976, pp. 232–233 and 1977, pp. 459–460) suggested the potential existence of a positively sloped Phillips curve. But in neither case did Friedman reconsider his model of dynamic monetary theory in light of his empirical work.

In his Nobel lecture, Friedman acknowledged that additional research was needed to resolve the inconsistency between the monetarist Phillips curve and empirical data. He anticipated that this "third stage" of the research into the relationship between

inflation and unemployment would only be successful if a way was found to incorporate political factors:

> In recent years, higher inflation has often been accompanied by higher not lower unemployment, especially for periods of several years in length. A simple statistical Phillips curve for such periods seems to be positively sloped, not vertical. The third stage is directed at accommodating this apparent empirical phenomenon. To do so, I suspect that it will have to include in the analysis the interdependence of economic experience and political developments. It will have to treat at least some political phenomena not as independent variables—as exogenous variables in econometric jargon—but as themselves determined by economic events—as endogenous variables [...]. The third stage will, I believe, be greatly influenced by a third major development—the application of economic analysis to political behavior, a field in which pioneering work has also been done by Stigler and Becker as well as by Kenneth Arrow, Duncan Black, Anthony Downs, James Buchanan, Gordon Tullock, and others. (1977, p. 470)

In my doctoral thesis (Ravier, 2010), I called this "Friedman's dilemma" because Friedman observed an empirical reality his own analytical framework was unable to explain. Friedman observes a positively sloped Phillips curve and a long-term effect of monetary stimulus which is not neutral in real terms. Both are inconsistent with his own theories. Instead he provides evidence confirming the work of Robert Lucas (1973) and, more recently, William Niskanen (2002). Robert Mulligan (2011) has demonstrated the connection between Niskanen's article and Austrian business cycle theory.[3]

In fact, Hayek wrote extensively on this topic, but did not attempt to formalize it in terms of the Phillips curve. In *The Campaign Against Keynesian Inflation*, he explained:

[3] "William Niskanen (2002) estimated a Phillips curve for the United States using annual 1960–2000 data. By adding one-year lagged terms in unemployment and inflation, he was able to show that this familiar equation is mis-specified. In his improved specification, Niskanen found that the immediate impact of inflation is to reduce unemployment, confirming the traditional understanding of the Phillips-curve relationship, but also finding that after an interval as short as one year inflation has generally been followed by increased unemployment. Though Niskanen was perhaps unaware of it, his results lend strong support to the Austrian model of the business cycle. In that model, credit expansion results in a temporary but unsustainable expansion. Unemployment is lowered in the short run, but once the policy-induced mal-investment is recognized, total output and income will be permanently reduced, and unemployment will increase." (Mulligan, 2011, p. 87)

> *The Keynesian dream is gone even if its ghost continues to plague politics for decades*. It were to be wished that the words "full employment" themselves, which have become so closely associated with the inflationist policy, should be abandoned—or that we should at least remember the sense in which this was the aim of classical economists long before Keynes: John Stuart Mill reports in his autobiography how "full employment with high wages" appeared to him in his youth as the chief desideratum of economic policy. What we must now be clear about is that our aim must not be that maximum of employment which can be achieved in the short run, but a "high and stable level of employment," as one of the post-war British White Papers on employment policy still phrased it. This, however, we can achieve only through the re-establishment of a properly functioning market which, by the free play of prices and wages, secures in each sector a correspondence of supply and demand. Though it must remain one of the chief tasks of monetary policy to prevent great fluctuations of the quantity of money or the volume of the income stream, the effect on employment must not be the dominating consideration guiding it. The primary aim must again become the stability of the value of money and the currency authorities must again be effectively protected against that political pressure which today forces them so often to take measures which are politically advantageous in the short run but harmful in the long run. (Hayek, 1978, pp. 207–208)

In the following paragraphs, we explain the rationale behind the Austrian Phillips curve with a positive slope. But to do this, we first need to clarify a concept central to discussion of the Phillips curve with adaptive expectations: "the natural rate of unemployment."

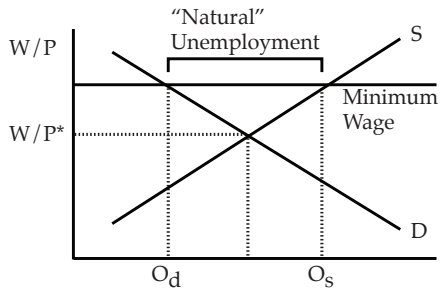
Even though Milton Friedman developed this concept with Wicksell's "natural rate of interest" in mind, it is important to recognize that there is really nothing "natural" about this special rate of unemployment.[4] This "natural" rate has several implicit precursors, such as labor legislation (especially the minimum wage), the monopoly power of unions, and efficiency wages,[5]

[4] In his Nobel Prize Lecture, Friedman explained: "The 'natural rate of unemployment,' a term I introduced to parallel Knut Wicksell's 'natural rate of interest,' is not a numerical constant but depends on 'real' as opposed to monetary factors—the effectiveness of the labor market, the extent of competition or monopoly, the barriers or encouragements to working in various occupations, and so on." (Friedman, 1977, p. 273)

[5] "Efficiency-wage theories propose a third cause of wage rigidity in addition to minimum-wage laws and unionization. These theories hold that high wages make workers more productive. The influence of wages on worker efficiency may explain the failure of firms to cut wages despite an excess supply of labor. Even though a

all of which represent rigidities in the labor market. (Mankiw, 2001, p. 162)[6] In the absence of these labor market rigidities, full employment would be the true "natural" rate. Figure 3 makes this relationship explicit:

Figure 3. Labor Market and "Natural" Unemployment



This is the familiar textbook example showing the impact of a minimum wage set above the actual market wage, causing disequilibrium or unemployment. (Mankiw, 2001, p. 162) This is what Friedman calls "natural unemployment," determined by local characteristics or other structural rigidities in the labor market.

From this point, we consider the impact of expansive credit policy and its impact on the labor market following a sequence of steps consistent with Austrian business cycle theory.

Garrison (2001), following Mises (1912) and Hayek (1931), points out that an expansionary credit policy results in an interest rate which is below its "natural" level. Investment expands without a corresponding increase in savings, which makes the subsequent boom unsustainable. But in the short term, the lower interest rate

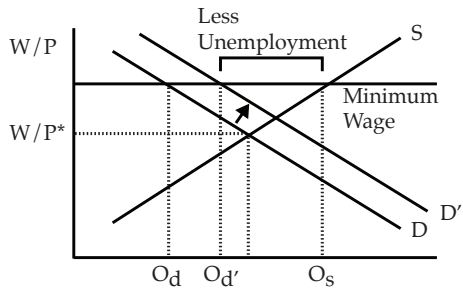
wage reduction would lower a firm's wage bill, it would also—if these theories are correct—lower worker productivity and the firm's profits" (Mankiw, 2001, p. 166).

[6] Some authors, such as Mankiw, prefer to show a vertically sloped curve of labor supply, but this does not change the conclusion.

allows entrepreneurs to increase investment, which also increases the demand for labor. In Figure 4 we show the movement of the demand curve once monetary policy increases demand for labor across the entire spectrum of employment.

Unemployment is reduced, at least temporarily. In the short term, even real wages increase until inflation takes hold, due to the lagged impact of monetary policy. Friedman would say that this situation is only sustainable because the change in monetary policy "surprised" economic agents, but once they adjust their expectations, the loss of purchasing power is "neutralized" and employment returns to prior levels.

Figure 4. Monetary Policy and Less Unemployment in the Short-Term



It is at this point that the divergence of opinion occurs. The Austrian explanation may be summarized as follows:

> On the other hand, and this is the most relevant aspect, due to the mal-investment process during the stimulus phase we also face a situation in which the potential productive capacity of the economy (and thus the real wages potentially earned once the economy returns to normal levels of employment) is reduced as a consequence of the partial destruction of capital. Many authors, including for example Huerta de Soto (1998, pp. 413–415), focus attention on the "partial destruction of capital" that inevitably occurs because there is a category of resources which are lost when investment projects are abandoned. Stimulus significantly

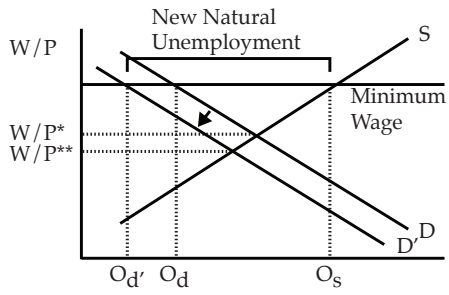
> increases the volume of resources that ultimately fall in the "sunk cost" category: at the end of the stimulus phase, some resources have already been committed to investment projects but are not yet productive; when the stimulus phase ends and it turns out that these projects are not going to be completed, these resources are "sunk" costs and not re-assignable to new projects. (Ravier, 2011b, p. 369)

Microeconomic theory explains that the level of real wages depends on capital accumulation and the productivity gains achieved by productive investment in the economy. The Austrian theory of the business cycle explains *not only* why the process of boom, crisis, and depression ends with widespread unemployment, *but also* why it destroys some portion of the capital mobilized by the boom. Real wages fall because destruction of capital ultimately reduces the productivity of workers.

In comparison with the situation prior to the boom-bust cycle, demand for labor will be reduced at each level of real wages. This is shown in Figure 5.

Under the empirical assumption that the real minimum wage remains constant through the boom and bust phases, more workers are now excluded from the formal labor market. The explanation lies in the reduced aggregate productivity of workers which results from the partial destruction of capital experienced by the economy.

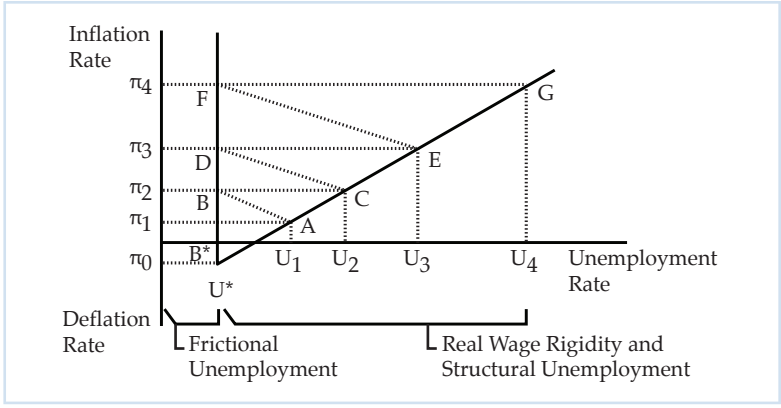
Figure 5. Capital Destruction and More Unemployment in the Long-Term



Once malinvestments are liquidated, workers may be re-hired only if they accept lower real wages. A return to the previous level of real wages will require a new process of capital formation, which will only be "genuine"—and hence sustainable over time—if it is again based on voluntary savings. Attempting to restore the real wage level using a new injection of artificial credit is only effective temporarily because an artificial boom is simultaneously launched.

With this in mind, the implications of Figure 6, the Austrian Phillips curve with a positive slope, become clear. Let us suppose that we start from point A, with a low level of inflation and its associated "natural" rate of unemployment.

Figure 6. A Phillips Curve with a Positive Slope: A Possible Solution to Friedman´s Dilemma



In the tradition of the Austrian School, the only way to truly achieve a stable situation and full employment is by adhering to a neutral monetary policy (which enables investments to match the level of savings) while providing absolute flexibility in the labor market (by eradicating all labor laws, including any minimum wage). If this happens, the economy would move from point *A* to point *B** via a genuine process of capital formation. This results in increased productivity and is consistent with "growth deflation." (Salerno, 2002)[7]

[7] See also George Selgin (1997) and Lawrence H. White (2008). The latter offers the following example: "Between 1880 and 1900 the United States experienced one of

There is, however, an alternative which may achieve full employment in the short term, but only by sacrificing price stability and giving rise to some distortions in the economy. This is once again the Keynesian prescription: monetary policies that stimulate demand do create jobs, but achieve full employment only by reducing real wages.

As explained above, both the Keynesian and monetarist models show that governments can use monetary policy to move from *A* to *B* (in Figure 6), but only at the expense of the inflationary impact of those same monetary policies. We need to acknowledge that Krugman (2010) was to some extent correct when he suggested that Austrians are Keynesians during booms.

Friedman (1977) claimed that these effects would only materialize in the short term, but in the long term would be neutralized, returning unemployment to its "natural" rate. This is the crucial question: will the economy return to the same pre-boom "natural" rate of unemployment, or will the "natural" rate be altered by the detour to full employment and the subsequent adjustment process? Is the effect really neutral in the long term?

In confronting the long-term neutrality of money, we are tackling one of the most widely accepted assumptions in modern macroeconomics. It should be acknowledged that the new Keynesians and monetarists accept some non-neutrality in the short term, but in the long run both believe those effects disappear. The Real Business Cycle theory of the New Classical macroeconomists assumes rational expectations and therefore necessarily rejects non-neutrality in both the short and long term.

The literature on non-neutrality has its roots in the *Cantillon Effect*, which is the distortion of relative prices and redistribution of income that occurs when liquidity is injected into the market (Cantillon, 1755). The impact of *forced savings*, introduced by Jeremy Bentham but revived by Hayek and extended by Horwitz (2000,

the most prolonged periods of deflation on record. The price level trended more or less steadily downward, beginning at 6.10 and ending at 5.49 (GDP deflator, base year 2000 = 100). That works out to a total decline of 10 percent stretched over 20 years. The deflationary period was no disaster for the real economy. Real output per capita began the period at $3,379 and ended it at $4,943 (both in 2000 dollars). Total real per capita growth was thus a more than healthy 46 percent. (Real GDP itself more than doubled.)" (White, 2008, p. 4)

p. 15), and the "money illusion" (Patinkin, 1987), which involves the degree to which people are able to distinguish between real and nominal variables, also contribute to, and are consistent with, non-neutrality.

The impediment to adjustment during the "bust" phase of the cycle that usually receives the greatest attention is the "stickiness" of prices and long-term contracts. Wage contracts are denominated in nominal terms. If actual price inflation exceeds the expectation of inflation, then real wages fall. If workers observe this, they may reduce their productivity. Alternatively, they may claim redress through unions, but rigidities in the labor market (including the duration of labor contracts) mean that any adjustments will take time.

In principle, the destruction of capital is consistent with lower real wages. If we assume that the minimum wage remains constant in real terms, after a boom and bust cycle more people "earn" income below the legal minimum and automatically lose their jobs. Unemployment is thus greater than in the initial situation.

However, minimum wages are also expressed in nominal terms. The return to the "natural" rate of unemployment can be explained by assuming that the adjustment process is completed, that malinvestment is liquidated and that unemployed workers find new jobs. But the structure of production is no longer the same as it was before the boom and subsequent bust. It is for this reason that workers receive lower *real* wages. The destruction of capital shifts the production possibilities frontier (PPF) to the left, and productivity is reduced in the process. (Ravier, 2011b)

A return to the initial situation in terms of real wages requires a genuine process of capital formation based on savings. This takes time. Garrison and Bellante do not ignore the effect monetary stimulus has on the structure of production, but they do not recognize that the final result of the boom-bust cycle is substantively different from the pre-boom situation. Monetarists are unable to explain the mysterious reason why the *same* equilibrium that existed before the monetary expansion took place miraculously reappears after short term distortions dissipate. (Ravier, 2011a) Austrians do explain why the same equilibrium does *not* reappear, and the non-neutrality of money that the Hayekian triangles illustrate is crucial to that explanation.

Figure 6 shows that the economy does return to its "natural" state, but we must emphasize once again that there is no longer anything 'natural' about the unemployment rate associated with that state: it is a product of imposed rigidities and moves further and further from full employment with the adjustment that follows each monetary stimulus. In fact, the loss of employment is usually exacerbated because rigidities are often increased during the adjustment phase, a political reaction to the difficulties monetary expansion inevitably causes.

It is crucial to remember that for the Austrian School, the effect is not just nominal and restricted to prices. Unemployment also rises, as shown in Figure 6, from point *B* to point *C*, which is higher than the initial point *A*. If the government again insists on implementing expansionary monetary and credit policies in an attempt to prevent deflation and crisis by means of stimulus, then a new cycle begins which will speed the economy towards a new level of inflation and increasing unemployment, perhaps reaching point *D* in the short term, to then settle down at the point *E* once the subsequent adjustment is completed.

This suggests two implications: 1) the theoretical Phillips curve slope should be positive, as Friedman suggested, and 2) in the context of economic policy, the government should not increase the money supply if its objective is sustainable economic growth and development. Ultimately, as Mises (1949) pointed out, government intervention invariably generates results which are precisely the opposite of those sought.

PART IV: CONCLUSIONS

In his Nobel Prize Lecture, Friedman concluded:

> Much current economic research is devoted to exploring various aspects of... the *dynamics of the process*, the formation of expectations, and the kind of systematic policy, if any, that can have a predictable *effect on real magnitudes*. (emphasis added) (1977, p. 459)

Here we suggest an advance in the direction suggested. In this article we show that the non-neutrality of money in the long term is the crucial concept when explaining the divergent views of the

Chicago and Vienna Schools on the impact of monetary stimulus. (Ravier, 2011a and 2011b)

Friedman's work illustrates the limitations of the Chicago School's analytical framework for understanding problems related to the economic cycle. Therefore, although we acknowledge certain elements common to both traditions (Schenone and Ravier, 2007), we suggest Chicago theorists would benefit from adopting a subjective and heterogeneous capital theory (Lachmann, 1955), the Austrian theory of the business cycle and the concept of subjective (as opposed to "adaptive" or "rational") expectations (Shackle, 1949; Lachmann, 1955; Crespo, 1998; Garrison, 2001).

Finally, current U.S. unemployment difficulties may well have their roots in the monetary policy of short term interest rates pursued by the Federal Reserve in response to a succession of crises (Krugman, 2002). The financial *tsunamis* of the Wall Street stock market crash of October 19, 1987, the dot-com crisis in 2001, and the subprime crisis of 2008 provide empirical evidence for the theoretical derivation of a Phillips curve with a positive slope presented here (Ravier and Lewin, 2012). The link between these financial *tsunamis* and the Austrian Phillips Curve deserves more thorough investigation.

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