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"The Phillips Curve and the Tyranny of an Assumed Unique Macro Equilibrium"

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THE PHILLIPS CURVE
AND THE TYRANNY OF AN ASSUMED UNIQUE MACRO EQUILIBRIUM

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ABSTRACT

To make the argument that the behaviour of modern industrial economies since the 1990s is inconsistent with theories in which there is a unique ergodic macro equilibrium, the paper starts by reviewing both the early Keynesian theory in which there was no unique level of income to which the economy was inevitably drawn and the debate about the amount of demand pressure at which it was best of maintain the economy: high aggregate demand and some inflationary pressure or lower aggregate demand and a stable price level. It then covers the rise of the simple Phillips curve and its expectations-augmented version, which introduced into current macro theory a natural rate of unemployment (and its associated equilibrium level of national income). This rate was also a NAIRU, the only rate consistent with stable inflation. It is then argued that the current behaviour of many modern economies in which there is a credible policy to maintain a low and steady inflation rate is inconsistent with the existence of either a unique natural rate or a NAIRU but is consistent with evolutionary theory in which there is perpetual change driven by endogenous technological advance. Instead of a NAIRU evolutionary economies have a non-inflationary band of unemployment (a NAIBU) indicating a range of unemployment and income over with the inflation rate is stable. The paper concludes with the observation that the great pre-Phillips curve debates of the 1950s that assumed that there was a range within which the economy could be run with varying pressures of demand, and varying amounts of unemployment and inflationary pressure, were not as silly as they were made to seem when both Keynesian and New Classical economists accepted the assumption of a perfectly inelastic, long-run Phillips curve located at the unique equilibrium level of unemployment.

Key Words: Natural rate of unemployment, NAIRU, NAIBU, inflation targeting, Phillips curve, evolutionary theory, equilibrium theory.

Most economists seem to feel deeply in their guts – and their training predisposes them to do so – that the economy must have a unique equilibrium to which market forces inevitably propel it, even if the approach is sometimes, as some believe, painfully slow. In this paper, I argue that this view is counter-factual. Instead, a view of the economy as an entity that is constantly evolving in the face of path dependent, endogenously generated technological change is both closer to reality and explains what seems mysterious in the experience of modern economies over the last two decades. What stands in the way of accepting this view is the tyranny of the generally accepted assumption of a unique, ergodic macro-equilibrium. To develop this argument, we need to look at some of the macro controversies and developments over the period since the end of World War II.

I. The 1950s

During the 1950s, British economics saw debates over both theory and policy that were significantly different from those that occurred in period between the two World Wars.

Keynes Triumphant

By the mid-1950s, Keynesian economics had been fairly well established in the economics profession. Critically, it contained no full-employment equilibrium. Instead, aggregate desired expenditure could equal aggregate production at any level of income and employment. In modern terms, there were no natural rates of income, Y^*, and unemployment, U^*.

During the 1950s extensive micro underpinnings had been provided for Keynesian macro theory.[1] In particular, firms' horizontal short run marginal cost (SRMC) curves plus full cost pricing explained why firms reacted to variations in demand mainly by altering output rather than prices in the short run. Numerous empirical studies had established these two key observations.

Although there was strong evidence that the SRMC curve of the typical manufacturing firm was horizontal, there was confusion about how to interpret this observation.[2] The correct interpretation lies in the nature of the firm's fixed factor. The standard text book talks of spreading more or less of the variable factor, usually taken to be labour and materials, over a given quantity of a fixed factor, usually taken to be capital equipment in the case of manufacturing, or land in the case of agriculture. It then appeals to the law of diminishing returns to explain a U-shaped SRMC curve, the most important part of which is the upward sloping part. But this only applies if the fixed factor is subject to a strong equality: $K=K^*$ (where K^* is the fixed amount available in the short run and K is the amount actually employed). In most situations, however, the fixed factor is subject to an inequality constraint: one can use less but not more than the fixed amount available in the short run, $K \leq K^*$. Consider, for example, a

[1] For a fuller discussion of these underpinnings see Lipsey (2000).

[2] For a contemporary review of the evidence on cost curves see Johnston (1960) and for a discussion of its significance in Keynesian models see Lipsey (1981:274-6).

building containing 100 sowing machines with one hundred operators. If the firm's demand falls cyclically and it desires to reduce output by 10 percent, it does not have 90 operatives running around trying to tend 100 machines; instead it lays off 10 operatives and leaves 10 machines idle. This holds the ratio of labour to machines constant allowing the firm to produce at the same unit cost as when output was at full capacity.

A substantial amount of direct questioning[3] showed that firms claimed to follow a full cost pricing rule, calculating full cost, adding a markup, then selling whatever was demanded at that price. This seemed implausible to those who believed in a positively sloped SRMC curve but it was eminently plausible given a horizontal SRMC curve. All that was then required was, first, that the markup at normal capacity was at or near the profit-maximising markup and, second, either that the elasticity of demand did not change significantly as demand varied cyclically or that the benefit gained from constantly changing price by small amounts as the profit-maximizing markup changed cyclically was less than the cost.

So these two empirically supported and theoretically defensible propositions provided strong support for the prediction that cyclical variations in demand would be met by variations in output with prices more or less constant.

An excellent illustration of the cost of not educating students in the history of our subject is the almost total loss of any knowledge of the full cost pricing controversy and of the empirical evidence for horizontal SRMC curves among modern economics students (but not all business school students).[4] Today, the assumption of a positively sloped SRMC curve is nearly ubiquitous and used as a key assumption in the proofs of many propositions that would not be true if SRMC curves were horizontal.[5]

The Pressure of demand debate[6]

At that time, most economists accepted that, *ceteris paribus*, inflation was undesirable and that if it could be manipulated independently of other economic variables, zero inflation would be the obvious goal. But such independence of the inflation rate from other real economic variables was never accepted. Instead, the debate concerned how much inflation should be tolerated as a price of achieving two other social goals, low unemployment and high growth. It was taken for granted that the economy could be operated with varying pressures of aggregate demand, unemployment and inflationary pressure, more unemployment being associated with lower inflation.

Some argued that inflation had to be kept under control even if that required a moderately high rate of unemployment. Others argued that a mild rate of inflation was an acceptable price to pay for maintaining full employment. But what about economic growth, which had been a major

[3] Hall and Hitch (1939) started off a host of studies of full cost pricing.

[4] Barattiere (2013) has rediscovered this controversy and produced some interesting theory and evidence about its importance.

[5] For one illustration see Mankiw's "proof" (Mankiw and Scarth 2001: 554-5) that the Philips curve and the AS curve are just two different ways of looking at the a single relation and Lipsey's (2010: 161-2) argument that this is not so if the SRMC curve is horizontal.

[6] For an excellent review of this debate see Schwarzer (2012). However, the debate took place in the oral tradition in the 1950s before it occurred in writing and hence was available to Schwarzer.

concern of the British government in the immediate post war period? Although there was lack of agreement about how to determine the optimal rate of growth, there was little doubt among UK policymakers in the late 1950s and early 1960s that its current growth rate was too low. Keynesians argued that running the economy with high aggregate demand pressure would provide the profits needed to finance investment, and the demand needed to induce firms to raise productivity – albeit at the cost of some mild inflationary pressure. In contrast to this 'carrot theory' of growth, others, of whom professor Frank Paish of the London School of Economics was a key advocate, argued that running the economy with low aggregate demand pressure would provide the stick that would encourage economic growth by making it imperative for businesses to raise productivity as the main available method for sustaining profits (Paish 1958, 1962, 1968).

Phillips' empirical estimate of the apparent wage-unemployment trade off came into this debate like a thunder bolt. His relatively low figure for the amount of unemployment consistent with price stability seemed to support those who would accept some higher-than-necessary unemployment as a cost of restraining inflation and encouraging growth. All Phillips was saying was that the rate of unemployment consistent with a stable price level was about 2.5 per cent.[7] There was no trade-off implied here.

To those Keynesians who accepted Philips' analysis, his curve seemed to apply to the range of excess aggregate demand while in the range of deficient aggregate demand its relative flatness seemed to provide evidence of a downward stickiness of prices that would prevent price reductions from curing periods of unemployment over any acceptable time period.

II. THE 1960s[8]

Sometime in the 1960s the Phillips curve came to be thought of as providing a stable trade-off between inflation and unemployment. When Lipsey did adopt this trade-off version, as for example Lipsey (1965), inflationary points on the Phillips curve represented disequilibrium points that had to be maintained by monetary policy that perpetuated the disequilibrium by suitable increases in the rate of monetary expansion. In the new Classical interpretation that began with Edmund Phelps (1967), Milton Friedman (1968)[9] and Lucas and Rapping (1969), each point was an equilibrium point because demands and supplies of agents were shifted from their full-information locations when they misinterpreted the price signals. There was, however, only one full-information equilibrium of income, Y^*, and unemployment, U^*.

In this new version, recorded unemployment was actually voluntary arising because workers sometimes expected higher rates of inflation than actually occurred. This induced them to reject some available jobs because they thought the real wage would be lower than it turned out to be. [10] Booms in which income exceeded its potential level and employment was unusually

[7] This figure is exceedingly low by current standards of both the experiences and methods of measuring unemployment. But is seemed high to Keynesians in the 1950s when both experience and methods of measurement led to much lower rates of perceived unemployment.

[8] For a more detailed study of the Phillips curve debate during this period see Schwarzer (2013).

[9] At various places in his presidential address, Friedman takes both a disequilibrium and an equilibrium view, although by the time of Friedman (1975), he was clearly in the equilibrium camp.

[10] This alleged behaviour called out for a survey of the unemployed asking such questions as: Did you have any job opportunities that you turned down or did not pursue? If so, what were they? Do you have any expectation of the

high were also possible if an unexpected inflation led firms and workers to misinterpret a general rise in prices as a rise in their relative price or wage and produce and work more.[11] If the inflation continued, firms and workers would eventually come to expect it and revert to their full-information behaviour. If the central bank wished to perpetuate the boom, it would have to generate a higher rate of inflation unexpectedly but one to which agents would sooner or later come to expect, and so on with the inflation rate ever accelerating.

This led to the expectations-augmented Phillips curve and its vertical, long-run shape. Now any level of real national income other than Y^* would cause the price level to change at a rate shown by the short-run Phillips curve and, if the money supply was not expanded in compensation, the economy would be returned to its natural rates of U^* and Y^*.

Such is the ingrained feeling among most economists that the economy must have a unique, ergodic market-clearing equilibrium, that there was no significant protest at the abandonment of the Keynesian position that the economy could persist for long periods, if not forever, at positions other than full employment with actual income equal to potential income.

III. SUSTAINED INFLATIONS ESTABLISHED AND ENDED: 1970-1990

The early 1970s saw a new phenomenon brought on by the OPEC-induced dramatic rise in the price of oil (and hence also the prices of its many derivatives): stagflation.[12] Partly in response to the confusion caused by this period of rising unemployment combined with rising prices, Keynesians combined the *IS* and *LM* curves into an aggregate demand (*AD*) curve and added a short run aggregate supply (AS) curve. Stagflation was then explained by supply shocks that shifted the *AS* curve upwards causing prices and to rise and output to fall along the negatively sloped *AD* curve. The model was closed by an expectations-augmented Phillips curve that showed the speed with which equilibrium was re-established whenever it was disturbed.[13]

Speaking for myself, I was so intent in showing that this *AD-AS* construction provided a simple Keynesian explanation of stagflation, contrary to the accusation of the New Classical economists that stagflation provided a conclusive refutation of Keynesian economics that I paid

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behaviour of the price level over the near future? If so, what is it? If you were told that the price level was going to fall by 1% over the next few months, would you accept a job with the following specifications…? What if you were offered a job with the same specifications but were told that the price level was going to rise by 5%...? The answers to these, and other more carefully defined questions, would very probably have revealed that, almost without exception, the unemployed did not have the expectations or behavioural incentives that were assumed in the theory. Of course, this would not refute the then-prevailing version of New Classical theory, but it would pose a problem to its proponents. It would be up to them to explain how workers could act as if they had the assumed motivation and behaviour and yet report totally different motives and behaviour. The possible Friedmanesque retort that only predictions not assumptions should be tested has been dismissed as bad methodology by many writers. See, for example, Blaug (1992) and Lipsey (forthcoming).

[11] Although relative prices appear in the supply equations of a Walrasian general equilibrium model, the theory of the firm makes it clear that price-taking, profit-maximising firms only need to know the money prices of their outputs and inputs and not other prices or their average, the general price level.

[12] For an excellent study of this period see Blinder (1979)

[13] Models of this sort entered the elementary text books in the late 1970s and early 1980s. For an early empirical model of similar sort see Eckstein (1981).

too little attention to the enormous importance of the new assumption introduced into Keynesian models. The addition of an expectations-augmented Philips curve, negatively sloped in the short run but vertical in the long run, produced a unique macro equilibrium that would be reached whatever macroeconomic policy was adopted.

The decade of the 1980s was a period of rapid inflations in most developed countries, but ones that seemed more normal in the sense of appearing to respond more to demand than to cost pressures. Unorthodox theories of inflation gradually fell into disrepute and it came to be accepted that only aggressive action by central banks could curtail inflation. Slowly during the 1980s, many central banks came to this view. By raising short term interest rates they had a direct effect on interest-sensitive expenditures and, more importantly, an indirect effect on the rate of monetary expansion. Inflations fell in most industrialised countries and early in the 1990s they entered an era of low and relatively stable inflation rates.

IV. WHERE ARE WE NOW?

Figures 1-3 provide scatters of unemployment against the inflation rate (as measured by the rate of change of the consumers price index). The charts show some interesting common behaviour with the high inflation rates of the 1980s continuing into the early 1990s but then being followed by two decades of much lower average rates. Although the inflation rates have varied since then, none of the countries have shown any clear systematic tendency for the inflation rate to be negatively related to unemployment (which ranges over the period from 9.6 to 4.0 percent in the USA, from 10.2 to 4.7 percent in the UK and from 11.4 to 6.0 percent in Canada).

Within those broad similarities, there are differences. In Canada, the rate has been within the Bank of Canada's target band of one percentage point on either side of its target rate of two percent in all but two years in both of which it fell below the lower band. In the USA, the rate has been more scattered than in Canada, lying below one per cent in 2009 when it actually went negative and above it in 2000, 2005, 2006 and 2008. Between 2005 and 2006, however, both inflation and unemployment fell, while between 2007 and 2008 both rose, hardly a negative relation between these two variables. In the UK, inflation did not fall below 3 percent until 1993, one year behind the USA and Canada. Then from 1993 until 2001 unemployment fell steadily from 8.5 percent to 5.0 percent while inflation fell from 2.7 percent to 1.3 percent. Inflation and unemployment stayed fairly constant from 2001 to 2004. Then unemployment rose slightly while inflation rose dramatically from 1.3 percent to 3.6 percent in 2008 while unemployment fell slightly until 2008. With unemployment staying within the range 7.6-8.0 percent, inflation rose from 2.1 percent in 2009 to 4.4 percent in 2011 and then back to 2.8 percent in 2012.

Simple inspection of these scatters suggests that these data are not consistent with a negative relation between the rate of inflation and unemployment, which is required if there is a unique Y^* and U^*, deviations from which set up inflationary or deflationary pressures to push the economy towards these values.

In a more detailed investigation of this type of data Carlaw and Lipsey (2012) correlate the inflation rate and unemployment for five countries, France, Italy, Spain, the UK and the US. They also relate the acceleration of these countries' inflations to their GDP gaps defined as the difference between their actual unemployment rates and their NAIRUs, estimated using a

Kalman filter. They conclude that starting in the early 1990s, the data for these countries are not consistent with either a negative relation between unemployment and the rate of inflation or a unique NAIRU below which inflation accelerates and above which inflation decelerates.[14]

V. WHY ARE WE WHERE WE ARE NOW?[15]

In the study just referred to, Carlaw and Lipsey distinguish three main types of macro theories. The first they term "equilibrium with deviations (EWD) theories". These are theories in which a full-information, unique equilibrium exists but can be deviated from due to such transitory forces as errors in perception or lagged reactions to random fluctuations in tastes and technology. They can be expressed in terms of the static concept of a general equilibrium to which the economy returns after a transitory disturbance and the text-book unique equilibrium balanced-growth path along which agents wish to do the same thing period by period, and to which the economy will return if disturbed. This class includes New Keynesian and earlier New Classical theories. In all EWD theories the past is repeatable and disturbances leave no trace once their effects have been worked out ─ history does not matter.

The second class may be termed equilibrium always (EA) theories. Theories in this class include some recent versions of New Classical models, which contain neither income gaps nor Phillips curves of any form. Instead, since all markets always clear, and all agents are farsighted and rational, all realised levels of income are equilibrium levels, representing optimal adjustments to the long term growth path and the disturbances around it. Theories in these first two classes are all stationary (either in levels or first differences) in which history does not matter.

Theories in the third class model the economy as constantly evolving under the impact of endogenously generated technological change taking place at the microeconomic level under conditions of uncertainty.[16] Such continuous endogenous technological change creates an economy that is constantly evolving in ways that can to some extent be foreseen but to some extent stem from genuine uncertainty and hence give rise to a more or less continuous flow of genuine surprises. Because of the path dependency produced by endogenous technological change, a disturbance that affects the immediate path of technological development can have lasting effects in the sense that the economy will never return to the path that it would have taken in the absence of that disturbance ─ history matters. My co-authors and I describe theories in this class as "evolutionary" to draw a contrast between the unique, ergodic equilibrium concept employed in both the EWD and EA classes and the path dependent, non-ergodic, historical processes employed in the evolutionary class.

In this paper I follow Carlaw and Lipsey in contrasting EWD and evolutionary theories but do not consider EA theories further. I do this because EA theories are clearly not taken

[14] Of course in some New Classical models the acceleration of inflation is the cause and not the outcome of a lower rate of unemployment. If the economy is shocked and hence not at the natural rate there will be no true acceleration of inflation in such models. There might be a temporarily higher or lower rate of inflation but in the end the economy will move back to the natural rate and to the rate of inflation given by the money growth rate.

[15] This section summarises material that my co-authors and I have written about in many other places see e.g., Lipsey, Carlaw and Bekar (1995), Lipsey (2010), Lipsey and Scarth (2011) and Carlaw and Lipsey (2012).

[16] These theories have a long history that goes back through the seminal writing of Nelson and Winter (1982) to Joseph Schumpeter (1934) and even earlier to the 19th century economist John Rae (1834 reprinted 1905).

seriously by current policy makers who are revealed to believe that there are circumstances in which an active fiscal and/or monetary policy can improve the performance of the economy – a possibility that is denied by EA theories since whatever macro values are realised are optimal reactions to any disturbances and cannot be improved on. Furthermore, most policy makers are also revealed to believe that an increase in consumers' confidence can lead to a rise in demand, an increase in output and a fall in unemployment, which may or may not be followed by price changes — this in contrast to believing that a rise in consumers' confidence leads first to a rise in prices and only then to an increase in output and employment .

Given the evidence illustrated in the three scatters included here and in the earlier study by Carlaw and Lipsey (2012), I suggest that the explanation of the current behaviour of inflation, output and unemployment in modern industrial economies is provided not by any EWD theory but by evolutionary theories. These build on the obvious observation that technological change is continual in modern economies (decade by decade at least since 1760), but uneven (tending to come in spurts), and path dependent (because, among other reasons, knowledge is cumulative with one advance enabling another). These changes are generated endogenously by private-sector, profit-seeking agents competing in terms of new products, new processes and new forms of organisation, and by public sector activities in such places as universities and government research laboratories. They continually alter the structure of the economy, causing waves of serially correlated investment expenditure that are a major cause of cycles, as well as driving the long-term growth that continually transforms our economic, social and political structures. In their important book *As Time Goes By*, Freeman and Louça (2001) trace these processes as they have operated since the beginnings of the First Industrial Revolution.

A critical distinction in all such theories is between risk, which is easily handled in neoclassical economics, and uncertainty, which is largely ignored in it except to pay it lip service.[17] In risky situations, agents with the same objective function and identical knowledge will chose the same alternative: the one that maximizes the expected value of their profits or utility. This gives rise to unique predictable behaviour of agents acting under specified conditions. In contrast in uncertain situations, two identically situated and motivated agents can, and observably do, choose different alternatives — as for example when different firms all looking for the same technological breakthrough chose different lines of R&D — and there is no way to tell in advance of knowing the results which is the better choice.

Importantly, agents typically make R&D decisions under conditions of genuine uncertainty. No one knows if a direction of technological investigation will go up a blind alley or open onto a rich field of applications until funds are spend investigating the route. Sometimes trivial expenses produce results of great value while major expenses produce nothing of value. Since there is no way to decide in advance which of two alternative actions with respect to invention or innovation is the best one until the results are known, there is no unique line of behaviour that maximises agents' expected profits. Thus agents are better understood as groping into an uncertain future in a purposeful, profit- or utility-seeking manner, rather than as maximizing their profits or utility.

Because there is no unique static equilibrium in the evolutionary world in which history matters, no adjustment mechanism is required to maintain it. Instead, the constantly changing

[17] Lipsey (forthcoming) provides many examples of the changes that need to be made to many currently accepted propositions when endogenous technological change and uncertainty replace exogenous technologies and risk.

economy can exist over a wide range of income, employment and unemployment values, without behaving as it would if its inflation rate were determined by an expectations-augmented Phillips curve or any similar construct centred on unique general equilibrium values of *Y* and *U*. Thus there is no stable long-run vertical Phillips curve or aggregate supply curve. Although the economy clearly does cycle, there has never been any serious evidence that it cycles around a stable equilibrium national income, *Y**, such that whenever current *Y* does not equal *Y** pressures will be clearly operating to return the economy to *Y**.

Instead of the Phillips curve there is a band as shown in Figure 4. Its midpoint is at the expected rate of inflation. If the central bank has a credible inflation target that it sticks to, the expected rate will be that target rate, shown as π^e in the figure. The actual rate will vary around the expected rate depending on a number of influences such as changes in productivity, the price of oil and food, but not significantly on variations in *U* or *Y*. At either end of this band, there may be something closer to a conventional Phillips curve with prices and wages falling in the face of a major depression and rising in the face of a major boom financed by monetary expansion. Also, the whole band will be shifted by anything that changes the expected rate of inflation.

In a sense, one could say that the perfectly elastic Phillips curve raised on *Y** and its associated NAIRU, points on which were consistent with various fully expected rates of inflation, has been rotated though 90^o to become a NAIBU, a non-inflationary band of unemployment (and income) located at the constant expected inflation rate, points on which are consistent with various levels of *Y* and *U*.

The change in policy implied by this change in how the economy is viewed is dramatic. In EWD theories there is only one level of income and unemployment *Y** and *U** on which policy makers should target. Given fully rational expectations, no other levels of income and unemployment can be sustained. If expectations are less than fully rational, such as being adaptive or based on less than a perfect understanding of how the economy works, other levels of *Y* and *U* can be sustained by policy for some time but will sooner or later be met either by accelerating inflation (if $Y > Y^*$ and $U < U^*$) or deflation (if $Y < Y^*$ and $U > U^*$). In contrast, evolutionary theories imply that policy makers have a range of *Y*s and *U*s on which they can target.[18] On the one hand, they could try to minimise unemployment consistent with staying within the NAIBU. They would do this by expanding the economy until inflation threatened to accelerate. On the other hand, they could seek to hold the economy near the high unemployment end of the NAIBU range. They could do this by depressing it until the inflation rate showed signs of falling below the NAIBU's lower band. Since the economy will cycle whatever the authorities

[18] Some might raise the Lucas critique here arguing that one finds the NAIBU in the data because policymakers are credibly only concerned with inflation. As soon as policymakers made use of the NAIBU, the whole unemployment-inflation non-relation as seen since the 1990s might change or break. For example, unions, particularly in the European Union, where they are typically more powerful than in North America, might alter their behaviour once they became aware that the central bank was actually targeting employment levels directly and appeared to have the power to do so. If so, the Bank would have to establish that its priorities were lexicographically ordered with control of inflation paramount so that any level-of-activity target would be quickly dropped whenever inflation threatened to go outside of the target bands. For example, instructions this effect are laid down in The Treaty on the Functioning of The European Union, Article 127(1).

do, these policies would have the effect of making the economy cycle within the area marked *K* (for Keynesian) in the former case and the area marked *P* (for Pashian) in the latter case.[19]

So we seem to have gone full circle from early Keynesian view in which there was no unique level of income to which the economy was inevitably drawn, through a simple Phillips curve with its implied trade off, to an expectations-augmented Phillips curve (or any of its more modern equivalents) with its associated unique level of national income, and finally back to the early non-unique Keynesian view in which policy makers had an option as to the average pressure of aggregate demand at which the economy could be operated.

> "Perhaps [then] Keynesians were too hasty in following the New Classical economists in accepting the view that follows from static [and all EWD] models that stable rates of wage and price inflation are poised on the razor's edge of a unique NAIRU and its accompanying *Y**. The alternative does not require a long term Phillips curve trade off, nor does it deny the possibility of accelerating inflations of the kind that have bedevilled many third world countries. It is merely states that industrialised economies with low expected inflation rates may be less precisely responsive than current theory assumes because they are subject to many lags and inertias, and are operating in an ever-changing and uncertain world of endogenous technological change, which has no unique long term static equilibrium. If so, the economy may not be similar to the smoothly functioning mechanical world of Newtonian mechanics but rather to the imperfectly evolving world of evolutionary biology. The Phillips relation then changes from being a precise curve to being a band within which various combinations of inflation and unemployment are possible but outside of which inflation tends to accelerate or decelerate. Perhaps then the great [pre-Phillips curve] debates of the 1940s and early 1950s that assumed that there was a range within which the economy could be run with varying pressures of demand, and varying amounts of unemployment and inflation[ary pressure], were not as silly as they were made to seem when both Keynesian and New Classical economists accepted the assumption of a perfectly inelastic, one-dimensional, long run Phillips curve located at a unique equilibrium *Y** and NAIRU." (Lipsey 2011: 389)

[19] Of course, there is no place at all for policy intervention in EA theories since whatever macro values are realised are optimal reactions to any disturbances and any intervention can only worsen the economy's performance.

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FIGURE 1
CPI INFLATION RATE AND PERCENTAGE OF THE LABOUR FORCE UNEMPLOYED: CANADA 1990-2013

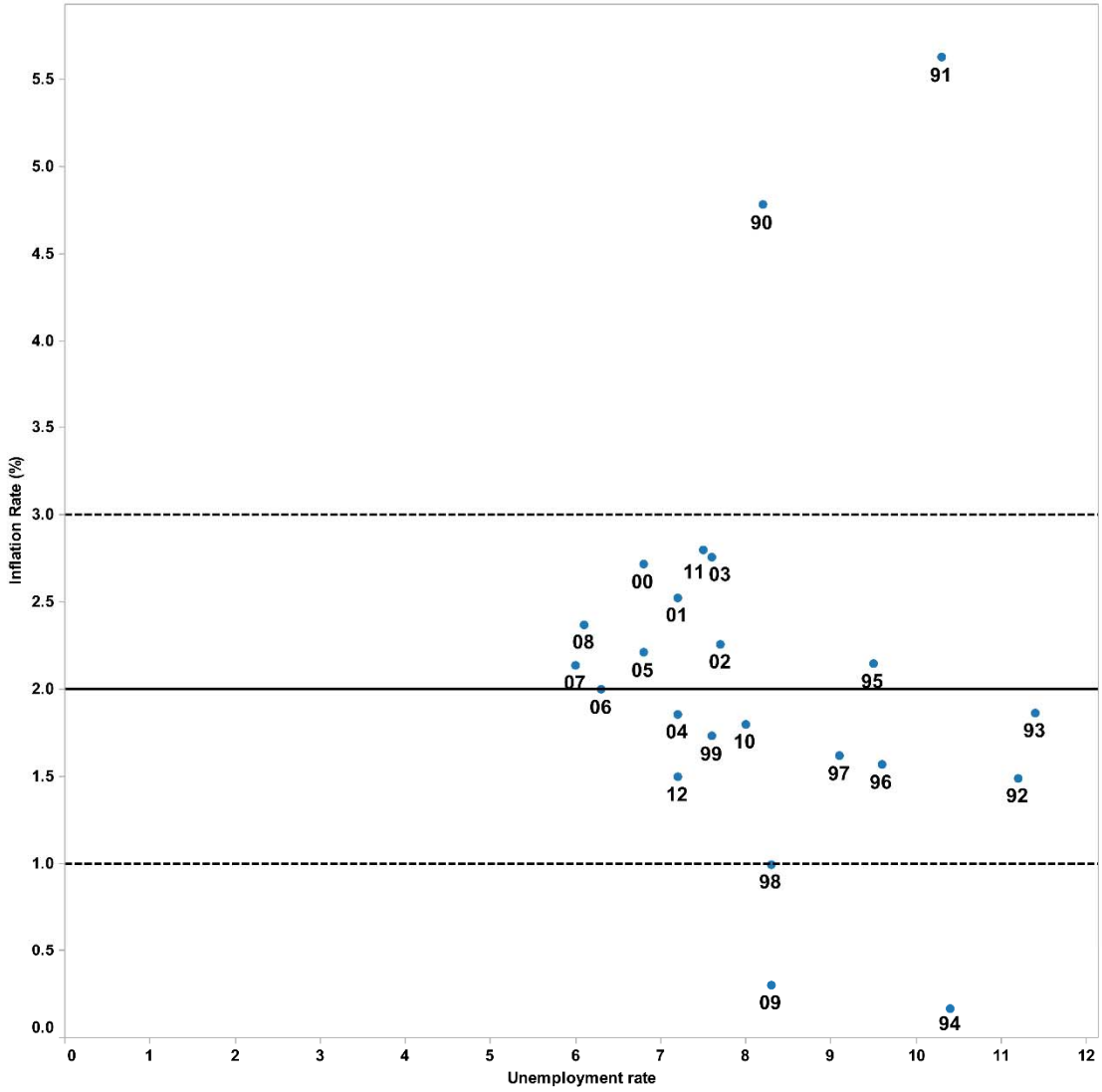

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FIGURE 2

CPI INFLATION RATE AND PERCENTAGE OF THE LABOUR FORCE UNEMPLOYED: USA 1990-2013

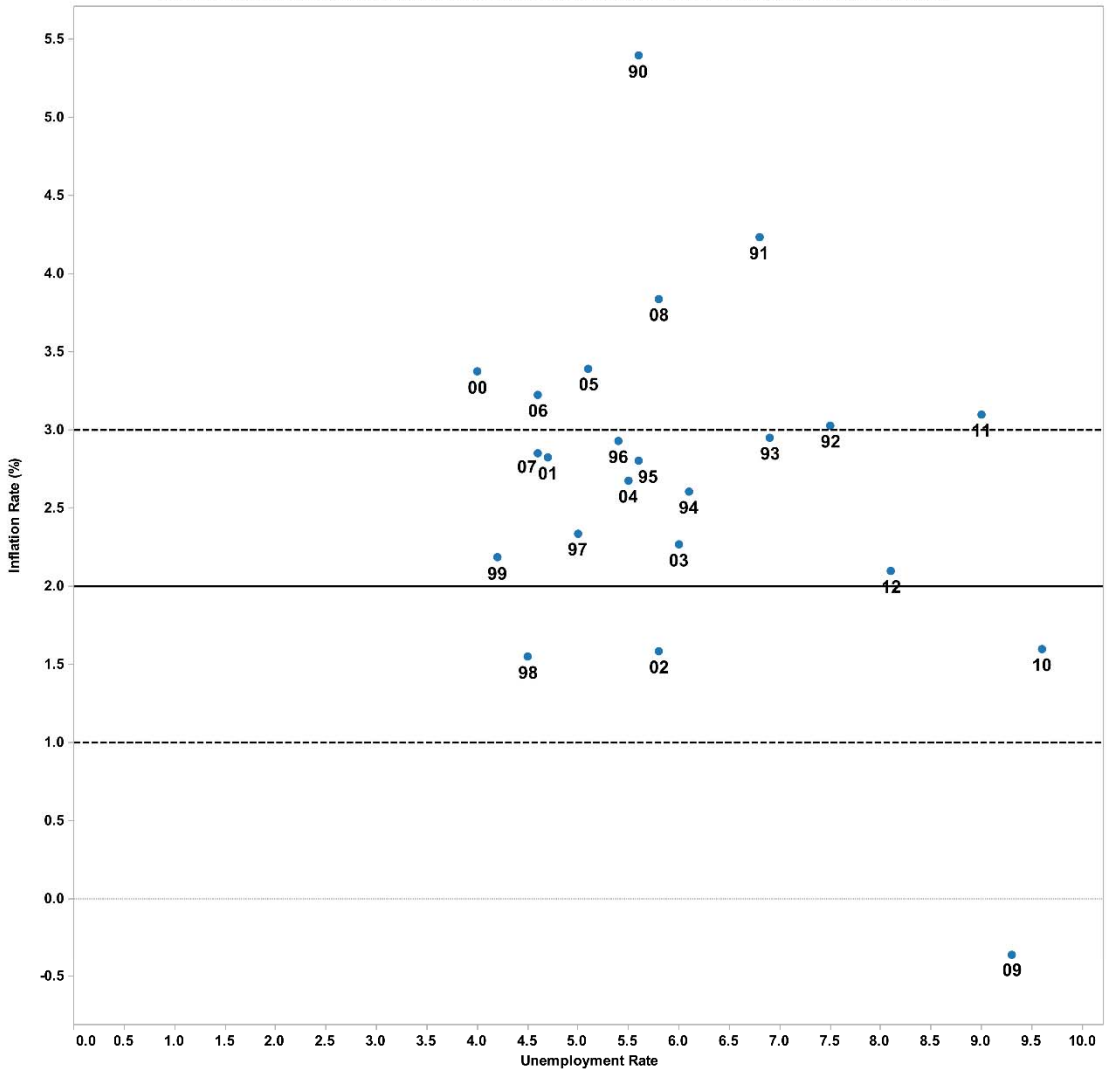

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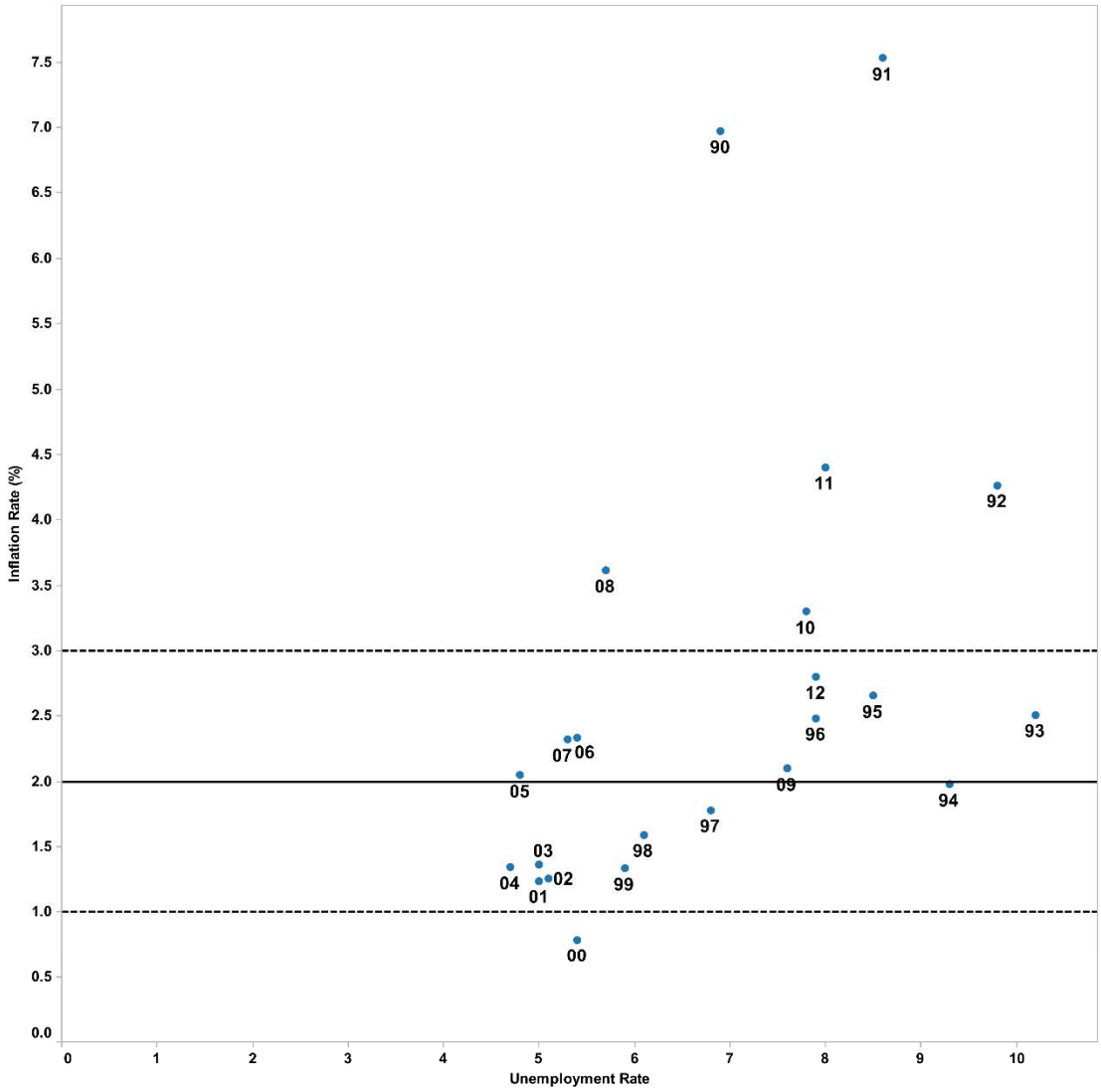
FIGURE 3
CPI INFLATION RATE AND PERCENTAGE OF THE LABOUR FORCE UNEMPLOYED: UK 1990-2013



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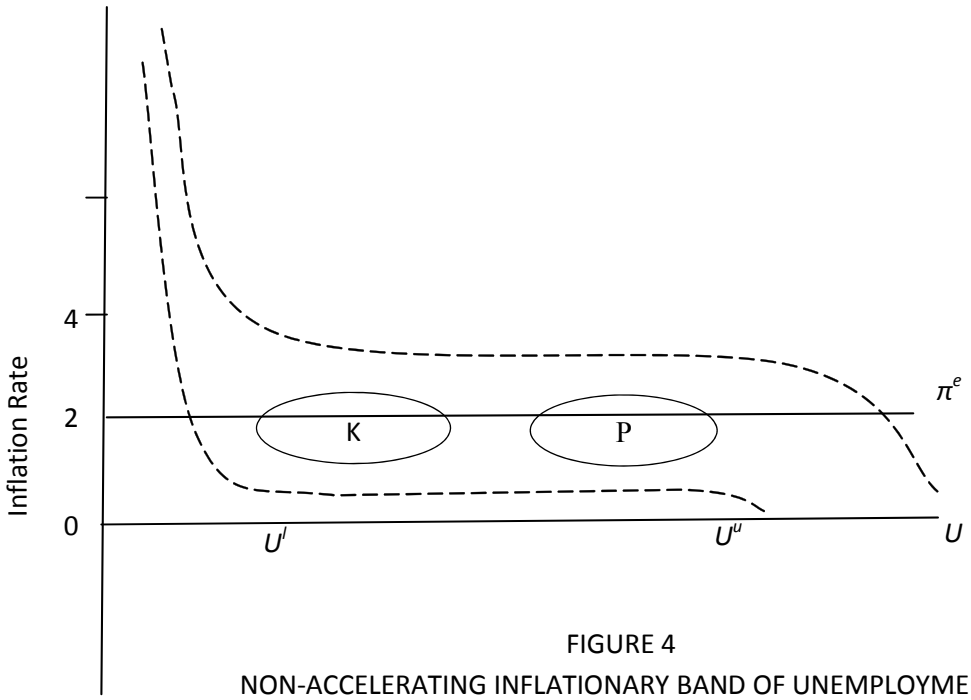

FIGURE 4
NON-ACCELERATING INFLATIONARY BAND OF UNEMPLOYMENT (NAIBU):
All Unemployment Rates Between U^l and U^u are NAIRUs