

Phelps's Contributions and Labour Market Research

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The demise of Edmund Strother Phelps (1933–2026) is an appropriate occasion to document his pioneering contributions to economics. Phelps obtained his Bachelor of Arts in economics from Amherst College and his doctorate from Yale University in 1959, with a thesis titled “A Statistical Test for the Presence of Cost Inflation.” His first contribution was in growth theory. Building on the framework developed by Solow (1956), Phelps (1962) derived the golden rule that maximises per capita consumption.

Phelps's research can be broadly grouped into the following categories: the first in growth theory and the second consisting of the huge spate of papers from the mid-1960s to the early 1970s on the labour market—specifically those pertaining to the expectations-augmented Phillips curve (henceforth EAPC) and its conceptual counterpart, the natural rate of unemployment. The third category is about the price-setting behaviour of firms (Phelps and Winter 1970) and staggered wage contracts (Phelps and Taylor 1977). What is now called the New Keynesian Phillips Curve literature was largely spawned by some of his work in categories two and three, apart from Okun (1981).

Those publications on the positive impact of technical innovation on growth and the standard of living (Nelson and Phelps 1966) would fall under a fourth category. Under a fifth category, one could classify his explanation of the persistently high European unemployment since the 1980s. His papers on optimal taxation, motivated by John Rawls's criteria, would fall under a sixth category. A seventh category would be his analysis of racism and sexism (Phelps 1972), an area in which he remains a mostly unknown pioneer. The study of discrimination has expanded into a huge sub-area in economics. The final miscellaneous category would comprise diverse

collaborations post 2000 such as Bhide and Phelps (2005).

Phelps was perhaps the last of a genre of notable economists—Paul Samuelson, Robert Solow, and Milton Friedman in America and Nicholas Kaldor, Roy Harrod and Joan Robinson in the United Kingdom—whose publications spanned various topics, transcending the boundaries of macro and microeconomics, and without the narrow specialisations that now dominate research. This article examines Phelps's labour market research.

Natural Rate Hypothesis

The natural rate of unemployment—a term coined by Friedman (1968)—is arguably among the most important concepts in macroeconomics. From the minutes of the Federal Open Market Committee over the decades, it is evident that its members are gauging the value of the natural rate in determining the monetary policy stance and the policy rate. The natural rate hypothesis can be stated as follows: there is no long-run trade-off between inflation and unemployment, although there is a short-run trade-off. Its empirical manifestation, the EAPC, provides the rationale for inflation targeting, a policy that has gained widespread acceptance by central banks globally.¹

A fairly obvious corollary of the natural rate and EAPC analysis is that although social welfare depends heavily upon unemployment, welfare over multiple periods is maximised when central banks ignore growth and unemployment and target only a low-to-zero inflation rate. That is because all they can control over a multi-period horizon is the inflation rate.

Explicit inflation targeting started with the Reserve Bank of New Zealand in 1991. That has spread to almost 50 countries now, including India, which adopted it in 2016, indicating the phenomenal practical success of the EAPC globally. In his 2006 Nobel Prize acceptance speech, Phelps (2006: 353) said, “looking back, it may be that my 1967 paper was the father of what came to be called inflation targeting.”

Basic formulation of the EAPC: The original Phillips (1958) curve and then

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Samuelson and Solow (1960) ignored expected inflation. What is common to both Friedman's (1968) and Phelps's (1967, 1968) versions of the EAPC is that the economy is in long-run equilibrium when actual inflation, denoted by π , equals expected inflation, denoted by $\pi(\text{exp})$. When actual unemployment, U , is at the natural rate, denoted as U^* , this equality will hold. When U exceeds U^* , inflation will decline, and vice versa. One can express the EAPC, for both Friedman and Phelps, as follows:

$\pi = \pi(\text{exp}) + \theta(U - U^*)$ for period t , with coefficient $\theta < 0$.²

However, they had different formulations about what determines $\pi(\text{exp})$, with possible different policy implications.

Friedman's version of the natural rate:

The analytical narrative of Friedman (1968) in his December 1967 presidential address was based on continuous market clearing without any involuntary unemployment. Some job offer is always available at any time for any worker. Unemployment results from prospective workers actively searching for the best-paying offer, while turning down those below their chosen reservation wage. A nominal demand stimulus, due to an increase in money supply, leads firms to offer higher nominal wages. This, in turn, induces the searching unemployed to accept these offers more readily, thinking real wages were raised. The unemployment rate and duration of unemployment will both fall.

This situation rectifies as workers demand even higher money wages to compensate for higher prices (or inflation) and actual U reverts to the natural rate U^* . This came to be known as the fooling or confusion theory of unemployment, since misperceptions about prices resulted in workers misjudging their real wage and U going below U^* . Indeed, this is the version that is outlined in most textbooks. The long-run vertical Phillips curve is entirely a labour supply phenomenon resulting from the absence of money illusion and workers demanding and receiving their expected real wage.

However, several robust stylised facts about business cycles hugely contradict Friedman, and subsequently, the far

more extreme rational expectations approach to the EAPC of Lucas (1972) based on misperceptions about the price level. These facts and their implications are cogently summarised by Okun (1980).

Phelps's version of the natural rate:

In his pioneering paper, Phelps (1967) developed a rigorous model of the EAPC. He worked out solution values for many macro variables by maximising the discounted value of a social welfare utility function, based on inflation and unemployment. Indeed, his Nobel Prize was mainly awarded for "his analysis of intertemporal tradeoffs in macroeconomic policy." This paper set the stage for the widely-cited Kydland and Prescott (1977) exposition of time-inconsistent preferences, based on optimal control theory, implying huge benefits from an independent central bank. Phelps labelled U^* in his model as the equilibrium unemployment rate and the warranted rate, as in Harrod's growth theory, but himself later started using Friedman's term natural rate.

In his next paper, "Money-wage Dynamics and Labour-market Equilibrium" (Phelps 1968), he laid out his framework. To begin with, as for Friedman, the economy is at the natural rate U^* when $\pi = \pi(\text{exp})$. In his words,

A necessary labor market condition for what might be called a macro equilibrium in terms of the relevant averages and aggregates is therefore equality of the expected and actual rate of change of the average wage rate ... Further there is no clearing of the labor market in the ordinary sense. (Phelps 1968: 698)

In Phelps's model, since there may be involuntary unemployment even at the natural rate, a full catch-up for money wages in response to price increases may not hold. Money wage dynamics are largely driven by the decisions of firms. With regard to his EAPC equation for wage inflation, he stated:

I believe that the expectation of price increases affects money wages only through its effect on expected vacancy rates and the expected employment rates. (Phelps 1968: 699)

I gather that cost-of-living clauses are not very widespread in this country. (Phelps 1968: 701)

Further, and what is generally not known, is that Phelps had also suggested that wage inflation can be reduced by wage-price guideposts, then being implemented in the United States (us). A fuller discussion of this issue is in Moorthy (1986).

One implication seems to be that a guidepost policy can be successful if it causes firms to expect other firms to raise their wages at a lower rate. (Phelps 1968: 701)

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This conclusion is diametrically opposite to that of Friedman. Ironically, he introduced the EAPC and the term “natural” level of unemployment while critiquing these guideposts in his Chicago Booth School debate with Solow (Friedman 1966). For Friedman, the EAPC is nested within a nominal demand constraint, specifically money growth. Expectations do not have a life of their own. A numerical simulation with the EAPC as the proximate determinant of inflation, but then adjusting to be in sync with an exogenous nominal gross national product (GNP) growth demand constraint, is developed in Moorthy (2017).

Phelps on High European Unemployment

The disinflation in the US was a robust, almost textbook illustration of the EAPC and natural rate hypothesis (Figure 3, Appendix, p 20). However, the 1980s turned out very differently in Europe. During the disinflation, unemployment did not just rise sharply, but stayed higher in Europe. Going by the natural rate hypothesis, such high unemployment should have then led to falling inflation but it did not. These developments led to the notion of hysteresis, which contradicts the natural rate.³

The persistence of high unemployment in Europe certainly warranted an explanation. In their co-authored work, Fitoussi and Phelps (1986, 1988) attributed this hysteresis to excessively high real interest rates. The higher real interest rate reduces the willingness of firms to incur recruitment and training costs for workers, and investing in capital stock itself, all of which have negative effects on employment and thus lead to an endogenously rising natural rate. This strand of thought was developed further in a turnover-training model (Hian Teck Hoon and Phelps 1992) and in several co-authored papers. The full theory was presented in Phelps's (1994) book titled *Structural Slumps: The Modern-Equilibrium Theory of Unemployment, Interest and Assets*.

However, one can certainly question the Fitoussi–Phelps explanations. The US also faced very high real rates and an overvalued exchange rate through the

mid-1980s, but employment growth was robust, unlike in Europe. A distinction between manufacturing and services jobs would suggest that the explanation of high real interest rates applies mostly to the manufacturing sector. Overall, less restrictive hiring and firing rules, compared to Europe, could explain stronger job growth for the US.

Before abandoning the natural rate hypothesis, a much broader labour market analysis is called for, including examining the role of unemployment benefits in inducing those who lost jobs to remain in the labour force. After the 2008 crisis, unemployment in the US peaked in 2010 at 9.9% but fell below 4% by the end of 2018. Employment and the labour force participation rate in the US for males remain weak. But unlike in Western Europe, unemployment in the US remains low, as dismissed workers drop out of the labour force.

Subsequently, Phelps turned to suggesting constructive policies to alleviate high unemployment—specifically graduated subsidies for employers. His book, *Rewarding Work: How to Restore Participation and Self-Support to Free Enterprise* (1997), building on co-authored papers (Hoon and Phelps 1996), was widely reviewed. It is not possible to assess these policies in detail here.

My own view is that Phelps should have considered payroll tax schemes to incentivise employers to reduce hours per worker. Banning overtime premiums

and removing payroll taxes on those working “short” hours (say 30 and under a week) would induce firms to “share the work” among more potential workers (Moorthy 2020). To offset job losses from automation, “long” hours (40 and more a week) must be taxed to save jobs.

Assessing the EAPC Contribution of Phelps versus Friedman

Both Friedman and Phelps developed their EAPC analysis separately and partially simultaneously. Phelps's first paper in August 1967 preceded Friedman's December 1967 presidential address speech. Nevertheless, Friedman got far more credit. The pervasiveness of his term natural rate and the nomenclature “Friedman–Phelps natural rate hypothesis” denotes his primacy.

This primacy is justifiable. Before Phelps's 1967 paper, Friedman in April 1966 introduced the term “natural” while commenting on the then ongoing disinflation from about 90% to 45% in Brazil. Further, much earlier, he had provided the rationale for an independent central bank (Friedman 1962). There are other compelling reasons too for this primacy, but we cannot go into them. The leading Keynesian economist Tobin conceded that Friedman's December 1967 speech was the most influential article in economics (Snowdon and Vane 1999: 102).

In his Nobel Prize banquet statement, Phelps said, “I have lived to see key parts of my research absorbed in textbooks

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and in central banks across the world.” That statement certainly applies to his work on the EAPC, but even more so to Friedman. In an autobiographical account on the award of the Nobel Prize in 2006, Phelps himself described his work as “putting people into economics.” That characterisation is valid for some of his work, but not for all of it. What can certainly be said is that he put a lot of mathematics into economics.

NOTES

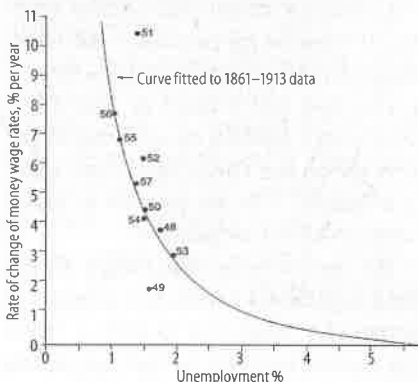
- 1 The natural rate is usually referred to as a hypothesis, with the associated acronym NRH. Initially it was just that. Since it is 60 years since the term was coined, it would be more accurate to call it a concept. However, the term and acronym NRH continue, and hence, we will use it too.
- 2 This convenient linear formulation is adequate for normal ranges of U . The appendix provides a factual template useful in comprehending the EAPC: The original Phillips curve for early post-war United Kingdom (Figure 1); the short-run Phillips curve for the US up to 1968 (Figure 2); and the long-run Phillips curve for the US for three decades (Figure 3).
- 3 Hysteresis implies that when a system is given a shock, some of it remains permanently. Economists borrowed the term from physics.

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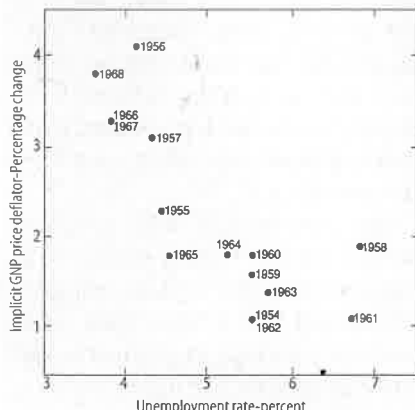
Appendix: Phillips Curve Charts

Figure 1: Phillips Curve for UK (1948–1957)



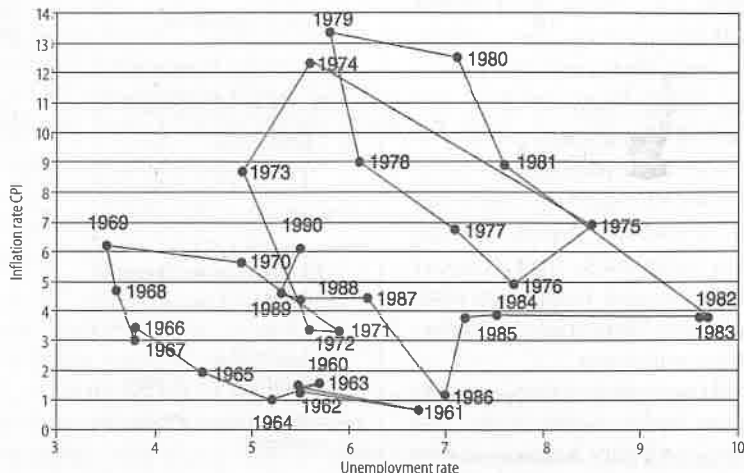
In 1949, then Chancellor of Exchequer, Sir Stafford Cripps, implemented Income Policy in the United Kingdom.

Figure 2: US Phillips Curve in the Early Post-war Period



Source: Page 95 of US Economic Report to the President 1969.

Figure 3: Long-run Phillips Curve for the US for Three Decades



Source: US Bureau of Labor Statistics data.