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WAGES, UNEMPLOYMENT AND SOCIAL STRUCTURE: A NEW PHILLIPS CURVE

Abstract

There exist several economic theories on the inherent relationship between employment and inflation, and the connections with other economic variables.

The classical hypothesis posits a relation between the rate of change of the wage share and unemployment. The original Phillips curve shows that money wages raises in a nonlinear manner when unemployment is below some critical levels, and falls in a similar manner when unemployment is above that level. Furthermore, numerous scholars demonstrate through empirical analyses such relationship for different time series. This paper presents a study on US data considering differently and more efficiently data on employment and change of money wage. Noticeable changes are highlighted in the historical periods considered.

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1. Introduction

Pre-Keynesian economics was characterized by the familiar notion of simultaneous equilibrium in all markets, including the full employment of

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workers in the labor market. All prices were assumed to function only as market-clearing variables. This attribution carried over to the labor market in which competitive real wages were assumed to only serve as labor market-clearing variables, their sole function being to maintain full employment. Workers admittedly bargained for real wages in order to achieve a standard of living, but in the end the living standard they got was the one that ensured their own full employment. In a perfectly competitive economy the struggle between labor and capital played no role in the determination of the *equilibrium* real wage (Shaikh, 2003, p. 129-132; Snowdon and Vane, 2005, pp. 37-54).

Keynes also based himself on competitive markets, since he believed that even "atomistic competition" could result in persistent unemployment (Leijonhufvud, 1967, p. 403)[1]. Yet in his case wage bargains and labor struggles played a big role. He was well aware of the neoclassical claim that unemployment would reduce the real wage, increase profitability and thereby move the system back toward full employment. Indeed, after the publication of the *General Theory* he conceded that persistent unemployment would erode not only money but also real wages (Bhattacharjea, 1987, pp. 276-279) so that *eventually* profitability, investment, output and hence employment would rise. Yet in the interim, in a society characterized by decentralized wage bargaining each wage reduction would have to be fought out at the local level, which would result in "wasteful and disastrous struggles" that could not be justified on social grounds (Snowdon and Vane, 2005, p. 66, citing Keynes). He therefore argued that in a crisis it would be far better to have the State engage in fiscal policy to directly increase aggregate demand and employment.

2. Inflation and the Phillips Curve

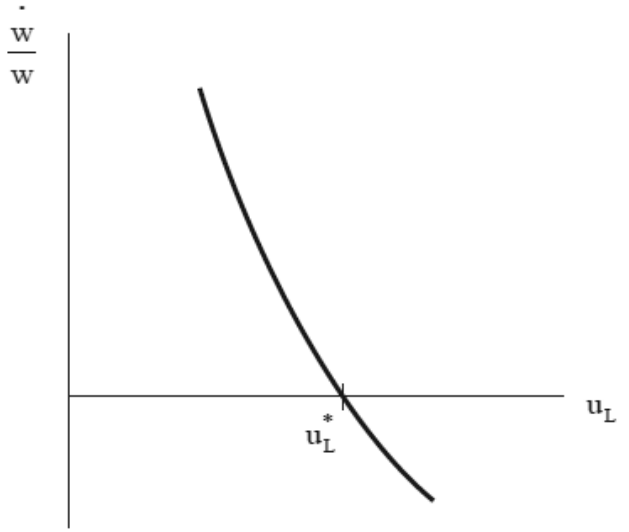
In the aftermath of the Great Depression and World War II, governments all over the developed capitalist world expressed a strong commitment to maintaining a high level of employment and rising levels of incomes – at least in the center countries. From this point of view, the period from 1950-1973 became viewed as a Golden Age sustained by to Keynesian policies (Snowdon and Vane, 2005, pp. 15-17). In neoclassical theory the system was

[1] Kalecki's original argument on effective demand was in terms of "free competition" (Kriesler, 2002, pp. 624-625) which made it even more congruent to Keynes.

assumed to be normally at full employment (which subsumed normal frictional unemployment), so an increase in aggregate demand fueled by an increase in money supply would lead *only* to an increase in prices. In Keynesian theory the system was assumed to be normally below full employment, so an increase in aggregate demand would first increase output and employment up to the point of effective full employment and only then increase prices. Joan Robinson had already proposed at a theoretical level that prices would actually start to rise somewhat before full employment (Backhouse, 2003, pp. 460-461) and by the early 1960s this notion was operationalized by adding the Phillips curve to the basic Keynesian policy toolbox (Snowdon and Vane, 2005, p. 23).

Phillips' (1958) original finding was that money wages rose in a nonlinear manner when unemployment was below some critical level, and fell in a similar manner when unemployment was above that level. He show that at empirical level from 1861-1957 the *cyclically-adjusted* rate of change of money wages in the UK was positive when unemployment was below a certain critical level u_L^* and was negative when unemployment was higher than this. His was a proposition about the trends, i.e. cyclically adjusted values, of the two variables. It implies an underlying curve of the shape in Figure 1, in which w = the money wage, $\frac{\dot{w}}{w}$ = percentage rate of change of wages and u_L = the unemployment rate.

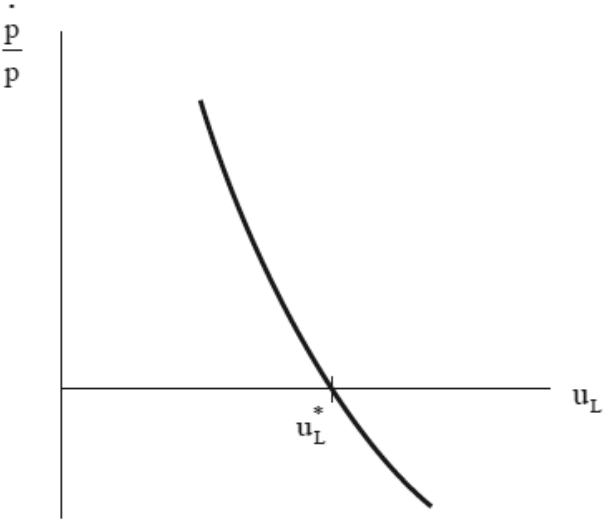
Figure 1. The Phillips Curve



Source: our elaborations

Keynesian policies in the postwar period needed to have a concrete expression of the relation between inflation and unemployment, which was provided by transforming the money-wage Phillips curve into a money-price curve on the assumption that prices were formed as markups on money wages. The new relation posited that there was a stable negative relation between the rate of change of money prices (inflation) and the unemployment rate, as in Figure 2. This meant that policy makers could think of reducing employment below the critical level u_L^* in return for accepting some tolerably higher rate of inflation $\left(\frac{\dot{p}}{p}\right)$.

Figure 2. The Inflation-Tradeoff Phillips Curve



Source: our elaborations

3. The Rise and Fall of the Phillips Curve

Phillips' original data covered 1861-1957 in the UK, and early postwar data in other countries seemed to confirm Phillips' "law". For example, Figure 3 which compares the US inflation rate to its unemployment rate from 1955-1970 displays a clear Phillips' type relation. But as shown in Figure 4, over time the relationship began to fall apart and by 2010 there seemed to be no empirical support for the hypothesis (see the Data Appendix for all sources and methods).

Figure 3. Inflation vs. Unemployment, US 1955-1970

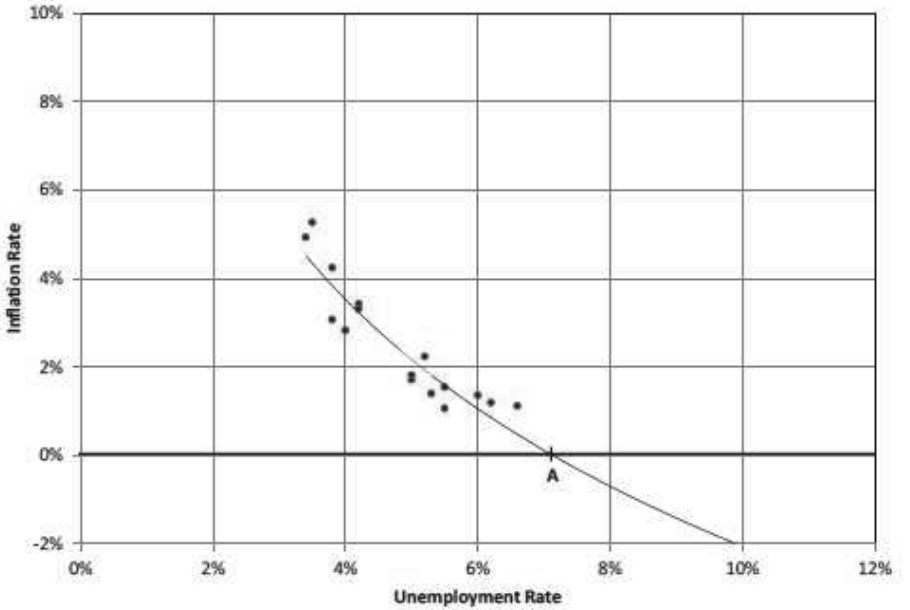


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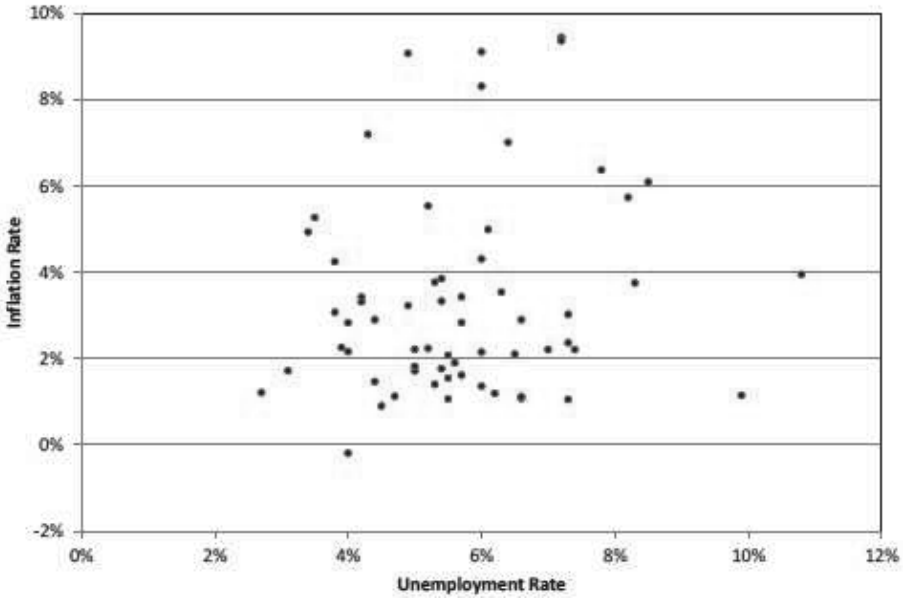
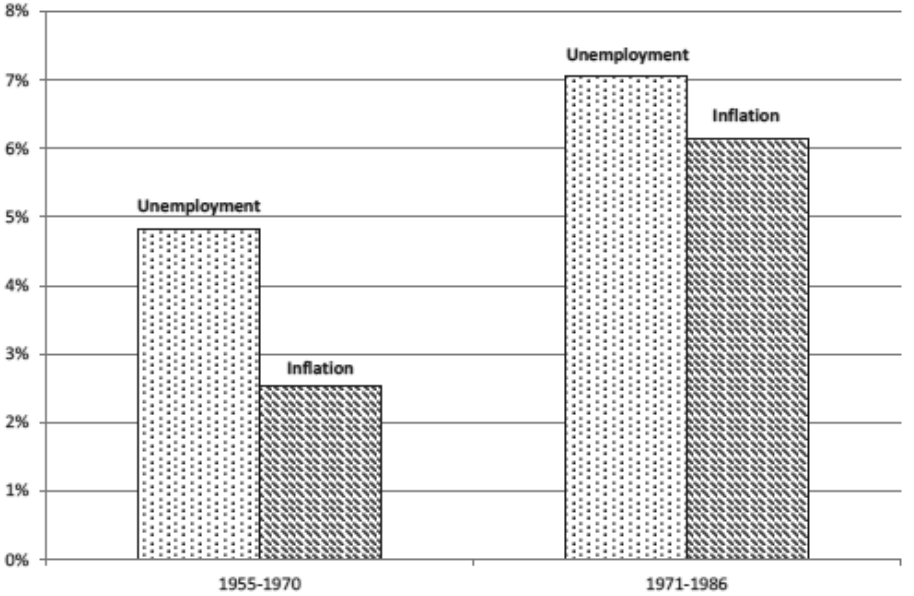
Figure 4. Inflation vs. Unemployment, US 1949-2010



Source: our elaborations

Worse yet, between 1955-1970 and 1971-1986 unemployment rose substantially, yet instead of falling inflation *rose* even more. This directly contradicted Keynesian theory and undermined the notion of a stable Phillips curve.

Figure 5. US Inflation and Unemployment Rates, 1955-70 and 1971-1986



Source: our elaborations

4. Revenge of the Empire: The Neoclassical "Solution"

Keynesian theorists were trapped by the contradiction between their theory and the facts. According to their theory, inflation should have *fallen* when unemployment rose, while in practice inflation rose as unemployment rose. A great deal of Keynesian effort was expending in trying to solve this "paradox". But in the end the winning argument came from the neoclassical side when Friedman and Phelps stepped into the breach. They proposed two things. First, that the proper Phillips-type relation was between the rate of change of *expected real* wages and the unemployment rate, not the rate of change of actual nominal wages. Second, that in the long run the system *does* actually achieve effective full employment, so that any observed unemployment is voluntary because workers preferred unemployment or welfare to work, or induced by the state or unions which served to raise the real wage above the market clearing one (Blanchard and Katz, 1997, pp. 53-

54; Friedman, 1977, p. 459).

I will not dwell on the Friedman-Phelps-Lucas debates on the dynamics of these propositions. For now, what is relevant is that when expectations are aligned with actual outcomes, neoclassical theory requires a stable negative relation between cyclically-adjusted real wages and the unemployment rate, i.e. *a real-wage Phillips curve*.

5. Phillips' question vs. his answer: a tale of three Phillips' curves

It is useful at this point to return to Phillips' original work, so as to distinguish between his *question* and his *answer*. Phillips' general question may be posed in terms of the effect of unemployment on wages. His particular answer was to link the rate of change of money wages to the rate of unemployment Friedman and Phelps assume that workers struggle for a standard of living, i.e. for a real wage, not a money wage. Hence from their point of view, the correct Phillips-type relation would be in terms of the rate of change of real wages.

However, in the classical tradition it has always been recognized that the real wage depends not only on the strength of labor relative to capital, but also on the general level of development of society, i.e. on *the level of productivity* (Dobb, 1973, pp. 91-92, 152-153). Thus from the classical point of view, an appropriate Phillips-type relation might be in terms of the rate of change of real wages relative to productivity, i.e. in terms of the rate of change of the *wage share*. Indeed, this *Classical Curve* appears as one of the two central dynamic relations in Goodwin's elegant formalization of Marx's argument that capitalism creates and maintains a persistent pool of involuntarily unemployed, reserve army of, labor (1967, p. 55). In addition to w, p as the previously defined wage rate and price level, let yr = the level of productivity and $\omega = \dfrac{(w/p)}{yr} = \dfrac{w}{p \cdot yr}$ = the ratio of the real wage to productivity, i.e. the wage share. Then the classical hypothesis is that

1) $\dfrac{\dot{\omega}}{\omega} = f(u_L)$ [Classical wage-share curve]

So we end up with three possible answers to Phillips's question: a Keynesian one in terms of the rate of change of money wages; a neoclassical one in terms of the rate of change of real wages; and a classical one in terms of the rate of change of the wage share. It is useful at this point to note that the three curves must be related. Since $\frac{\dot{\omega}}{\omega} = \frac{\dot{(w/p)}}{(w/p)} - \frac{\dot{yr}}{yr} = \frac{\dot{w}}{w} - \frac{\dot{p}}{p} - \frac{\dot{yr}}{yr}$, if the classical curve is valid we would expect from equation 1 that the real-wage Phillips curve would have productivity growth as a shift factor, and that the original money-wage Phillips curve would have inflation as a further shift factor.

2) $\frac{\dot{(w/p)}}{(w/p)} = f(u_L) + \frac{\dot{yr}}{yr}$ [Neoclassical real-wage curve]

3) $\frac{\dot{w}}{w} = f(u_L) + \frac{\dot{p}}{p} + \frac{\dot{yr}}{yr}$ [Keynesian money-wage curve]

6. Empirical Evidence for the US, 1949-2012

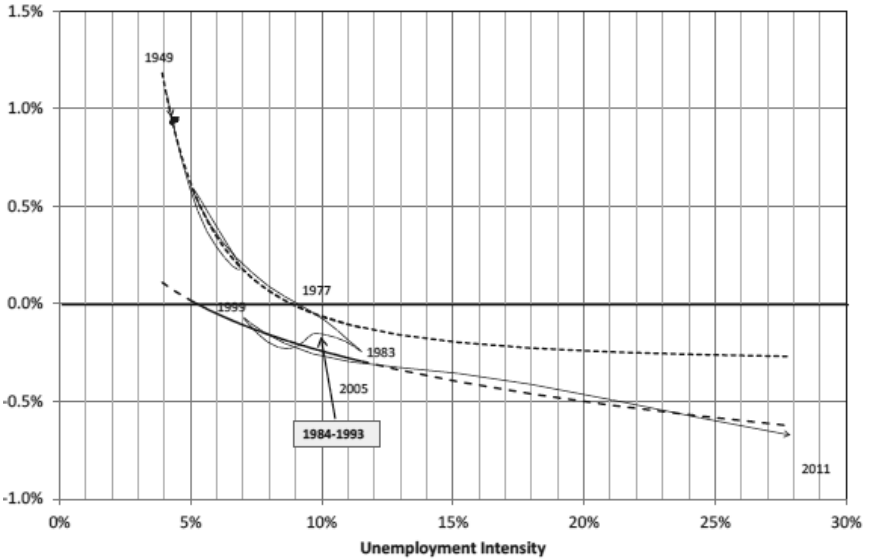
The classical hypothesis posits a relation between the rate of change of the wage share and some measure of unemployment. In the latter regard, it is striking that both the rate of unemployment and the duration of unemployment drifts upward in the 1970s-1980s and then rise again after 2008. But in the latter period, the unemployment duration rises much more sharply[2]. In order to take both features into account, a measure of *unemployment intensity* was constructed as the product of the unemployment rate and an index of unemployment duration, with the latter measure set equal to 100 in 1948-51. From this point of view, both the extent and the duration of unemployment can exert downward pressure on the ability of workers to secure increases in their real wages. We may think of the

[2] BLS Series Id LNS13008275, http://data.bls.gov/pdq/SurveyOutputServlet

combined measure as an index of the number of worker-weeks of unemployment. Following Phillips' original procedure, all data is cyclically adjusted, in the present case by using HP-filtered values of the variables (see the Data Appendix).

Figure 6 examines the hypothesis of a classical curve by plotting the annual rate of change of the US wage share on the vertical axis against the unemployment intensity on the horizontal axis, both variables being represented by HP-filtered values. In addition, the direction of travel from year to year is indicated by the arrows attached to each point (the effect is quite striking when the data path is animated). The data path clearly indicates a break in the transition from the "golden age" for labor in 1948-1980 to the neoliberal Reagan-Thatcher era from 1994 onward. According there are also two fitted curves indicated by dotted lines fitted to the two eras 1949-1982 and 1994-2011 using Phillips' original functional form $y = a + bx^c$ where $y = \dot{\omega}/\omega$, x = unemployment intensity and a, b, c are fitted parameters (see the Data Appendix).

Figure 6. Rate of Change of Wage Share vs. unemployment intensity US 1949-2012 (HP filtered values)



Source: Our elaborations

The data in Figure 6 has several striking features. First, there is a stable curve postwar classical curve from1948-1983, corresponding to a stable balance of power between labor and capital. Second, the economy moves back up this stable curve during the Vietnam War boom from 1960-1968, and then moves down it as the boom peters out after 1968. Third, the curve continues to hold even during the Stagflation Crisis of the 1970s and early 1980s. Fourth, the curve breaks up between 1984-1993 after labor is dramatically weakened during the Reagan-Bush era and the economy enters into a region of *falling* wage shares - which after all was the whole point. Fifth, a new stable curve is established from 1994 onward. Sixth, the Dot.Com credit bubble from 1993-1999 moves the economy upward along this new curve, and then back down it as the boom fades. The up and down movements along the respective curves in the Vietnam War and Dot.Com booms speak to the effects of sharp expansions of new purchasing power through the expansion of public or private deficit spending.

Finally, it is interesting to speculate that had Phillips answered his own question in classical rather than Keynesian terms, there might not have been a theoretical crisis for Keynesian policy during the Stagflation era of the 1970s and 1980s because it would have been understood that the money wage Phillips curve shifted with both the rate of inflation and the rate of productivity growth (equation 3). Hence there would not have been the same opening for the neoclassical counterattack on such policy. Of course, this need not have changed the possibility of a political attack aimed at weakening labor so as to raise the rate of change of the profit share by reducing the rate of change of the wage share (Shaikh, 2011).

Data Appendix

Bureau of Economic Analysis (BEA) GDP and the National Income and Product Account (NIPA) Historical Tables, http://www.bea.gov/national/index.htm#gdp, for prices, wages and productivity. p = the price level = the GDP Deflator from Table 1.1.9, line 1; w = the nominal wage = EC*100/FEE where EC = Compensation of employees, paid from Table 1.10, line 2; w/p = the real wage; yr = productivity = (GDP*100/p)/(FEE/1000), where GDP is from Table 1.10, line 1.

Bureau of Labor Statistics (BLS) for the unemployment rate (http://data.bls.gov/cgi-bin/surveymost?ln, series LNS14000000Q) and unemployment duration (http://www.bls.gov/cps/duration.htm, series LNS13008275). An index of unemployment duration was created using 1948-51 = 100, and unemployment intensity = unemployment rate x index of unemployment duration.

Rates of change of w, w/p, ω as well as the unemployment rate and intensity were filtered by the Hodrick-Prescott (HP) filter with the default parameter of 100. Finally, curves indicated by dotted lines in Figure 6 were fitted to the two eras 1949-1982 and 1994-2011 using Phillips' original functional form $y = a + bx^c$ where the dependent variable $y = \dot{\omega}/\omega$ = GWSHHP100, the independent variable x = unemployment intensity = ULINTENSITYHP100, and a, b, c are fitted parameters. The final equations were adjusted to remove non-significant parameters.

Dependent Variable: GWSHHP100
Method: Least Squares
Date: 05/25/13 Time: 18:42
Sample (adjusted): **1949 1982**
Included observations: 34 after adjustments
Convergence achieved after 4 iterations
GWSHHP100 = C(1)+((ULINTENSITYHP100)^C(3))

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-1.026431	0.001418	-723.9645	0.0000
C(3)	-0.010677	0.000500	-21.35759	0.0000

R-squared	0.930871	Mean dependent var	0.003252
Adjusted R-squared	0.928711	S.D. dependent var	0.003145
S.E. of regression	0.000840	Akaike info criterion	-11.27011
Sum squared resid	2.26E-05	Schwarz criterion	-11.18032
Log likelihood	193.5918	Hannan-Quinn criter.	-11.23949
F-statistic	430.9021	Durbin-Watson stat	0.120899
Prob(F-statistic)	0.000000		

Source: Our elaborations

Dependent Variable: GWSHHP100
Method: Least Squares
Date: 03/03/13 Time: 15:00
Sample (adjusted): **1994 2011**
Included observations: 18 after adjustments
Convergence achieved after 4 iterations
GWSHHP100 = C(1)+ ULINTENSITYHP100^C(3)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-1.010996	0.000401	-2518.266	0.0000
C(3)	-0.003709	0.000175	-21.15025	0.0000

R-squared	0.964965	Mean dependent var	-0.002710
Adjusted R-squared	0.962775	S.D. dependent var	0.001758
S.E. of regression	0.000339	Akaike info criterion	-13.03610
Sum squared resid	1.84E-06	Schwarz criterion	-12.93717
Log likelihood	119.3249	Hannan-Quinn criter.	-13.02246
F-statistic	440.6863	Durbin-Watson stat	0.470611
Prob(F-statistic)	0.000000		

Source: Our elaborations

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