Structural change in the US Phillips curve, 1948-2021: the role of power and institutions

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Structural change in the US Phillips curve, 1948-2021:
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Abstract

This paper provides an institutional-analytical account of changes in the structure of the US

Phillips curve (PC) during the post-war period. It does so by restoring conflict and power to

the forefront of macro theory and, in particular, the wage- and price-setting behaviour of

workers and firms. The resulting account is consistent with the main stylized facts that

characterize the evolution of the US PC since 1948: the disappearance and subsequent

reappearance of a 'standard' PC (relating the level of the inflation rate, not the change in this

rate, to the rate of unemployment); and the flattening of the PC since the 1990s.

Keywords: Phillips Curve, inflation, unemployment, natural rate hypothesis, bargaining

power, institutions

JEL classification codes: E12, E24, E25, E31, N12

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1. Introduction

Conflict between social classes is a prominent theme in Tom Palley's many contributions to macroeconomics (see especially Palley, 1998a, 1999). Once a cornerstone of classical political economy, the absence of conflict and power as analytical categories is, according to its critics, one of main lacunae of 'traditional' or 'mainstream' (neoclassical) macro theory. This is nowhere more evident than in the theory of the Phillips curve (PC), the foundations of which rest on wage- and price-setting behaviour. Even authors who are only cautiously supportive of mainstream PC theory (for example, Blanchard, 2016, 2018) are not inclined to embrace conflict and power as essential to understanding the PC. This disconnect is all the more striking because some mainstream authors have begun to recognize that changes in the distribution of power have had a decisive influence on macroeconomic outcomes in recent decades (for example, Stansbury and Summers, 2020).

In fact, numerous economists have recognized that the standard 'textbook' model of a PC that is downward-sloping only in the short run, and vertical in the long run, no longer fits the data for the US and other countries (Blanchard, 2018; Svensson, 2015). In the standard model, which will be explained in more detail in the next section, the PC is downward sloping using the change in the inflation rate, not the level of the inflation rate. Yet even the author of a leading textbook now states flatly, 'In both the United States and the European Union, except for the large decline in inflation in 2009, there does not appear to be any relationship between the unemployment rate and the change in inflation in the last two decades' (Blanchard, 2018, p. 99).[1] The re-emergence of a PC that slopes downward in the level of the inflation rate is usually explained by the 'anchoring of expectations' as a result of

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[1] In fairness to Blanchard, the seventh edition of his textbook (Blanchard, 2017) allows for cases in which expectations are anchored and the PC becomes downward-sloping in levels of the inflation rate, even in the 'long run'. Still, conflict and power relations are not emphasised.

the adoption of inflation-targeting policies by central banks (Svensson, 2015). King and Lu (2021) argue that it was a shift from monetary policy regimes 'without commitment' prior to the 1980s to ones 'with commitment' since then that accounts for the achievement of lower and more stable inflation. The PC has also become much flatter in many countries (including the US) since the mid-1990s than it was in previous decades, as observed by Svensson (2015) among others.

This chapter will argue that bringing conflict and power – and changing institutional regimes for managing them – into the analysis of the inflation-unemployment relationship is essential for explaining these dramatic shifts in the PC since the mid-twentieth century. In what follows, section 2 briefly outlines mainstream PC theory and then shows how the PC, as an empirical phenomenon, has evolved through distinct episodes in the US economy since 1948. Section 3 furnishes an institutional-analytical account of this shifting macroeconomic performance, while section 4 constructs a simple theoretical model that makes sense of the stylized facts outlined in sections 2 and 3. We show that making conflict and power central to the theory of the PC reveals that *distribution* is a critical third element in the inflation-unemployment relationship, and provides an explanation of both changes in the *structure* of the US PC (levels versus differences) and the recent *flattening* of its slope that is congruent with the data. A final section offers some conclusions.

2. Phillips curves in levels and differences

2.1 Mainstream PC theory

The standard model of an expectations-augmented PC takes the following form:

$$\pi_t = \alpha + \pi_t^e - \gamma U_t + \varepsilon_t \qquad [1]$$

where π is the inflation rate (rate of change in the price level), π^e indicates the expected

inflation rate, U is the unemployment rate, ε is a random error and the subscript t indexes time (discrete time periods, such as years). Under a very simple form of adaptive expectations, expected inflation is assumed to equal the one-period lag:

$$\pi_t^e = \pi_{t-1} \qquad [2]$$

Substituting this into equation [1], the PC can then be expressed in first-difference form as

$$\Delta\pi_t = \alpha - \gamma U_t + \varepsilon_t \qquad [3]$$

where $\Delta\pi_t = \pi_t - \pi_{t-1}$. Then, in a 'long-run' equilibrium in which inflation is stable and there are no random shocks, so that $\Delta\pi_t = \varepsilon_t = 0$, the model solves for a 'natural rate of unemployment' (NRU) or 'non-accelerating inflation rate of unemployment' (NAIRU),[2]

$$U_n = \frac{\alpha}{\gamma} \qquad [4]$$

and the long-run PC is vertical at this unemployment rate.

Alternatively, suppose inflation expectations are 'anchored', for example, by a (low) historical average rate of inflation or an announced inflation target of the central bank,

$$\pi_t^e = \bar{\pi} \qquad [5]$$

In this case, the model has no solution in first differences. An NRU does not exist, and the PC is always downward-sloping (that is, in the long run as well as the short run):

$$\pi_t = \alpha + \bar{\pi} - \gamma U_t + \varepsilon_t \qquad [6]$$

A crucial hidden assumption in the model developed so far is that the coefficient on expected inflation is unity. This is known as 'dynamic homogeneity' or 'full indexation', and takes different specific forms in different vintages of NRU analysis (see, for example, Lang et al., 2020, pp. 20-22). In mainstream PC theory, this assumption stems from the idea that

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[2] A distinction is sometimes made between the NRU and the NAIRU on the grounds that the former provides an equilibrium solution to [3] that also involves labour market clearing. In what follows, however, we treat the NRU and NAIRU as synonymous and refer exclusively to the NRU.

rational agents (firms and workers) pay full attention to inflation expectations when negotiating wages and setting prices. Full indexation makes sense when inflation is chronically high, but it is less plausible when inflation is low or sporadic (Akerlof et al., 2000).[3] Thus, a more general version of equation [1] would be

$$\pi_t = \alpha + \beta \pi_t^e - \gamma U_t + \varepsilon_t \qquad [7]$$

where the coefficient β reflects the degree of attention that agents pay to inflation expectations in setting wages and prices, with $0 \leq \beta \leq 1$. When agents ignore inflation expectations altogether ($\beta = 0$), equation [7] becomes the 'original' PC:

$$\pi_t = \alpha - \gamma U_t + \varepsilon_t \qquad [8]$$

2.2 Empirical evidence for the US economy

Figure 1 presents standard textbook-like PC diagrams, using annual US data for 1948-2021, while Table 1 presents econometric estimates of the slopes of the corresponding equations and their levels of statistical significance.[4] Measuring the inflation rate in levels (π_t), there is no apparent relationship between inflation and unemployment (if anything, there is a slight upward slope, but it is statistically insignificant as shown in Table 1). Measuring inflation in first differences ($\Delta \pi_t$), there is a downward slope (coefficient of -0.29), and the PC intersects the horizontal axis (where $\Delta \pi_t = 0$) at an apparent NRU of 5.1 percent. This contrast is used by mainstream textbook writers like Blanchard (2017, pp. 161-163) to claim support for the

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[3] See also Palley (2003, 2012) for a competing account of why expectations might be less-than-fully incorporated into aggregate inflation outcomes.

[4] The corresponding equations are [8] for the PC in levels of the inflation rate and [3] for the PC in first differences of the inflation rate. Complete econometric results for these equations are provided in Appendix Tables A.1 and A.2. Results for a third econometric specification, which estimates the more general PC in equation [7] under the expectational assumption [2],

$$\pi_t = \alpha + \beta \pi_{t-1} - \gamma U_t + \varepsilon_t$$

are presented in Appendix Table A.3. The sample starts in 1949 when the inflation rate is differenced or lags are used. Data for 2021 are averages for January-October.

natural rate hypothesis (NRH).

Figure 1: Phillips curves in levels and first differences of the inflation rate (π), full sample, 1948–2021

(a) π (b) $\Delta\pi$
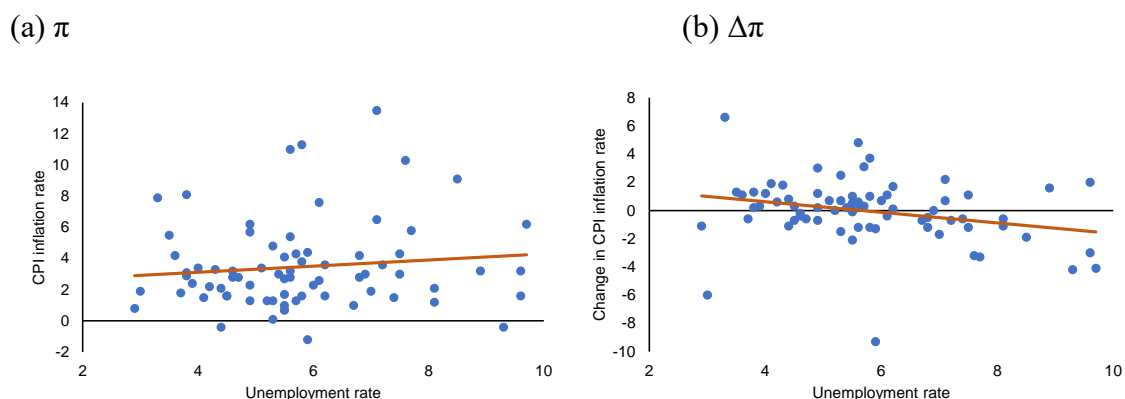
Sources: U.S. Bureau of Labor Statistics (BLS), www.bls.gov, and authors' calculations.

Notes: All data are in percentages. Data in first differences start in 1949. Data for 2021 are averages for January-October.

Table 1: Alternative estimates of Phillips curve slope (coefficient γ)

Time period	Inflation rate measured in	
	Levels (π_t)	Differences ($\Delta\pi_t$)
Full sample, 1948-2021[a, b]	0.13	−0.29*[c]
Post-war Golden Age, 1948-1968	−0.90**	−0.14[c]
Stagflation and adjustment, 1969-1993	−0.11	−0.93***
Great moderation, stagnation, and crises, 1994-2021[b]	−0.21*	0.11

Notes: Statistical significance levels are indicated by * (10 percent), ** (5 percent), *** (1 percent). Details of the underlying estimates are provided in Appendix Tables A.1 and A.2.

[a] Hypothesis tests for this period are statistically invalid due to significant serial correlation of the residuals (in levels, using a Breusch-Godfrey LM test) and equation misspecification (in differences, using Ramsey's RESET test).

[b] Data for 2021 are for January-October only.

[c] Sample period starts in 1949 due to differencing.

However, the appearance of support for the NRH and the estimated NRU rest on a shaky foundation, because the hypothesis test for the slope coefficient, which appears to show statistical significance at the 10 percent level (Table 1), is invalid as a result of equation misspecification (according to Ramsey's RESET test) and residuals that are not normally distributed (according to a Jarque-Bera test).[5] Similarly, the estimated equation in levels – although it does not show a significant slope – is also statistically unreliable because the residuals have significant serial correlation (according to a Breusch-Godfrey test). Moreover, the serial correlation persists even when dummy variables are added to the equation in levels for the years of large oil shocks (1974, 1979 and 1980). These statistical problems with the estimates for the full 74-year sample period suggest that the data for the whole period do not reflect the same data generating process (DGP), or in other words, that the structure of the economy changed so radically within that period that a single set of coefficient estimates does not exist.

To verify this view, Figure 2 shows how much the PC for the US economy has varied during three major subperiods. During the post-war recovery and 'Golden Age' of capitalism (1948-1968), the PC has a downward slope in both levels and differences of the inflation rate, but the negative slope is significant only in levels (see Table 1).[6] The slope in levels is −0.90 (significant at the 5 percent level). For the period of stagflation and neoliberal adjustment (1969-1993), the reverse is true: the negative slope is significant only when the equation is estimated using the first difference of the inflation rate.[7] Using the estimates for $\Delta\pi_t$ for this

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[5] This remains true in spite of the inclusion of dummy variables for two 'outlier' years (1951 and 1974) that otherwise have very large residuals. Also, the Breusch-Godfrey test for serial correlation has a *p*-value of only 0.13. Statistical problems of this nature and the resultant need for care when interpreting econometric results are openly acknowledged by cautious NRH advocates such as Blanchard (2016, pp. 33-34).

[6] Additional estimates, described in footnote 4 with results shown in Appendix Table A.3, show that lagged inflation is statistically insignificant in a PC estimated with the inflation rate in levels for 1949-1968.

[7] In the additional estimates using inflation in levels with lagged inflation included as a regressor, the slope is also significantly negative (10 percent level, coefficient of −0.85) and the coefficient on lagged inflation is significantly (1 percent level) positive at 0.92 for this period. According to a Wald *t*-test, we cannot reject the
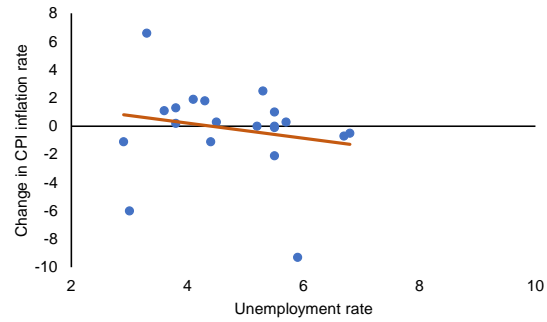
period, the slope is a similar −0.93 (significant at the 1 percent level) and there is an apparent

NRU of 6.4 percent.

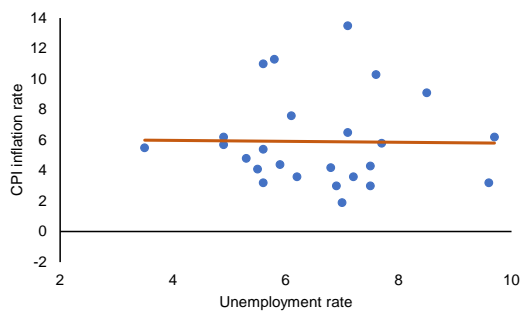**Figure 2: Phillips curves in levels and first differences of the inflation rate (π), three subperiods**
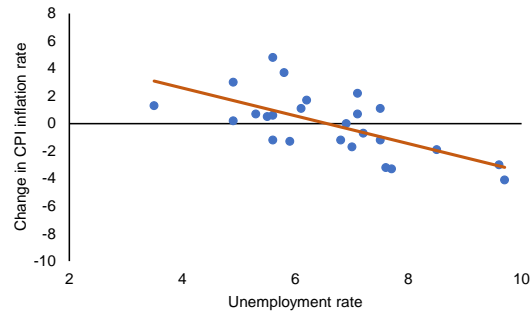
(a) π (1948–1968)
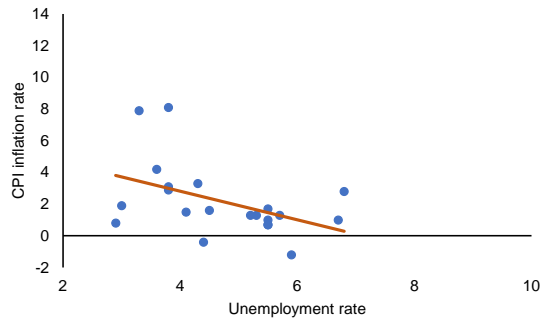
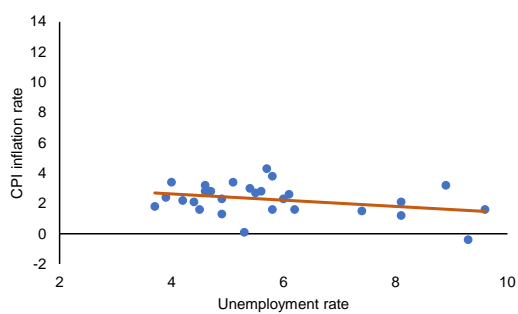

(b) $\Delta\pi$ (1949–1968)
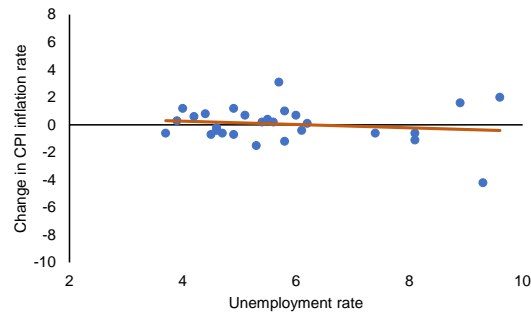

(c) π (1969–1993)

(d) $\Delta\pi$ (1969–1993)

(e) π (1994–2021)

(f) $\Delta\pi$ (1994–2021)

Sources and notes: Same as for Figure 1.

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null hypothesis that the latter coefficient equals 1 for the 1969-1993 period. For details, see Appendix Table A.3.

Finally, the period from 1994-2021 – which combines the so-called 'Great Moderation' up to 2007, the major crises of 2008-2009 (financial crisis) and 2020-2021 (covid pandemic), and the interregnum of 'secular stagnation' between those two crises – more resembles the earlier post-war era of stability. In the 1994-2021 period (which was characterized by a stable neoliberal policy regime, as discussed in the next section), the PC again has a significant negative slope only with inflation measured in levels, not differences (see Table 1). However, there is one striking new feature of the PC for the latter period: the slope is only −0.21 (significant at the 10 percent level), which is notably flatter than in either of the earlier periods, thus confirming the previous findings of Svensson (2015) and others.

There are several key take-aways from these (admittedly simple) empirical findings. First, the NRH is, *at best*, consistent with the data *only* for one 25-year period (1969-1993). The hypothesis is simply inconsistent with the data for the earlier (1948-1968) and more recent (1994-2021) periods, in which the PC is downward-sloping in levels and no relationship exists in first differences of the inflation rate. In fact, the estimates in Appendix Table A.3 show that lagged inflation (which, in the conventional view, is a proxy for expected inflation), is insignificant in both the earlier and later periods. Thus, Friedman (1968) and Phelps (1967) had good luck in the timing of when they proposed the expectations-augmented PC and the NRH, which appeared to fit the data for the next generation (see also Palley, 2018, pp. 477-478). But the NRH fails badly (even on its own terms) as a description of the US inflation process in other periods before and since.

Second, the fact that the NRH is *consistent* with the data for the 1969-1993 period does not necessarily imply that this hypothesis is a correct *explanation* of the observed relationships at that time. The significance of the lagged inflation term (in the estimates in Appendix Table A.3) and the existence of a downward slope when inflation is measured in first differences merely demonstrate that inflation was *persistent* during that period; it does

not prove that 'expectations' were the reason for that persistence.[8] The persistence of inflation in that era can be explained by other factors, especially 'supply shocks' (changes in energy prices and productivity growth rates) and institutional transformations (the collapse of the post-war social contract), as we will discuss in greater depth in the next section.

Last but not least, we have to explain why the PC has become so much flatter since the mid-1990s. As previously noted, much of the conventional discussion about the flattening of the PC (and the disappearance of a PC relationship in differences of the inflation rate) has focused on the proposition that inflation expectations became 'anchored' by the adoption of inflation-targeting monetary policies by central banks and the more transparent announcement of (and commitment to) those targets (usually, 2 percent). In this case, equation [6] replaces equation [3] as the mainstream PC specification. But even if this is true, it only (at best) explains why equation [3] no longer holds, i.e. why there is no PC in difference form. The alleged anchoring of expectations cannot explain why the slope coefficient γ has decreased (in absolute value) so dramatically, from approximately -0.9 in both periods before 1994 to -0.2 since then. To account for the flattening of the slope of the PC curve, as well as the changes in whether a PC relationship is observed in levels or differences of the inflation rate (and whether lagged inflation is significant or not), we must delve into the deeper social transformations and changes in policy regimes that occurred during the historical periods covered here, and we must also seek a broader theoretical framework, as we will do in the next sections.

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[8] For a skeptical view of the importance of expectations in determining inflation dynamics, see Rudd (2022).

3. Changes in the PC over time: an institutional-analytical explanation

The statistical insignificance of the slope of the PC in levels in the full sample (1948-2021) means that, statistically speaking, the PC is flat for the 1948-2021 period as a whole. In other words, more or less any rate of unemployment can be (and has been) reconciled with essentially the same rate of inflation. This time series observation for the US dovetails with the earlier observation by Cornwall (1990, pp. 95, 113-115) of a flat PC in cross section, when different OECD countries are observed at the same point in time.

What explains both of these observations is institutional differences: different *institutional frameworks* in which aggregate wage and price dynamics are embedded render different rates of unemployment consistent with the same rate of inflation. This is revealed to be true both when countries with different institutional frameworks are compared at a point in time (as in Cornwall, 1990) and, as demonstrated by Figure 2, when a single country (such as the US) is examined over time or, more specifically, in the *long run*, defined here as a period of sufficient duration for typically-inert institutions to undergo fundamental change. Hence between 1948 and 2021 the US underwent substantial institutional change associated (*inter alia*) with the transformation of its *distributive regime* (Cornwall and Setterfield, 2002), from the value-sharing 'social bargain' between capital and labour during the post-war Golden Age (1948-1968), through the 1969-1993 breakdown of Golden Age institutions (when policy conventions that had previously privileged full employment gave way to 'cold bath' macroeconomic policies that sacrificed employment at the altar of inflation), to the 'winner takes all' – with capital as the winner – neoliberal era, 1994-2021.[9]

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[9] According to Setterfield (2007), this progression can be interpreted in terms of the rise, decline and rise of successive *incomes policies* in the US, where an incomes policy is defined broadly as 'formal and/or informal institutions that frame and mediate aggregate wage and price setting behavior in such a way as to reduce conflict over income shares and better reconcile conflicting income claims' (Setterfield, 2007, p. 129).

The focus on institutions in what follows does not preclude the possibility that other factors influence the shape and position of the PC. For example, Palley (1994, 1997) develops and finds evidence supportive of a

One question this analysis then raises is: does the PC in levels surface 'within episodes' (such as the Golden Age or neoliberalism), when the institutional framework is stable and an underlying inverse relationship between inflation and unemployment (albeit one specific to a particular historical period) can be discerned through the flux of longer-term institutional change and/or the 'noise' associated with periods of institutional breakdown? The answer provided by the data analysis in the previous section is clearly affirmative – with the important caveat that by the most recent period (1994-2021), the PC in levels is *flatter*. In what follows, we explain these observations in terms of the rise and decline of the successive and historically-specific institutional frameworks alluded to above.

3.1 The post-war recovery and Golden Age, 1948-1968

As illustrated in Figure 2, the data for the early post-war decades support the original PC, which is downward-sloping in *levels* of the inflation rate. This is because a well-defined and stable institutional framework – the post-war social bargain between capital and labour – lent structural stability to the PC during the period 1948-1968, making the inverse relationship between inflation and unemployment clear.[10] The Golden Age (GA) was an era during which labour had considerable bargaining power, thanks to the high level of unionization achieved after the Great Depression (and legitimized by the 1935 Wagner Act). It was also a period when oligopolistic US firms produced largely for a domestic market in which they faced

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Tobinesque theory of the PC in levels, based on the sequential emergence of sectoral bottlenecks in production in a multi-sector economy. This need not be seen as mutually exclusive with the account of the PC advanced in this paper (see Palley, 2009). Instead, sectoral bottlenecks may contribute an additional dimension to the inflation/real activity relationship even when the latter is fundamentally mediated by institutions framing conflicting income claims. Witness, for example, the sharp rise in inflation during the recovery from the COVID pandemic in 2021.

[10] This can be considered an instance of 'other things being equal' in real historical time (and hence in the data), allowing an underlying bivariate relationship to assert itself. As our previous comments on the 1948-2021 period as whole suggest, this is not a general property of time series data over any arbitrary interval of time, due to institutional change and its effects on the DGP.

relatively little foreign competition, allowing them to pass through changes in unit labour

costs into consumer prices (Blecker et al., 2022).

Nevertheless, despite the potential for wage and price growth latent in this situation,

inflation was largely quiescent even at the low rates of unemployment experienced during the

GA, thanks to the social bargain between capital and labour. The value sharing norm of

distributive justice embodied in the social bargain exchanged a commitment to the 'right to

manage' free of industrial dispute on the part of workers for a commitment to steadily rising

real wages consistent with the rate of growth of productivity on the part of firms (Bowles et

al., 1990; Cornwall, 1990; Glyn et al., 1990; Cornwall and Cornwall, 2001). This social

bargain, and the associated distributive regime, ameliorated the inflationary pressure that

might otherwise have manifested as both the labour and goods markets tightened during

cyclical booms. This is evident in the modest and statistically insignificant slope of the PC in

first differences for 1948-1968, indicating that the wage-price inflationary spiral was

dampened during the GA (hence, the insignificance of lagged inflation in the PC equation in

levels for this period, shown in Appendix Table A.3). Workers had the bargaining power to

exploit the advantage of reductions in U, but this did not lead to persistently high inflation

because the (relatively) cooperative labour relations of the time – aided by rapid productivity

growth – moderated wage and price inflation even as real wages grew relatively quickly. To

put it another way, during the GA workers restrained their nominal wage demands to a

sufficient extent that their real wage gains would approximately equal the gains in labour

productivity.

3.2 Stagflation and neoliberal adjustment, 1969-1993

The 'disappearance' of the PC in levels 1969-1993 is explained by the fact that this is a

period of *inter regnum* in modern capitalist history, marked by profound institutional change

– the breakdown of the post-war social bargains – accompanied by the post-1973 productivity slowdown and repeated 'oil shocks' (Bowles et al., 1990; Cornwall, 1990; Cornwall and Cornwall, 2001). Hence in contrast to the GA, the 1969-1993 period was marked by the *absence* of a well-defined and stable institutional framework which, coupled with the trend decline in productivity growth, created structural *instability* in the PC that *obscured* the underlying inverse relationship between inflation and unemployment.

The marked (and statistically significant) downward slope of the PC in first differences 1969-1993 is also consistent with this account. A decline in corporate profitability that began in the late 1960s and continued into the 1970s (see Bowles et al., 1990) led corporate interests to abandon their previous acceptance of a cooperative social order and seek more aggressive ways of raising their profit rates. On the side of labour, as the relatively cooperative industrial relations of the GA broke down at the same time as productivity growth slowed and oil prices skyrocketed, workers were forced to engage in more militant strike activity in an effort to prevent the erosion of their real wage gains. In the absence of rapid productivity growth and in the presence of other supply shocks, this contributed to a pronounced wage-price inflationary spiral (a larger $\Delta\pi$ following any initial change in U). In this environment, oil price shocks quickly and noticeably propagated into sustained inflation because of the strong wage-price inflationary spiral (as reflected in the significance of the lagged inflation variable for this period in the estimates shown in Appendix Table A.3).

The response of corporations and (in particular) the state to the developments described above was especially combative. The 1980s was an era of 'cold bath' restrictive macroeconomic policies designed to diminish inflation and restore the profitability of firms by reducing the bargaining power of workers (Bowles et al., 1990; Cornwall, 1990; Epstein and Schor, 1990; Cornwall and Cornwall, 2001; Setterfield, 2006; Mishel and Bivens, 2021). The result was a decade of sustained relatively high unemployment that did achieve

significant reductions in inflation, but largely by suppressing wages. This set of macro

policies was accompanied by dramatic changes to the institutional framework, as

corporations and the state used globalization and deregulation as levers to weaken unions,

while deindustrialization began to shrink the very foundations of the union movement. The

1980s also witnessed a widening disconnect between real wages and labour productivity,

with the former not only lagging systematically behind the latter, but actually declining

absolutely during the decade.[11]

3.3 Great moderation, secular stagnation, and major crises, 1994-2021: the neoliberal era

Figure 2 illustrates that the 1994-2021 neoliberal era resembles the early post-war GA

decades insofar as it is characterized by a PC in levels but not in differences. As discussed

earlier, contemporary mainstream thinking credits the re-emergence of a PC in levels after

1994 to the anchoring of inflation expectations. But if expectations are intrinsically un-

moored and only become anchored in the presence of a *convention* (in this case a policy

convention – the central bank's inflation target), then this suggests that the PC only ever

achieves historically-specific 'conditional stability' (Crotty, 1994) based on a stable

institutional framework. In other words, contemporary mainstream thinking is merely a

variant of our own institutionalist account of the PC.

Moreover, by focusing on the anchoring of inflation expectations, mainstream theory

misses the most important institutional developments associated with the recent history of the

PC – namely, the fact that it is based on an 'incomes policy based on fear', an institutional

framework in the labour market that increases employment and income insecurity and so

disempowers workers at any rate of unemployment. Unlike the consensus and value sharing

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[11] See Mishel and Bivens (2021, p. 13), who show that real hourly compensation actually decreased between 1980 and the mid-1990s.

implicit in the GA social bargains, the neoliberal incomes policy based on fear rests on a 'winner takes all' norm of distributive justice that involves the dominance of labour by capital. But *like* the GA social bargains, it is a well-defined and stable institutional framework that lends structural stability to the PC, once again allowing the inverse relationship between inflation and unemployment to assert itself in the data – albeit with a weaker relationship between those variables, reflected in the lower slope seen in Figure 2 and Table 1.

The core mechanisms of the incomes policy based on fear derive from corporate- and state-led initiatives that began in the 1980s. As detailed by authors such as Palley (1998b) and Mishel and Bivens (2021), these mechanisms have included: deunionization initiatives (including, but not limited to, changes in labour law and the diminished pursuit of its enforcement); corporate 'downsizing' exercises that create the threat of unemployment independently of general economic conditions associated with the business cycle; increases in the quantity of non-standard (part-time, temporary, and 'gig') work that threaten full-time, year-round employees with underemployment; international trade agreements that expose US workers to low-wage competition; and inter-regional and international plant relocation and 'offshoring' more generally.[12]

The latter exemplifies the workings of these mechanisms. In addition to the contribution made by *actual* plant relocation to the process of deunionization, the now-extant *credible threat* of plant relocation both directly increases worker insecurity (by threatening job loss), and indirectly increases worker insecurity by reducing the efficacy of strike activity and union organizing drives (Palley, 1998b, pp. 34-35; Bronfenbrenner, 2000). These effects can occur without plant relocation actually taking place – and regardless of the rate of unemployment. One consequence of all this is that instead of competition between spatially-distinct and geographically immobile firms based on product and process innovations, we

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[12] The importance of plant relocation was first emphasised by Bluestone and Harrison (1982).

now observe competition between *political jurisdictions* seeking to attract footloose

corporations – which competition takes the form of (among other things) the degradation of

labour standards. This is what Palley (2019) calls 'barge economics', with reference to

former General Electric CEO Jack Welch's suggestion that, ideally, all physical plant would

be located on barges that would continuously float between political jurisdictions to

immediately capitalize on any cost advantage, regardless of its source.

In short, the neoliberal incomes policy based on fear is an inequitable but nevertheless

stable institutional framework, as a result of which the PC in levels has re-emerged since

1994. Meanwhile the insignificant slope of the PC in first differences and the flatter slope in

levels since then reveal that workers are now much less *able* to bid up wages as the rate of

unemployment falls (whatever their willingness to do so might be), thanks to the operation of

the incomes policy based on fear.[13]

In this environment, as the gap between labour productivity and the real wage (i.e.,

real hourly compensation) continued to widen, the labour share of national income began to

fall notably after 2000 (see Mishel and Bivens, 2021).[14] *Distribution* rather than nominal

dynamics (i.e. inflation) thus becomes the adjusting margin.[15] This observation reveals that

throughout the preceding discussion we have actually been analysing not a bipartite

relationship between inflation and unemployment (as modified by the presence or absence of

a stable institutional framework), but a *tripartite* relationship between inflation,

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[13] Apart from a brief period in the late 1990s when it appeared to accelerate, productivity growth has not been spectacular during the neoliberal era. But unlike the 1970s and 1980s, this has not been associated with an inflationary spiral. Although productivity growth plays an important role in aggregate wage and price dynamics, this observation supports the notion that institutional developments – not the productivity slowdown – were (and remain) of more central importance to the determination of inflation outcomes.

[14] Even substantial commodity price shocks (such as the sustained oil and energy price increases from 2003-2008 and again from 2011-2014) did not propagate a robust defence of the real wage or a strong wage-price inflationary spiral. Of course, the energy-intensity of output is now much lower than during the 1970s, so an energy price shock no longer has the same direct effect on costs of production and hence prices.

[15] Hence, the old stylized fact of a constant labour share has now been replaced by the new stylized fact of a nearly-constant inflation rate – i.e. a flat PC.

unemployment, and the distribution of income. This is a relationship that the traditional interpretation of the PC fails to recognize. But an explicit tripartite relationship between inflation, unemployment, and distribution is very much a part of the account of the PC advanced here, as will be made clear by the model developed in the next section.

4. A simple model

The relationship between inflation, unemployment and distribution mentioned above can be made explicit by means of the following conflicting-claims inflation model:[16]

$$\omega = \mu(v_W - v) \qquad [9]$$

$$\pi = \varphi(v - v_F) \qquad [10]$$

$$\mu = \mu(U, I) \, , \, \mu_U < 0, \, \mu_I < 0 \qquad [11]$$

Here, as before, U is the rate of unemployment and π is the rate of price inflation, but now (for mathematical convenience) the latter is defined as the instantaneous rate of change in prices in continuous time.[17] In addition, ω is the rate of nominal wage inflation (also in continuous time), v is the actual wage share, v_W is the target wage share of workers, v_F is the target wage share of firms, I represents institutional features of the labour market that create employment and/or income insecurity among workers, and the parameters μ and φ denote the relative power of workers in the wage bargain and the relative power of firms in product markets, respectively. Equations [9] and [10] – the wage-bargaining (*WB*) and price-setting (*PS*) curves, respectively – describe workers and firms pursuing wage and price increases in pursuit of target shares of total income. Equation [11], meanwhile, suggests that workers'

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[16] See Setterfield (2006). For a related model, see Blecker and Setterfield (2019, pp. 257-261).

[17] Thus, U, π, ω and v are all functions of time, but *t*-subscripts are suppressed after these variables to simplify the notation.

bargaining power depends on outcomes and institutions in the labour market. The logic of the theory is that inflation is a by-product of workers' and firms' irreconcilable claims on total income.

Figure 3: Conflicting claims and the PC
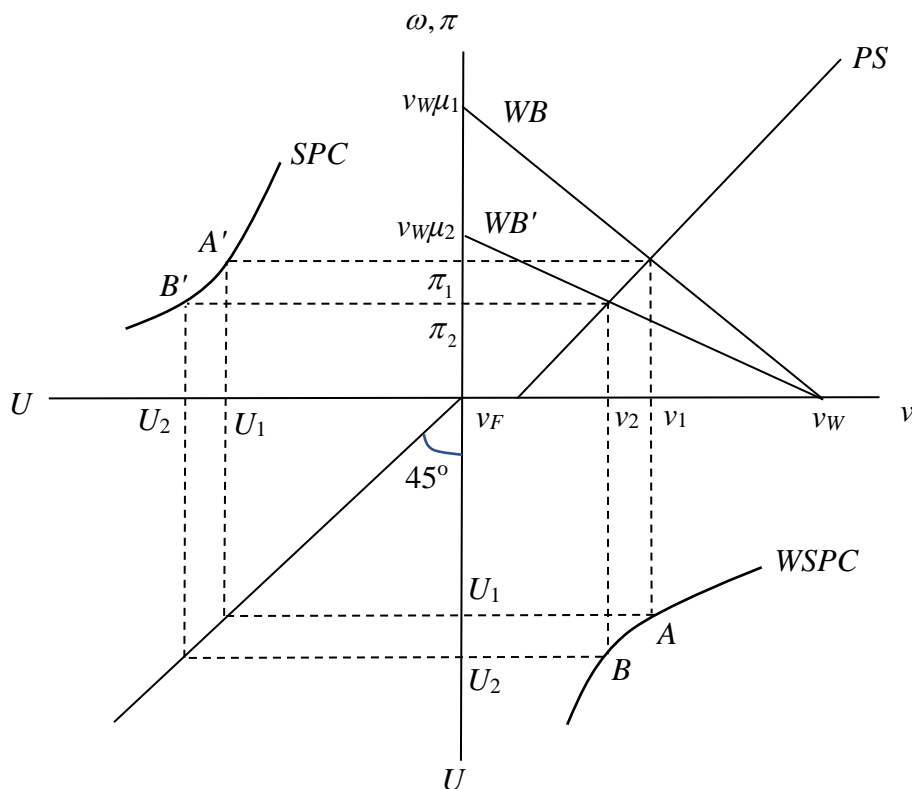
The north-east quadrant of Figure 3 illustrates the model outlined above in an initial equilibrium at v_1, π_1 (where the *WB* and *PS* schedules intersect), associated with the rate of unemployment U_1 in the north-west and south-east quadrants of the figure.[18] Now consider an increase in U to U_2 in the north-west and south-east quadrants of Figure 3. This produces a

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decline in μ from μ_1 to μ_2 (consistent with $\mu_U < 0$ in [11]), causing the wage-bargaining

schedule to rotate to WB', and an associated movement to the new (lower) equilibrium wage

share and inflation rate at v_2, π_2 in the north-east quadrant. These changes are consistent with

movements from points A and A' to B and B' in the south-east and north-west quadrants,

respectively. The 'accounting traces' of these changes are the standard PC (*SPC*) and wage-

share PC (*WSPC*) illustrated in Figure 3.[19]

As noted earlier, there is clear evidence of flattening of the PC in the neoliberal era

(1994-2021), suggesting that a decline in unemployment now results in a smaller increase in

inflation. The key to understanding this flattening of the PC lies in the emergence and

operation of the incomes policy based on fear, and can clearly explained in the context of the

conflicting-claims inflation model outlined above.[20] Suppose we begin at the equilibrium

v_1, π_1 in the north-east quadrant of Figure 4. The economy is thus at points A and A'

(respectively) on $WSPC_1$ and SPC_1 in the south-east and north-west quadrants of the figure.

Ceteris paribus, a rise in institutionalized worker insecurity (*I*) lowers μ from μ_1 to μ_2

(consistent with $\mu_I < 0$ in [11]), causing the wage-bargaining schedule to rotate to WB' and

producing a new equilibrium at v_2, π_2 in the north-east quadrant of Figure 4. Since

unemployment is unchanged, these reductions in inflation and the wage share are associated

with shifts in *WSPC* and *SPC* in the south-east and north-west quadrants of Figure 4, to

$WSPC_2$ and SPC_2.

However, if these developments are accompanied by a simultaneous reduction in U

(from U_1 to U_2) sufficient to exactly offset the negative impact of the change in I on μ, the

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[19] Note that, apart from its nonlinearity, the *SPC* depicted in Figure 3 is akin to the PC in levels in equation [7] with $\beta < 1$. In this case, however, the absence of full indexation is explained by the incomplete bargaining power of workers – their inability to fully incorporate expected future (or even recent past) inflation into nominal wage increases, rather than any lack of rationality or deliberate inattention to inflation.

[20] Recall that as noted in section 2, mainstream theory credits the re-appearance of a PC in levels after 1994 to the anchoring of inflation expectations, but this cannot explain the *flattening* of the PC in levels.

wage-bargaining schedule rotates back to *WB* and the equilibrium in the north-east quadrant

of Figure 4 will be restored to its initial configuration. The economy now comes to rest at

points *B* and *B′* (respectively) on $WSPC_2$ and SPC_2. Ultimately, we will observe a lower rate

of unemployment (U_2) consistent with the original rate of inflation and wage share, π_1 and

v_1.

Figure 4: Conflicting claims and the flattening of the PC
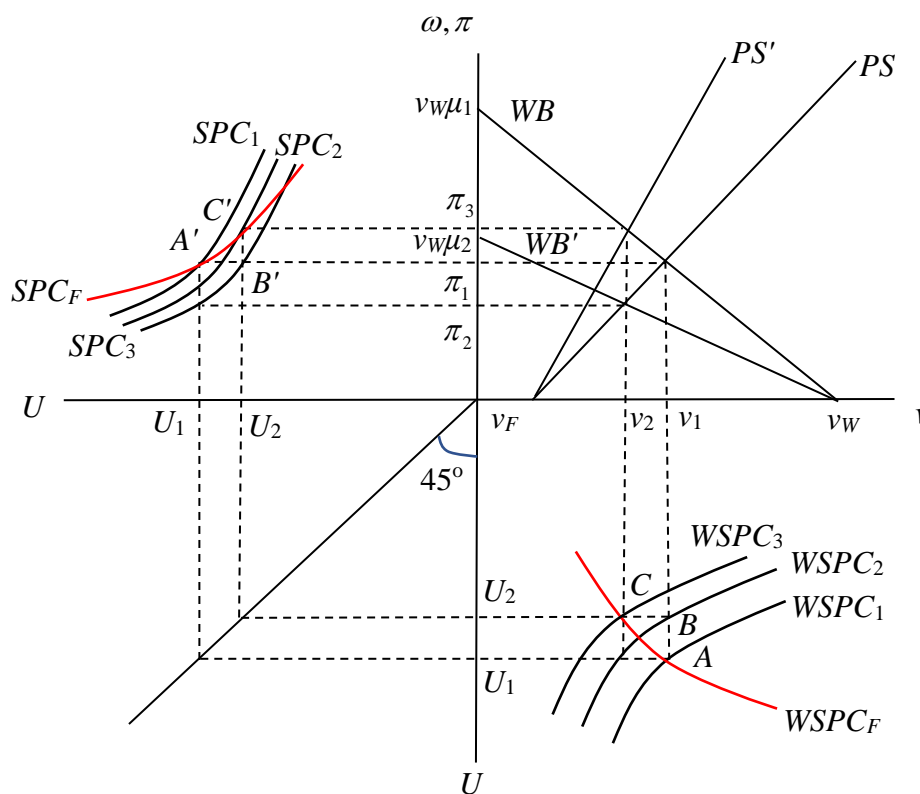
But this is not the end of the story. Recall the phenomenon of 'barge economics'

(Palley, 2019) used in section 3 to exemplify the institutionalized insecurity of workers in the

labour market. This phenomenon also draws attention to the fact that, while increased

economic openness and exposure to international competition in the late twentieth century

initially disrupted the domestic product market power of large corporations, capital has since

reorganized on a global scale resulting in increases in the market power of multinational

corporations during the neoliberal era (Baker, 2019; Philippon, 2019; Eeckhout, 2021). This

development is captured by an increase in φ in equation [10] that, in Figure 4, causes the

rotation of the price-setting schedule from *PS* to *PS'*, which creates a new higher equilibrium

rate of inflation (π_3) and a lower wage share (shown returning to v_2) at U_2. These

developments are captured by further shifts in *WSPC* and *SPC* in the south-east and north-

west quadrants of Figure 4, to $WSPC_3$ and SPC_3. Finally, the 'accounting traces' of the events

described above – the simultaneous consolidation of the incomes policy based on fear,

reduction in unemployment and increased corporate power in product markets – are captured

by movements from points *A* and *A'* (respectively) to *C* and *C'* (respectively) in the north-

west and south-east quadrants of Figure 4, which are represented by the *flatter* standard PC,

SPC_F, and the now *positively sloped* wage-share PC, $WSPC_F$, in Figure 4.

The observation of a positively sloped *WSPC* draws to attention the pernicious

distributional consequences of containing inflation and flattening the standard PC by means

of weakening labour (the essence of the neoliberal incomes policy based on fear). As

illustrated in Figure 4, the flattening of the *SPC* is accompanied by a fall in the wage share of

income, even as labour-market performance improves from U_1 to U_2. As with the flatter *SPC*

documented in section 2 above, the direct relationship between unemployment and the wage

share depicted in Figure 4 is clearly evident in the data. Hence comparing the periods 1969-

1993 and 1994-2020, as the average annual rate of unemployment fell from 6.6 percent to 5.8

percent, the average annual wage share also fell from 63 percent to 59 percent.[21] Note also

that the decline in the wage share as a 'by product' of the incomes policy based on fear can

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[21] Authors' calculations based on data from US Bureau of Labor Statistics, www.bls.gov.

be connected to the adverse consequences for demand formation and household financial fragility discussed by Palley (2002), as households accumulate debt to finance consumption spending that they cannot fund from stagnant wage income.

5. Conclusions

A downward-sloping PC is an enduring feature of the US economy, but the PC cannot and should not be regarded as a singular and unchanging 'law' describing a time-invariant relationship between unemployment and inflation. Instead, the PC has undergone major structural changes over time that have fundamentally altered its DGP – structural changes that are associated with extensive institutional changes during the post-war period. Institutional change is discrete rather than continuous and, as demonstrated in this chapter, the result is an episodic PC, the inverse relationship between unemployment and inflation it describes becoming clearly evident only when there exists a stable institutional framework within which wage- and price-setting behaviour are embedded. Otherwise, the inverse relationship asserts itself only after controlling for lagged inflation, which is significant during an unstable regime that allows inflationary 'shocks' to persist as a result of heightened social conflict. The extent of the trade off between unemployment and inflation is also affected by institutions, changes in which explain the recent flattening of the US PC.

Institutions modify and codify class power relations that are fundamental to wage- and price-setting dynamics based on distributional conflict. The PC is, essentially, an accounting trace of these dynamics, which also make clear the tripartite relationship between inflation, unemployment and distribution that is essential to PC analysis. In this way, our chapter contributes to the project of restoring conflict and power to the centre of macroeconomic analysis – a longstanding theme in the work of Tom Palley.

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Appendix: Complete regression results

Table A.1: Estimated Phillips curves, in levels of the inflation rate

Dependent variable: inflation rate, π_t

Sample period	1948–2021[a]	1948–1968	1969–1993[b]	1994–2021
Constant	2.35	6.44	6.31	3.46
	(2.42)	(1.98)	(2.54)	(0.70)
Unemployment rate, U_t	0.13	−0.90	−0.11	−0.21
	(0.16)	(0.41)	(0.38)	(0.12)
Adjusted R^2	0.37	0.37	0.22	0.07
Breusch-Godfrey F-test,				
p-value	0.01	0.54	0.00	0.50

Notes: All equations are estimated by ordinary least squares (OLS). Numbers in parentheses are standard errors. Data for 2021 are for January-October.

[a] Includes year dummies for 1974, 1979, 1980.
[b] Includes a year dummy for 1980.

Table A.2: Estimated Phillips curves in first differences of the inflation rate

Dependent variable: change in the inflation rate, $\Delta\pi_t$

Sample period	1949–2021[a]	1949–1968	1969–1993[b]	1994–2021[c]
Constant	1.47	0.12	5.92	−0.40
	(0.89)	(2.97)	(1.50)	(0.80)
Unemployment rate, U_t	−0.29	−0.14	−0.93	0.11
	(0.15)	(0.60)	(0.22)	(0.14)
Adjusted R^2	0.20	0.17	0.52	0.36
Breusch-Godfrey F-test,				
p-value	0.13	0.74	0.53	0.18

Notes: All equations are estimated by OLS. Numbers in parentheses are standard errors. Data for 2021 are for January-October. Sample starts in 1949 due to differencing.

[a] Includes year dummies for 1951 and 1974.
[b] Includes a year dummy for 1974.
[c] Includes a year dummy for 2009.

Table A.3: Estimated Phillips curves in levels of the inflation rate, including the lagged inflation rate

Dependent variable: inflation rate, π_t

Sample period	1949–2021[a]	1949–1968	1969–1993[b]	1994–2021
Constant	1.41	5.65	5.86	3.23
	(0.81)	(1.80)	(1.52)	(0.90)
Lagged inflation rate, π_{t-1}	0.68	−0.13	0.92[c]	0.08
	(0.08)	(0.18)	(0.12)	(0.20)
Unemployment rate, U_t	−0.09	−0.73	−0.85	−0.20
	(0.14)	(0.35)	(0.26)	(0.12)
Adjusted R^2	0.57	0.12	0.73	0.04
Breusch-Godfrey F-test, p-value	0.17	0.34	0.53	0.28

Notes: All equations are estimated by OLS. Numbers in parentheses are standard errors. Data for 2021 are for January-October. Sample starts in 1949 because of the lag.

[a] Includes year dummies for 1951 and 1974.
[b] Includes a year dummy for 1974.
[c] The t-statistic for the null hypothesis that this coefficient equals 1 is 0.54, indicating that the null cannot be rejected.