

Vicious and virtuous circles - the political economy of unemployment in interwar UK and USA

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Abstract

This paper develops a political economy model of multiple unemployment equilibria to provide a theory of an endogenous natural rate of unemployment for the UK and the US interwar period. The theory here sees the natural rate and the associated path of unemployment as a reaction to mainly demand shocks and the institutional structure of the economy. The channel through which these two forces feed on each other is a political economy process whereby voters with limited information on the natural rate react to shocks by demanding more or less social protection. The reduced form results confirm a pattern of unemployment behaviour in which unemployment moves between high and low equilibria in response to shocks.

JEL classifications: E24; E27; P16

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1. Introduction

Much of postwar unemployment policy has its roots in the experience of mass unemployment in the interwar period. Unemployment in both the USA and UK reached levels that hitherto had never been experienced in either economy. In the UK, the vision of the ‘army of one million unemployed’ men after world war one had powerfully etched itself into the collective memory of the electorate and the politico-economic establishment. Not until the economic reforms of Mrs. Thatcher did the UK economy, and importantly the voting public, wean themselves off the postwar thinking of demand management. Between 1929 and 1933 in the USA, unemployment soared to 25 per cent of the workforce. The political economy that underscored Roosevelt’s ‘New Deal’ remained with the economic establishment until the Reagan tax reforms of the 1980s. The puzzle for the USA is that despite the best efforts of the New Deal, unemployment remained stubbornly high and refused to fall below 15 per cent. The puzzle for the UK was that during the half century before the First World War, real income grew at a rate of 2 per cent a year but unemployment averaged less than 4 per cent; from 1920 to 1938, real income continued to grow by about the same rate, but unemployment averaged 14 per cent.

This paper argues that shocks causing sharp cyclical demand swings generate political reactions from public opinion and vested interests, which in turn produce fiscal and monetary (demand policy) responses and also changes in supply-side policy, i.e., policy affecting the equilibrium values of real variables or ‘natural rates’. Specifically, bad demand shocks tend to produce supply policy that distorts the market because these shocks generate demands for protection; these distortions in turn produce an equilibrium with a higher natural rate of unemployment which in turn can reinforce the demands for yet more protection, until matters are bad enough to create a political equilibrium where the bad effects cause enough opposition to yet more distortions.

Vice versa, a good run of demand shocks produces more liberal supply-side policies as people are less nervous about potential misfortune. This again is self-reinforcing so that the economy moves in a virtuous circle to a low-unemployment high-output equilibrium. The dynamics of unemployment exhibit three equilibria— one stable low unemployment equilibrium, one stable high unemployment equilibrium and a non-stable intermediate unemployment equilibrium that lies between the two.

The model of political economy of supply-side policies in this paper is similar to Wright (1986). In Wright (1986), workers have different unemployment risks, and unemployment benefits play the sole role of an insurance against adverse shocks. The median voter will optimally determine unemployment benefits by weighing their benefits (in terms of better insurance) against their costs (in terms of higher taxes). Thus, the more exposed to unemployment is the median voter, the higher the political support for unemployment benefits, much as in Meltzer and Richard (1981) the median voter’s support for redistributive taxation varies with the state of the economy. However as noted by St-Paul (1996), this prediction neglects other effects of unemployment benefits to the extent that higher wages lower job creation and harm the unemployed. Therefore, a higher exposure of the employed to unemployment will tend to moderate the desire of the

median voter for a high benefit level. St-Paul also analyses how labour market institutions can affect the median voter's choice.

The political economy model of institutions in this paper extends the analysis of Meltzer and Richard (1981), Wright (1986) and St-Paul (1996). Long-lasting shocks to the economy lead to demand for social protection (identified with the benefit/wage -or replacement- ratio). However, we also take into account the feedback distortionary effect of benefits on unemployment which progressively raises the chances of unemployment for the median voter. We therefore address the missing channel of Wright (1986) of how labour market institutions can affect the welfare of the decisive voter, as suggested by St-Paul (1996).

This paper joins a large literature on the creation and evolution of the institutions that favour or inhibit capitalist growth (see, for example, Persson and Tabellini, 1994; Alesina and Roderick, 1994; Perotti, 1993; Stokey and Rebelo, 1995; Krusell et al., 1997 and Weede (1997)). It also joins a set of other studies explaining the rise in unemployment since the 1970s in terms of macroeconomic shocks interacting with institutional patterns (see Blanchard and Wolfers, 2000; Fitoussi et al., 2000; Bertola et al., 2001; and Nickell et al., 2005). Our contribution here (and in Minford and Naraidoo, 2004, for postwar unemployment) is to view these interactions as the product of a political economy process.

This paper is organised along the following lines. The next section sketches the theoretical framework that produces circles of a vicious or virtuous nature. Section 3 embeds the framework within the historical context of the interwar period. Section 4 estimates the reduced form dynamic unemployment function which is capable of producing a three equilibrium unemployment case consistent with the experience of the interwar period. A bootstrapping procedure is included to test the prevalence of the 3-equilibrium case. In section 5 we test the reduced form model against a general model of hysteresis by providing out-of-sample forecast accuracy tests. Section 6 concludes.

2. Vicious and virtuous circles

This section sketches the theoretical framework that produces vicious and virtuous circles in unemployment (a detailed exposition can be found in Minford and Naraidoo, 2004 and Matthews, Minford and Naraidoo, 2006). The theory consists of two components: a model of the natural rate and a model of the political economy of supply-side policy (particularly towards the central labour market). We discuss each in turn.

As outlined by Siebert (1997), starting from a simple notion of an equilibrium in a classically clearing labour market, institutional arrangements can influence the clearing function of the labour market in basically three ways: by weakening the demand for labour, making it less attractive to hire a worker by explicitly pushing up wage costs or by introducing a negative shadow price for labour; by distorting labour supply; and by impairing the equilibrating function of the market mechanism (for instance, by influencing bargaining behaviour). To these interventions may be added those of trade unions (see Blanchard and Katz, 1997).

Our set-up for the labour market follows that of Minford (1983). He took the classical labour supply

set-up and added the idea of a permanent unemployment benefit, payable without check on work availability. The result was to tilt the labour supply curve so that the real wage offer never fell below the benefit level, as shown in Fig. 1. Should the benefit level rise relative to productivity, unemployment will increase. That is, people will voluntarily refuse to take available wage offers because benefits are preferable; they are ‘unemployed’ in the sense that they are not working but are ‘available for work’.

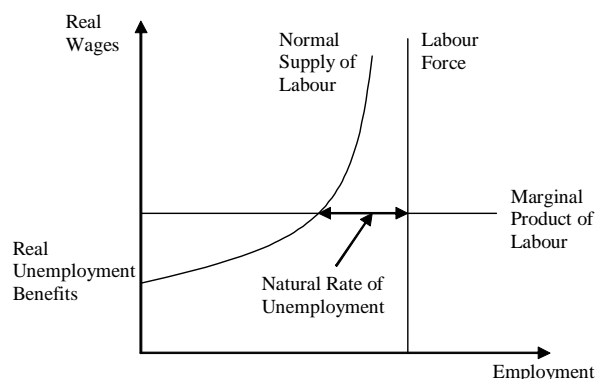


Figure 1: The natural rate of unemployment.

These ideas can be summarised in the following model of structural unemployment¹. In our analysis we focus purely on benefits, because this will be the choice variable for voters under our political economy model below; such things as taxation and public expenditure, union power, and minimum wages are also potential choice variables. It should also be noted that some empirical works have been carried out as to the multidimensional nature of preferences for redistribution (see Bernasconi, 2006). But for simplicity we leave them out of the explicit model,

$$\ln U_t = u_0 + \delta \ln\left(\frac{B_t}{\bar{W}_t}\right) + u_{1t} + u_t^c \quad (1)$$

where u_0 is a constant, B_t is the real benefit rate, \bar{W}_t is real wages (set it is assumed by productivity), u_t^c

¹Later versions have proliferated; in the UK, Layard and Nickell (1986) estimated a similar model, and Bean et al. (1986) attempted to extend it to other European countries which began to experience rising unemployment UK-style during the late 1980s and 1990s. It turns out that in each country there are substantial idiosyncracies in the social support mechanisms, complicating effective modelling of the natural unemployment rate.

In more recent empirical works, Nickell (1997), Nickell and Layard (1998) and OECD (1999) suggest that structural unemployment in major OECD economies is associated with the following labour market features: (a) generous unemployment benefits that are allowed to run on indefinitely, combined with little or no pressure on the unemployed to obtain work, (b) high unionisation with wages bargained collectively and no coordination between either unions or employers in wage bargaining and (c) high overall taxes impinging on labour or a combination of high minimum wages for young people associated with high payroll taxes.

is cyclical unemployment, and u_{1t} represents other persistent influences on unemployment, an error process assumed therefore to display high serial correlation. Examples of such influences would be demographic shifts (such as a rise in working age population), and sectoral shifts like a decline in manufacturing. These influences will have no long-run effect on unemployment but their effect is assumed to be long drawn out.

This effect provokes a political economy response. In our model, the median voter holds some non-human capital but nevertheless relies heavily on income from human capital. If this voter experiences unemployment spells, unemployment benefits yield a much needed replacement of wage income. The higher level of unemployment means that agents are more exposed to the risk of being unemployed which therefore increases their desired benefit/wage ratio. However, we also take into account the feedback distortionary effect of benefit on unemployment which increases the probability of unemployment for the median voter. Hence, as unemployment rises, the median voter's demands for benefits rise but at a diminishing rate, as these higher benefits progressively raise the chances of unemployment.

Suppose we define an index, B_t , as the level and duration (overall 'generosity') of real unemployment benefits; for short we shall refer to it as 'benefits' (the same as in Eq. (1)). Our analysis implies that the log of the benefit/wage ratio is a quadratic in the rate of unemployment, U_t , or say :

$$\ln\left(\frac{B_t}{W_t}\right) = B_0 + \varphi(U_{t-1} - z) - \beta(U_{t-1} - z)^2 + \epsilon_t \quad (2)$$

Initially a rise in unemployment above some normal rate, z , would trigger demands for higher benefits, but as unemployment rises, the rising chances of unemployment become an increasingly restraining factor. In Eq. (2), B_0 is a minimum benefit/wage ratio set in normal circumstances and φ and β are constants.

Combining Eqs. (1) and (2) leads to the following log-linear dynamic unemployment model:

$$\ln U_t = (u_0 + \delta B_0 - \delta\varphi z - \delta\beta z^2) + (\delta\varphi + 2\delta\beta z)U_{t-1} - \delta\beta U_{t-1}^2 + u_{1t} + u_t^c + \delta\epsilon_t \quad (3)$$

or more compactly:

$$\ln U_t = a_0 + a_1 U_{t-1} + a_2 U_{t-1}^2 + \xi_t \quad (4)$$

3. Interwar unemployment

The period between the two world wars has been the source of much contemporary economic, social and policy lessons. The conventional view that aggregate demand deficiency was the principal cause of unemployment in interwar Britain was first challenged by Benjamin and Kochin (1979) who argued that part of the explanation for the high level of unemployment was due to the generosity of unemployment benefits relative to wages. While Benjamin and Kochin's explanation has been hotly contested in the academic literature (Benjamin and Kochin, 1982), a consensus view is that supply as well as demand shocks mattered

to varying degrees (see Matthews, 1986; Broadberry, 1986). More recently Benjamin and Matthews (1992) have challenged the perceived differences between the UK and US experiences of interwar unemployment. While demand factors mattered a great deal in the case of the USA, supply factors in the form of public relief contributed to the high level of unemployment that persisted up until the eve of the second world war (Wallis and Benjamin, 1981). This section reviews unemployment policy in both countries between the wars with the aim of demonstrating the reinforcing reaction of supply policy to negative demand shocks.

The earliest plan for a national unemployment insurance scheme in the UK (National Insurance Act 1911) was based on the assumption that unemployment was caused by temporary maladjustments in the labour market. Unemployment benefit grounded on the principles of insurance together with the savings of the individual worker was to provide a short-term tide-over until re-employment. But the unemployment insurance system in the UK that developed after the first world war was fundamentally different from this. The Unemployment Act of 1920 removed many of the former system's safeguards and increased benefits by nearly 40 per cent and extended the coverage to a further 11 million workers. In the following decade, the expansion of the insurance system was achieved by relaxation of the contributory requirement, the extension of the duration and the allowance of additional weeks of special benefits. Several forces combined to put pressure on the system to push the unemployment benefit system from insurance to maintenance. By 1931, 'need' had completely replaced 'insurance' as a criterion for transitional and unemployment benefits. The relaxation of the insurance rules was also accompanied with a continuous increase in the average level of benefit. The increase in benefit was even more pronounced when the cost of living was taken into account.

Turning to the USA, there was no centralised system of unemployment relief at the end of the first world war. Up until the 1930s, unemployment relief was local government based combined with private charitable organisations. The unprecedented unemployment and financial hardship that followed the 'Great Depression' brought forth a considerable expansion of relief activities. In 1932 with the establishment of the Reconstruction Finance Corporation (RFC) the federal government began to play a role in them, disbursing funds to private businesses on the condition that all locally funded relief be exhausted. In 1933 the newly elected President Roosevelt supplanted the RFC with the Federal Emergency Relief Administration (FERA), which was to spend \$3 billion on unemployment relief- a fundamental change in philosophy. Its principal aim was to put financial assistance directly into the hands of the unemployed through cash grants and work relief. Recipients of FERA were occasionally required to take part in public works programmes but it was far more commonplace for no work requirements be made. The FERA was phased out in 1935 and was replaced by the Works Progress Administration (WPA). This was a programme that explicitly established a 'nation-wide' system of work relief. Individual relief was based on 'needs' levels and local pay which determined the number of work hours contributed to WPA programmes. However, those who were either unable to work or did not have suitable skills for WPA programmes were eligible for general relief which was an unconditional cash grant. This combination of work relief and general relief remained in existence until the onset of the second world war.

4. Econometric results

Eq. (4) in the text is estimated using monthly unemployment series for the UK (1887.01-1939.10, 634 observations) and the USA (1906.06-1942.06, 433 observations)². The results from estimating model (4), treating $u_{1t} + u_t^c + \delta\epsilon_t$ as a composite error term are presented in Table 1. We report the ordinary least squares estimates for the model, together with their Newey-West standard errors which correct for heteroscedasticity and autocorrelation. The Breusch-Godfrey serial correlation LM test shows that we cannot reject the null hypothesis of no serial correlation.³

Table 1

Log-linear dynamic unemployment model^a

	constant	U_{t-1}	U_{t-1}^2	ξ_{t-1}	ξ_{t-2}	ξ_{t-3}	ξ_{t-4}	se ^b	\bar{R}^2	LM ^c
Countries										
UK	0.048 (0.030)	0.318** (0.006)	-0.009** (0.000)	0.373** (0.138)	0.241** (0.046)	0.185** (0.078)	0.093* (0.051)	0.183	0.963	2.08 (0.126)
USA	-0.443** (0.031)	0.368** (0.008)	-0.009** (0.000)	0.602** (0.108)		0.175** (0.062)		0.330	0.946	2.10 (0.110)

Two asterisks denotes statistical significance at the 5% level and one asterisk at the 10% level.

^aNewey-West corrected standard errors in parenthesis.

^bStandard error of regression.

^cBreusch-Godfrey serial correlation LM Test. p value in parenthesis.

The key parameter \hat{a}_2 is negative and significant in both the UK and the USA cases, implying mean reversion. Taking the exponential function of the estimated equation and setting the supply and demand shocks to zero, we can focus on the deterministic path of unemployment. The estimated function can be solved by setting $U_t - e^{a_0 + a_1 U_{t-1} + a_2 U_{t-1}^2} = 0$ and plotting the corresponding values in Figs. 2 and 3 below. The computed unemployment equilibria (low, middle and high) is shown in Table 2 for the one-lag and 12th lag case.

²The data source is the NBER Macro History Database and a detailed discussion of data is in our working paper (Matthews, Minford and Naraidoo (2006), available at www.cardiff.ac.uk/carbs/econ/workingpapers/papers/E2006_25.pdf).

³On the argument that one-lag may not adequately capture the political economy process, different lags of the variable U_t (of up to the 12th order) was included in our political process for both the UK and the USA. A test of robustness was also carried out to test the statistical difference in the parameters (\hat{a}_0, \hat{a}_1 and \hat{a}_2). The results available in Matthews, Minford and Naraidoo (2006) indicate robustness of the results at shorter time lag but this robustness soon disappears as the time lag increases. However the main results which follow do not change as we move from the one-lag to the twelve-lag specification.

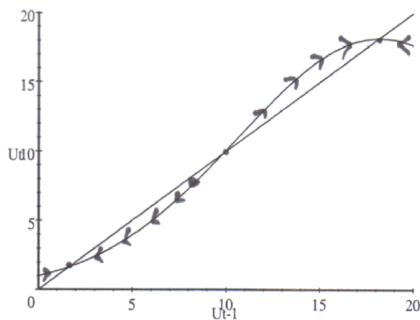


Fig. 2. UK phase diagram.

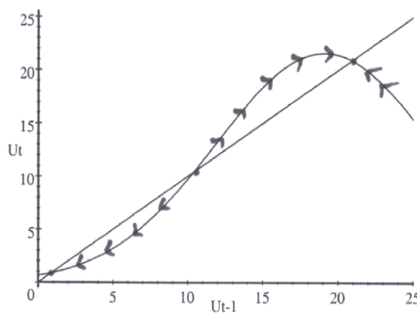


Fig. 3. USA phase diagram.

Table 2

The estimated equilibria

	Countries			
	<i>lag 1</i>	<i>lag 1</i>	<i>lag 12</i>	<i>lag 12</i>
	UK	USA	UK	USA
Low \bar{u}	1.7	0.9	2.46	1.50
Middle \bar{u}	9.8	10.4	10.75	13.76
High \bar{u}	18.2	20.9	15.80	19.97

The dynamics and equilibria of unemployment can be interpreted by inspecting Figs. 2 and 3 which use the estimates from the one-lag case. The low unemployment equilibrium is a stable position and conforms with the historical experience of the pre-first world war period. Once the economy experiences large demand shocks, unemployment follows more persistent dynamics but mean reverts globally, implying a high unemployment equilibrium rate. The political process discussed earlier comes into play following large shocks to the economy. The estimates suggest a plausibly high top equilibrium rate of unemployment in both countries during the 3-equilibrium period. The UK estimate of 18.2% is consistent with Matthews' (1986) finding based on a full macroeconomic model, that the natural rate of unemployment increased substantially during the 1930s. The top equilibrium rate of unemployment in the USA which amounts to nearly 11 million persons, is harder to explain. On average, nearly a quarter of the unemployed during the 1930s were in receipt of relief payments. Benjamin and Matthews (1992) estimate that nearly 1 million may have been added to the unemployed through the rise in real relief payments in the 1930s, and a further 3 million private sector jobs would have been crowded out by the end of the period through the creation of public sector relief jobs. This suggests that nearly half of the average level of unemployment during the period (1931-39) could be accounted for through the effects of Federal unemployment policy.

Another econometric issue relates to the robustness of statistical inference on the parameters - $\hat{\alpha}_0$, $\hat{\alpha}_1$ and $\hat{\alpha}_2$. According to our theory the error terms are autocorrelated. Hence, the standard error associated with the estimators is likely to be biased. It follows, that a 't' - or normal distribution may not approximate the

actual empirical distribution of the parameters particularly well. The approach taken here is to augment our results by deriving standard errors and actual confidence intervals for the distribution of the relevant coefficients by means of bootstrap procedure, originally developed by Efron (1979) and reviewed by Li and Maddala (1996).⁴

The full-sample bootstrap results based on 600 re-estimations for both countries are presented in Table 3. The summary of the results of the bootstrap are very similar to the OLS results and the point estimates of the standard errors are similar to those obtained from the Newey-West correction.

Table 3

Bootstrap estimates^a and confidence intervals based on 600 re-estimations

Countries	\hat{a}_0	95% <i>C.I.</i>	\hat{a}_1	95% <i>C.I.</i>	\hat{a}_2	95% <i>C.I.</i>
UK	0.0474 (0.0158)	0.016,0.078	0.3184 (0.0043)	0.310,0.326	-0.0087 (0.0002)	-0.009,-0.008
USA	-0.4429 (0.0212)	-0.484,-0.400	0.3680 (0.0085)	0.352,0.384	-0.0096 (0.0004)	-0.010,-0.009

^aStandard errors in parenthesis.

However, the key issue of this paper is whether a country is or is not subject to vicious/virtuous circles, in the sense of having three equilibria (the middle one being unstable) rather than merely one. Our central results imply that both countries have experienced 3-equilibrium situations over the sample period. Therefore we wish to develop a statistical test on the joint values of the 3 parameters ($\hat{a}_0, \hat{a}_1, \hat{a}_2$) determining the number of equilibria. For this we turn to the bootstrapped joint parameter distribution which reveals the statistical possibilities. As it turned out, the parameter combinations for both countries generated only 3-equilibrium outcomes. This tells us that the estimated distribution of the parameters only admits of the 3-equilibrium case. Thus we cannot possibly reject the hypothesis of both countries being 3-equilibrium.

Can we however also reject the hypothesis of them being 1-equilibrium? That is, could a 1-equilibrium model generate 3-equilibrium cases like those we estimated for each country? To answer this, we bootstrap a model that lies on the borderline between the 1-equilibrium and the 3-equilibrium cases. Such a model can be defined as one for which the slope of the phase diagram in its middle or average region (σ) is unity⁵. Fig. 4 illustrates this point. On the left is the UK's interwar phase diagram and corresponding slope. On the right

⁴The basic idea of the bootstrap procedure used is easily outlined. Essentially artificial data is created by resampling the error terms obtained from estimating the initial sample itself. This resampling procedure is repeated 600 times to generate 600 samples for each country. Then Eq. (4) in the text is reestimated for each of the 600 artificial samples. Circularity is involved since we have to choose an estimator in the first place to obtain the sample of the error distributions. One of the problems in our bootstrap is the presence in certain residuals of autocorrelations. This implies that the errors cannot be regarded as random and are therefore unsuitable for resampling in any order. Therefore the errors used in this stage have all been purged off autocorrelation at the original estimation of Eq. (4) in the text, by the inclusion of appropriate autocorrelation parameters in the model itself. The latter is then used for the bootstrapping exercise. The results are little different from those with 300 bootstraps, suggesting that the distributions have well converged by 600. We therefore set the number of bootstraps to 600.

⁵ $\sigma = \partial U_t / \partial U_{t-1}$ at mean unemployment, $\bar{U} = (a_1 + 2 * a_2 * \bar{U}) \exp(a_0 + a_1 \bar{U} + a_2 \bar{U})$

is the USA's postwar equivalent from Minford and Naraidoo (2004). This is a borderline case where there is (just) one equilibrium; a slight displacement of the constant would give three. In the middle region the slope is unity, i.e., $\sigma = 1$. Plainly in the UK interwar case $\sigma > 1$. For an unambiguous 1-equilibrium case, σ would be less than 1. σ is thus a measure of the extent to which the combination of parameters diverges in either direction from the borderline case. We can generate its bootstrapped distribution for the two countries from the interwar errors, under the assumption that the true σ is unity and given by the postwar US parameters. Table 4 and Fig 5 show these distributions, together with the estimated $\hat{\sigma}$ for interwar UK and US. Plainly these $\hat{\sigma}$ convincingly reject the hypothesis that $\sigma = 1$.

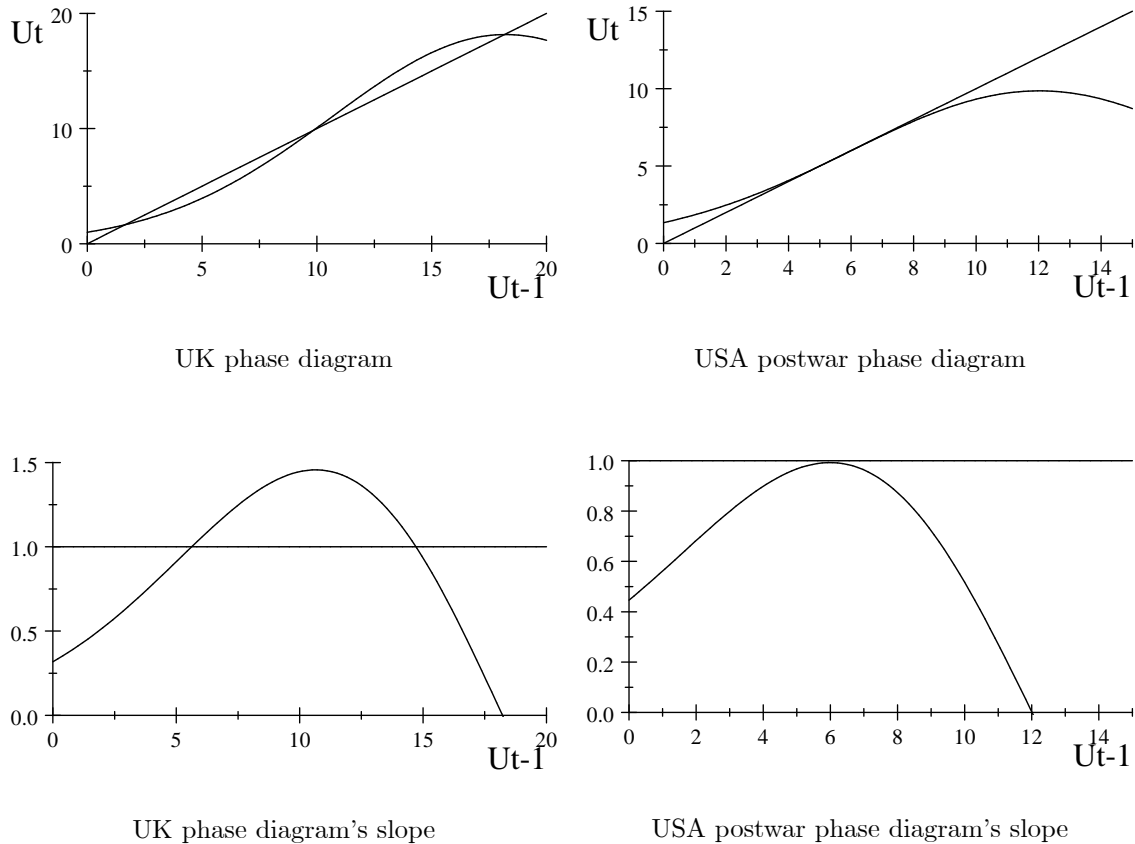


Fig. 4. Features of 1-equilibrium and 3-equilibrium models.

Table 4

Summary statistics for the slope estimate σ		
Countries	UK	USA
Mean	0.993	0.993
Std. deviation	0.016	0.041
95% <i>C.I</i>	0.960,1.026	0.915,1.075
99% <i>C.I</i>	0.952,1.034	0.897,1.099
Estimated $\hat{\sigma}$	1.25	1.12

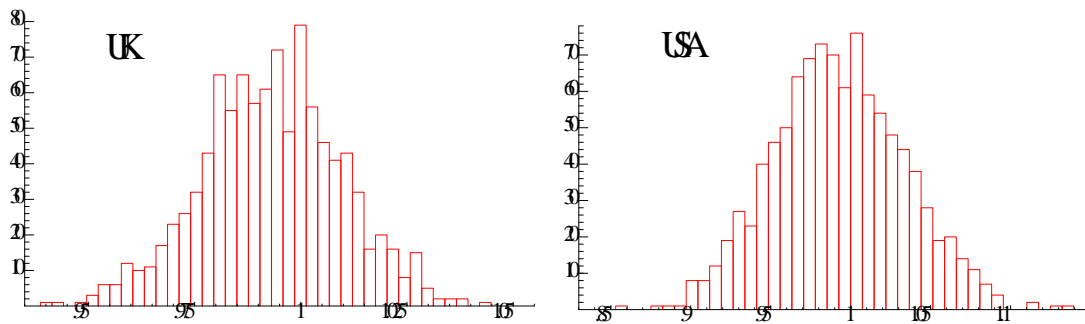


Fig. 5. Countries distribution over σ .

5. Testing the reduced form equation against rival ‘general hysteresis’ models

The reduced form equations we have estimated are derived from the theoretical model set out above. However, other models have been proposed that make unemployment dependent on its past- or ‘hysteresis’. If our regressions could have been produced by these models too, then we face an identification problem.

Hysteresis models of unemployment have been proposed by Blanchard and Summers (1986) who focus on Europe in the 1980s where there were large negative shocks and institutional arrangements which led to the disenfranchisement of ‘outsiders’ as opposed to employed ‘insiders’ who bargain only on behalf of the employed. In the simplest case where insiders simply set wages to ensure the employment of their current members, there will be a unit root in the level of unemployment. Røed (1997), in a review of the hysteresis literature, concludes that a unit root is a normal feature of these models. Thus these models of ‘generalised hysteresis’ do not in general have the same implications as ours that there may be two stable equilibria; rather they suggest that unemployment has great persistence and may be non-stationary. If non-stationary they would have potentially an infinite number of equilibria or natural rates, each shock creating a new one.

We would argue that the model set out here is to be preferred on theoretical grounds to such alternative models; thus theory alone could be argued to be sufficient identification. Nevertheless we also propose an empirical test of our reduced form against one of generalised hysteresis; this permits us to test whether the predictions from our model could have been produced by a general hysteresis model- if not then the reduced form identifies our model. We allow the alternative model to be represented by the best-fitting ARMA/ARIMA or non-linear time series process we can find. Within sample we would expect the fit of such alternatives against our particular form to be barely distinguishable, given the high correlations between different transformations of unemployment and its lags. However, the key distinguishing feature of our model from these general time series representations lies in its forecast implications, namely that the equilibrium to which the economy returns depends on the size of the shocks; small shocks do not alter the economy’s local equilibrium but at low unemployment large positive shocks drive unemployment to a high unemployment equilibrium, while at high unemployment large shocks, both positive and negative, drive it back to low unemployment. A general time series process will forecast unemployment either to stay roughly where it is if

non-stationary; or, if stationary, to revert to some deterministic equilibrium. Thus the rival models' forecast implications are quite different. We use this as the basis for a repeated forecasting test, where we produce non-nested forecast tests for each date in the sample for each model.

The best model out of the general class of ARMA/ARIMA and polynomial models is a simple AR(1) with a root close to one, namely:

$$\ln U_t = \alpha + \beta \ln U_{t-1} + \epsilon_t$$

We denote it by R, our own model by M. Table 5 shows that based on the goodness of fit measure (\bar{R}^2), the two models are indeed virtually indistinguishable. This is further confirmed by the fact that $\hat{\sigma}_M/\hat{\sigma}_R$, the ratio of the two models' estimated standard errors, lies well within the 95% interval of its bootstrapped distribution under the null hypothesis that the two models' in-sample predictions are the same.

Table 5

AR(1) model statistics^a and in-sample fit comparison

	constant	$\ln U_{t-1}$	\bar{R}^2	se ^b	LM ^c	\bar{R}^2 (M)	\bar{R}^2 (R)	95% C.I of σ_M/σ_R	$\hat{\sigma}_M/\hat{\sigma}_R$
UK	0.022 (0.020)	0.987** (0.009)	0.973	0.155	1.054 (0.349)	0.96	0.97	0.935,1.230	1.182
USA	0.035* (0.020)	0.971** (0.011)	0.948	0.329	0.828 (0.363)	0.94	0.94	0.905,1.032	0.971

Two asterisks denotes statistical significance at the 5% level and one asterisk at the 10% level.

^aNewey-West corrected standard errors in parenthesis.

^bStandard error of regression.

^cBreusch-Godfrey serial correlation LM Test. *p* value in parenthesis.

We therefore turn to out-of-sample comparisons to distinguish the two models. We retain $m = 60$ observations for out-of-sample forecasting (from 1934/M11 for the UK and from 1937/M7 for the USA). We use the forecast encompassing concept originally due to Chong and Hendry (1986), with later developments due to Ericsson and Marquez (1993), Fisher and Wallis (1990) and Andrews et al. (1996). The idea is to regress the forecast error of one model on the other's forecasts.

$$y_t = \gamma_o + \gamma_1 \hat{y}_t + \gamma_2 y_t^* + \epsilon_t; \epsilon_t \sim N(0, \sigma^2)$$

where \hat{y}_t is the forecast of the maintained model (here ours, M), y_t^* that of the other (here R). If the first model is correctly specified, there is no additional information contained in the other's forecasts that can help explain the forecast error of the first model.

The null-hypothesis is simply that $y_t - \hat{y}_t = \epsilon_t$, that is the forecast error be an innovation. To test this null against the alternative that $y_t - y_t^* = \epsilon_t$, Chong and Hendry (1986) and Ericsson and Marquez (1993) suggest $H_0 : \gamma_2 = 0 \mid \gamma_1 = 1$, whereas Fisher and Wallis (1990) suggest $H_0 : \gamma_2 = 0$. However we follow

Andrews et al. (1996) in treating $H_0 : \gamma_2 = 0 \mid \gamma_1 + \gamma_2 = 1$ which has the advantage that, writing the regression as

$$y_t - \hat{y}_t = \gamma_o + \gamma_2(y_t^* - \hat{y}_t) + \varepsilon_t \quad (5)$$

then if y_t is integrated of order one, then all the variables in Eq. (5) are I(0) if we also make the extremely plausible assumption that any forecast is cointegrated with its outturn.

Table 6 presents forecast encompassing regressions for fixed 12-month-ahead forecasts over this whole period; we choose 12 on the grounds that a year is the forecast horizon of greatest interest to most forecasters but similar ones were found for a variety of other forecasting horizons. What these results all show is that the (M-R) forecast helps a lot to explain the R forecast error in both the UK and the USA cases whereas the (R-M) forecast only helps to explain the M forecast error to a limited extent in the case of the UK and not at all in the USA case. Another way of putting this is that for the UK the optimal weights on M and R are 0.8 and 0.2 respectively, and for the US 1 and 0 respectively. Thus the general conclusion is that the R model is heavily dominated by our M model. In sum, the out-of-sample forecasting test discriminates powerfully in favour of our specific nonlinear model against one of generalised hysteresis.

Table 6

Forecast encompassing regression- 12-month-ahead forecast^a

Countries	M=NULL			R=NULL ^d		
	constant	$(\hat{y}_t - y_t^*)$	se ^b	\bar{R}^2	LM ^c	\bar{R}^2
UK	0.028** (0.008)	0.808** (0.050)	0.052	0.903	1.121 (0.335)	0.338
USA	0.0174 (0.045)	1.033** (0.136)	0.251	0.889	29.648 (0.000)	0.008

Two asterisks denotes statistical significance at the 5% level and one asterisk at the 10% level.

^aNewey-West corrected standard errors in parenthesis.

^bStandard error of regression.

^cBreusch-Godfrey serial correlation LM Test. *p* value in parenthesis.

^dThe R-M regression of the R error on $(y_t^* - \hat{y}_t)$ yields a coefficient of 1 minus that in the M-R regression on the M error and its constant, standard errors and LM statistic are all the same; we report only its \bar{R}^2 .

6. Conclusion

This paper argues that in both the US and the UK in the interwar period unemployment was determined by the nonlinear interaction of economic shocks and the political process. In both countries unemployment moved between a low and a high natural rate of unemployment, supporting the model's implication that if there are adverse shocks (usually brought about by a big monetary mistake - the return to gold in the UK, and the Fed policy in the aftermath of the Great Crash), voters demand protection and unemployment

benefit relief to deal with the situation. In this way, bad monetary policy breeds a worse supply-side response and the economy spirals downwards into a ‘vicious circle’, producing a worse equilibrium with a higher natural rate of unemployment. Movement out of the high unemployment equilibrium occurs because a large demand or supply shock triggers the ‘virtuous circle’; in these cases this shock was supplied by rearmament and the second world war. This theory both fits the data in its own terms and is superior in forecasting performance out of sample to alternative models of ‘generalised hysteresis’ which within sample are empirically indistinguishable for familiar reasons.

The paper has a number of policy implications. One is that good macroeconomic management has a role in supporting good supply-side policy. Another is that the education of public opinion in the nature of the economy and the shocks hitting it can avoid counter-productive demands for social protection. Yet another is that reform programmes or demand shocks which overall jolt the economy away from the high unemployment equilibrium can be beneficial.

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References

- Alesina, A., Roderick, D., 1994. Redistributive politics and economic growth. *Quarterly Journal of Economics* 109, 465-490.
- Andrews, M. J., Minford, P. L., Riley, J., 1996. On comparing macroeconomic models using forecast encompassing tests. *Oxford Bulletin of Economics and Statistics* 58, 279-305.
- Bean, C. R., Layard, P. R. G., Nickell, S. J., 1986. The rise in unemployment: A multi-country study. *Economica* 53, S1-S22.
- Benjamin, D. K., Kochin, L. A., 1979. Searching for an explanation of unemployment in interwar Britain. *Journal of Political Economy* 87, 441-478.
- Benjamin, D. K., Kochin, L. A., 1982. Unemployment and unemployment benefits in twentieth century Britain. *Journal of Political Economy* 90, 410-436; see also critics’ views in the same issue.
- Benjamin, D. K., Matthews, K. G. P., 1992. *US and UK Unemployment Between the Wars: A Doleful Story*. Hobart Paperback 31, Institute of Economic Affairs, London.
- Bernasconi, M., 2006. Redistribution taxation in democracies: Evidence on people’s satisfaction. *European Journal of Political Economy* 22, 809-837.
- Bertola, G., Blau, F. D., Kahn, L., 2001. Comparative analysis of labour market outcomes: Lessons for the US from international long-run evidence. CEPR Discussion Paper 3023, Centre for Economic Policy Research, London.

- Blanchard, O.J., Summers, L. H., 1986. Hysteresis and the European unemployment problem. In: Fischer, S. (Ed.), *NBER Macroeconomics Annual*, MIT Press, Cambridge, pp. 15-77.
- Blanchard, O., Katz, L., 1997. What we know and do not know about the natural rate of unemployment. *Journal of Economic Perspectives* 11, 51-72.
- Blanchard, O., Wolfers, J., 2000. Shocks and institutions and the rise of European unemployment. The aggregate evidence. *Economic Journal* 110, 1-33.
- Broadberry, S., 1986. Aggregate supply in interwar Britain. *Economic Journal* 96, 467-481.
- Chong, Y. Y., Hendry, D. F., 1986. Econometric evaluation of linear macro-economic models. *Review of Economic Studies* 53, 671-90.
- Efron, B., 1979. Bootstrap methods: Another look at the jackknife. *The Annals of Statistics* 7, 1-26.
- Ericsson, N., Marquez, J., 1993. Encompassing the forecasts of US trade-balance models. *Review of Economics and Statistics* 75, 19-31.
- Fisher, P. G., Wallis, K. F., 1990. The historical tracking performance of UK macroeconomic models, 1978-85. *Economic Modelling* 7, 179-97.
- Fitoussi, J. P., D. Jestaz, Phelps, E. S., Zoega, G., 2000. Roots of the recent recoveries: Labor reforms or private sector forces. *Brookings Papers on Economic Activity*, 1, 237-312.
- Krusell, P., Quadrini, V., Rios-Rull, J. V., 1997. Politico-economic equilibrium and economic growth. *Journal of Economic Dynamics and Control* 21, 243-272.
- Layard, P.R.G., Nickell, S. J., 1986. Unemployment in Britain. *Economica*, 53, S121-S170.
- Li, H., Maddala, G. S., 1996. Bootstrapping time series models. *Econometric Reviews* 15, 115-58.
- Matthews, K. G. P., 1986. *The Interwar Economy*. Gower Press, London.
- Matthews, K. G. P., Minford, M., Naraidoo, R., 2006. Vicious and virtuous circles - The political economy of unemployment in interwar UK and USA. Cardiff Economics Working Paper no. 25, 2006/07, Cardiff University, www.cardiff.ac.uk/carbs/econ/workingpapers/papers/E2006_25.pdf.
- Meltzer, A. H., Richard, S. F., 1981. A Rational Theory of the Size of Government. *Journal of Political Economy* 89, 914-928.
- Minford, P., 1983. Labour market equilibrium in an open economy. *Oxford Economic Papers* 35, Supplement, 207-244.
- Minford, P., Naraidoo, R., 2004. Vicious and Virtuous circles-The Political Economy of Unemployment. Centre for Economic Policy Research, London. Discussion Paper, 3618.
- Nickell, S., 1997. Unemployment and labour market rigidities: Europe versus North America. *Journal of Economic Perspectives* 11, 54-74.
- Nickell, S., Layard, R., 1998. Labour market institutions and economic performance. CEP Discussion Paper 407, Centre for Economic Performance, London School of Economics and Political Science.
- Nickell, S., Nunziata, L., Ochel, W., 2005. Unemployment in the OECD since the 1960s. What do we know?. *Economic Journal* 115, 1-27.

- OECD, 1999. Employment Outlook. Paris
- Perotti, R., 1993. Political equilibrium, income distribution and growth. *Review of Economic Studies* 60, 755-776.
- Persson, T., Tabellini, G., 1994. Is inequality harmful for growth. *American Economic Review* 84, 600-621.
- Røed, K., 1996. Hysteresis in unemployment. *Journal of Economic Surveys* 11, 389-418.
- Siebert, H., 1997. Labour market rigidities: At the root of unemployment in Europe. *Journal of Economic Perspectives* 11, 37-54.
- Saint-Paul, G., 1996. Exploring the political economy of labour market institutions. *Economic Policy* 22, 263-315.
- Stokey, N.L., Rebelo, S., 1995. Growth effects of flat-rate taxes. *Journal of Political Economy* 103, 519-550.
- Wallis, J., Benjamin, D. K., 1981. Public relief and private employment in the Great Depression. *Journal of Economic History* 41, 97-102.
- Weede, E., 1997. Income inequality, democracy and growth. *European Journal of Political Economy* 13, 751-764.
- Wright, R., 1986. The redistributive roles of unemployment insurance and the dynamics of voting. *Journal of Public Economics* 31, 377-399.