Hysteresis and the European Unemployment Problem

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Blanchard and Summers NBER Macro Annual 1986

Macro Lunch

January 30, 2013
1. Why do we see persistently elevated levels of unemployment in Europe?

2. Do membership considerations largely explain persistent high unemployment?
General Summary

1. Periods of persistently high unemployment are not uncommon events in a broad historical context, yet standard macro theories have a hard time accounting for them.

2. These periods can be understood in terms of theories of hysteresis\(^1\) that make the long-run \(u\) depend on history.

3. Membership effects may well be important sources of hysteresis.

4. Conclude that membership effects become important in bad times and are not crucially dependent on the presence of unions.

5. Suggest that enfranchising workers (e.g. work sharing programs) would help and surprising expansionary policies can have very long-lasting benefits.

\(^1\)Hysteresis is a very high dependence of current unemployment on past unemployment.
1. The Record of Persistent Unemployment
2. Mechanisms for Hysteresis - Insider Outsider Model
3. Empirical Evidence in Europe
4. Policy Implications: Comparison with US Great Depression
I. Persistent Unemployment

Outline:
- Empirical record on unemployment shows evidence of hysteresis
- Theories of Hysteresis
I. Persistent Unemployment - Evidence

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*Forecast.
I. Persistent Unemployment in UK

AR(1): \( u_t = 0.93 u_{t-1} + e_t \).

\( SE = 0.04 \) and \( \sigma_e = 2.1\% \)
I. Persistent Unemployment in US

AR(1): \( u_t = 0.9u_{t-1} + e_t. \)

\[ \text{SE} = 0.04 \text{ and } \sigma_e = 2.0\% \]
Takeaways:

1. Evolution of unemployment rate over past half century isn’t well captured by any simple linear AR representation

2. Persistence arises largely from relatively infrequent changes in the level around which unemployment fluctuates
I. Persistent Unemployment - Evidence

Takeaways:

1. Evolution of unemployment rate over past half century isn’t well captured by any simple linear AR representation

2. Persistence arises largely from relatively infrequent changes in the level around which unemployment fluctuates

Question:
What causes changes in the mean level of unemployment? And why are the episodes so persistent?
I. Persistent Unemployment

What can explain the persistence of unemployment?

1. Aggregate Demand
2. Aggregate Supply
Aggregate Demand?

- Tight monetary policy & fiscal contraction in 80s
- But if $\text{AD} \perp \text{NAIRU}$, we’d expect sustained high $u \Rightarrow$ rapid declines in rate of $\pi$
- There is some evidence of NAIRU increasing (from 2.4 in 1967 to 9.2 in early 80s in UK)
I. Persistent Unemployment

Aggregate Demand?

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**Bottom line:** AD shocks clearly played role in $\uparrow u$, but can’t be whole story, given the increase in the rate of unemployment consistent with steady inflation
I. Persistent Unemployment

Aggregate Supply?
Sachs et al argue higher equilibrium unemployment is a combo. of:

1. **Adverse supply shocks**
   - Unemployment benefits
   - Structural Change - need for large-scale reallocation of labor $\Rightarrow \uparrow u$
     but there is little evidence of SC since 1960s when $u$ was low
   - TFP Growth
   - Taxes

2. **Real wage rigidities**
For shocks to have long lasting effect, need long-lasting rigidities.

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4 But more eligibility rules than benefit levels and U on UB regressions weak
5 labor supply is inelastic in the LR
I. Persistent Unemployment

**Bottom line:** “It is difficult to account for the increase in equilibrium $u$ or equivalently NAIRU by pointing to these shocks [...] the difficulty is in finding propagation mechanisms that can explain how AD and AS shocks can propagate over long periods.”
Mechanisms for Hysteresis

1. Physical Capital
2. Human Capital
3. Insider Outsider Models
1. Persistent Unemployment

1. Physical Capital

- ↓ $K$ ⇒ $L^D$ ⇒ Protracted high unemployment
- **BUT** some substitution of $L$ for $K$ is possible
- and substantial disinvestment during the 1930s did not preclude a rapid recovery
- and very substantial reduction civilian capital stock during the war did not prevent full employment post war
I. Persistent Unemployment

2. Human Capital

- Unemployed workers lose opportunity to maintain and update skills
- If for incentive or human capital reasons, employers may prefer workers with long horizons \( \Rightarrow \) hard for middle aged workers to find new jobs
- In high \( u \) environment, may be hard for workers to signal their quality by holding jobs and being promoted. Resulting inefficiencies in sorting workers may reduce the overall demand for labor
- Lack of good times may reduce labor force participation
- **BUT** if early retirement is forever, why do it following temporary shocks?

Overall, human capital mechanisms can explain some of the protracted response to shocks, but not sufficient
3. Insider Outsider Model

- Suppose wages set by bargaining between employed workers and firms and workers don’t care about unemployed.
- Insiders will just set wage so as to remain employed.
- In the presence of shocks, employment follows a random walk.
- For instance, after an adverse shock, some workers will lose their insider status and the new smaller group of insiders sets the wages so as to maintain this new lower level of employment.
II. Insider Outsider Model

Outline:

1. One period model
2. Different membership rules
3. GE model
4. Limitations
One period model:

- Initial group membership $n_o$
- Passive firms that provide labor demand on which group picks its preferred outcome
- Labor Demand: $n = -cw + e$
- $e$ is uniformly distributed $[Ee - a, Ee + a]$
II. Insider Outsider Model

Step 1: Pick \( \bar{w} \)
II. Insider Outsider Model

Step 2: Draw $e$. Then calculate labor demand, i.e. $n = -cw + e$
II. Insider Outsider Model

Labor Market Outcome:

- If $n > n_0$ outsiders hired
- If $n < n_0$ insiders fired (with equal chance of being fired)

Probability of being employed, $p$, is:

$$p = 1 - \frac{1}{4a}(n_0 + cw - Ee + a)^2$$  \hspace{1cm} (1)

Note this applies when $n_0 + cw \geq Ee - a$. It doesn’t apply when worst case draw still yields $n > n_0$ in which case the probability is 1.
Picking Wage $\bar{w}$: Suppose $U = p + bw$, then plug in for $p$ and optimize

$$\frac{1}{c} (-n_0 + Ee + a(2\frac{b}{c} - 1))$$

$$n_0 - a(2\frac{b}{c} - 1) + (e - Ee)$$
II. Insider Outsider Model

Insights:

- \( p^* = 1 - a\left(\frac{b}{c}\right)^2 \)
- Wage depends negatively on \( n_0 \)
- \( \bar{n} \) exceeding \( n_0 \) depends on preferences for employment protection versus wages

Membership Rules Matter:

1. Constant membership (\( m = \infty \))
2. Membership equals employment (\( m = 1 \))
3. Intermediate Cases
II. Insider Outsider Model

Constant membership \((m = \infty)\):

- Initial group membership \(\tilde{n}_t\) at time \(t\) and \(n_t\) realized employment
- \(P = 1 - \tilde{n}_0 + n\)
- Utility is given by:

\[
U_0 = E_0 \sum_{t=0}^{\infty} \theta^t [p_t + bw_t]
\]  \hspace{1cm} (2)
Constant membership \((m = \infty)\):

- Assume labor demand shocks are mean zero and iid uniform \([-a,a]\), so same \(p\) and same problem every period
- As before, \(w_t^* = \frac{1}{c}(-\tilde{n}_0 + a(2\frac{b}{c} - 1))\) and \(n_t = \tilde{n}_0 - a(2\frac{b}{c} - 1) + e_t\)
- Employment will be white noise in response to WN shocks\(^6\)
- Employment \(\geq\) membership depends on \(\frac{b}{c} \geq \frac{1}{2}\)

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\(^6\)Changes in expected value of \(e\) do not affect level of employment. Only deviations from \(E_e\).
Membership equals employment \( (m = 1) \):

- \( \tilde{n}_t = \tilde{n}_{t-1} \)
- If same rule, \( w_t^* = \frac{1}{c} (-\tilde{n}_{t-1} + a(2 \frac{b}{c} - 1)) \) and \( n_t = \tilde{n}_{t-1} - a(2 \frac{b}{c} - 1) + e_t \)
- Employment will follow random walk with drift.
- However, members should recognize the inability to commit to future memberships to wage policies.
- They know that their decisions today will affect membership tomorrow.
- If he becomes an outsider, his chance of staying with the firm goes way down so he probably wants to set a lower wage.
II. Insider Outsider Model

Membership equals employment \((m = 1)\):

- \(w^*_t = \frac{1}{c}(-\tilde{n}_{t-1} + a(2\frac{b}{c}(\frac{1}{1+b\theta w'}) - 1))\) where \(w'\) is the wage around which the groups objective function is linearized.
- \(n_t = \tilde{n}_{t-1} - a(2\frac{b}{c}(\frac{1}{1+b\theta w'}) - 1) + e_t\)
- \(p^*_t = 1 - a[\frac{b}{c}(\frac{1}{1+b\theta w'})]^2\)
Intermediate Case:

- No longer unanimity. Recent job losers and new hires both insiders.
- Wage setting policies less cautious than $m = 1$ case but more so than constant membership.
- Short sequences of unexpected shocks won’t result in insiders being laid off long enough, **but long -and infrequent- sequences of shocks of the same sign will have effects on membership**.
- Interestingly, no need to be symmetric for good and bad shocks so “favorable and unfavorable shocks will persist to differing extents.”
Persistent Effects of Nominal and Real Disturbances: Setup

- Wages are set in nominal terms
- Many firms $j$ in economy selling an imperfectly substitutable good
- Demand $y_j = -k(p_j - p) + (m - p)$, $k > 1$ gives interior max.\(^7\)
- Each firm is CRS and employment is given by $y_j = n_j$.
- Given set up, prices are $p_j = w_j + e$, which is a tech shock common to all firms.
- Insiders chose wage based on this demand function:
  \[ n_j = -k(w_j - e - p) + (m + p) \]

\(^7\)note constants ignored, $m$ is nominal money and $p$ is price level.
II. Insider Outsider Model

Choice of the Wage and Employment

- Assume $m = 1$ rule. Pick nominal wage based on $Ep, Em$, and $Ee$.
- Ignoring constant, expected employment equals membership:
  $$-k(w_j - Ee - Ep) + (Em - Ep) = n_j(-1)$$
- This implicitly defines wages in terms of membership and expectations.
- Thus, $Ep = Em - n(-1)$ and $w_j = Ee + Em - n(-1)$.
- Plugging in and aggregating we have:
  $$n_t = n_{t-1} + (m_t - Em_t) + (e_t - Ee_t).$$

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8Since nominal prices are same and equal to price level, the terms multiplied by $k$ equal zero.)
II. Insider Outsider Model

Choice of the Wage and Employment: Intuition

- Workers set a nominal wage to leave employment unaffected by expected AD
- Firms simply mark up over this nominal wage
- Unexpectedly low AD leads to unexpected declines in output and employment with no changes in nominal wages (by assumption) and in prices (b/c of constant returns)
II. Insider Outsider Model

Other issues

- Endogenous $m$. Really bad shocks could cause current employees to wrest control from those controlling it in the interests of past workers.
- Firms hiring decisions can affect wage demands subsequently
- Firms could introduce two tier systems, but rare, which may be evidence of membership concerns
III. Empirical Evidence on Hysteresis

Outline

1. Strength and Size of Union Sector
2. Estimating Wage and Employment Equations
3. Labor Market Turnover
Strength and Size of Union Sector

- In France, Germany, UK, wages mostly set at firm or plant level\(^9\)
- Membership Rules: workers can remain in union if they lose their jobs, but no longer have right to vote.
- Evidence that many leave union after job which suggests that for the most part they don’t see reasons to stay in the union, providing support for idea that union mostly cases about currently employed.

\(^9\)formally, some bargaining sets not binding floors at the industry level.
III. Empirical Evidence on Hysteresis

Wage and Employment Equations

- Labor Demand: \( n = sn_{-1} - (1 - s)b(w - p) + e \)
- Union acts to set expected \( n \) according to: \( En = (1 - a)n^* + an_{-1} \)
- \( a = 1 \) corresponds to \( m = 1 \) and \( a = 0 \) is case where union policy is independent of history so no hysteresis.
- Solving for wages and employment yields:
  \[
  w = Ep + \frac{1}{b(1-s)}(- (1 - a)n^* + (s - a)n_{-1} + Ee) + u \\
  n = (1 - a)n^* + an_{-1} + (e - Ee + (1 - s)b(p - Ep - u))
  \]
III. Empirical Evidence on Hysteresis

Wage and Employment Equations

- Use OLS for \( n = (1 - a)n^* + an_{-1} + (e - Ee + (1 - s)b(p - Ep - u)) \)
- \( w = Ep + \frac{1}{b(1 - s)}(-(1 - a)n^* + (s - a)n_{-1} + Ee) + u \) endogenous b/c Ee core with last past productivity and thus past employment.
- Lag labor demand from last slide and plug into first equation here:

\[
w - w_{-1} = k + (Ep - p_{-1}) + \frac{1}{b}(1 - s)((1 + s - a)n_{-1} - sn_{-2}) + u
\]  

Wage inflation is a function of expected price inflation and two lags of employment\(^{10}\)

\[\text{\(^{10}\)k} = -(\frac{1}{b}(1 - s))(1 - a)n^*\]
Results

1. Virtually all specifications for Germany, France, and UK suggest substantial degree of hysteresis. Ratio $Z$ of lag to current is one when $a = 1$ is estimated to be roughly 1.

2. Time trends contribute little

3. US has much less hysteresis (half the magnitude)
### III. Empirical Evidence on Hysteresis

#### Table 5  WAGE EQUATIONS, 1953–1984

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III. Empirical Evidence on Hysteresis

Labor Market Turnover

1. High turnover w/ many having short spells of unemployment and then being hired problematic

2. Low rate of flow into and out of emp. and long jobless duration good for theory

3. Table 8 (see paper) shows lower flow into unemployment in UK than US despite higher UR (thus high UR reflects insufficient hiring of unemployed).

4. Rate of flow into unemployment has increased surprisingly little as UR soared
IV. Is Eurosclerosis Really the Problem?

**Question:**
Is the source of hysteresis European institutions or the sequence of adverse shocks?
IV. Is Eurosclerosis Really the Problem?

**Approach**

1. Compare with Europe in mid 1950s to late 1960s (same institutions). Finds somewhat less hysteresis and that bad times as well as unions account for findings of hysteresis. But not sufficiently powerful evidence.

2. Compare with US during Great Depression
IV. Is Eurosclerosis Really the Problem?

Compare with US during Great Depression

1. **Unemployment**: rose from levels comparable to those in Europe in 60s to 25% and stayed above 14% until 1940.

2. **Pessimism**: forecasts that unemployment will never decline, concern that $I$ and $K$ have prevent employing full labor force, and that expansionary policies will lead directly to inflation.

3. Failure of **inflation and real wages** to recede more rapidly (1936-1940 US high $u$ but no deceleration in $\pi$ and real wages increased 10%.

4. Labor market turnover parallels Europe’s.

5. **Autocorrelation** of unemployment from 1919-1941 was .87 in the US ⇒ more bad times than particular labor institutions.
IV. Is Eurosclerosis Really the Problem?

Compare with US during Great Depression: Bottom line

“The finding of so many parallels between the current European situation and the American depression suggests to us that hysteresis in Europe may be more of a result of a long series of adverse shocks than the result of structural problems.”
IV. Is Eurosclerosis Really the Problem?

So why did unemployment increase in Europe?

- **1970s:** Europe hit with surprise oil price increases, a productivity slowdown, and rapid tax rate increases.
- Wages were rigid in short run and each shock created unemployment.
- Decrease in employment was validated by higher wage demands.
- As a result, by end of 1970s, equilibrium unemployment increased substantially.

- **1980s:** series of aggregate demand shocks as monetary policy followed US and fiscal policy turned contractionary.
- Led to higher wage demands by those who remained employed.
- Predict that unemployment will remain high even if there are no more adverse shocks given the power of insiders to set wages.
V. Conclusion

General Summary

1. Periods of persistently high unemployment are not uncommon events in a broad historical context, yet standard macro theories have a hard time accounting for them.

2. These periods can be understood in terms of theories of hysteresis that make the long-run $u$ depend on history.

3. Membership effects may well be important sources of hysteresis.

4. Conclude that membership effects become important in bad times and are not crucially dependent on the presence of unions\(^\text{11}\).

5. Suggest that enfranchising workers (e.g. work sharing programs) would help and surprising expansionary policies can have very long-lasting benefits.

\(^\text{11}\) but the theory of membership effects in nonunion settings isn’t fully satisfactory.