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Jobs Don’t Grow on Trees

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Introduction:
The majority of macroeconomic models account for unemployment by making simplifying assumptions:
1. There is no involuntary level of unemployment.
2. The economy is not at its natural level and tends towards equilibrium.

Implicit in these models is also the assumption that the actual behavior of unemployment does not affect the equilibrium level. My research, however, is growing number of economists in pointing out that such assumptions are not true; the equilibrium also depends on past behavior, a so-called hysteresis. If unemployment exhibits hysteresis, the economy is not at its natural level and tends towards equilibrium.

My research considers the Hysteresis Hypothesis for using an improved version of ordinary least squares to estimate a Phillips curve and construct a series for equilibrium unemployment. Regression analysis shows strong evidence that actual unemployment also affects equilibrium levels. I also focus on one of the specific channels through which hysteresis operates, the duration of unemployment.

The duration is the variable that unemployed, workers’ skills degrade as they lose their connection to the labor market. Since unemployment has the potential to affect unemployment duration even in the absence of labor market shocks, it is a critical variable in any model of hysteresis. Because duration information is useful in understanding the equilibrium level, finding it is a theory of hysteresis.

I use a series of statistical techniques and t-tests in time series analysis to analyze the timing of changes in unemployment duration and the equilibrium level. I find evidence for the Hysteresis Hypothesis by concluding one of its central predictions: the average duration of unemployment after a recession. However, increasing duration of events provides strong evidence against the connection between the duration and the Hysteresis Hypothesis, despite both hypotheses being true. This conclusion is strikingly paradoxical and must be the topic of future research.

Research Questions:
1. Does unemployment fix itself or does it exhibit Hysteresis?
2. Does unemployment depend on historical unemployment? Does changing the unemployment rate change its equilibrium?
3. Is there a connection between the duration and the Hysteresis Hypothesis?

Hysteresis means equilibrium unemployment changes in response to changes in actual unemployment. On the left without hysteresis, the equilibrium does not change so unemployment tends back down to a low level. In contrast, on the right hysteresis causes equilibrium unemployment to rise and so unemployment only falls slightly. In the hysteresis case, unemployment is permanently higher because of the change in expectations.

A Time Series for Equilibrium Unemployment:
The natural way to study the natural time series is to estimate a Phillips curve with regression equations.
1. \( y_t = \beta_1 + \beta_2 x_{t-1} + \epsilon_t \), where \( y_t \) is change in unemployment, \( x_{t-1} \) is change in unemployment, \( \beta_1 \) is the constant, \( \beta_2 \) is the coefficient on unemployment.
2. We estimate this equation using ordinary least squares.
3. We then use the estimated coefficients to calculate the equilibrium unemployment.
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Hysteresis Hypothesis Link:
The time series that has potential here based on the duration of unemployment is if we use the change in average duration of unemployment. We take the change in the average duration of unemployment. This changes the unemployment rate of those who have been unemployed for a longer time, which will be a rise in the average duration of unemployment. So if a recession starts to cool, average duration should continue rising if hysteresis is true. That is precisely what we see in the data changing in duration and unemployment. Other than at the end of recessions; we would expect average duration to track unemployment closely—so they should move together. That exactly what we observe from the regression in the table above. These two results shows the evidence is consistent with ranking.

Jobs Don’t Grow On Trees: Unemployment is Not Self-Correcting
By: Nic Johnson
Adviser: Engin Sungur

Hysteresis:
In unemployment path dependency? To answer this, I calculated equilibrium unemployment as described in the bottom left. This should be when unemployment is heading to the long run. From the regression results displayed above, it is easily seen that a change in unemployment is associated with a change in equilibrium unemployment in the same direction, which is exactly what I would hold true for hysteresis runs time. It is not as strong evidence that they are both counter cyclical, but for hysteresis to be true there must be an element of causality, and it must be from equilibrium to equilibrium, not simply opposed to the traditional one way run. To see for causality, look at the timing of changes in unemployment and equilibrium below. Changes in unemployment already precede changes in equilibrium in the same direction. Unless something really is happening with time travel and the times affects the past, this is solid evidence that equilibrium affects unemployment, and not hysteresis in time.

Conclusion:
Only Policy Will Fix Unemployment
The most important finding is that unemployment does not fix itself. Because it is path dependent, once unemployment rises over time does in equilibrium level. In other words, if unemployment suddenly jumps upwards, it is in the absence of other shock pushing it down it is not likely to decline. This implies that government must respond strongly to economic downturns or face permanent longterm stagnation.

Hysteresis Is Not Well Understood
More research is needed on the causes of hysteresis common explanations such as duration and ranking are not sufficient. Duration and equilibrium unemployment are not related in any systematic way, as one would expect if duration caused hysteresis. What is clear is that hysteresis is a property of unemployment, what is not clear is why. I understand the causes of hysteresis is potentially crucial to formulating policy response to it.