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An evaluation of the inflationary pressure associated with short- and long-term unemployment

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HIGHLIGHTS

- Analysis of the effect of short- and long-tern unemployment on inflation has proven difficult because the series are highly correlated.
- Use of regional variation can discriminate the separate effects of short- and long-term unemployment on inflation.
- This is demonstrated using a simple model and Monte Carlo exercises.
- Applying the ideas to US data suggests that short- and long-term unemployment exert equal downward pressure on price inflation in the United States.

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ABSTRACT

The role of long-term unemployment in inflationary pressures has been examined in academic studies and discussed by policymakers. I demonstrate econometric weaknesses in previous studies, propose a solution based on regional variation, and present new evidence.

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1. Introduction

Theoretical considerations raise the possibility that short- and long-term unemployment exert different pressure on prices (e.g., Blanchard and Summers (1988), Layard et al. (1991) or Blanchard and Diamond (1994)). These considerations have raised the question of whether the long-term unemployed exert less downward pressure on prices. Such questions are highly relevant in policy discussions following the Great Recession (e.g., Economic Report of the President (2014), pages 81–83). However, empirical evidence, based on estimation of Phillips curves for US national data, is mixed.

The next section presents information on US (national) data and estimates national-level Phillips curves, illustrating the empirical challenges associated with discriminating between the effects on inflation of short- and long-term unemployment. Section 3 presents a model to highlight the small-sample issue and how regional variation may yield more precise parameter estimates. Section 4 presents the results using US metropolitan area data and Section 5 concludes.

2. Aggregate evidence for the united states

Short- and long-term unemployment are highly correlated in the United States, although, there has been some divergence in their respective paths since 2009. Notably, short-term unemployment fell to near its average level over this period by 2013, while long-term unemployment remained elevated.

To examine the inflationary pressure from unemployment rates, a simple Phillips curve is specified, in which inflation ($\Delta p(t)$) depends on its own lag and rates of unemployment (with the rates of total, short- and long-term unemployment denoted by $u(t)$, $u^s(t)$, $u^l(t)$, respectively):

$$\Delta p(t) = aE\Delta p(t) + \rho\Delta p(t-1) + \alpha^s u^s(t) + \alpha^l u^l(t) + e(t). \quad (1)$$

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Table 1
Estimates of Phillips curve using national data.

Unemployment measure	Sample period							
	1985–2013	1998–2013	1985–2013	1998–2013	1985–2013	1998–2013	1985–2013	1998–2013
	Total		Short		Long		Short and long	
a	0.52		0.52		0.51		0.52	
	(0.23)		(0.22)		(0.23)		(0.23)	
ρ	0.50	0.14	0.61	0.35	0.44	0.04	0.59	0.15
	(0.17)	(0.21)	(0.17)	(0.12)	(0.19)	(0.16)	(0.23)	(0.18)
α^s	−0.11	−0.16	−0.28	−0.34	na	na	−0.24	−0.17
	(0.05)	(0.05)	(0.11)	(0.12)			(0.21)	(0.20)
α^l	−0.11	−0.16	na	na	−0.17	−0.24	−0.03	−0.14
	(0.05)	(0.05)			(0.08)	(0.08)	(0.15)	(0.15)
Wald test (p-value)								
$\alpha^s = 0, \alpha^l = 0$	0.03	0.01	0.02	0.01	0.04	0.01	0.05	0.01
Wald test (p-value)								
$\alpha^s = \alpha^l = 0$	na	na	na	na	na	na	0.54	0.92
R^2	0.69	0.57	0.69	0.53	0.68	0.54	0.69	0.57

Standard errors of coefficient estimates in parentheses under appropriate coefficient. Wald test (p-value) refers to the asymptotic χ^2 test.

We estimate this equation for the period from 1985 to 2013 and the more recent period from 1998 to 2013 using annual data.[1] In our empirical specification, we allow inflation expectations ($E\Delta p$) to be a function of a constant and the measure of expected inflation over the next 10 years from the Survey of Professional Forecasters for the 1985 to 2013 period.[2] We use the Consumer Price Index (excluding food and energy) as our price measure.

Results are reported in Table 1. We consider a range of cases: the first two columns report the case using the total unemployment rate (i.e., $\alpha^s = \alpha^l$)); columns 3 and 4 report the case using only short-term unemployment ($\alpha^l = 0$), while columns 5 and 6 report the case using only long-term unemployment ($\alpha^s = 0$). Finally, the last two columns allow for separate influences from short- and long-term unemployment.

A few results are clear. First, some type of Phillips curve relationship is present in the data, as all of the specifications with only one measure of unemployment show statistically significant coefficients on the unemployment measure. In addition, all of the equations fit quite similarly. Finally, consistent with Williams (2006), inertia is reduced in the most recent (1998–2013) period in each specification.

The reason previous analyses have taken the approach of looking at either short- or long-term unemployment, but not both, is clear in the last two columns: the coefficients on short- and long-term unemployment are very imprecisely estimated when each measure is allowed to enter. However, these coefficients are jointly highly significant in the statistical sense (as indicated by the p-value associated with the Wald test for the exclusion of these variables). Finally, due to the lack of precision, the Wald test for the equality of the coefficients on short- and long-term unemployment cannot reject this hypothesis.

3. A model to guide the analysis

We now provide an illustration of the problem and our approach to resolving these difficulties.

We start by observing, as in Fitzgerald et al. (2013), that the United States is composed of many regions, and it is plausible to consider Phillips curves at the regional level. Labor markets may be somewhat localized, implying that regional labor market conditions may affect costs (and hence prices) within a region. With these thoughts in mind, we suppose that price inflation in region i ($\Delta p(i,t)$) is related to regional and national factors in much the same way as assumed above:

$$\begin{aligned}\Delta p(i,t) = {} & aE\Delta p(i,t) + \rho_1 \Delta p(i,t-1) + \rho_2 \Delta p(t-1) \\ & + \alpha_1^s u^s(i,t) + \alpha_1^l u^l(i,t) + \alpha_2^s u^s(t) \\ & + \alpha_2^l u^l(t) + e^i(t). \end{aligned} \tag{2}$$

Note that this equation allows for independent roles for regional and national factors (in expectations, in inertia, and in the role of labor market factors). We have assumed symmetry across regions.

To demonstrate the challenges that arise using national data, we use a Monte Carlo approach. Specifically, we parameterize Eq. (2), simulate data from this parameterization, and then estimate Phillips curves using national and regional simulated data.

Our simulations assume symmetric regions. Focusing on the Phillips curve, we assume that inflation expectations are anchored (at a constant level), that inertia is local (with $\rho_1 = 0.5$ and $\rho_2 = 0$), and that short- and long-term unemployment enter the Phillips curve with equal coefficients and that these effects are local (with $\alpha_1^s = \alpha_1^l = 0.25$ and $\alpha_2^s = \alpha_2^l = 0$). Finally, we assume that the errors in the Phillips curve have a standard deviation of 1 and that the correlation between regions is 0.2.

For unemployment, we assume regional short- and long-term unemployment rates are the sum of a common and regional factor, both of which are auto-correlated. The common unemployment factor is an AR(2) process (where the coefficient on the first lag is 1.1 and that on the second is −0.5) whose innovation standard error is 0.4 percent. The regional factors for short-term and long-term unemployment are independent (within and across regions); this implies that the correlations between short- and long-term unemployment within and across regions are due to the common factor. The regional factors are AR(1) processes with a lag coefficient of 0.9 and an innovation standard error of 0.237.

(More details on the simulated model are provided in an appendix in the working paper version.)

This calibration roughly matches features of US data for CPI inflation and unemployment across the regions we use in our empirical analysis. In particular, we examine 24 large metropolitan areas in the United States for which we could gather the Consumer Price Index and measures of unemployment over the 1985–2013 period. An appendix presents more information on the data used in this study.

[1] Similar equations are explored in Ball and Mazumder (2011), Stock (2011), Gordon (2013), Krueger et al. (2014), Linder et al. (2014), Watson (2014), Williams (2006), Kiley (2007), and Boivin et al. (2010). Note that Kumer and Orrenius (2015) focus only on regressions using data from 1994 onward because of concerns related to the effect of the CPS redesign in 1994 on duration measures. According to Abraham and Shimer (2001), the effect of the redesign on long-term unemployment as defined herein (more than 26 weeks) was minimal (page 13). Researchers concerned about this issue may focus on the results for the later sample period.

[2] As the survey measure of expected inflation is essentially constant after 1998, expected inflation is proxied by the constant term in the 1998–2013 sample.