An Evaluation of the Inflationary Pressure Associated with Short- and Long-term Unemployment

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The views expressed are the authors, and not those of the Federal Reserve Board

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Overview

Motivation for our analysis

- In the years following 2009 (in the US), long-term unemployment has been very elevated while inflation has fallen only moderately
- Short-term unemployment has returned to near "normal" levels
- Is short-term unemployment the relevant measure for price pressures?
  - Some theoretical motivations for a different role for short-term unemployment
    - Recently unemployed more likely to be marginal worker
    - Blanchard and Summers (1988), Layard, Nickells, and Jackman (1991) or Blanchard and Diamond (1994)
  - Empirical studies: Ball and Mazumder (2011), Economic Report of the President (2014), Gordon (2013), Linder, Peach, and Rich (2014), Krueger, Cramer, and Cho (2014), or Rudebusch and Williams (2014)

Previous Empirical Evidence (and problems with their approach)

Previous approach

- Consider approach of Rudebusch and Williams: 1960-2013 sample period

$$\Delta p(t) = \Sigma_{j=-1}^{2} \alpha_j \Delta p(t-j) - 0.27 u^{sr}(t) - 0.02 u^{lr}(t)$$

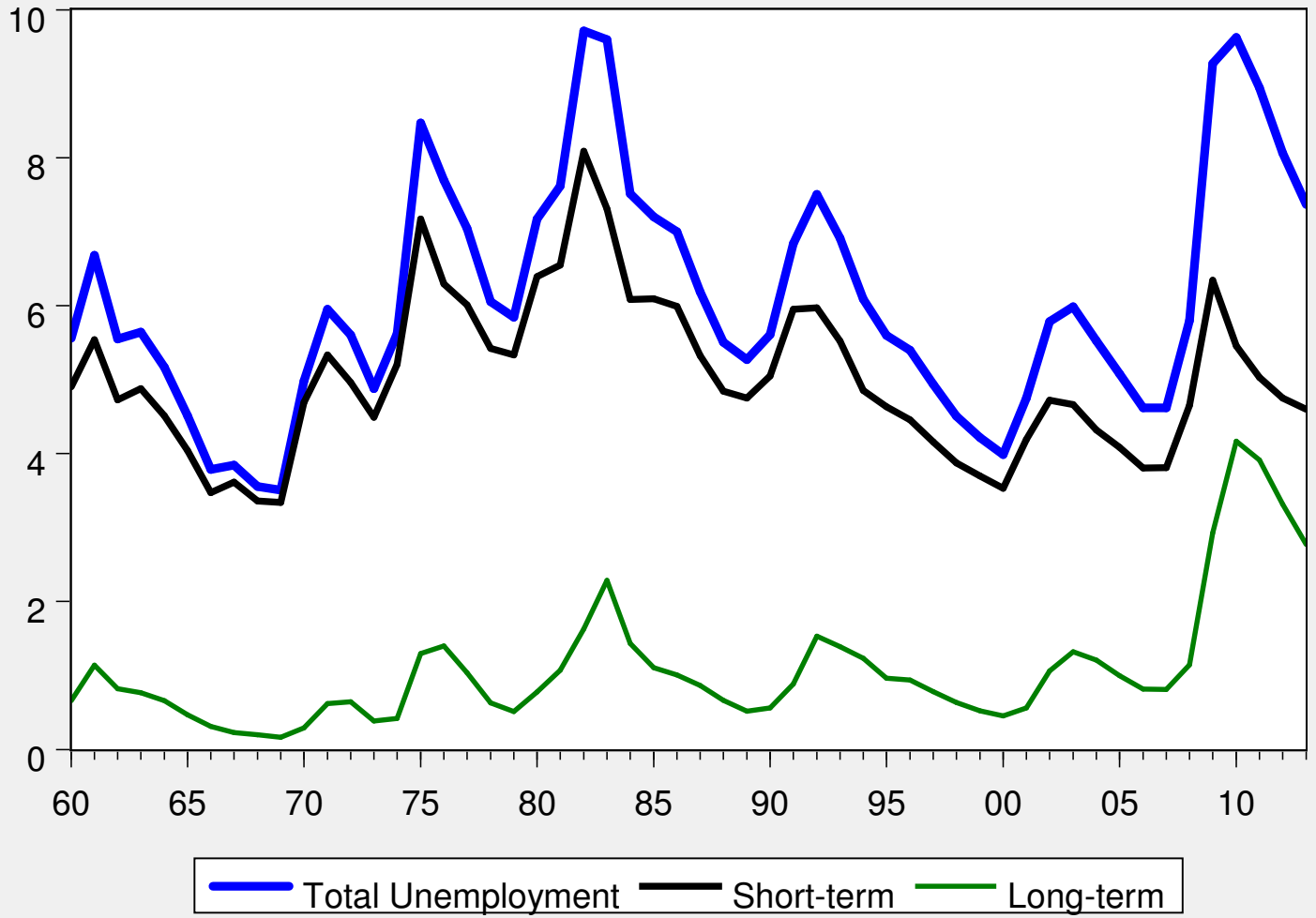
- Short-run unemployment coefficient large and (very) "statistically significant"; long-run coefficient effectively zero
- This equation has problems
  - Expectations anchored since late 1990s, and parameters on lags can shift notably – affecting other coefficients (e.g., Williams (2006), Kiley (2009))
  - Post-Volcker monetary policy approach results in important shift in the effect of slack on inflation in a reduced-form approach (e.g., Boivin, Kiley, and Mishkin (2010))
  - These effects are borne out strongly in the data (e.g., Andrews-Quandt test suggests instability)

Previous approach, recent decades

Estimate Phillips curve using national data

	Sample Period							
	1985-2013	1998-2013	1985-2013	1998-2013	1985-2013	1998-2013	1985-2013	1998-2013
Unemployment Measure	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

Seeing the problem



An Illustration of the Problem and a Solution

The problem and a solution

- Problem: multicollinearity
- Solution: Use more data
  - Problem with this solution: Ball and Mazumder (2011) suggestion (wait a few years) takes too long (because a few years will not do it!)
  - Alternative: Exploit cross-section
  - but this will only work if there is sufficient cross-sectional variation and regional factors matter
- Monte Carlo example suggests this approach has some hope

New Empirical Evidence

Approach

Estimate Phillips curve including regional factors

24 U.S. metropolitan regions

$$\Delta p(i,t) = aE\Delta p(i,t) + \rho_1 \Delta p(i,t-1) + \rho_2 \Delta p(t-1) \\ +\alpha_1^s u^s(i,t) + \alpha_1^l u^l(i,t) + +\alpha_2^s u^s(t) + \alpha_2^l u^l(t) + e^i(t). \quad (1)$$

- Examine magnitude of short- and long-term unemployment responses
- Examine role of regional variation
- Include controls for regional and time-varying factors
- Relax accelerationist restriction

Results

	Sample Period and Specification					
	National Data			Metropolitan Data		
	1985-2013	1998-2013	1985-2013	1998-2013	1985-2013	1998-2013
a	0.52		0.42		na	na
	(0.23)		(0.22)			
ρ_1			0.43	0.42	0.44	0.15
			(0.23)	(0.09)	(0.05)	(0.28)
ρ_2	0.59	0.15	0.25	-0.18	na	na
	(0.23)	(0.28)	(0.22)	(0.27)		
α_1^s			-0.21	-0.17	-0.22	-0.17
			(0.05)	(0.09)	(0.05)	(0.15)
α_1^l			-0.27	-0.29	-0.27	-0.14
			(0.07)	(0.09)	(0.07)	(0.15)
α_2^s	-0.24	-0.17	-0.14	-0.13	na	na
	(0.21)	(0.20)	(0.21)	(0.25)		
α_2^l	-0.03	-0.14	0.29	0.20	na	na
	(0.15)	(0.15)	(0.17)	(0.18)		
Wald test (p-value)						
$\alpha^s = 0, \alpha^l = 0$	0.05	0.01	0.00	0.00	0.00	0.00
Wald test (p-value)						
$\alpha^s = \alpha^l$	0.54	0.92	0.28	0.54	0.57	0.46
Wald test (p-value)						
$\alpha_2^s = 0, \alpha_2^l = 0$			0.11	0.47	na	na
Regional fixed effects	No	No	Yes	Yes	Yes	Yes
Time-period fixed effects	No	No	No	No	Yes	Yes

Wrapping up

Subsequent work and conclusions

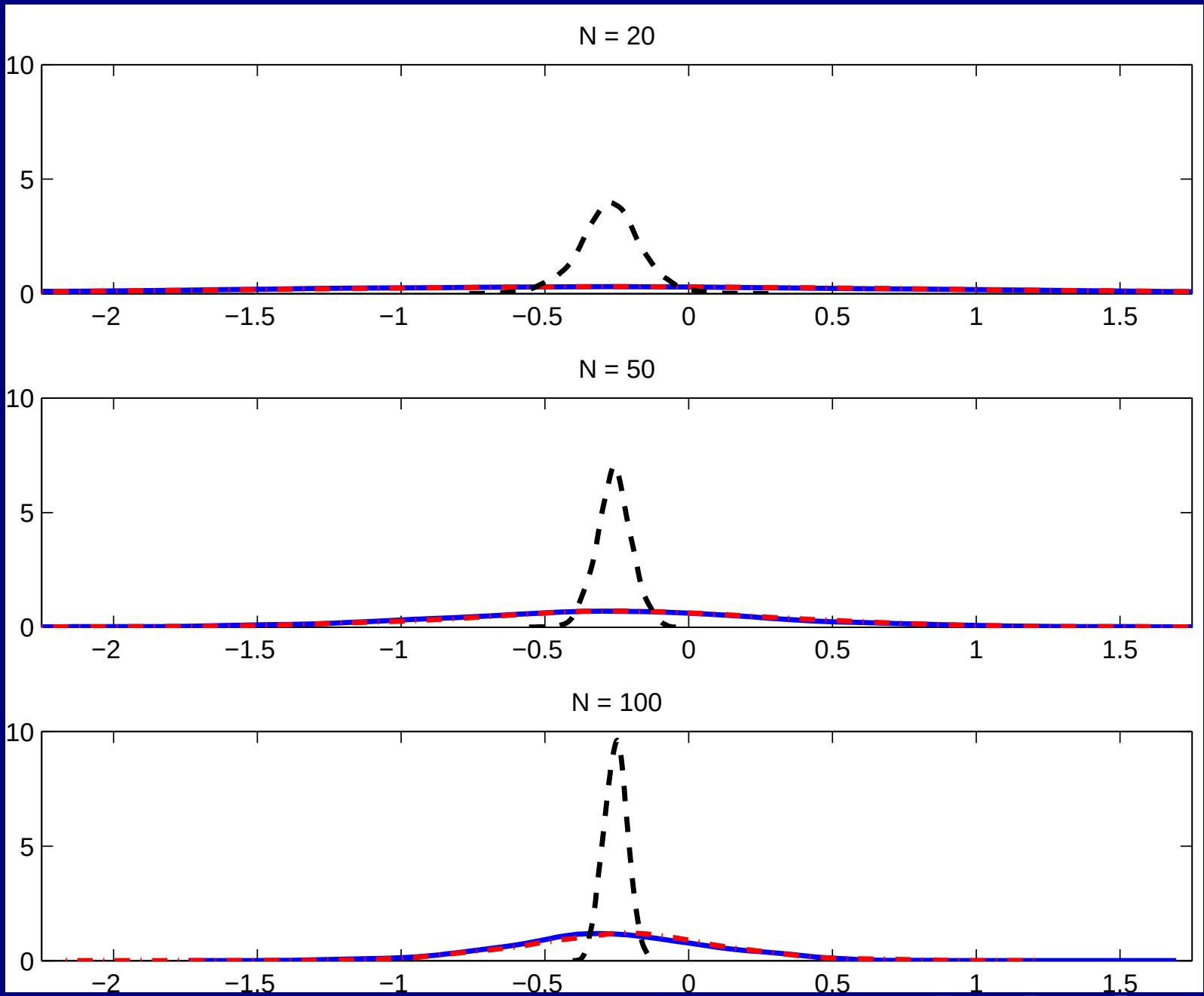
- Consider wages: Smith (2014) and Blanchflower and Posen (2014)
  - Similar findings
- Takeaways
  - Previous work has had a hard time answering the question
  - This should be expected given the data-generating process
  - Demonstrate this with a simple model/simulation exercise
  - Exploit more data (regional) and find little difference (historically) in the effects of short- and long-term unemployment on inflation

Additional Slides

Monte Carlo Experiment: DGP

	Consumer Price Index (excluding food and energy)			
	Data		Simulated	
	National	Regional	National	Regional
Standard Deviation	1.1	1.3	0.8	1.3
Autocorrelation	0.9	0.7	0.7	0.6
Average pairwise Correlation across regions	0.3		0.3	
	Unemployment, Short-term			
	Data		Simulated	
	National	Regional	National	Regional
Standard Deviation	0.8	1.0	0.7	0.9
Autocorrelation	0.7	0.7	0.7	0.8
Average pairwise Correlation across regions	0.5		0.6	
	Unemployment, Long-term			
	Data		Simulated	
	National	Regional	National	Regional
Standard Deviation	1.0	1.0	0.7	0.9
Autocorrelation	0.8	0.8	0.7	0.8
Average pairwise Correlation across regions	0.8		0.6	

Estimates with National Data



Estimates with Regional Data