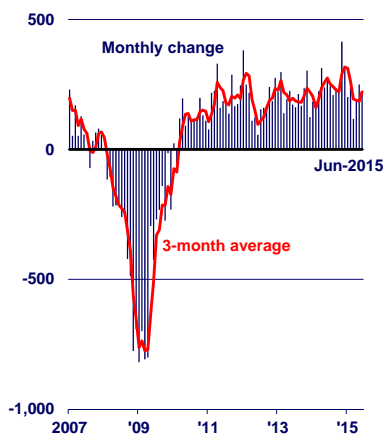

Wages

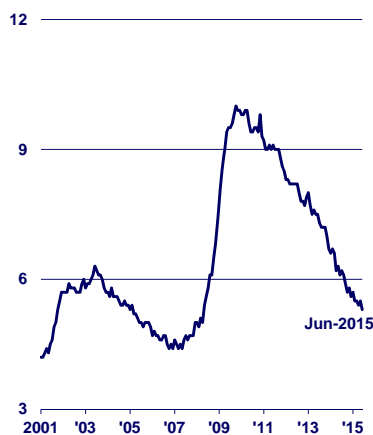
Daniel Aaronson
Vice President and Director of Microeconomic Research
Federal Reserve Bank of Chicago

Labor Market Trends Still Positive on Balance

Private Nonfarm Payroll Employment
(change, thousands)

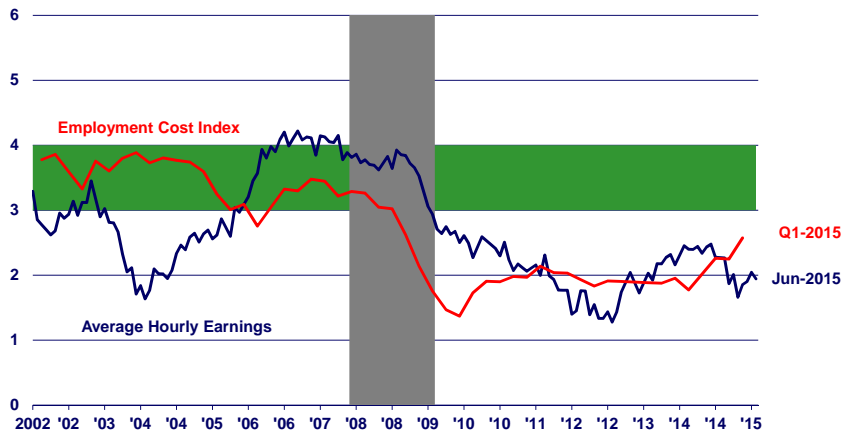


Unemployment Rate
(percent)



But Wage Growth Remains Disappointing

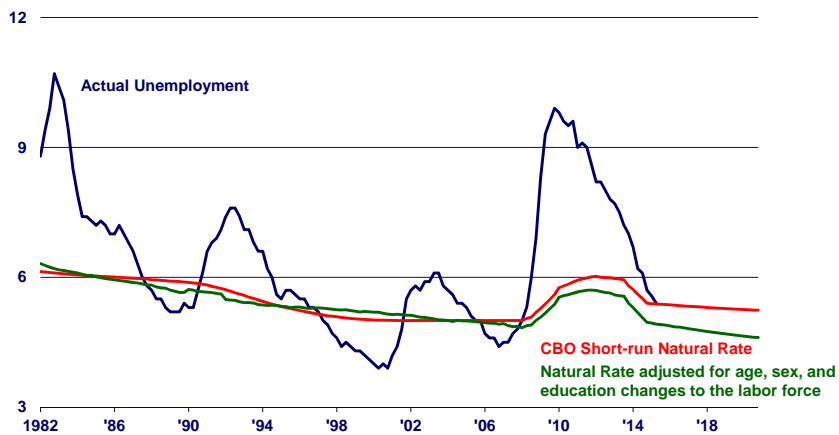
Hourly Compensation
(4-quarter percent change)



3

Even With Unemployment at CBO's U*

Unemployment Rate
(percent)



4

Additional Labor Market Slack Measures

- **Many other possible measures of slack in addition to standard unemployment rate**
 - Labor force participation rate versus its trend
 - Employment to population ratio versus its trend
 - [Gap between payroll employment and its trend](#)
 - Involuntary part time
 - Vacancy rate
 - Quit rate
 - Job finding rate

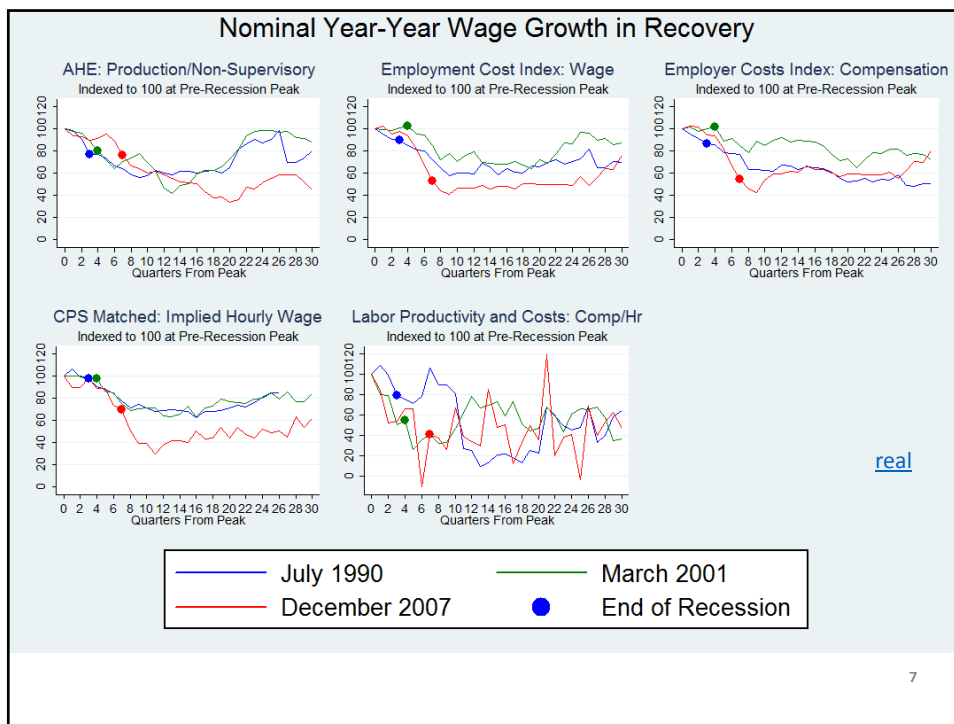
Aaronson, Hu, Seifoddini, and Sullivan, Economic Perspectives, 2014 Q4.
 Aaronson, Hu, Seifoddini, and Sullivan, Chicago Fed Letter, 2015.

5

Some topics/questions

- **Given labor market conditions, is wage growth lower than we would expect?**
 - Why?
- **Which measure(s) of wage growth should we use?**
 - Relationship to stuff we care about: U
 - The flexibility of micro data (CPS) – leaking into next section.
- **When might wage growth accelerate?**
 - State-level Phillips Curves
 - Measures of wage rigidity
 - JOLTS quits (more micro data)
- **And price inflation...?**
 - Relationship to stuff we care about: π
 - Granger causality

6



Why? Decomposing wage growth

- **Definition of labor share:** $\alpha_t = \frac{w_t}{p_t A_t}$ where w_t is the nominal wage per hour, p_t is the output price, and A_t is labor productivity (output per hour).
- **Decompose nominal wage growth into three pieces:**

$$d \ln w_t = \pi_t + d \ln A_t + d \ln \alpha_t$$

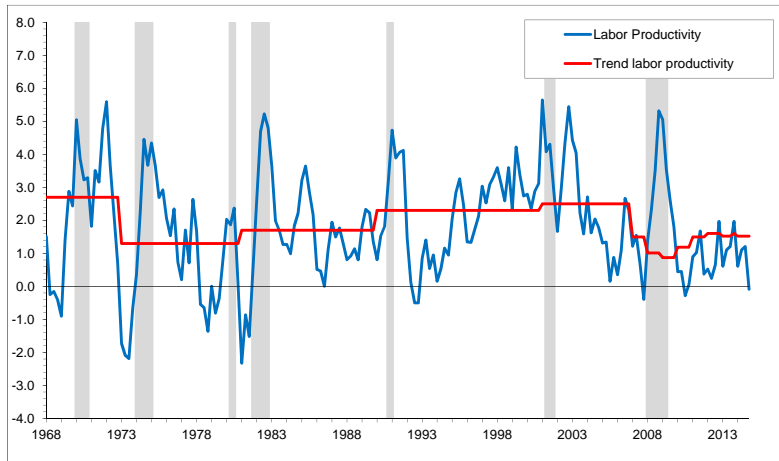
$$d \ln w_t^* = \underbrace{\pi_t^* + d \ln A_t^*}_{\text{usual}} + d \ln \alpha_t^* \quad \leftarrow * = \text{trend}$$
- **→ Estimate nominal wage growth gap = inflation gap, labor productivity growth gap, labor share growth gap, and residual.**
 - π_t : PCE, SPF 10 year ahead trend PCE inflation
 - $d \ln A_t$: LP, our own trend estimates spliced with CBO's
 - $d \ln \alpha_t$: From Board of Governors (FRB-US)

8

Lisa Barrow and Jason Faberman, forthcoming Chicago Fed Letter, 2015.

Productivity growth sucks

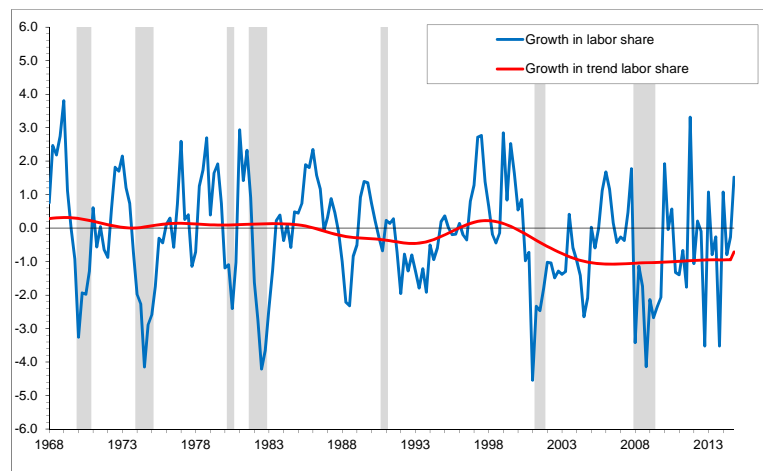
Growth in labor productivity, actual and trend



9

FRB-US trend labor share falling and faster than data. Actually pulling wage gap up!

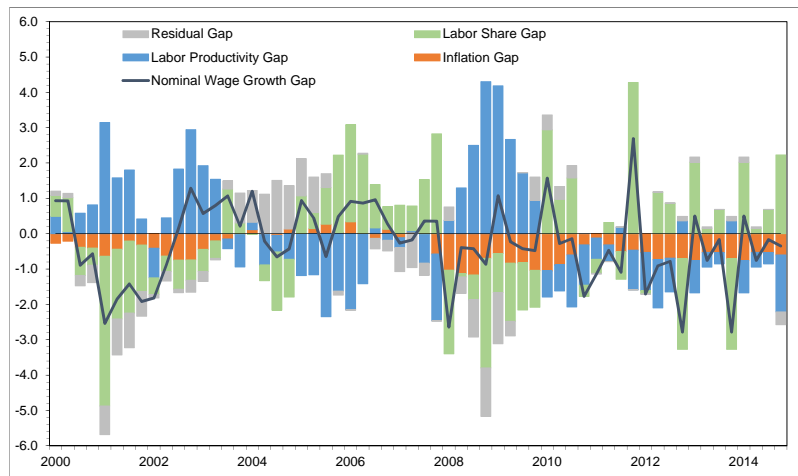
Growth in labor share, actual and trend



10

The culprits

Decomposition of the nominal wage growth gap

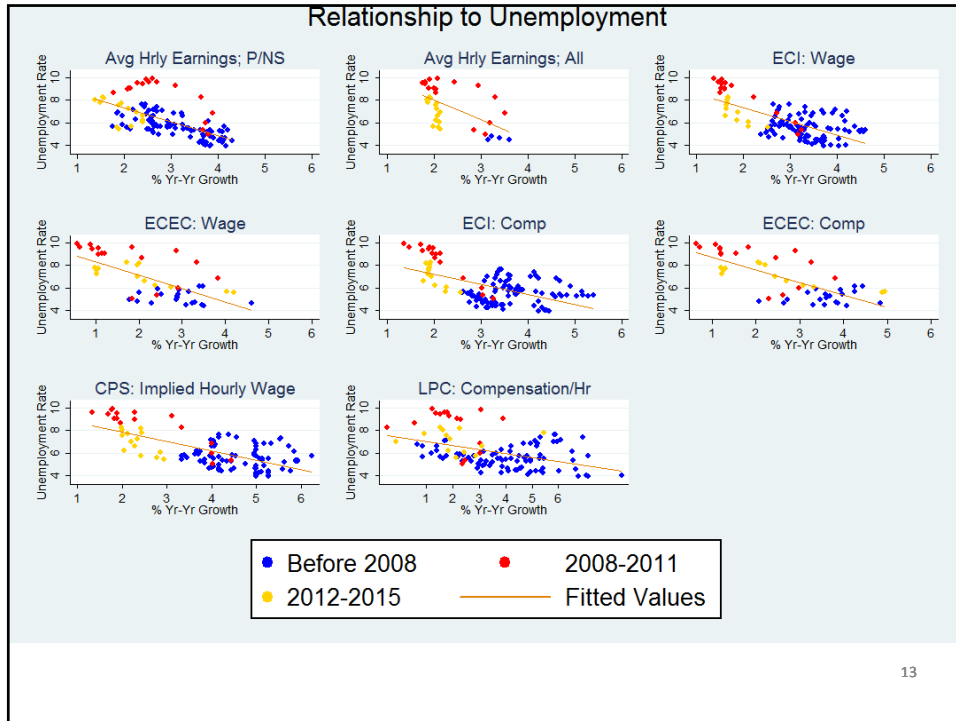


11

Lisa Barrow and Jason Faberman, forthcoming Chicago Fed Letter, 2015.

Which measure should we pay attention to?

12



Which measure should we pay attention to?

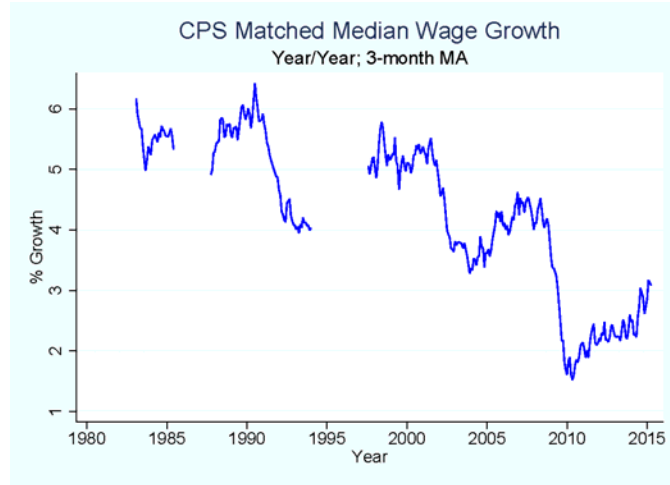
Correlation with unemployment

	Unemployment rate 2003Q1-	Unemployment rate 1985Q1-
AHE, P/NS	-0.53	-0.66
AHE, All	-0.63	
ECI, wages	-0.86	-0.68
ECI, total comp	-0.81	-0.56
ECEC, wages	-0.68	
ECEC, bonuses	-0.38	
ECEC, total comp	-0.75	
Comp/hr, prod	-0.60	-0.43
CPS matched, hourly workers	-0.83	-0.68
CPS matched, all	-0.85	-0.68

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Particularly robust applause for the CPS

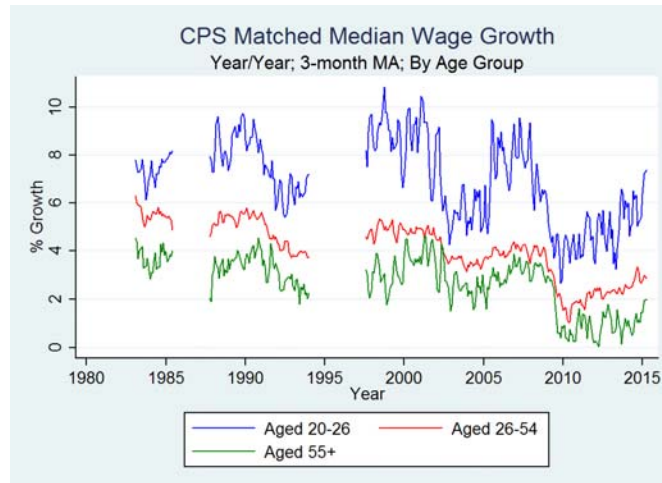
- **Monthly mini-Census of households**
 - In for 4 months, out for 8, in for 4. Earnings asked twice (mos 4 & 8)



15

Particularly robust applause for the CPS

- **Monthly mini-Census of households**
 - Combined with basic CPS questions about demographics, location, education, occupation, industry, immigration, etc.

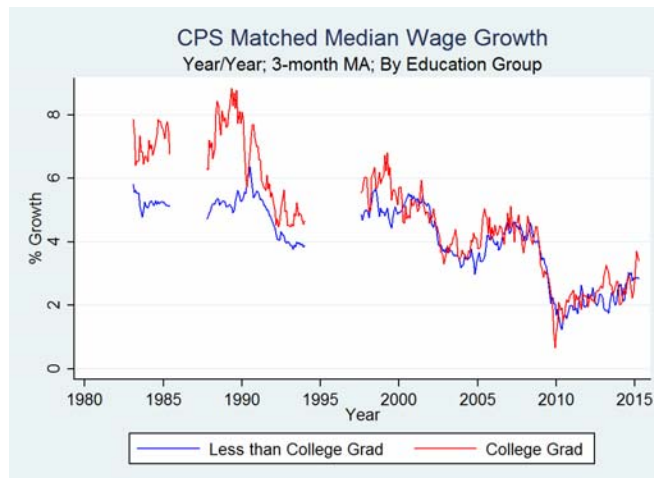


16

Particularly robust applause for the CPS

■ Monthly mini-Census of households

- Combined with basic CPS questions about demographics, location, education, occupation, industry, immigration, etc.



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Particularly robust applause for the CPS

■ Not without its issues

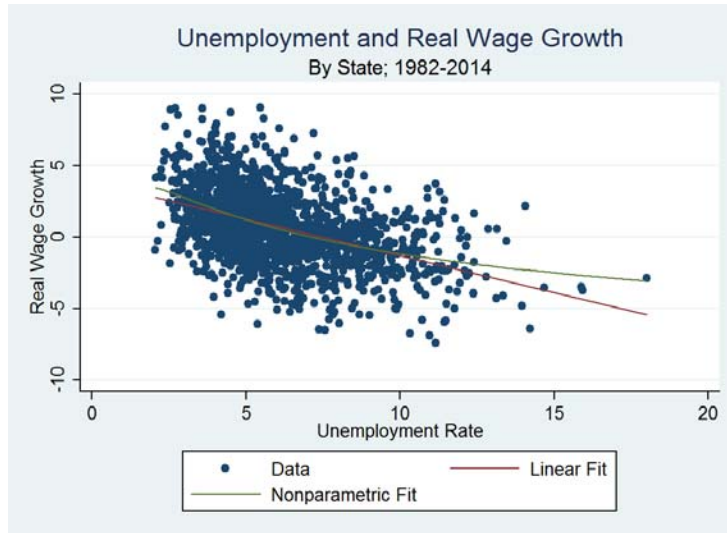
- Top coding means can't say anything about high wage folks. And job growth has been stronger in high wage occupations this expansion. [Graph](#)
- Nonsensical wages (< MW) are not uncommon.
- Selection problem. Who has a wage in two periods, one year apart. (one explanation for high level)
- Includes the impact of a year of experience and maybe tenure. Should be biased up by rate of return. (another explanation for high level)
- Doesn't include non-wage compensation.

■ That said, its flexibility and timeliness is super valuable.

- Examples: Heterogeneity, Phillips Curves, Wage rigidity

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Neat stuff to do with micro data:
States as “mini-economies”



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Neat stuff to do with micro data:
States as “mini-economies”

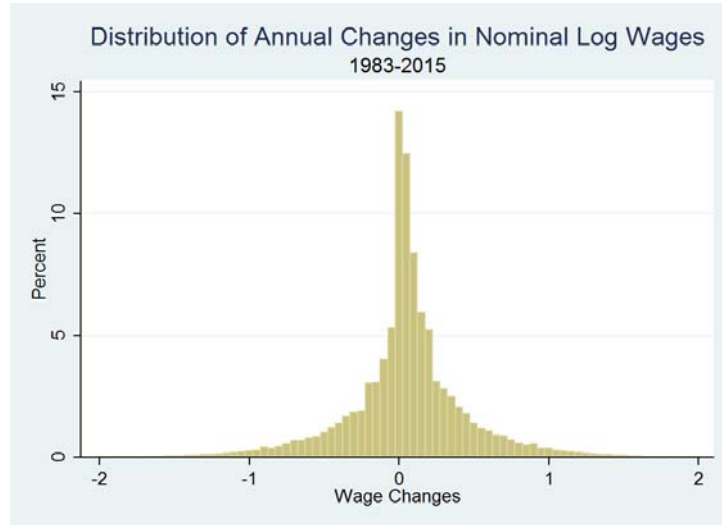
State Phillips Curves

	1982-2014	1994-2014	1982-2014	1982-2014
UR < 6 weeks	0.014 (0.097)	0.267 (0.216)	0.124 (0.107)	-0.015 (0.105)
UR 6-25 weeks	-0.723 * (0.102)	-0.598 * (0.144)	-0.539 * (0.102)	-0.671 * (0.104)
UR 26+ weeks	-0.303 * (0.077)	-0.170 (0.092)	-0.059 (0.098)	-0.235 * (0.087)
PT for econ			-0.404 * (0.086)	
PT for non-econ				0.083 * (0.026)
“Wage gap” in 2015Q2 Relative to 2005-07 average	-0.3	-0.2	-0.6	-0.3
Due to UR 6-25 wks	-0.1	-0.1	-0.1	-0.1
Due to UR 26+	-0.2	-0.1	0.0	-0.2
Due to PT econ			-0.5	

20

Aaronson and Jordan, Chicago Fed Letter, 2014.

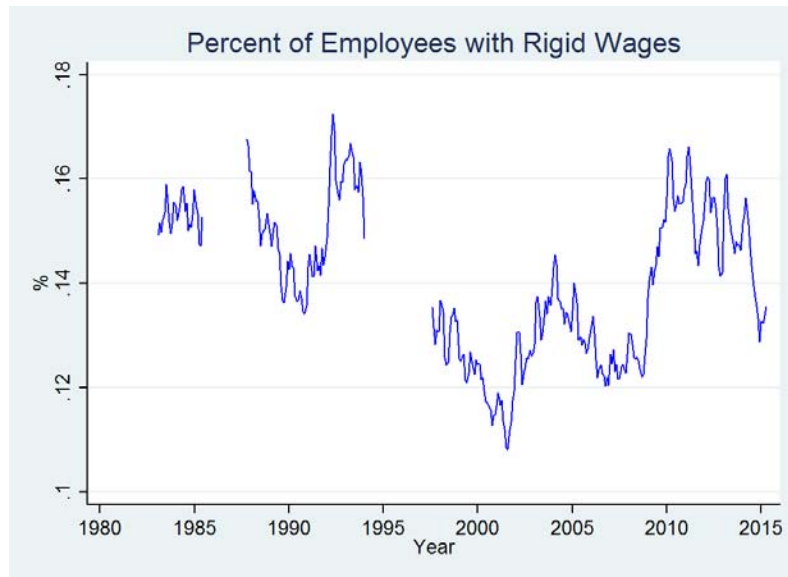
Neat stuff to do with micro data:
Nominal wage rigidity



See, e.g., Mary Daly and Bart Hobijn, FRBSF Economic Letter, January 5, 2015.

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Neat stuff to do with micro data:
Nominal wage rigidity



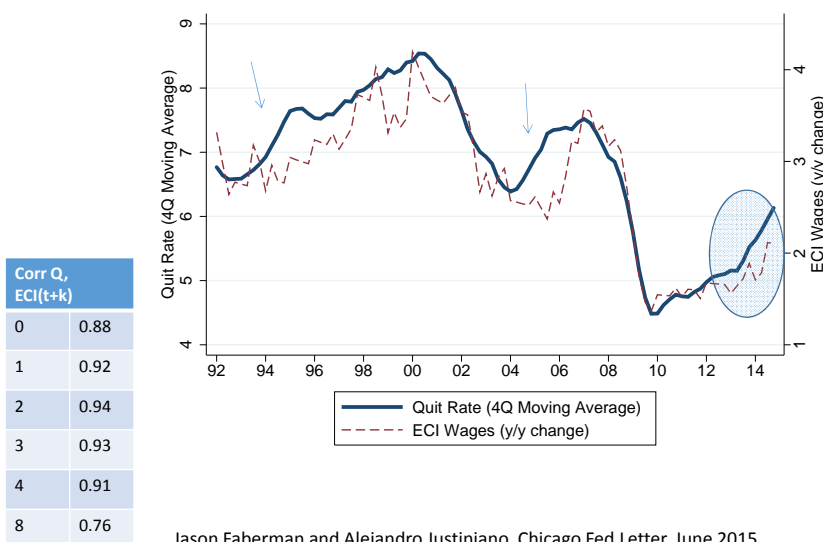
22

Neat stuff to do with micro data: Nominal wage rigidity

	Wage growth, 1983-2014			UR, 1983-2014
Percent rigid wage	-0.224 * (0.035)	-0.138 * (0.030)	-0.096 * (0.032)	0.240 * (0.043)
UR < 6 weeks		0.069 (0.107)	0.141 (0.110)	
UR 6-25 weeks		-0.650* (0.115)	-0.519 * (0.112)	
UR 26+ weeks		-0.232 * (0.091)	-0.059 (0.102)	
PT for econ			-0.351 * (0.097)	
“Wage gap” in 2015Q2 Relative to 2005-07 average	-0.1	-0.3	-0.5	
Due to perc rigid wg	-0.1	-0.1	-0.1	
Due to UR 6-25 wks		-0.1	-0.1	
Due to UR 26+		-0.2	0.0	
Due to PT econ			-0.3	

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Neat stuff to do with micro data: JOLTS and job switching

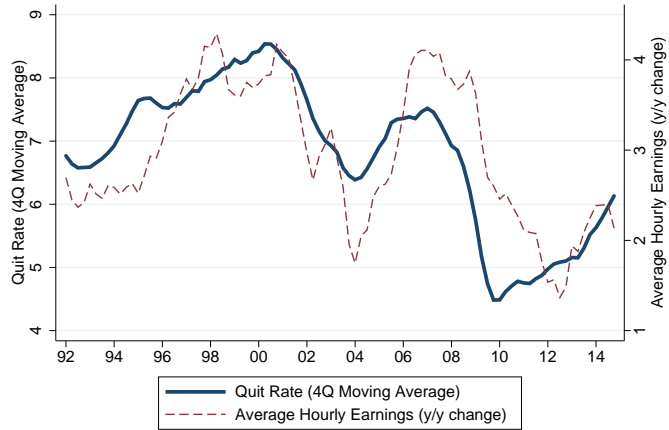


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Jason Faberman and Alejandro Justiniano, Chicago Fed Letter, June 2015.
Davis, Faberman, and Haltiwanger, 2012, Journal of Monetary Economics.

Neat stuff to do with micro data: JOLTS

Corr Q, ECI(t+k)	
0	0.66
1	0.71
2	0.76
3	0.77
4	0.78
8	0.69

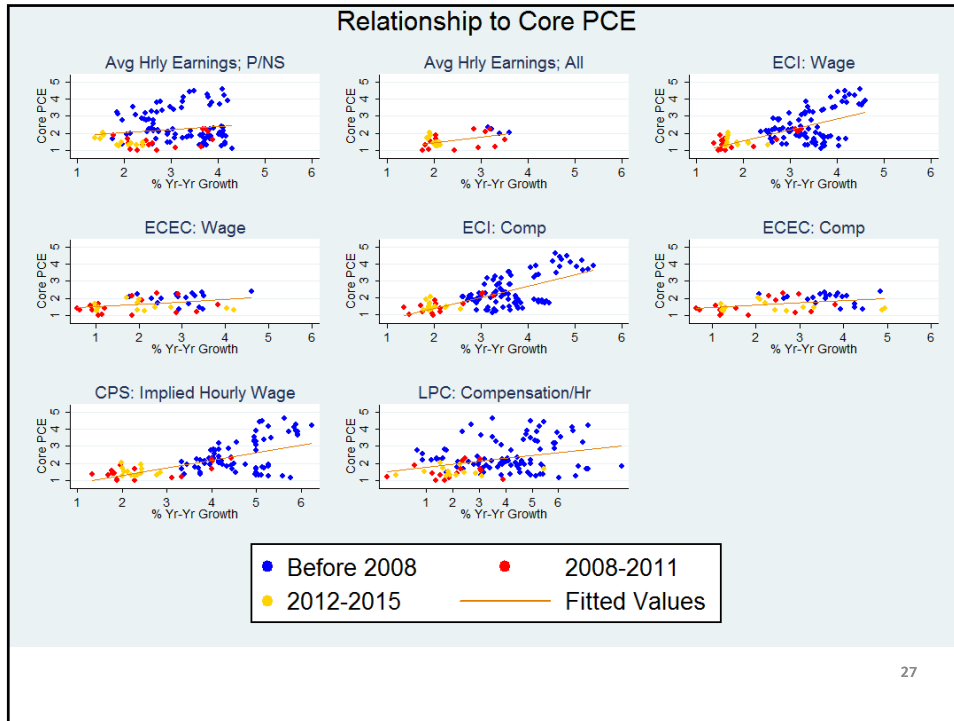


Jason Faberman and Alejandro Justiniano, Chicago Fed Letter, June 2015.
Davis, Faberman, and Haltiwanger, 2012, Journal of Monetary Economics.

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Which measure should we pay attention to? Relationship with inflation

26



Which measure should we pay attention to?

Correlation with inflation, unemployment, 2003:Q1-2015:Q1

	Unemployment rate	PCE	Core PCE
AHE, P/NS	-0.53	0.34	0.47
AHE, All	-0.63	0.43	0.50
ECI, wages	-0.86	0.63	0.70
ECI, total comp	-0.81	0.72	0.60
ECEC, wages	-0.68	0.48	0.42
ECEC, bonuses	-0.38	0.13	0.30
ECEC, total comp	-0.75	0.54	0.42
Comp/hr, prod	-0.60	0.57	0.46
CPS matched, hourly workers	-0.83	0.62	0.66
CPS matched, all	-0.85	0.68	0.70

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Which measure should we pay attention to?

Correlation with inflation, unemployment, 1985:Q1-2015:Q1

	Unemployment rate	PCE	Core PCE
AHE, P/NS	-0.66	0.28	0.16
AHE, All			
ECI, wages	-0.68	0.53	0.61
ECI, total comp	-0.56	0.71	0.68
ECEC, wages			
ECEC, bonuses			
ECEC, total comp			
Comp/hr, prod	-0.43	0.33	0.33
CPS matched, hourly workers	-0.68	0.50	0.58
CPS matched, all	-0.68	0.53	0.59

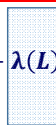
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Does wage growth cause inflation? Or vice-versa?

■ Granger causality test

$$\Delta\pi_t^p = \alpha(\pi_{t-1}^p - \pi_{t-1}^w) + \lambda(L)\Delta\pi_{t-1}^w + \gamma(L)\pi_{t-1}^p + X_t\beta + \varepsilon_t$$

↑
Error correction



↑
Own lags

↑
Supply/demand shocks

P-value of $H_0: \lambda(L)=0$.

π_t^p = GDP deflator, π_t^w = Unit labor costs

	$\pi^w \rightarrow \pi^p$	$\pi^p \rightarrow \pi^w$
1986Q1-2015Q1	0.16	0.00
2000Q1-2015Q1	0.27	0.05
1986Q1-2007Q4	0.41	0.02

If use
PCE, ECI

30

Luoja Hu and Maude Toussaint, Economic Perspectives, 2010, 2nd quarter.

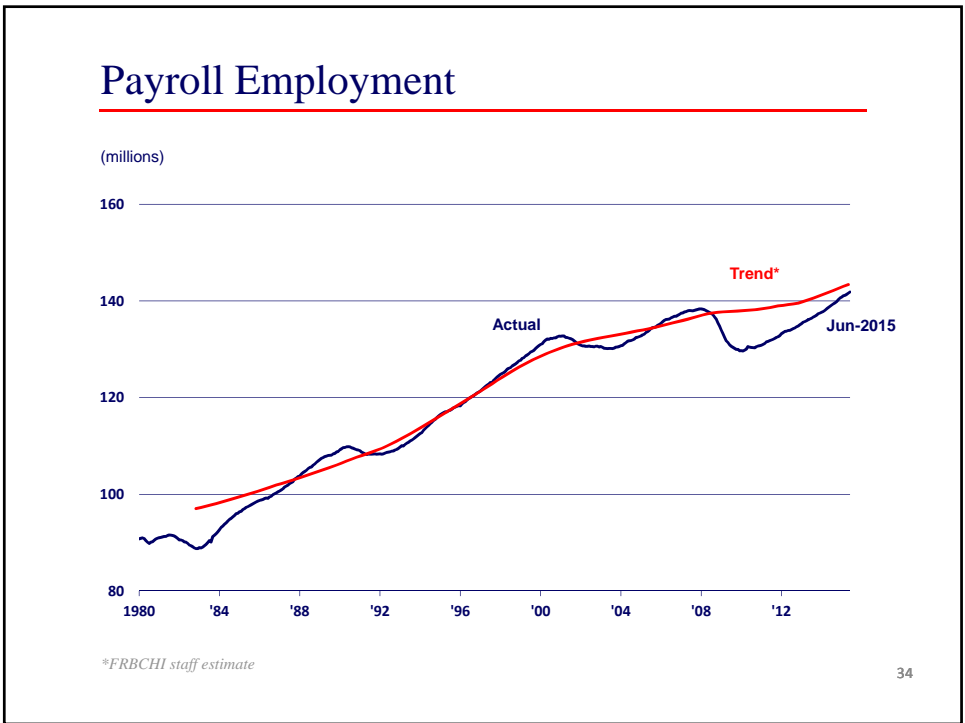
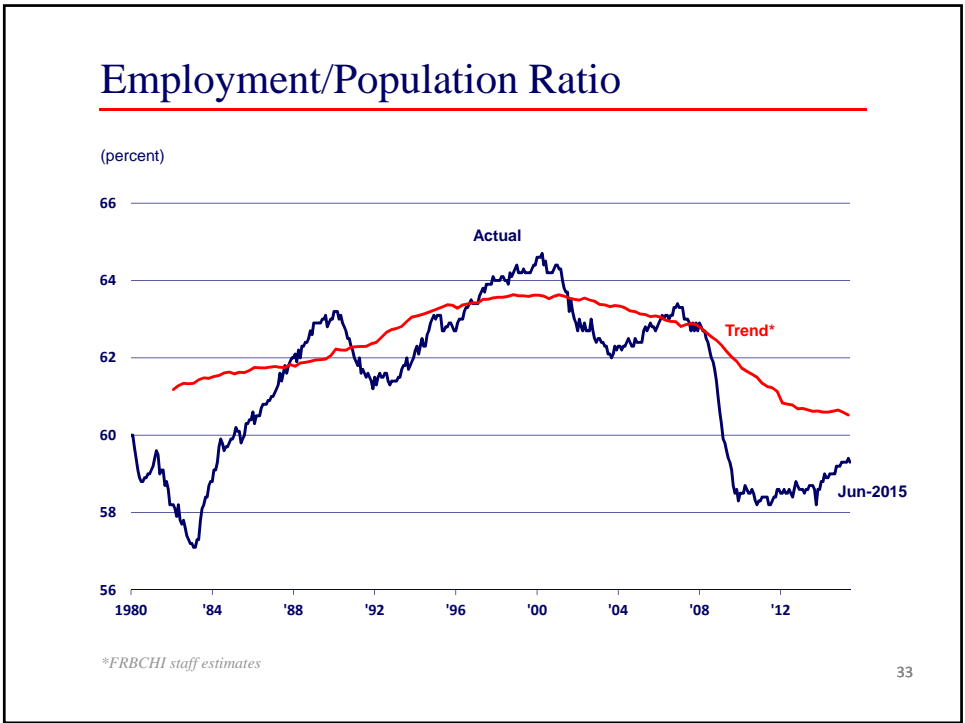
Conclusion

- **Wage growth is another measure of labor market performance.**
 - Might be an alternative way to think about how close the economy is to steady-state. But lots of issues.
- **There are many wage measures.**
 - They don't all same the same thing at the same time. Nor should they.
 - In the past, some (ECI, CPS?) have performed a little better than others along some metrics.
- **Micro data can be quite valuable.**

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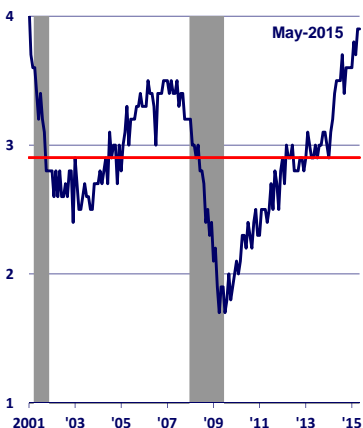
Extra slides

32

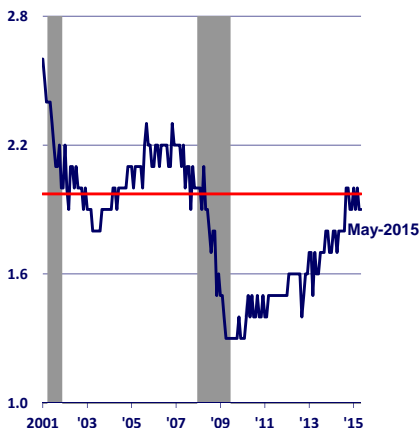


Job Openings and Turnovers

Vacancy Rate (JOLTS Survey)
(SA, percent)



Quits Rate (JOLTS Survey)
(SA, percent)



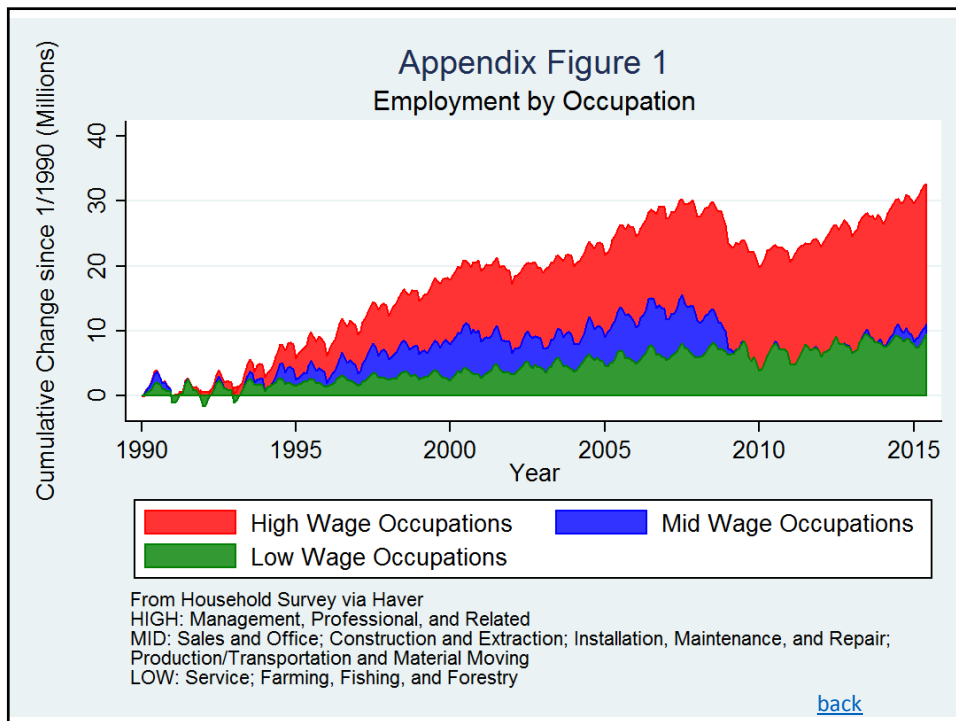
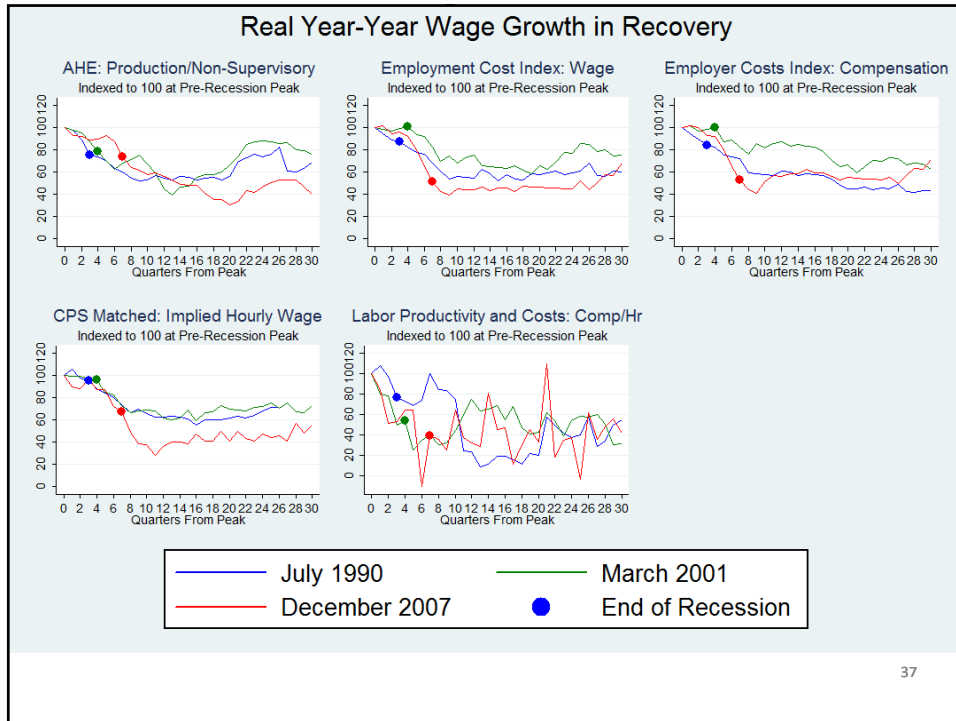
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Exit Rate from Unemployment to Employment

(% of Unemployed)



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Does wage growth cause inflation? Or vice-versa?

■ Granger causality test

$$\Delta\pi_t^p = \alpha(\pi_{t-1}^p - \pi_{t-1}^w) + \lambda(L)\Delta\pi_{t-1}^w + \gamma(L)\pi_{t-1}^p + X_t\beta + \varepsilon_t$$

↑ Error correction ↑ Own lags ↑ Supply/demand shocks

P-value of $H_0: \lambda(L)=0$.

π_t^p = PCE core, π_t^w = ECI wages

	$\pi^w \rightarrow \pi^p$	$\pi^p \rightarrow \pi^w$
1986Q1-2015Q1	0.48	0.71
2000Q1-2015Q1	0.34	0.56
1986Q1-2007Q4	0.45	0.30

39

Luojia Hu and Maude Toussaint, Economic Perspectives, 2010, 2nd quarter.