Reservation wages and the wage flexibility puzzle

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June 2014

Introduction

- Empirical evidence suggests that wages are not very responsive to the business cycle
  - Benchmark estimate of unemployment elasticity of wages: -0.1 (Blanchflower and Oswald 1994)
  - not a universal constant but in the right ballpark
  - Shocks to labor demand have a much larger short-run impact on unemployment rather than wages.
- The search-and-matching labor market model struggles to quantitatively replicate these results
- Large literature on the "wage flexibility puzzle"
  - how can the model be fixed to deliver predictions in line with evidence
  - natural fix consists in introducing some degree of wage rigidity
- This paper argues that the search behavior of the unemployed (reservation wages) has clear implications for wage cyclicality
- Focus on reservation wages sheds light on puzzle

The wage flexibility puzzle (I)

- Shimer (2005) argues that the Mortensen and Pissarides (1994) model lacks an amplification mechanism, i.e. it generates too little fluctuations in unemployment, given plausible productivity shocks.
- Puzzle boils down to excess wage cyclicality, which mutes response of quantities
- Wages in reality are less cyclical than implied by standard model calibrations, thus elements of wage stickiness would improve model predictions
- Simplest element of stickiness: high replacement ratios (more generally, high value of nonmarket time, Hagedorn and Manovskii, 2008). But implied replacement ratios are implausibly high (0.95).
- Approach criticized by Costain and Reiter (2008) and Pissarides (2009) as it delivers excess sensitivity of unemployment to policy changes.

The wage flexibility puzzle (II)

- Pissarides (2009) shows that acyclical (vs procyclical) hiring costs reduce predicted wage cyclicality.
- Robin (2011) indicates endogenous job destruction as mechanism amplifying the impact of productivity shocks on unemployment. A relatively high replacement ratio is still needed.
- Infrequent wage negotiation also helps address the puzzle (Hall 2005, Pissarides 2009, Haefke et al 2008)
- Barnichon (2012) shows that wage flexibility estimates are downward biased by endogenous response of (measured) productivity to non-tech shocks.

This paper's approach

- Use canonical model to obtain a relationship between wages and unemployment (wage curve), which is independent of labor demand shocks - and can be easily estimated
- Under plausible assumptions reservation wages are the main cyclical component of wages
- If reservation wages are not cyclical, neither are wages
- Cyclicality question directly shifted on reservation wages
- Evidence on these predictions from micro data on (reservation) wages for UK and Germany
- Discuss alternative views on reservation wage formation

Approach

Approach is general in a few important aspects:

- allows for infrequent wage negotiation, which is a recognized element of wage rigidity;
- focuses on a general wage curve, which can be obtained from Nash bargaining in search model, but is also consistent with alternative wage setting models;
- does not require to estimate a relationship between productivity shocks and unemployment.

The Model

Matching model with infrequent wage negotiation
(staggered wage setting à la Calvo 1983, Gertler and Trigari 2009).

- Wages are negotiated at the start of a job-worker match, and reflect the PDV of future expected labor market conditions
- Afterwards, opportunities to renegotiate wages happen infrequently.
- A fraction of wages in the economy thus reflect past negotiations.
- This assumption has implications for cyclicality.
- And is consistent with evidence that wages in new jobs are more cyclical than wages in continuing jobs.
- Obtain simple implications for the elasticity of wages to unemployment under alternative scenarios.

The Model: Matching

- Workers find jobs at rate λ; and lose jobs at rate s.
- Steady state unemployment:

$$u = \frac{s}{s + \lambda}.$$

The Model: Firms

- Wages in new jobs negotiated according to standard rent sharing
- But opportunity to renegotiate wages in existing jobs only arrives at Poisson rate ϕ
- Value of a vacant job at time t, $V(t)$

$$rV(t) = -c(t) + q(t)\left[J(t; w(t)) - V(t) - C(t)\right] + E_t \frac{\partial V(t)}{\partial t}$$

- Value at time t of a job paying w, $J(t; w)$

$$\begin{aligned} rJ(t; w) &= p(t) - w - s\left[J(t; w) - V(t)\right] + \phi\left[J(t; w(t)) - J(t; w)\right] \\ &\quad + E_t \frac{\partial J(t; w)}{\partial t} \end{aligned}$$

- Free entry: $V(t) = 0$

$$J(t; w(t)) = C(t) + \frac{c(t)}{q(\theta_t)}$$

The Model: Workers

- Value of being unemployed at time t

$$rU(t) = z + \lambda(t)\left[W(t; w(t)) - U(t)\right] + E_t \frac{\partial U(t)}{\partial t}$$

- Value at time t of being employed in a job that pays w

$$\begin{aligned} rW(t; w) &= w - s\left[W(t; w) - U(t)\right] + \phi\left[W(t; w(t)) - W(t; w)\right] \\ &\quad + E_t \frac{\partial W(t; w)}{\partial t} \end{aligned}$$

The Model: Wage determination

- Standard sharing of surplus

$$w(t) = \arg\max \left[W(t;w) - U(t)\right]^{\beta} \left[J(t;w) - V(t)\right]^{1-\beta}$$

- After substituting firm's value functions

$$W(t;w(t)) - U(t) = \frac{\beta}{1-\beta}\left[\frac{c(t)}{q(t)} + C(t)\right] \equiv \mu(t).$$

- $\mu(t)$ is mark-up of employment over outside options
- Substitute worker's value functions

$$w(t) = z + (r+s+\phi)\left[\mu(t) + E_t \int_t e^{-(r+s+\phi)(\tau-t)}(\lambda(\tau)-\phi)\mu(\tau)d\tau\right]$$

- Wages embody expectations over future labor market conditions $\lambda(\tau)$ and the effective discount rate is $r+s+\phi$

Wages cyclicality: Steady state

Current labor market conditions expected to last forever.

$$w = z + \mu(r + s + \lambda)$$

Given $u = s/(s+\lambda)$:

$$w = z + \mu\left(r + \frac{s}{u}\right)$$

- Assume acyclical hiring costs, thus mark-up is acyclical.
- Wage-unemployment elasticity:

$$\varepsilon_{wu} = -\frac{\mu s}{wu} = -(1-\eta)\frac{s}{ru+s}$$

  where $\eta \equiv z/w$ is the replacement ratio.
- $\frac{s}{ru+s}$ is close to 1, and thus $\varepsilon_{wu} \simeq -0.1$ requires $\eta \simeq 0.9$, which is unrealistically high.

[Procyclical mark-up]

- Mark-up:

$$\mu(t) = \frac{\beta}{1-\beta}\left[\frac{c(t)}{q(t)} + C(t)\right]$$

- Vacancy duration $1/q(t)$ is procyclical, thus $\mu(t)$ is procyclical as long as the flow cost of keeping an open vacancy is positive $(c(t) > 0)$
- But if vacancy costs are mainly independent of duration (selection, training, etc. - Pissarides 2009), $c(t) = 0$ and mark-up is acyclical
- What about if $c(t) > 0$ and mark-up is procyclical?

$$\varepsilon_{wu} = (1-\eta)\left(\varepsilon_{\mu u} - \frac{s}{ru+s}\right)$$

- Procyclicality of hiring costs $\left(\varepsilon_{\mu u} < 0\right)$ requires an even higher value of η to match a given elasticity of wages to unemployment.
- Same argument for procyclical z (Chodorow-Reich and Karabarbounis 2013)

[What is a plausible replacement ratio?]

- z represents the flow utility during unemployment
  - unemployment compensation
  - (dis)utility of leisure while unemployed
  - net of job search costs.
- In 2001, the average proportion of earnings that is maintained when a worker becomes unemployed in the U.K. and Germany was 0.42 and 0.63, respectively (OECD Benefits and Wages)
- Non-pecuniary effects of unemployment: strong detrimental impact of unemployment on subjective well-being, even conditional on household income (Winkelmann Winkelmann 1998, Clark 2003, Kassenboehmer Haisken-DeNew 2009)
- 0.42 and 0.63 should be interpreted as very generous upper bounds.

Wage cyclicality: Out of steady state (I)

- Wage curve with constant mark-up

$$w(t) = z + \mu \left[(r + s + \lambda(t)) + E_t \int_t e^{-(r+s+\phi)(\tau - t)} \lambda'(\tau) d\tau \right]$$

- Wages driven by current conditions $\lambda(t)$ and expected changes $\lambda'(\tau)$
- With **continuous wage negotiation** $\phi \to \infty$:

$$w = z + \mu \left(r + \frac{s}{u} \right)$$

- Same predictions as in steady state - it is only contemporaneous conditions that matter.

Wage cyclicality: Out of steady state (II)

Occasional wage renegotiation

- Wages embody expectations about the evolution of labor market conditions
- Need assumptions about $E_t\lambda(\tau)$
- e.g. $\lambda(\tau)$ follows a continuous-time AR process, with convergence ξ to steady state λ^*

$$E_t\lambda(\tau) = e^{-\xi(1-t)}\lambda(\tau) + [1 - e^{-\xi(1-t)}]\lambda^*$$

  where low values of ξ imply high persistence.
- Limiting case $\xi = 0$ is equivalent to previous two cases

Implications for wage cyclicality

- Embody $E_t\lambda(\tau)$ in the wage curve:

$$w(t) = z + \mu\left(r + \frac{s}{u^*}\right) + \gamma\left(\frac{s}{u_t} - \frac{s}{u^*}\right)$$

where

$$\gamma = \frac{r + s + \phi}{r + s + \phi + \xi} < 1$$

- Wage-unemployment elasticity

$$\varepsilon_{wu} = -(1-\eta)\frac{\gamma s}{ru^* + s}$$

- Model predictions should come closer to the data because target ε_{wu} is higher on newly-negotiatied wages (LHS higher) and because $\gamma < 1$ (RHS lower).

Evidence on wage cyclicality

According to the search model wages depend on productivity and outside options, proxied by the unemployment rate

$$\ln w_{iat} = \alpha x_{iat} + \beta \ln u_{at} + d_a + d_t + d_i + \varepsilon_{iat}$$

Issues:

- Right level of aggregation (local versus national unemployment)
- All matches versus new matches
- Several estimates in the literature (Blanchflower Oswald 1994, Gregg Machin Salgado 2014, among others)
- We replicate existing consensus on same data on which we estimate reservation wage equations, and allow for higher elasticity on new matches
- BHPS (1991-2009) for UK, SOEP (1987-2010) for Germany.

Wage equations for UK: all jobs

	1	2	3	4	5	6
ln w_{it-1}				0.759***	0.759***	0.759***
				(0.005)	(0.005)	(0.005)
ln u_t	**−0.022**	**−0.165****	**−0.155****	**−0.123****	**−0.106****	
	(0.032)	(0.044)	(0.043)	(0.017)	(0.025)	
ln u_{t-1}					−0.014	
					(0.020)	
ln u_{at}						**−0.026****
						(0.010)
trend	t	t, t^2	t, t^2	t, t^2	t, t^2	t, t^2
trend$*a$	no	no	yes	no	no	yes
Obs.	96270	96270	96270	70910	70910	70910
R^2	0.40	0.40	0.40	0.75	0.75	0.75

Sample: males and females 18-65; all jobs; 1991-2009.

Dep var: log real hourly wage. Other controls: gender, quadratic in age, educ (4 groups), cubic in tenure, married, children, region dummies.

OLS. s.e. clustered at year level (cols 1-5); at year*reg level (col 6).

***sig at 1%; **sig at 5%; *sig at 10%

Wage equations for UK: further specifications

	1	2	3	4	5	6
	New	**Old**	**All**	**All**	**1st diff**	**FE**
ln w_{it-1}				0.759^{***}		0.134^{***}
				(0.005)		(0.019)
ln u_t	$\mathbf{-0.279}^{***}$	$\mathbf{-0.116}^{***}$	$\mathbf{-0.144}^{***}$	$\mathbf{-0.123}^{***}$	$\mathbf{-0.092}^{***}$	$\mathbf{-0.183}^{**}$
	(0.077)	(0.038)	(0.040)	(0.017)	(0.021)	(0.032)
ln u_{start}			-0.039^{***}	-0.003	0.004	
			(0.008)	(0.004)	(0.004)	
trend	t, t^2	t, t^2	t, t^2	t, t^2	t, t^2	t, t^2
Obs.	25517	70753	95584	70438	70438	70102
R^2	0.41	0.39	0.40	0.75	0.02	

Sample: males and females 18-65; 1991-2009.

Dep var: log real hourly wage. Other controls: gender, quadratic in age, educ (4 groups), cubic in tenure, married, children, region dummies.

s.e. clustered at year level. Col 6: 2-way cluster-robust variance (Cameron and Miller 2013). ***sig at 1%; **sig at 5%; *sig at 10%

Wage equations for Germany: all jobs

	1	2	3	4	5	6
ln w_{it-1}				0.732***	0.732***	0.732***
				(0.006)	(0.006)	(0.006)
ln u_t	**0.078**	**−0.005**	**0.000**	**−0.023****	**0.015**	
	(0.043)	(0.027)	(0.027)	(0.014)	(0.019)	
ln u_{t-1}					**−0.048****	
					(0.019)	
ln u_{at}						**−0.016*****
						(0.006)
trend	t	t, t^2	t, t^2	t, t^2	t, t^2	t, t^2
trend$*a$	no	no	yes	no	no	yes
Obs.	213693	213693	213693	164933	164933	164933
R^2	0.64	0.64	0.64	0.85	0.85	0.85

Sample: males and females 18-65; all jobs; 1987-2010.

Dep var: log real monthly wage. Other controls: log hours, gender, quadratic in age, educ (4 groups), cubic in tenure, married, children, region dummies. OLS. s.e. clustered at year level (cols 1-5); year*reg (col 6). ***sig at 1%; **sig at 5%; *sig at 10%

Wage equations for Germany: further specifications

	1	2	3	4	5	6
	New	**Old**	**All**	**All**	**1st diff**	**FE**
ln w_{it-1}				0.726***		0.371***
				(0.007)		(0.025)
ln u_t	**−0.168*****	**0.027**	**0.012**	**−0.019**	**−0.037****	**−0.019**
	(0.030)	(0.029)	(0.023)	(0.014)	(0.014)	(0.024)
ln u_{start}			−0.025**	−0.008**	−0.001	
			(0.007)	(0.002)	(0.002)	
trend	t, t^2	t, t^2	t, t^2	t, t^2	t, t^2	t, t^2
Obs.	34095	179333	196616	152183	152183	164933
R^2	0.62	0.62	0.64	0.85	0.05	

Sample: males and females 18-65; 1987-2010.

Dep var: log real monthly wage. Other controls: log hours, gender, quadratic in age, educ (4 groups), cubic in tenure, region dummies, married, children. s.e. clustered at the year level. Col 6: 2-way cluster-robust variance (Cameron and Miller 2013).

***sig at 1%; **sig at 5%; *sig at 10%.

Wage equations: summary

- UK: all jobs, wage elasticity around -0.16
- new jobs: around -0.28
- specifications with regional unemployment at most $-0.03/-0.09$ resp
- controlling for unobserved heterogeneity (FE): -0.18
- results for Germany:
  -0.05 on all jobs (max);
  -0.17 on new jobs;
  $-0.016/-0.090$ with regional unemployment
  -0.02 with FE.

Plausible magnitudes:

- U.K. data
  - Unemployment transitions from the LFS imply $s = 0.0125$ monthly
  - AR unemployment rate estimates give $\xi = 0.003$ monthly
  - Expected contract length of about 12 months: $\phi = 0.0833$
  - $r = 0.003$ monthly
- η needs to match

$$\varepsilon_{wu} = -(1-\eta)\frac{\gamma s}{ru^* + s}$$

  where $\gamma = \frac{r+s+\phi}{r+s+\phi+\xi} = 0.971$.
- Need η around 0.71 in UK, 0.82 in Germany.
- Unemployment is too persistent for occasional wage renegotiation to make a sizeable difference

Reservation wages

- Reservation wage $\rho(t)$:

$$W(t;\rho(t)) = U(t)$$

- Substituting value functions:

$$\rho(t) = z + \mu(r+s+\phi)E_t\int_t e^{-(r+s+\phi)(\tau-t)}(\lambda(\tau)-\phi)d\tau$$

- Combining with wage equation: wage conditional on the reservation wage

$$w(t) = \rho(t) + (r+s+\phi)\mu$$

- With constant mark-up, all cyclicality in negotiated wages is driven by cyclicality in the reservation wage
- If reservation wages are not strongly procyclical, neither will be wages
- In particular:

$$\varepsilon_{\rho u} = \frac{w(t)}{\rho(t)}\,\varepsilon_{wu}$$

[Implied replacement ratio from reservation wage data]

- Imposing steady-state & no renegotiation ($\phi = 0$):

$$\rho = z + \frac{\lambda(w - z)}{r + s + \lambda} \simeq uz + (1 - u)w$$

  for $r \longrightarrow 0$

- Rewrite as

$$\eta \equiv \frac{z}{w} = \frac{1}{u}\left[\frac{\rho}{w} - (1 - u)\right]$$

- In BHPS data ρ/w close to 0.8 implies η close to zero.
- In line with findings from the wellbeing literature.

Cyclicality of reservation wages

- Information on reservation wages in BHPS for everyone out of work, looking for work, and willing to start work
- Question about:
  - "lowest take-home pay that one would consider accepting", and
  - "expected working hours for such lowest pay"
  - obtain a measure of hourly net reservation wage
- Information on reservation wages in SOEP elicited in monthly terms and not supplemented by information on expected hours
  - Estimate specifications for monthly reservation wages, controlling for whether an individual is looking for a full-time, part-time, or any job.
- Covariates
  - all determinants of wages
  - chances of finding a job (unemployment rate)
  - utility while unemployed (total benefits and household composition)

Reservation wage equations for the UK

	1	2	3	4	5	6
	OLS	OLS	OLS	OLS	OLS	FE
ln u_t	$-\mathbf{0.095}^{*}$	$-\mathbf{0.175}^{***}$	$-\mathbf{0.164}^{**}$	$\mathbf{0.116}$		$\mathbf{0.011}$
	(0.046)	(0.058)	(0.058)	(0.155)		(0.184)
ln u_{t-1}				$-\mathbf{0.215}^{*}$		$-\mathbf{0.119}$
				(0.111)		(0.129)
ln u_{at}					$-\mathbf{0.064}^{**}$	
					(0.028)	
trend	t	t, t^2	t, t^2	t, t^2	t, t^2	t, t^2
trend$*a$	no	no	yes	no	no	no
Obs.	14874	14874	14874	14874	14874	14874
R^2	0.25	0.25	0.25	0.25	0.25	

Sample: nonemployed males and females 18-65; 1991-2009. Dep var: log real hourly reservation wage. Other controls: gender, quadratic in age, educ (4 groups), cubic in duration, married, children, log benefits, region dummies. s.e. clustered at the year level (cols 1-4); year*reg (col 5). Col 6: 2-way cluster-robust variance (Cameron and Miller 2013). ***sig at 1%; **sig at 5%; *sig at 10%.

Reservation wage equations for Germany

	1	2	3	4	5	6
	OLS	OLS	OLS	OLS	OLS	FE
ln u_t	**0.134***	**−0.009**	**−0.005**	**0.152***		**0.123**
	(0.068)	(0.064)	(0.066)	(0.073)		(0.078)
ln u_{t-1}				**−0.231*****		**−0.189*****
				(0.049)		(0.046)
ln u_{at}					**0.062***	
					(0.033)	
ln u_{at-1}					**−0.081****	
					(0.032)	
trend	t	t, t^2	t, t^2	t, t^2	t, t^2	t, t^2
trend$*a$	no	no	yes	no	no	no
Obs.	17238	17238	17238	17238	17238	17238
R^2	0.36	0.36	0.36	0.36	0.36	

Sample: nonemployed males and females 18-65; 1987-2010. Dep var: log real monthly reservation wage. Other controls: gender, quadratic in age, educ (4 groups), cubic in duration, married, children, log benefits, whether looking for FT, PT or any job, region dummies. s.e. clustered at the year level (cols 1-4); year*reg (col 5); col 6: 2-way cluster-robust variance (Cameron and Miller 2013). ***sig at 1%; **sig at 5%; *sig at 10%.

Reservation wage equations: summary

- UK: reservation wages less cyclical than new wages.
  - 2 issues here: result not in line with wage negotiation outcome; and cyclicality too low
- Germany: reservation wages roughly as cyclical as new wages
  - but cyclicality of both lower than cyclicality the model would predict
- These estimates identify a flaw with the determination of reservation wages in search model

Possible explanations

- Quality of reservation wage data is poor and not informative of cyclicality
- Reservation wage model is mispecified

Quality of reservation wage data

- Post-unemployment wages on average 30% higher than reservation wages, but about 15% accept wages below their reservation wage
- From reservation wage equations: all human capital indicators and benefits have expected impact on reservation wages
- Correlation between reservation wages and
  - remaining unemployment duration;
  - post-unemployment wages

  is in line with model predictions

Quality of UK reservation wage data

	1	2	3	4	5	6
	Whether found job at t + 1			**Post-unemp wage**		
ln ρ_t	**0.001**	**−0.020*****	**−0.022*****	**0.436*****	**0.312*****	**0.308*****
	(0.008)	(0.008)	(0.007)	(0.021)	(0.036)	(0.037)
ln u_t		−0.069			−0.216**	
		(0.069)			(0.077)	
ln u_{at}			−0.036			0.015
			(0.026)			(0.057)
i.year	yes	no	no	yes	no	no
trend	no	t, t^2	t, t^2	no	t, t^2	t, t^2
Xs	no	yes	yes	no	yes	yes
Obs.	15278	14701	14701	2685	2594	2594
R^2	0.02	0.08	0.09	0.22	0.30	0.30

Sample: (1)-(3): nonemployed males and females 18-65; (4)-(6) with nonmissing wages at $t+1$, 1991-2009. Controls: gender, quadratic in age, educ (4 groups), cubic in duration, married, children, log benefits, region dummies. s.e. clustered at the year level. ***sig at 1%; **sig at 5%; *sig at 10%.

Quality of German reservation wage data

	1	2	3	4	5	6
	Whether found job at t + 1			**Post-unemp wage**		
$\ln \rho_t$	**0.034*****	**−0.067*****	**−0.067*****	**0.698*****	**0.367*****	**0.367*****
	(0.006)	(0.008)	(0.008)	(0.024)	(0.030)	(0.030)
$\ln u_t$		−0.093***			−0.234**	
		(0.029)			(0.113)	
$\ln u_{at}$			−0.032			−0.090
			(0.020)			(0.058)
i.year	yes	no	no	yes	no	no
trend	no	t, t^2	t, t^2	no	t, t^2	t, t^2
Xs	no	yes	yes	no	yes	yes
Obs.	17789	17789	17789	4718	4718	4718
R^2	0.01	0.07	0.07	0.20	0.31	0.31

Sample: (1)-(3): nonemployed males and females 18-65; (4)-(6) with nonmissing wages at $t+1$, 1987-2010. Controls: gender, quadratic in age, educ (4 groups), cubic in duration, married, children, log benefits (IV), whether looking for FT, PT or any job, region dummies. s.e. clustered at the year level. ***sig at 1%; **sig at 5%; *sig at 10%.

Alternative explanations

1. **Alternative search model**: workers search both off- and on-the-job and draw wage offers from a (posted) wage distribution $f(w)$
   - This model generates acyclical reservation wages whenever $\lambda^u = \lambda^e$, as $\rho = z$.
   - but if $\rho = z$ reservation wages do not respond to any individual covariate (eg human capital), while they clearly do.
   - also, evidence clearly shows $\lambda^u > \lambda^e$
2. **Hyperbolic discounting**
   - Discounting affects search behavior and reservation wages because returns to job search are delayed (Della Vigna and Paserman 2005)
   - High rates of short-time discounting implies all else equal lower reservation wages
   - This effect makes reservation wages more weakly correlated to wages and labor market conditions
3. **Reference points in job search**

Reference points in job search

- Reservation wages may be determined by perceptions of "fair wage"
  - perceptions strongly influenced by both past experiences and reference groups
  - less sensitive to current economic conditions than the arrival rate of job offers, which is the key cyclical driver of reservation wages in the canonical search model
- Lack of direct evidence on this possible explanation
- Falk, Fehr and Zehnder (2004): the temporary introduction of a min wage leads to a rise in subjects' reservation wages, even after the min wage has been removed.
- This makes reservation wages less cyclical than in the canonical model.

Reference points in job search

- If past wages shape reference points, which in turn influence reservation wages, we should expect a significant correlation between past wages and reservation wages.
- But several confounding factors in such correlation
- Direct links (if any) between UI benefits and past wages, and UI is key component of reservation wages in the canonical model.
  - this is the case for Germany - UI entitlement is function of previous social security contribution and thus past wages
  - but not for UK: eg JSA is currently £57.35 for 16-24; £72.40 for 25+; with some allowance for dependants.
  - no explicit reference to previous earnings in UK
- Unobserved productivity components of past wages, reflected into reservation wages in the canonical model via the wage offer distribution.

Approach

- Aim to isolate the *rent* component of past wages and observe its correlation with current reservation wages
- If job search is forward-looking (canonical model), past rents should not be relevant for reservation wages.
- If job search is reference-dependent, past rents feature in reservation wages - as long as they represent meaningful benchmark.

Approach

- Empirical reservation wage model:

$$\ln \rho_{it} = \beta_1 X_{it} + \beta_2 \ln w_{it-d_i} + \varepsilon_{it} \tag{1}$$

  where w_{it-d_i} is wage in last job held, lost d_i years ago

- w_{it-d_i} includes components of both worker ability (w_i^*) and rents (R_{it-d_i}):

$$\ln w_{it-d_i} = \gamma_1 X_{it-d_i} + \gamma_2 R_{it-d_i} + w_i^* + u_{it-d_i}$$

- Identification of reference point effect in (1) requires a proxy for past rents, which is orthogonal to worker ability.

Proxies for rents

- Industry affiliation as a proxy for the size of rents in a job
  - long-established literature (eg Krueger and Summers 1988)
- Use predicted industry-level wage as an instrument for previous wages in the reservation wage equation
- Exclusion restriction requires
  - no wealth effects from previous wages;
  - workers can distinguish rent and productivity components.

Steps

- Estimate log wage regression for 1982-2009 on ASHE, controlling for 4-digit industry effects, unrestricted age effects, region, year, individual fixed effects.
- Obtain $\widehat{\ln w_j}$ for j = 4-digit industries
- On BHPS, for each unemployed i at t: observed in employment d_i years ago, in industry j, earning wage wage w_{it-d_i}.
- Use $\widehat{\ln w_j}$ as IV for $\ln w_{it-d_i}$ in reservation wage equation.

Results: Reservation wages and rents

	1	2	3	4	5	6
	OLS	**OLS**	**OLS**	**IV**	**IV**	**IV**
ln w_{it-d}	**0.087*****	**0.087*****	**0.105*****	**0.149*****	**0.149*****	**0.197*****
	(0.005)	(0.005)	(0.008)	(0.018)	(0.016)	(0.155)
ln w_{it-d}*d			**−0.009*****			**−0.019*****
			(0.002)			(0.004)
ln u_t		−0.204***	−0.204***		−0.174***	−0.170***
		(0.083)	(0.082)		(0.086)	(0.084)
i.year	yes	no	no	yes	no	no
Obs.	8151	8151	8151	7790	7790	7790
R^2	0.28	0.27	0.27			
$F-$stat^1				709.26	928.6	484.7
$F-$stat^2						269.7

IV in cols 4-5: predicted 4-digit industry wage differential. IV in col 6: predicted 4-digit industry wage differential, and its interaction with time since job loss.

Conclusions

- (lack of) Wage cyclicality is an enduring puzzle in labor/macroeconomics
- We propose a matching model with infrequent wage negotiation which delivers simple, reduced-form predictions for elasticity of wages to unemployment
- Under plausible assumptions, the reservation wage is the main cyclical component of wages
- Estimates show that reservation wages are as cyclical as actual wages, but not as cyclical as the model would predict
- Flaw in determination of reservation wage calls for alternative reservation wage models - rather than alternative wage setting model
- Alternative models: Rents in previous jobs are strong predictors of reservation wages, in line with reference points in job search behavior.

Group-specific unemployment (UK)

By gender and 4 age groups (16-17; 18-24; 25-49; 50+)

Wage equations							
	All	Men	Women	16-17	18-24	25-49	50+
ln u_{gt}	−0.026	−0.048	−0.071	0.469	−0.198	−0.031	−0.024
	(0.009)	(0.017)	(0.018)	(0.302)	(0.052)	(0.015)	(0.018)
Obs.	70901	34372	36529	713	6824	48503	14861
R^2	0.75	0.75	0.71	0.37	0.47	0.75	0.76
Reservation wage equations							
	All	Men	Women	16-17	18-24	25-49	50+
ln u_{gt}	−0.054	−0.039	−0.065	0.151	−0.157	0.005	0.042
	(0.030)	(0.025)	(0.034)	(0.073)	(0.046)	(0.078)	(0.060)
Obs.	14874	6747	8127	1838	2894	7312	2830
R^2	0.24	0.23	0.27	0.16	0.21	0.19	0.21