

Nominal Wage Adjustments and Components of Pay: New Evidence from Payroll Data¹

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18 September 2020

ESCoE Conference on Economic Measurement

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¹ This work is based on the Annual Survey of Hours and Earnings Dataset (Crown copyright 2019), having been funded, collected, and deposited by the Office for National Statistics (ONS) under secure access conditions with the UK Data Service (SN:6689). Neither the ONS nor the Data Service bear any responsibility for the analysis and discussion of the results in this paper.

What We Do

- Use high-quality British payroll data to document a new set of facts about nominal wage changes
- Provide evidence against the notion that nominal wages cannot be cut
- Specifically, we highlight the role of extra pay components in increasing wage flexibility
- Show that the wage flexibility of new hires is not significantly different from that of existing workers
- Our results help to reconcile apparently conflicting findings in the previous literature

Why We Care

- Keynes (1936) asserted that workers simply refuse to accept cuts in their nominal wages (**Downward Nominal Wage Rigidity**)
- If DNWR prevents the real value of wages from falling during recessions, then it provides a plausible theory of cyclical unemployment
- The extent of DNWR is critical for important macroeconomic questions:
 - Argument for a positive inflation rate to '*grease the wheels of the labor market*' - (Tobin 1972)
 - Potential to account for cyclical unemployment fluctuations (Benigno & Ricci 2011, AER)
 - Rigid nominal wages are the crucial nominal friction needed in New-Keynesian models to fit the data (Christiano, Eichenbaum & Evans 2005, JPE)

Why We Care

- Despite its key role in macroeconomics, the extent of DNWR still remains an open question
 - This is surprising, since Keynes' hypothesis is, in principle, empirically testable:
- ⇒ If DNWR is sufficiently pervasive to cause job loss, we would expect some signs of it among workers who stay employed in the same jobs - we should see a scarcity of nominal wage cuts and a consequent abundance of wage freezes

Literature

- The main reason why the extent of DNWR is still debated is that existing datasets are not well-suited for the task
- Household surveys are plagued by considerable response error in self-reported earnings and hours
 - US household surveys: Akerlof, Dickens, & Perry (1996 BPEA); Card & Hyslop (1996); Kahn (1997 AER); Altonji & Devereux (2000); Lebow, Saks, & Wilson (2003); Barattieri, Basu & Gottschalk (2014 AEJ:Macro)
- Payroll data are accurate, but usually contain only total earnings
 - UK payroll: Smith (2000 EJ); Nickell & Quintini (2003 EJ); Elsby, Shin & Solon (2016 JoLE).
US payroll: Jardim, Solon & Vidgor (2019); Kurmann & McEntarfer (2019)

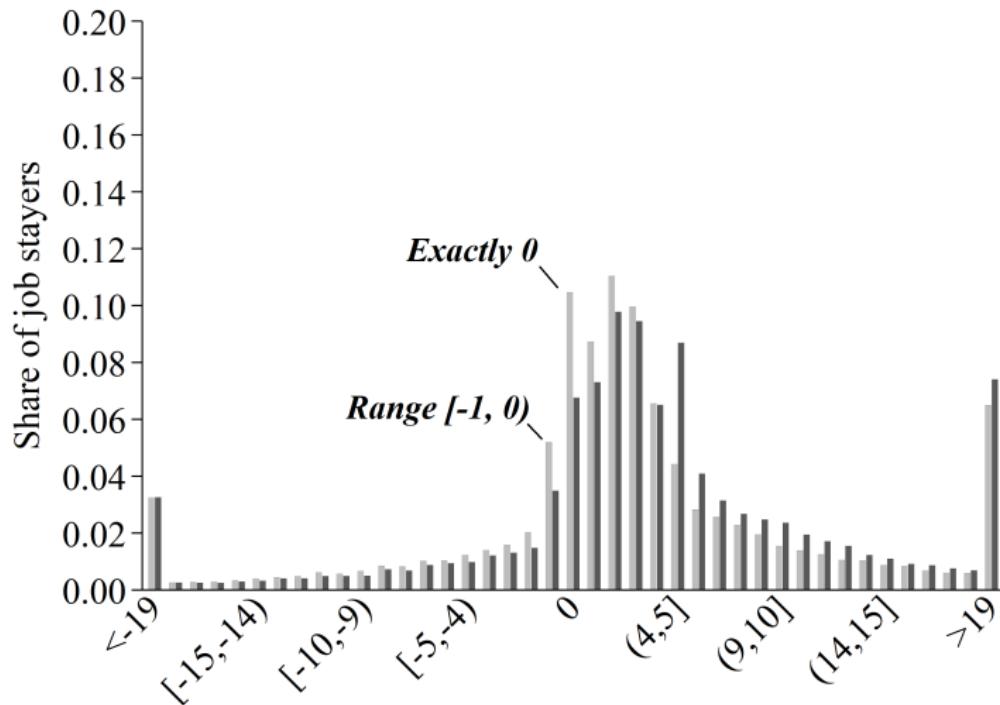
The Data

- Annual Survey of Hours and Earnings (ASHE), UK 2006-2018
- Panel of 1% random sample of income tax-paying employees, no attrition from sampling frame
- Specifically designed to provide accurate measures of components of pay: overtime, shift pay, incentive pay, other pay (e.g. meal allowances)
- Can identify job-stayers (as opposed to firm stayers)
- For hourly workers, employers report hourly pay rates
- Large sample size: 77,000 - 101,000 observations per year
- More benefits of ASHE: reliable (unlike household surveys); hourly vs non-hourly and pay components (unlike US payroll and previous UK); Hours worked and representative (unlike US-ADP; Grigsby, Hurst & Yildirmaz (2019))

The Data

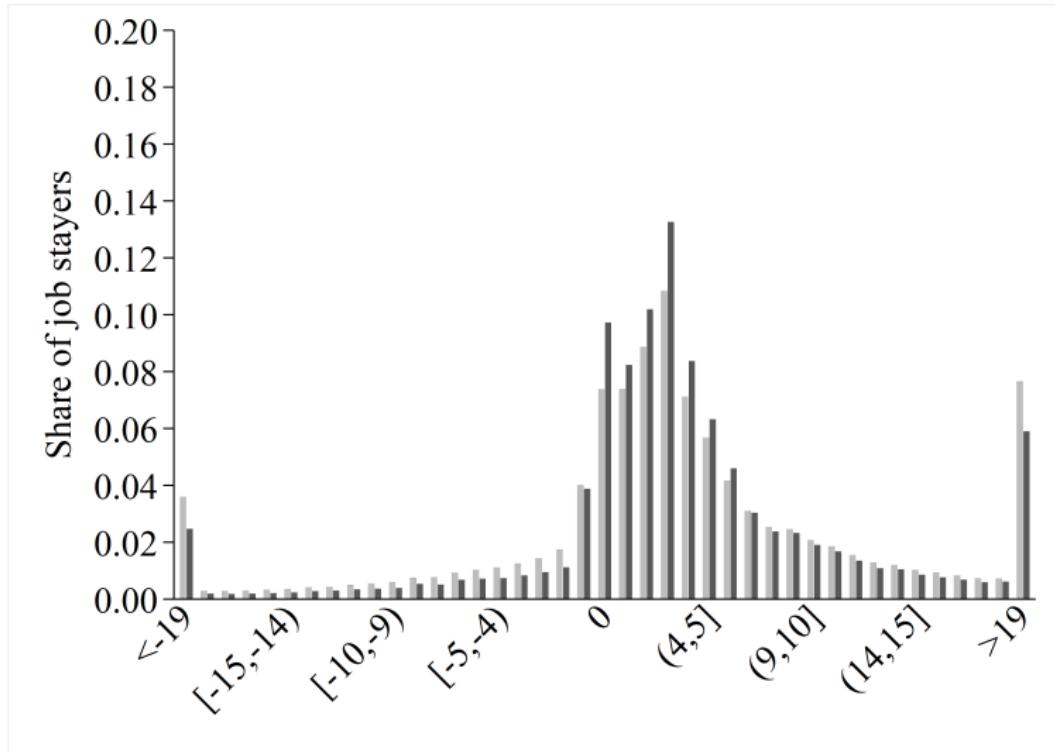
- Basic wages:
Basic pay - regular pay before adding anything extra - divided by hours worked
- Earnings per hour:
Sum of basic pay, shift premium pay, incentive pay, and other pay, divided by hours worked
- Hourly pay rate:
For the 1/3 of workers paid by the hour in the UK, ASHE contains what firms report as the hourly pay rate

Year-to-year changes in log earnings per hour, excl. overtime



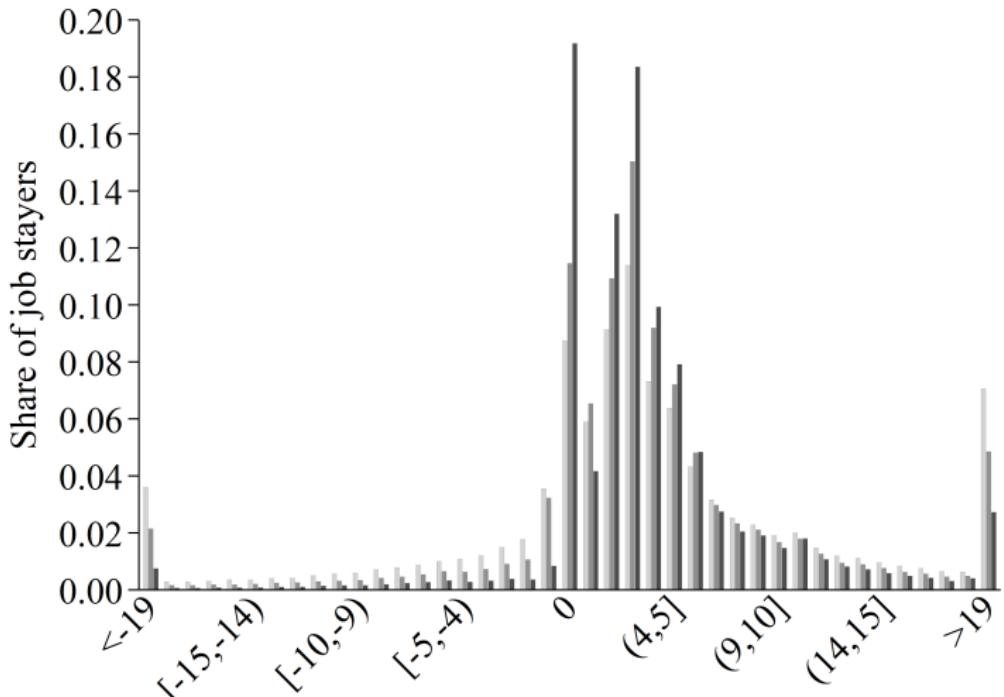
Light bars: 2012-13. **Dark bars:** 2006-07.

Year-to-year changes in log earnings per hour and basic wages



Light bars: earnings per hour. **Dark bars:** basic wages.

Year-to-year changes in log earnings per hour, basic wages and reported hourly rate: workers paid by the hour



Light bars: earnings per hour. **Medium grey bars:** basic wages.

Dark bars: reported hourly pay rates.

▶ Data

Do Spot Wages Matter?

- Since Keynes, our understanding of labour markets has evolved:
 - The present discounted value of wages, current and future, over the expected duration of a worker-firm match matters - not the spot wage.
- The key determinant of unemployment fluctuations in search and matching models is the flexibility of *hiring* wages
- But, if the wages of incumbents and new hires are linked through internal pay structures, rigidity in incumbents nominal wages can affect unemployment fluctuations
(e.g. Snell, Stueber & Thomas, 2018 RED)
- We investigate whether new hires can undercut existing workers' wages

Do Spot Wages Matter?

- First-step regression:

$$\log(w_{ijrt}) = \theta_{ij} + \mathbb{I}\{Incumbent_{it}\} \cdot \beta_{rt}^I + \mathbb{I}\{New\ hire_{it}\} \cdot \beta_{rt}^N + \mathbf{x}'_{it} \delta + \varepsilon_{ijrt}$$

- w_{ijrt} nominal wage of worker i , in firm j , in region r , and year t
- θ_{ij} is a firm-worker-match fixed effect, controlling for cyclical match quality
- $\hat{\beta}_{rt}^I$ gives the composition-adjusted period means, within region, of incumbent wages (analogues for new hires)
- Second-step regression:

$$\Delta \hat{\beta}_{rt}^z = c^z + \gamma^z u_{rt} + \eta_{rt}^z, \quad \text{for } z = \{I, N\}$$

Estimated semi-elasticities w.r.t. unemployment rate, γ^z

Dependent variable	Incumbents (≥ 1 year in job)	New hires (< 1 year in job)	Difference (Stayer-hire)
(Estimates $\times 100$)			
1. Earnings per hour	-0.36 (0.12)	-0.49 (0.15)	0.13 (0.16)
2. Basic wages	-0.36 (0.12)	-0.52 (0.15)	0.15 (0.16)
3. Hourly pay rate	-0.33 (0.10)	-0.46 (0.12)	0.13 (0.09)

Standard errors in parentheses robust to both year-level and NUTS1 region-level clustering.

Conclusion

- The wage flexibility of new hires is not significantly different from that of existing workers
- Hourly pay rates of hourly workers show strong signs of DNWR; confirms previous household-survey-based findings, but without the concerns about reporting errors
- Firms adjust extra pay components to overcome nominal rigidity in hourly pay rates
- Salaried workers experience frequent cuts in their basic wages and extra pay components
- The often invoked assumption that nominal wages *cannot* be cut, even if the alternative is unemployment, needs to be reconsidered

Appendix

ASHE variables

	Description
<u>ASHE variables</u>	
1.	Basic pay
2.	Overtime pay
3.	Shift premium pay
4.	Incentive pay
5.	Other pay
6.	Gross pay
7.	Basic hours
8.	Overtime hours
9.	Hourly pay rate
10.	Annual gross pay
11.	Annual incentive pay
<u>Derived variables</u>	
12.	Basic wage
13.	Earnings per hour
14.	Gross pay per hour

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Baseline sample summary statistics

	Job stayers (I)	All employees (II)
Private sector (%)	62.6	63.4
Female (%)	50.7	50.8
Age (years)	42.8	42.5
Full-time (≥ 30 hours, %)	76.3	75.7
Collective agreement (%)	50.6	50.1
Firm size (no. of employees, median)	2,938	2,703
Weekly basic hours (median)	37.0	37.0
Earnings per hour (mean, £)	14.39	14.31
Earnings per hour (median, £)	11.93	11.81
N	1,097,235	1,825,162

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Nominal changes in earnings per hour, 2006-2018

Years	Year-to-year change		Unemployment rate (April first year, %)	Inflation CPI (%)
	Freezes (%)	Cuts (%)		
2006-07	4.4	19.6	5.4	2.7
2007-08	3.1	17.9	5.4	2.9
2008-09	6.6	19.8	5.2	2.4
2009-10	9.5	23.9	7.6	3.7
2010-11	8.4	22.5	7.9	4.4
2011-12	11.2	22.5	7.8	3.0
2012-13	10.5	22.8	8.1	2.4
2013-14	6.8	20.2	7.8	1.8
2014-15	5.9	18.7	6.4	-0.2
2015-16	7.1	20.4	5.6	0.3
2016-17	6.3	19.5	4.9	2.7
2017-18	6.8	18.6	4.4	2.4

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Nominal changes in earnings per hour and basic wages, 2006-2018

Years	Earnings per hour		Basic wage	
	Freezes (%)	Cuts (%)	Freezes (%)	Cuts (%)
2006-07	4.4	19.6	6.2	13.8
2007-08	3.1	17.9	4.2	12.9
2008-09	6.6	19.8	8.8	13.8
2009-10	9.5	23.9	13.1	18.0
2010-11	8.4	22.5	11.9	16.1
2011-12	11.2	22.5	13.7	17.4
2012-13	10.5	22.8	13.9	17.4
2013-14	6.8	20.2	9.0	13.8
2014-15	5.9	18.7	7.3	13.2
2015-16	7.1	20.4	9.2	15.2
2016-17	6.3	19.5	8.3	14.2
2017-18	6.8	18.6	8.5	14.1

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Nominal changes in basic wages and hourly pay rates, 2006-2018

Years	Basic wage		Hourly pay rate	
	Freezes (%) (I)	Cuts (%) (II)	Freezes (%) (III)	Cuts (%) (IV)
2006-07	8.3	11.5	14.5	6.2
2007-08	6.4	12.1	10.4	4.0
2008-09	10.3	11.1	16.4	6.1
2009-10	16.3	15.3	24.0	5.7
2010-11	14.7	13.7	23.4	5.0
2011-12	14.0	14.0	24.7	4.5
2012-13	14.4	16.5	22.9	7.1
2013-14	11.8	12.8	20.3	4.2
2014-15	9.3	11.2	15.3	3.7
2015-16	9.9	13.5	17.9	6.2
2016-17	9.6	12.5	16.3	3.5
2017-18	8.9	11.5	18.5	3.3

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Nominal changes in basic wages and hourly pay rates, 2006-2018

Dependent variable / Cyclical indicator	Incumbents (≥ 1 year in job) (I)	New hires (< 1 year in job) (II)	Difference (Stayer-hire) (III)
Unemployment rate:			
1. Earnings per hour	-0.0036 (0.0012)	-0.0049 (0.0015)	0.0013 (0.0016)
2. Basic wages	-0.0036 (0.0012)	-0.0052 (0.0015)	0.0015 (0.0016)
3. Hourly pay rate	-0.0033 (0.0010)	-0.0046 (0.0012)	0.0013 (0.0009)
Nominal GVA:			
4. Earnings per hour	0.275 (0.058)	0.200 (0.121)	0.075 (0.129)
5. Basic wages	0.295 (0.056)	0.241 (0.103)	0.053 (0.103)
6. Hourly pay rate	0.200 (0.043)	0.158 (0.070)	0.041 (0.058)

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Marginal contribution of individual pay components - Freezes

Years	Earnings per hour	Including		Excluding	
		Overtime pay	Shift pay	Incentive pay	Other pay
<u>Freezes:</u>					
2006-07	5.6	4.6	5.7	6.2	6.5
2007-08	4.2	3.5	4.4	4.7	4.6
2008-09	7.9	6.4	8.2	8.8	8.8
2009-10	11.3	9.2	11.7	12.5	12.8
2010-11	11.2	9.6	11.6	12.0	12.9
2011-12	13.4	11.4	14.1	14.5	15.5
2012-13	12.8	10.8	13.3	13.8	14.4
2013-14	8.2	7.1	8.8	8.9	9.0
2014-15	6.9	6.0	7.1	7.5	7.5
2015-16	8.7	7.5	8.9	9.3	9.8
2016-17	7.6	6.7	8.0	8.1	8.4
2017-18	8.0	7.1	8.5	8.6	8.7

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Marginal contribution of individual pay components - Cuts

Years	Earnings per hour	Including		Excluding	
		Overtime pay	Shift pay	Incentive pay	Other pay
<u>Cuts:</u>					
2006-07	19.0	20.8	18.2	17.0	17.0
2007-08	17.4	19.3	16.7	16.2	15.2
2008-09	19.2	21.6	18.1	17.7	16.9
2009-10	23.0	25.2	21.7	21.7	20.5
2010-11	21.1	23.3	20.0	19.8	18.5
2011-12	21.4	23.5	20.1	20.1	19.1
2012-13	21.7	23.7	20.7	19.9	20.2
2013-14	19.5	21.6	17.8	18.4	17.0
2014-15	18.1	19.9	16.6	17.1	16.4
2015-16	19.6	21.6	18.6	18.6	17.4
2016-17	18.9	20.6	17.4	18.0	16.9
2017-18	18.0	19.5	16.7	17.0	16.4

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