

Flexible Work Arrangements in Low Wage Jobs

Evidence from Job Vacancy Data

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Introduction

Motivation

- ▶ Technological developments have changed the cost of offering different work arrangements
 - ▶ Easier to provide workers with flexible schedules and schedule work on-demand
 - ▶ Reduced the need for colocation of workers
- ▶ Indeed, by some measures, the structure of work is changing in the labour markets of developed economies
 - ▶ **Gig Economy** (platform mediated work), **Zero Hours Contracts** (no guarantee of a minimum number of hours), **Solo Self-Employment** (low income self-employment, potentially with dependence on a single firm)
 - ▶ only about 55% of jobs are traditional [permanent, full-time, (9-5)] (Mas & Pallais, 2020)

Motivation

- ▶ Policy interest in “alternative work arrangements” & flexible jobs
 - ▶ Concern about the potential for worker exploitation
 - ▶ Reduced role of firms in income smoothing & can be ineligible for support delivered through the employment relationship
 - ▶ ...what does this mean for the design and delivery of policy to support low-wage workers?
- ▶ Yet, job flexibility can also have benefits for firms & workers
 - ▶ Work-life balance & the ability to quickly adjust labour supply to domestic “shocks” (although evidence for this is weak)
 - ▶ Adjust production to variable demand

What we already know

- ▶ Strong focus of the recent literature has been on worker preferences for flexible jobs (Mas & Pallais 2017, 2020; Datta, 2019; Datta, Giupponi & Machin, 2019)
- ▶ Older literature on temporary jobs but unlikely to be ambiguity in ranking of permanent versus temp jobs
- ▶ Surprisingly little is known about the prevalence and characteristics of flexible jobs
- ▶ Empirical research held back by data and measurement issues (Abraham & Amaya, 2019; Katz & Krueger, 2019)
 - ▶ Questions on alternative work arrangements are not asked consistently over time
 - ▶ Challenges with how to interpret responses to some questions
 - ▶ Zero-hours contracts are under-recorded by the main labour force survey

This Paper

- ▶ Measure flexible work arrangements from job vacancies text
 - ▶ Burning Glass Technology: **text of more than 46 million job vacancies** in the UK from 2012 onwards
 - ▶ Manually annotate 6,500 vacancies to create training data set for supervised machine learning approach
 - ▶ Multiple dimensions of work arrangement: flexible/salaried/permanent/full time
 - ▶ Contribute to growing literature using job vacancy data: Hershbein & Kahn (2018); Deming & Kahn (2018); Clemens, Kahn & Meer (2020), Duchini et al (2020); Marinescu (2017), Javorcik et al (2020); Forsythe et al (2020); Turrell et al. (2018, 2019)

Growing literature using job vacancy data

2 **Top 3 Econ journals** (excluding papers and proceedings), 4 **Top field journals**

- ▶ **Wages** Clemens, Kahn & Meer (2021), Deming & Noray (2020), Duchini, Simion & Turrell (2020), Rock (2020)
- ▶ **Skills** Bruning & Mangeol (2020), Alekseeva, Azar, Gine, Samila & Taska (2020), Dillender (2020), Deming and Kahn (2018)
- ▶ **COVID-19** Tsvetkova, Grabner & Vermeulen (2020), Forsythe, Kahn, Lange & Wiczer (2020), Raj, Friedman, Hendren, Stepner (2020); Bai, Brynjolfsson, Jin, Steffen & Wan (2020);
- ▶ **Technology** Bloom, Hassen, Kalyani, Lerner & Tahoun (2020), Acemoglu, Autor, Hazell & Restrepo (2020), Agrawal, Gans and Goldfarb (2020), Hershbein & Kahn (2018)
- ▶ **Competition** Cen, Fox & Jiang (2020), Hershbein, Macaluso & Yeh (2020), Schubert, Stansbury & Taska (2020)

This Paper

- ▶ Use this new data to better understand firm demand for flexible work arrangements
 - ▶ How **prevalent** are flexible jobs?
 - ▶ Has there been any **change over time** in the prevalence of flexible arrangements advertised?
 - ▶ What **other job characteristics** does flexibility correlate with? Does this differ among high and low wage postings?
 - ▶ What is the role of **firms and local labour market conditions** in driving flexibility?

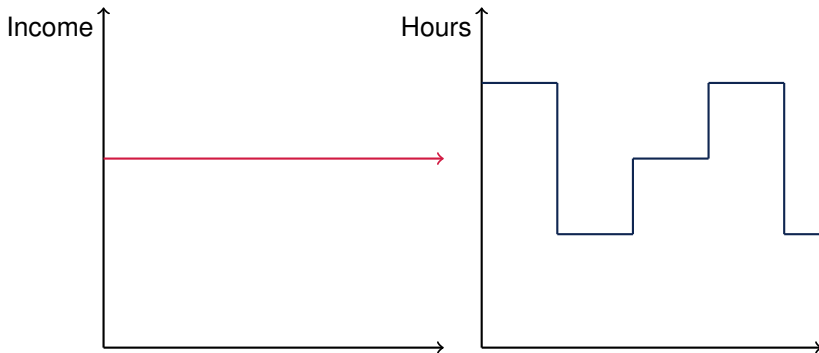
Data

Flexibility

- ▶ Treat flexibility as **schedule flexibility**
 - ▶ i.e. any arrangement in which the timing of work is not fixed in the contract and has to be agreed at a later date between the employer and the employee.
- ▶ In practice, we categorize a job to be schedule flexible if it mentions shift or rota work without a fixed pattern, offers flexible working, or specifies that work will be organised according to the needs of the business.

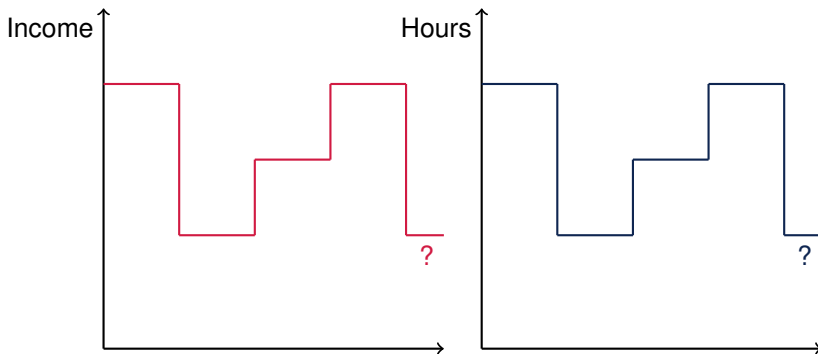
Salaried Flexible Jobs = Schedule Flexibility

Figure: Salaried Job with Flexible Hours



Schedule Flexibility + Pay by the Hour = Uncertain Income

Figure: Non-Salaried Job with Flexible Hours



Job Vacancy Data

- ▶ We measure work arrangements on the basis of job vacancy text
 - ▶ Burning Glass Technology: text of 50,240,650 job vacancies in the UK from 2014 onwards, from 7,500 job boards and company web pages
 - ▶ 4 main dimensions of work arrangements: permanent/temp, full-time, salaried/non-salaried, flexible
- ▶ Limitations:
 - ▶ Not all jobs are advertised online
 - ▶ Jobs posted online are disproportionately professional and \approx 30-40% missing wage info
 - ▶ Only what firms state in the advert rather than realised arrangement

Classifying Work Arrangements

- ▶ Take a supervised machine learning approach that relies on manual annotations
 1. Manually label a set of job vacancies for the dimensions of work arrangements of interest;
 2. Define the vocabulary and represent each job vacancy in a matrix format (using “bag of words” approach with 1-,2-, and 3-grams + binary count vectorizer);
 3. Train a machine learning model to classify work arrangements on the basis of vacancy text (logistic classification model);
 4. Apply the machine learning model to all 50 million job vacancies.

Manual Annotations

*“As this is a Bank position to **provide cover as and when we need it**, such as for annual leave or sick leave, **the hours and days you work will vary.**”*

Manual Annotations

“What we offer:

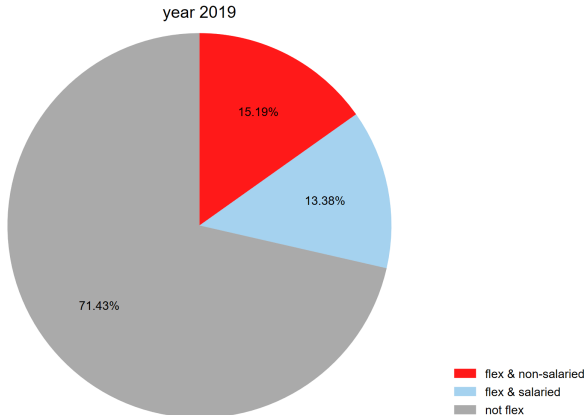
- ★ Competitive rates of pay- holiday pay, all out of pocket expenses paid including mileage. You should be able to earn £60-£82 per 6 hour day, based on interviews achieved*
- ★Ad hoc working- which allows flexibility and choice”*

Accuracy of our model

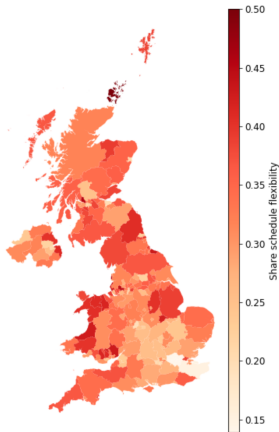
Contract type	Logistic Regression Model			Improvement to keywords		
	Precision	Recall	F	Precision	Recall	F
Schedule flexible	0.8540	0.8083	0.8303	0.0005	0.4399	0.1855
Permanent	0.9294	0.9736	0.9510	0.0471	-0.0067	0.0223
Full-time	0.9162	0.8881	0.9019	0.1898	0.2236	0.1314
Salaried	0.8604	0.8415	0.8503	-0.1032	0.3586	0.2070

Patterns in Flexibility

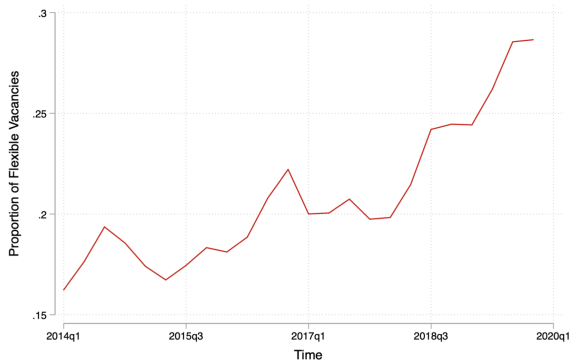
Fact #1: ~ 30% of jobs are advertised as flexible ...



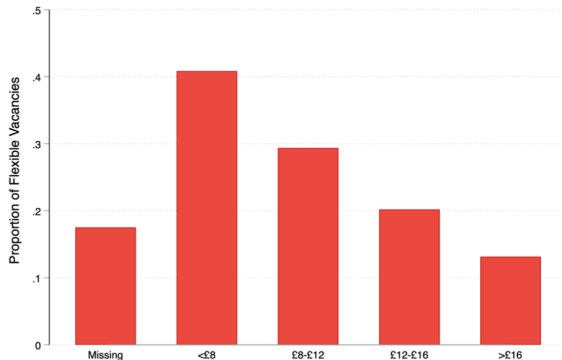
Fact #2: ... with more flexibility in poorer regions



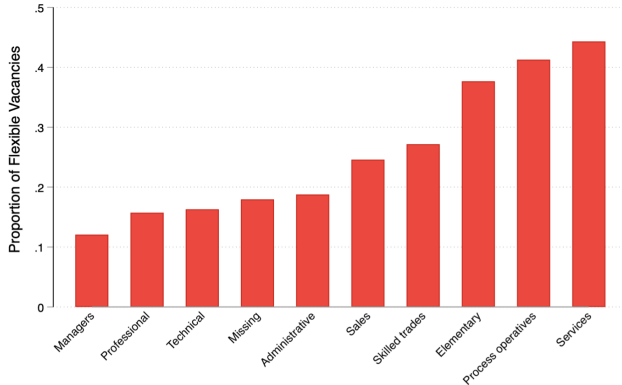
Fact #3: Since 2014, schedule flexibility doubled



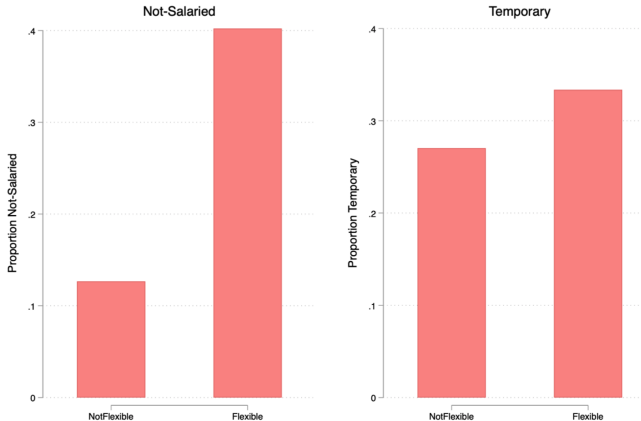
Fact #4: Flexibility more prevalent in low wage jobs ...



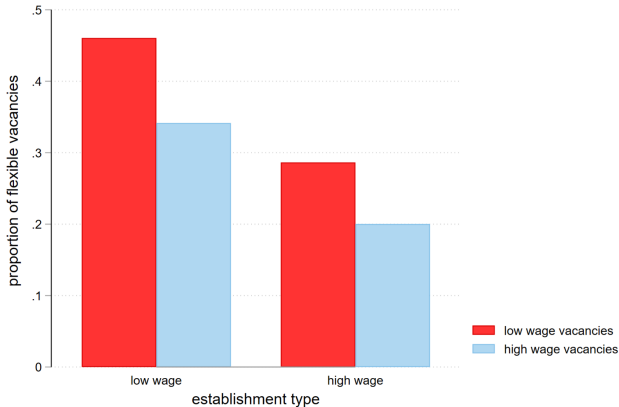
Fact #5: ... and low rank occupations



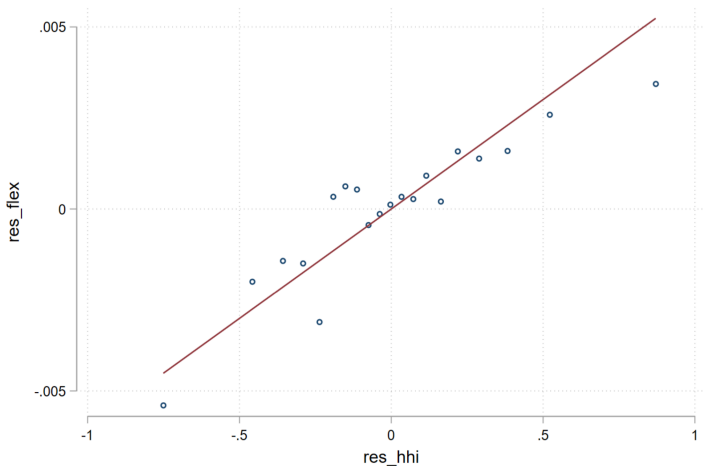
Fact #6: Non-salaried and temporary jobs up flexibility



Fact #7: Low wage firms post more flexibility



Fact #8: Employer Concentration increases flexibility



Conclusion

- ▶ We extract information on contract terms from job vacancy text to analyse firm demand for flexible work arrangements
- ▶ Vacancies that advertise flexible arrangements are disproportionately low wage, lower skilled and non-salaried
- ▶ On-going work examines the drivers of flexible work arrangements including adjustment to higher labour costs

Thank You!