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Wage regulation and the quality of police applicants

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Workshop on workforce quality in the public sector

Institute for Fiscal Studies, 19 February 2016

Motivation

- Pay rates for public sector workers often set nationally

1. Implies spatial variation in public sector pay differentials relative to private sector outside options
   - Might expect worker quality to be lower where relative pay is lower
   - Existing literature: Borjas (2002); Dal Bo, Finan and Rossi (2013); Hoxby and Leigh (2004); Propper and Van Reenan (2010); Britton and Propper (2016)

2. Implies wages cannot adjust to compensate for spatial variation in the disamenity of working in the public sector
   - Might expect worker quality to be lower where disamenity is higher
   - Existing literature: Rosen (1986); Roback (1982, 1988); Di Tommaso, Strom, Saether (2009)

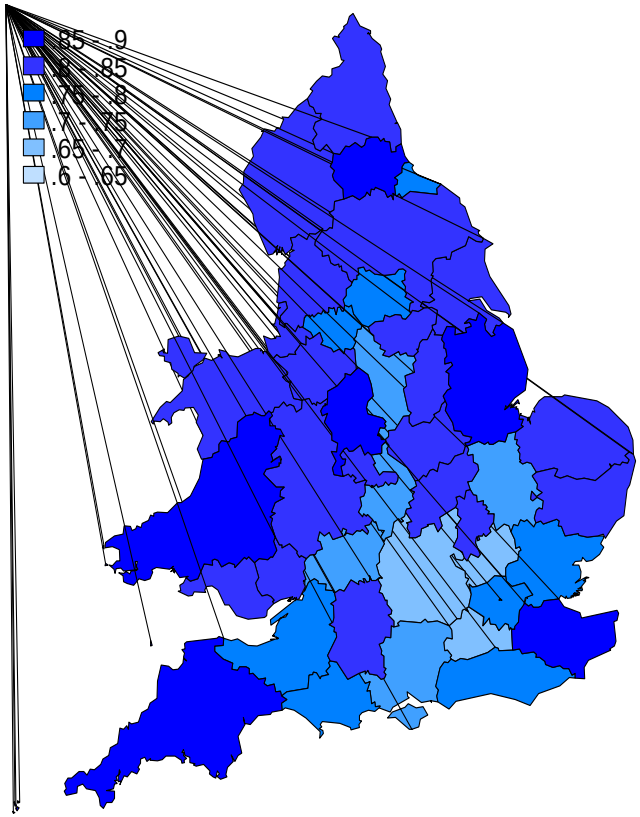
This paper

- Utilises a unique dataset to analyse the impact of centrally regulated pay on the quality of police applicants in England and Wales
- Contributions:
  - Consider both channels: spatial variation in outside labour market options and spatial variation in the disamenity of policing
  - Novel data (individual test scores from the national assessment taken by applicants to the police) provides direct measure of ‘quality’

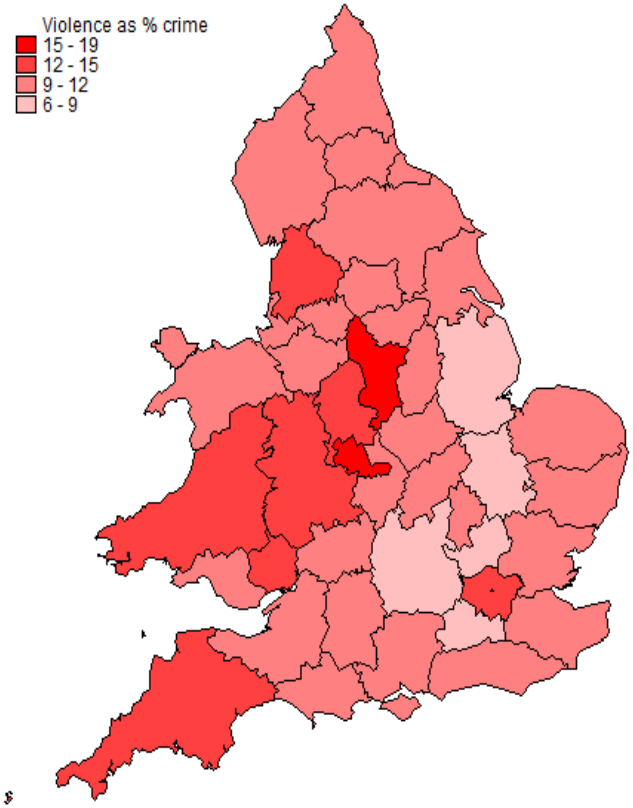
Context

- 43 police forces operating at the county or metropolitan level
- Pay scales set at the national level (small adjustment in London)

Average percentile of police in local hourly wage distribution:



Proportion of crime that is violence (with or without) injury:



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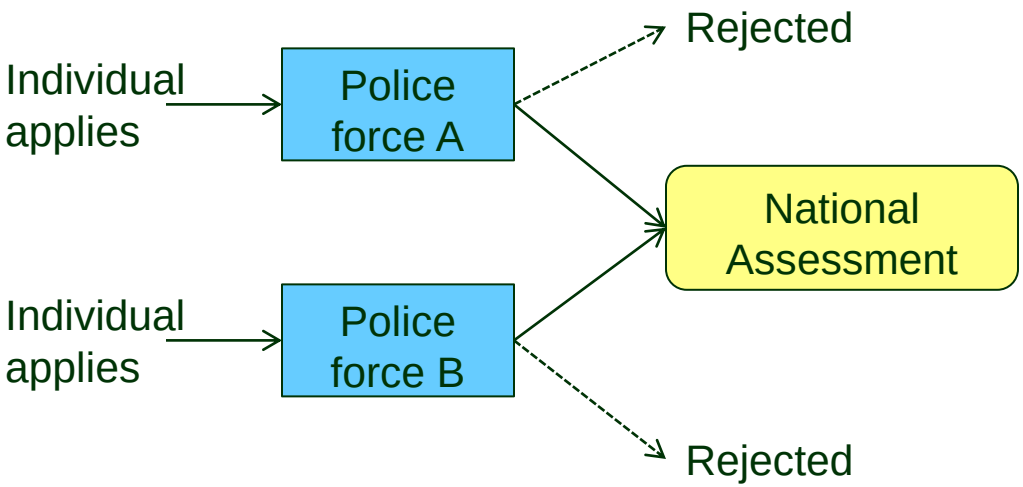
The police recruitment procedure



The Police SEARCH(R) Assessment Centre
(Structured Entrance Assessment for Recruiting Constables Holistically)

- Made compulsory across forces in 2004 to introduce a level of consistency in recruitment across England and Wales

9 exercises

"7" competency areas

	Interactive				Written			Psychometric Tests	
	Jones	Levy	Messan	Rubin	Dipping	Protest	Interview	Verbal Logical Reasoning	Numerical Reasoning
Community & Customer Focus	✓	✓		✓	✓	✓			
Effective Communication	✓			✓	✓				
Oral Communication	✓	✓	✓	✓			✓		
Written Communication					✓	✓		✓	
Personal Responsibility		✓	✓	✓					
Problem Solving	✓		✓	✓	✓	✓	✓		✓
Resilience		✓	✓				✓		
Respect for Race & Diversity	✓	✓	✓	✓	✓	✓	✓		
Teamworking	✓	✓	✓			✓	✓		

Table 1: Exercise by Competency Matrix

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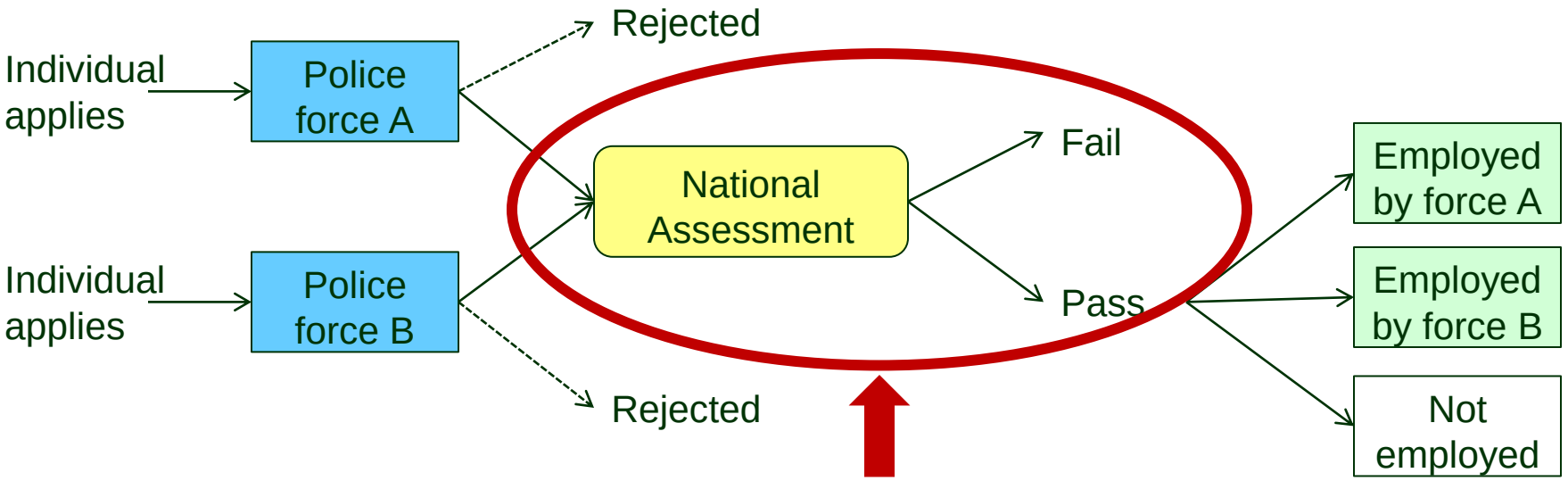


Our data

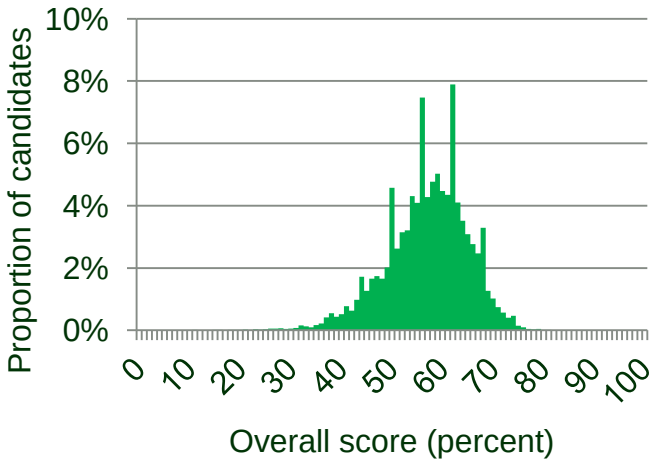
Information on 41,000 candidates who took the national assessment in (2007), 2008, 2009, (2010) :

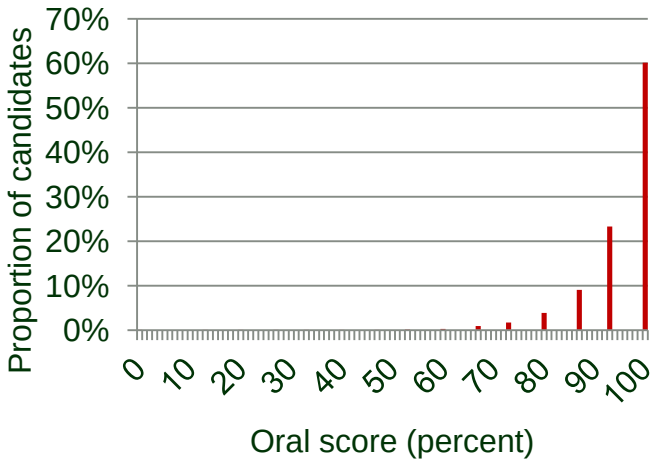
-Submitting force

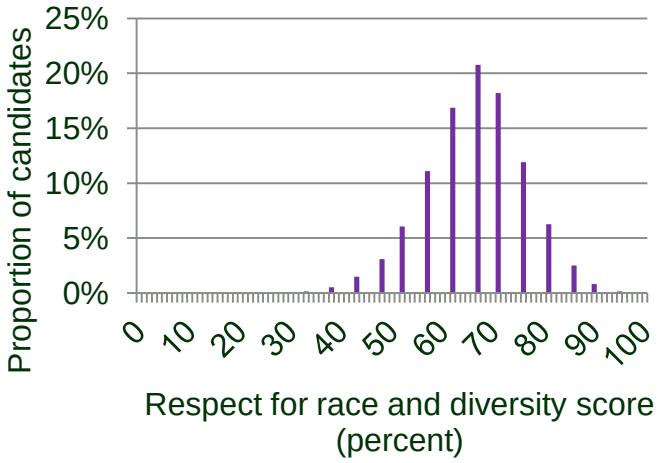
-Pass/Fail and test scores

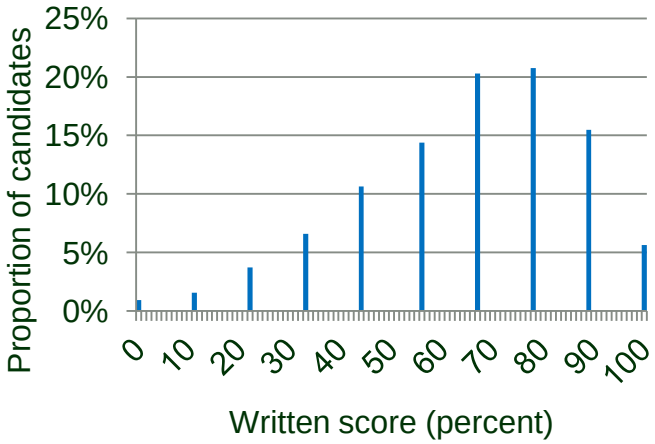
-Characteristics (age, sex, ethnicity, prior police experience (e.g. PCSO), other work experience)

Distribution of candidate test scores (2008)









To pass post-Nov 2007: Oral>=50%, Written >=44%, RFD>=50%, Overall>=50%
(**To pass pre-Nov 2007**: Oral>=60%, Written>=44%, RFD>=60%, Overall>=60%)

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Candidate characteristics associated with scores

	Probability of passing	Overall score (%)	Written score (%)	Oral score (%)	RFD score (%)
Age	3.8**	0.930**	1.224**	0.558**	1.045**
Age squared	-0.1**	-0.014**	-0.019**	-0.009**	-0.016**
Male	-6.2**	-1.820**	-2.434**	-1.014**	-2.255**
GCSEs	1.2	0.371*	1.840**	1.082**	0.176
A levels	9.8**	2.397**	5.933**	1.736**	1.813**
Graduate	16.8**	4.491**	9.767**	2.381**	3.303**
Experience: PCSO	13.2**	4.003**	2.685**	2.006**	3.902**
Experience: SC	9.2**	2.860**	3.120**	1.473**	2.682**
Mixed white	-3.1*	-0.512*	-3.395**	-0.161**	0.139
Asian	-20.9**	-3.793**	-15.309**	-2.801**	-2.190**
African	-28.8**	-5.436**	-19.627**	-4.656**	-1.827**
Chinese	-10.3**	-2.433**	-10.194**	-3.974**	-1.614*
Other	-26.9**	-5.903**	-19.962**	-5.271**	-2.486**
Missing	-5.3**	-1.126**	-3.939	-0.702**	-1.012**
Constant	17.6**	42.231**	47.661	86.282**	49.329**

Note: Baseline is 2007, female, <GCSE qualifications, no prior police experience, white ethnicity.
Sample size: 41,485. **,* indicates significance at the 1%,5% level.

Methodology for estimating impact of national wages on quality

$$Q_i = \alpha + \beta \ln(W_r^P / W_r^O) + \rho A_r + X_r \gamma + \tau + \varepsilon_i \qquad [1]$$

- Q_i is applicant quality
  - measured using candidate test score at national assessment

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  - Crimes per 1000 population, proportion of crime accounted for by: theft, criminal damage, dom. burglary, non-dom burglary, public order offences, drugs, shoplifting, vehicle crime, violence without injury, violence with injury

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- *X* are local area characteristics
  - Educational composition of population, unemployment rate, house prices

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- τ are time dummies

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Measuring the relative wage

- What is $\ln(W_r^P / W_r^O)$?
- Assume applicants motivated by how police wages compare to average wages across *all* employees in their local area
- Ideally estimate:

$$\ln W_{i,r} = \alpha + X_i\beta + \sum_r \theta_{1,r}F_r + \theta_2 P_i + \sum_r \theta_{3,r}P_i F_r + \eta_i \qquad [2]$$

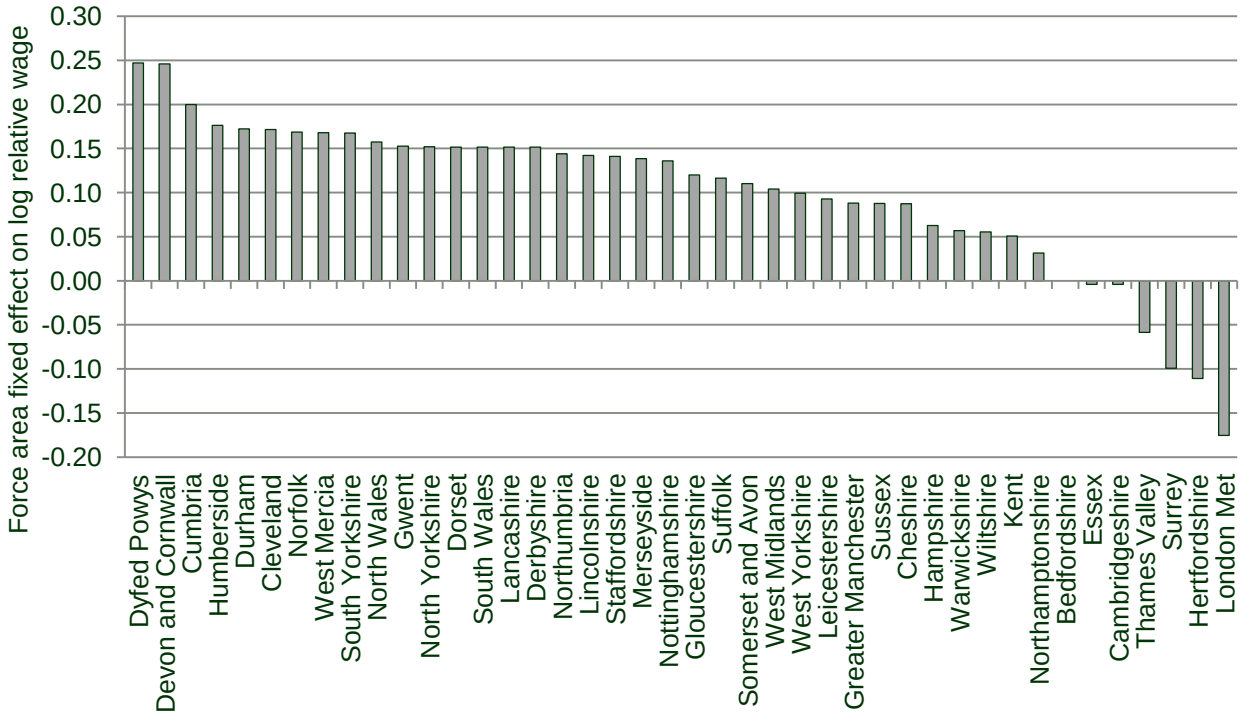
  and use estimated $\theta_{3,r}$ for the relative wage $\ln(W_r^P / W_r^O)$ in region r
- Difficult to find a dataset with sufficient sample size at local level
- If police wage genuinely national, $\theta_{3,r} = \theta_{1,r}$ and can simply estimate

$$\ln W_{i,r} = \alpha + X_i\beta + \sum_r \theta_{1,r}F_r + \eta_i \qquad [3]$$

- and use - $\theta_{1,r}$ for the relative wage in region r

Measuring the relative wage

- Estimate [3] using data from the Labour Force Survey
  - Pool 2005 to 2010; estimate police forces using local authority areas
  - Sample: all employees aged 20-50
  - Control for: sex, age, education, age*education, ethnicity, time



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Headline results (1/2)

- Relationship between applicant quality and relative wage [controlling for area characteristics and time]:
  - 10% increase in relative wage associated with:

    ~ 0.9 percentage point higher overall score

    ~ 1.2 percentage point higher probability of passing

    ~ 2.1 ppt higher written communication score, 1.8 ppt higher respect for race and diversity score, 0.9 ppt lower oral score

Headline results (2/2)

- Relationship between applicant quality and relative wage AND disamenity of policing [controlling for area characteristics, time]:
  - 10% increase in relative wage associated with:
    - ~ 1.3 percentage point higher overall score
    - ~ 3.1 percentage point higher probability of passing
  - Additional reported crime per 1000 population associated with:
    - ~ 3.9 percentage point lower overall score
  - 1% increase in proportion of crime that violence involving injury:
    - ~ 1.8 percentage point lower overall score
- For comparability:
  - 1 standard deviation ↑ in rel. wage ~ 1.1 ppt ↑ in overall score
  - 1 standard deviation ↑ in crime rate ~ 0.7 ppt ↓ in overall score
  - 1 standard deviation ↑ in proportion crime that violence with injury ~ 1.6 ↓ in overall score

Impact on the composition of applicants

- To what extent does the impact on quality manifest itself through observable characteristics of candidates?
- Controlling for applicant characteristics (age, sex, education, ethnicity):
  - Reduces associations slightly (e.g. impact of 10% increase in relative wages falls from 1.3ppt to 1.0ppt)
  - Suggests most of the impact is coming from unobservable quality
- Association with applicant characteristics:
  - Higher outside wage associated with lower average age of applicants, and smaller proportion who are female or white
  - Higher proportion of crime being violent associated with smaller proportion of applicants who are white or have A-levels or above

Conclusions

- National police pay scales do result in geographical variation in the quality of police applicants
  - Higher relative wage associated with higher quality candidates
  - Greater disamenity of policing is assoicated with lower quality candidates
- Both effects are important
  - In this case offsetting: effect of higher relative wage partially offsets effect of lower attractiveness of policing in some areas
- Largely manifested through unobservable characteristics
- However magnitude of effects is relatively small
  - E.g. Relative wage differences imply a 5ppt difference in overall score between Hertfordshire and Dyfed Powys
- There remains the important question of the impact of police officer quality on police force productivity