Police recruit quality and wage regulation

Rowena Crawford (IFS), Richard Disney (IFS, UCL, U of Sussex) and David Innes (IFS)

Seminar at College of Policing, 19th May 2015

Background

- This research constitutes part of an ESRC-funded programme of research on policing from 07-14 to 06-16 at the IFS.

- Three components to the programme:
  - Police recruitment (today's seminar)
  - Police retention and retirement
    - (this builds on earlier, published, work by Crawford and Disney on reforms to police pensions and to the finance of early retirement)
  - Police finance
    - The aim being to construct a structural model that embeds the local demand for policing, the local supply price of additional funding (precept) and the efficiency of local policing.

Institute for
Fiscal Studies

Overview of today's seminar

- National wage setting for public sector workers results in geographical variation in wages relative to 'outside option'

- Q: Does this impact on the quality of public sector workers?

- Investigate this question for the police using innovative new data:

  – Test scores from national assessment required of all police applicants

- Key findings:

  – Areas with higher wage premia to the police (relative to outside option) attract better quality applicants

  – However the higher wage premium acts to offset the higher disutility of policing in these areas

Institute for
Fiscal Studies

Illustration

- Police pay scales are set at the national level (small cost of living adjustment in London)

- Given that private sector wages vary geographically, the premium (or penalty) from working in the police will vary geographically

- This chart shows the position (percentile range) of police officers (constable/sergeant) in the area pay distribution (ASHE)

- Question: Do these area differences impact on the quality of police officers across areas?

Institute for Fiscal Studies
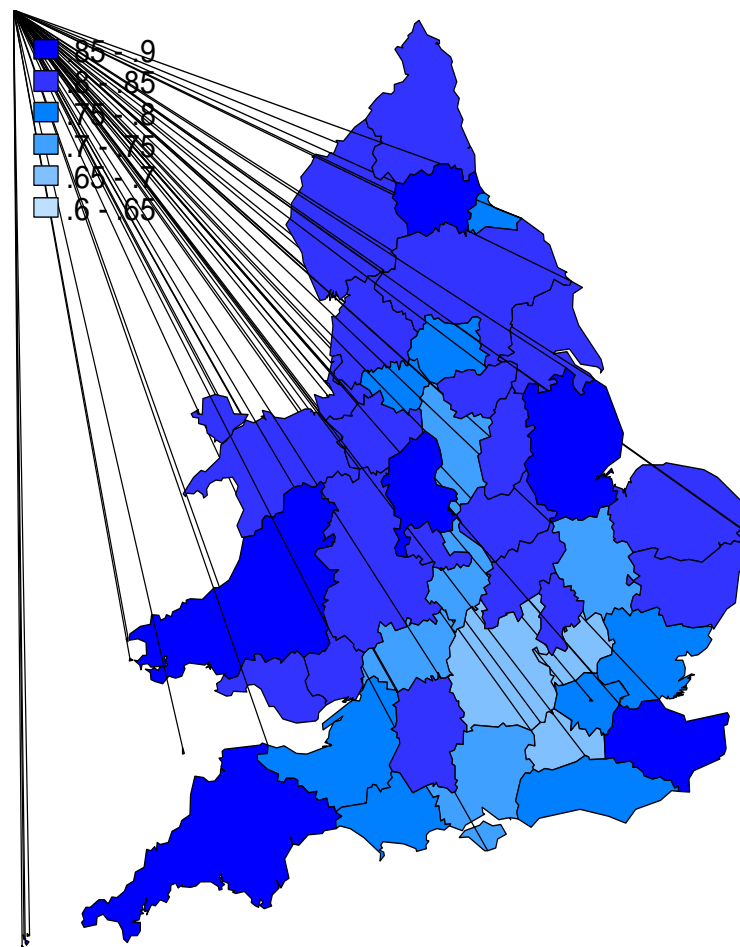
Existing literature

- On public pay and quality of public workers:
  - General implications of pay relativities for public sector worker quality: Borjas (2002). But, how to measure 'quality' of public sector workers?
  - Using school test scores as measure of 'quality': Nickell & Quintini (2002) and Hoxby and Leigh (2004)
  - Randomised wage offers + IQ/Aptitude tests of recruits: Del Bo et al (2013)
  - By institutional performance: Propper & Van Reenen (2010) – hospitals; Britton and Propper (2012) – schools

  Note: we have direct measures of quality *as police officers.*

- Other relevant literatures
  - Pay compensates non-work attributes (Rosen, 1986) – *but note here that police pay is regulated so doesn't adjust.*
  - Area attributes and pay: Rosbak (1982, 1988) *ditto*
  - Screening by quality with queue of applicants: (Weiss, 1980)
  - Incorporating search costs in dynamic models of labour demand e.g. Cahuc and Zylbeberg (2004)

Institute for
Fiscal Studies

Theoretical model (1/3)

- The theory of compensating differentials states that pay adjusts to non-wage attributes of job (can be spatial variation)

  - Workers come in quality types $i \in I$; police force areas $f \in F$.

  - Police wages are regulated: Working as a police officer, a worker of type i receives an exogenously-set wage $\hat{w}$, and experiences non-wage attributes of being a police officer of A_{if} that vary spatially.

  - Each worker type has an *outside option* (wage) w_{if} in another occupation with identical (normalised) job attributes A_f.

  - Utility is of the form $U_i = w_{if}e^{-\rho i A if}$ where ρ_i measures the type i worker's dislike of the disamenity of being a police officer.

  - A worker of type i in area f will therefore prefer to be a police officer than work in another occupation if:

$$\hat{w}\, e^{-\rho_i A_{if}} > w_{if}\, e^{-\rho_i A_f}$$

$$\frac{\hat{w}}{w_{if}} > e^{\rho_i (A_{if} - A_f)}$$

  i.e. preference for policing is decreasing in outside wage (w_{if}), decreasing in relative disamenity of policing ($A_{if}-A_f$)

Institute for
Fiscal Studies

Theoretical model (2/3)

- ## The supply of potential police recruits

    - At any time there is a probability θ_i that a worker of type i will be job seeking in area f. The flow of workers of type i seeking to be a police officer will therefore be:

$$n_{if} = \begin{cases} \theta_{if}\, q_{if} & \text{if} \quad \dfrac{\hat{w}}{w_{if}} \geq e^{-\rho_i(A_{if} - A_f)} \\[2em] 0 & \text{if} \quad \dfrac{\hat{w}}{w_{if}} < e^{-\rho_i(A_{if} - A_f)} \end{cases}$$

    where q_{if} is the quantity of workers of type i in area f

    - Total applicants to force f given $1...i...I$ types of workers is therefore

$$N_f = \sum_{i=1}^{I} n_{if}$$

    - Note: some types of workers will not apply for a particular police force; the decision will depend on spatial variations in outside option for ith type (w_{if}), and spatial variations in nature of policing (disamenity value A_{if} to ith type).

Theoretical model (3/3)

- The hiring decision, hiring costs and quality
  - Assume that the police force has a desired stock of workers, L^*_f, and an existing stock of workers, minus exits from the force δ. Hence desired hirings, H^*_f, is the difference between these stocks:

  $$H^*_f = L^*_f - (1 - \delta) L_{f,t-1}$$

  - Assume a force f will only employ individuals who score above a level Z_f in the national assessment, where $Z_f \geq Z_{min}$ (the national minimum pass threshold).

  - Denote λ_{if} as the probability an individual of type i achieves the required Z_f at national assessment.

  - Effective supply of applicants to force f is therefore
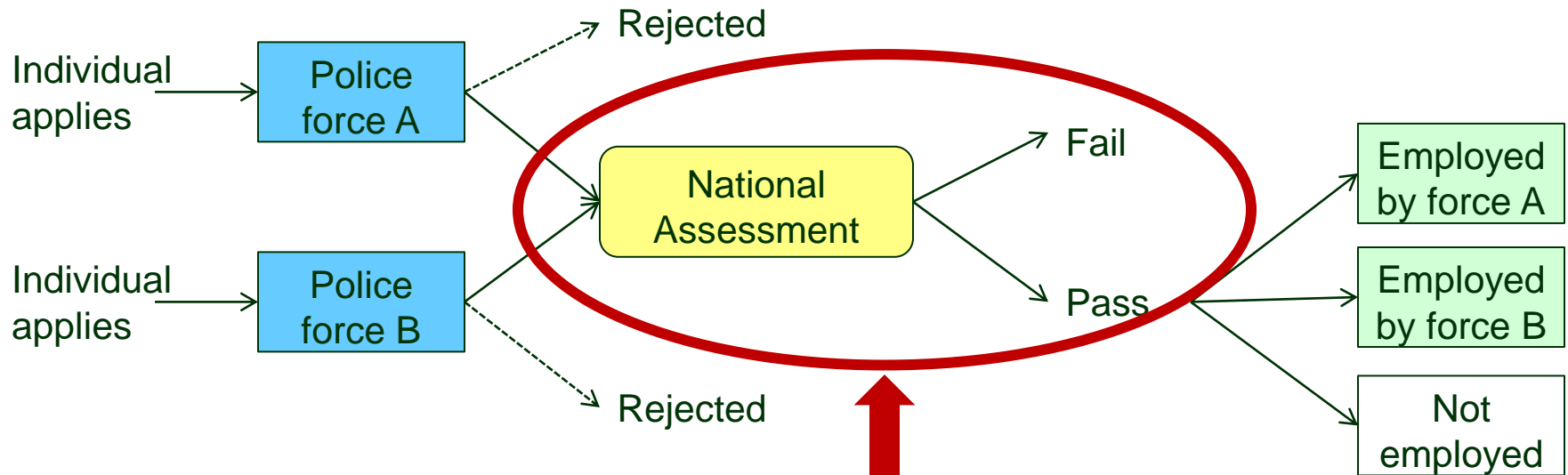
  $$S_f = \sum_{i=1}^{I} \lambda_{if} n_{if}$$

  - If $S_f \geq H^*$ (i.e. excess supply of suitable applicants) then force can choose from this pool using some criteria (e.g. test score)

  - If $S_f < H^*$ (i.e. insufficient suitable applicants) then force must engage in search activities for applicants of more productive types.

    - Since search is costly, resulting recruits must be of high enough quality to offset this search cost

Institute for
Fiscal Studies

Testable predictions from the theoretical model

- Given the police force wage is regulated and spatially invariant (small cost of living adjustment in London)…

- Quality of applicants, as measured by score in national assessment, is:

  - Decreasing in outside wage offer

  - Decreasing in disamenity value of policing in a given area

  - Increasing in supply of better quality worker types in given area

  - Increasing in search intensity of a police force for suitable applicants (?)

- Also:

  - Average test scores will vary by police area

  - Applicant mix (e.g. gender/level of schooling) will vary by police area

  - Some groups with higher test scores e.g. women/graduates may be deterred from assessment by outside wage/differences in amenity value of policing (i.e. applicant pool is endogenous)

Institute for Fiscal Studies

The police recruitment procedure

Individual applies → Police force A → Rejected

Individual applies → Police force B → Rejected

National Assessment → Fail / Pass

Pass → Employed by force A / Employed by force B / Not employed

Our data
Information on 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)

Institute for Fiscal Studies

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

Institute for Fiscal Studies

Distribution of candidate test scores (2008)
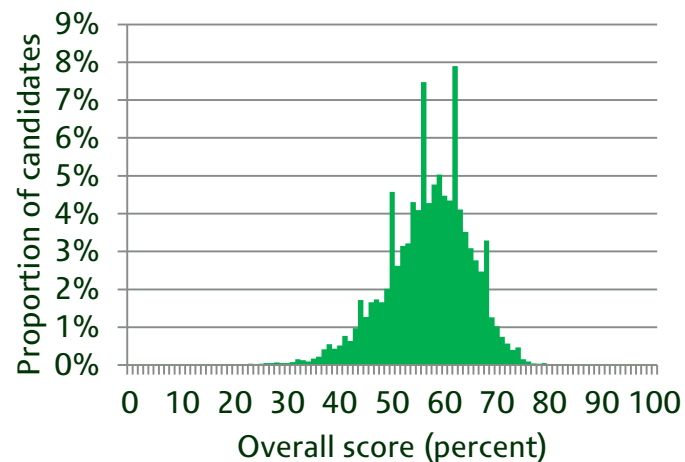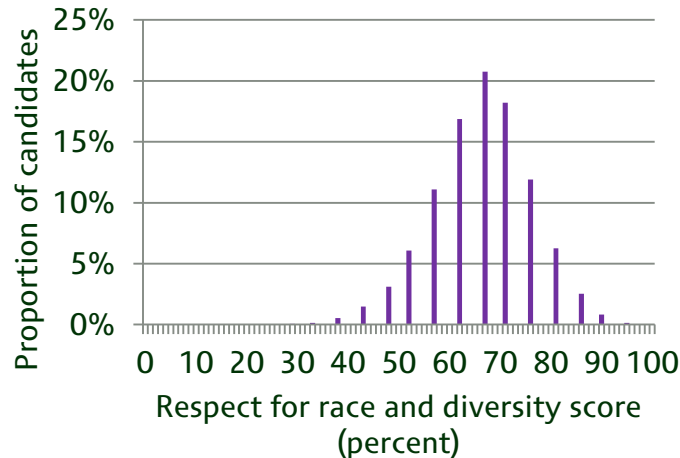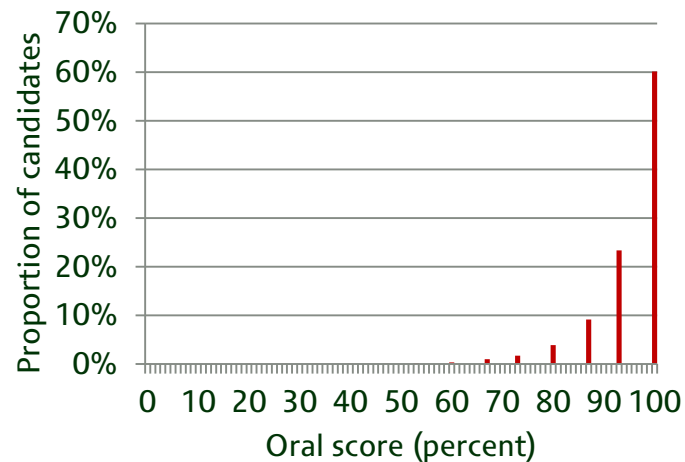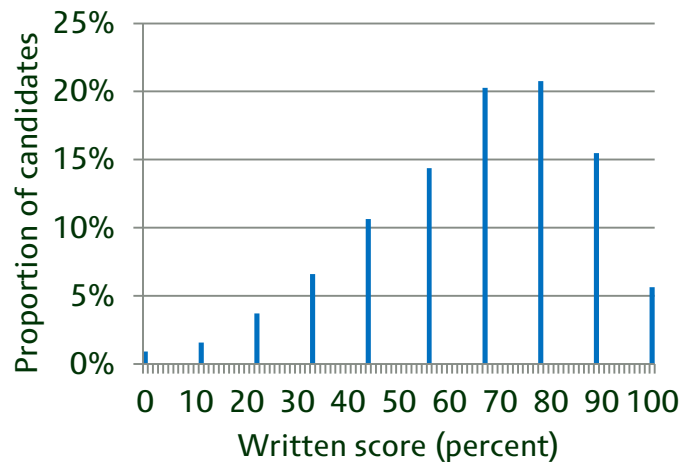
To pass post-Nov 2007: Oral>=50%, Written >=44%, RFD>=50%, Overall>=50%
(**To pass pre-Nov 2007**: Oral>=60%, Written>=44%, RFD>=60%, Overall>=60%)

Institute for
Fiscal Studies

Candidate characteristics associated with higher test scores

	Written score	Oral score	RFD score	Overall score	Pr(pass)
2008	-3.858**	-0.248	0.433*	-0.635**	-0.036**
2009	-11.381**	1.082**	1.332**	-2.822**	-0.124**
2010	-1.931**	1.576**	-0.171	0.566**	0.010
Age	1.224**	0.558**	1.045**	0.930**	0.038**
Age squared	-0.019**	-0.009**	-0.016**	-0.014**	-0.001**
Male	-2.434**	-1.014**	-2.255**	-1.820**	-0.062**
GCSEs	1.840**	1.082**	0.176	0.371*	0.012
A levels	5.933**	1.736**	1.813**	2.397**	0.098**
Graduate	9.767**	2.381**	3.303**	4.491**	0.168**
Experience: PCSO	2.685**	2.006**	3.902**	4.003**	0.132**
Experience: SC	3.120**	1.473**	2.682**	2.860**	0.092**
Mixed white	-3.395**	-0.161**	0.139	-0.512*	-0.031*
Asian	-15.309**	-2.801**	-2.190**	-3.793**	-0.209**
African	-19.627**	-4.656**	-1.827**	-5.436**	-0.288**
Chinese	-10.194**	-3.974**	-1.614*	-2.433**	-0.103**
Other	-19.962**	-5.271**	-2.486**	-5.903**	-0.269**
Missing	-3.939	-0.702**	-1.012**	-1.126**	-0.053**
Constant	47.661	86.282**	49.329**	42.231**	0.176**

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

Institute for
Fiscal Studies

Distribution of force average test scores (2008)
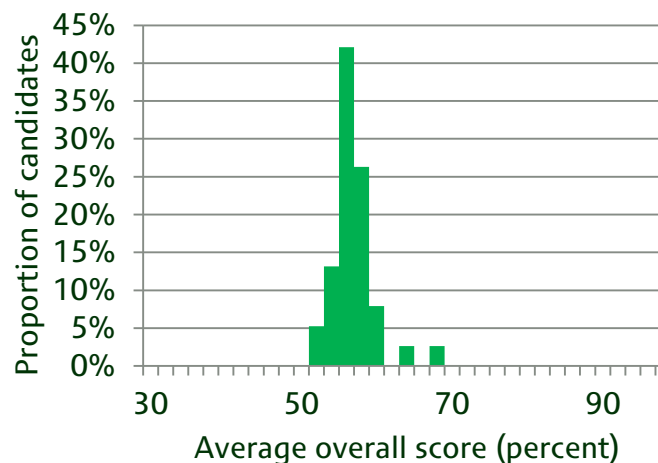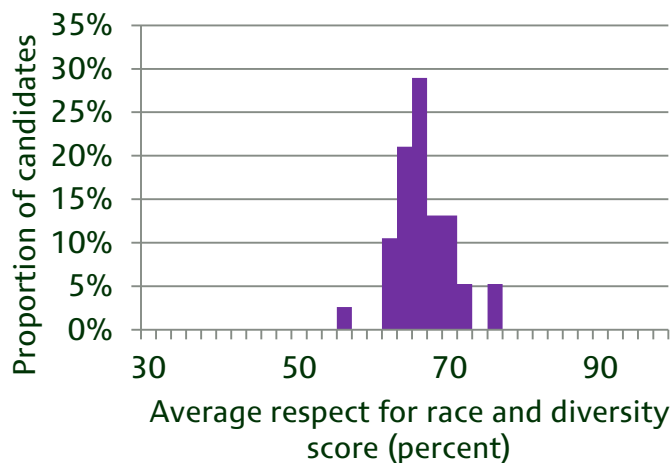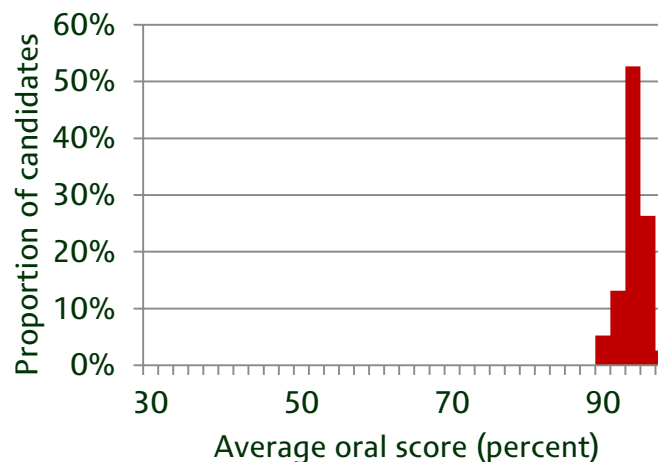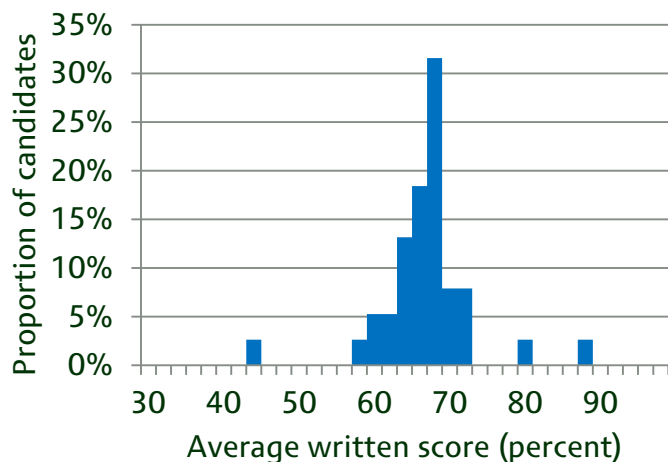
Empirical strategy 1

- Consider a reduced form model of supply/quality of supply of workers to a public sector occupation such as the police:

- Write: $$Q_{ift} = \beta lnW_{ift}^P + \gamma lnW_{ift}^O + \delta t + X'_{ft}\theta + Z'_{it}\vartheta + \epsilon_{ift} \quad (1)$$

- Where Q = 'Quality', W^P = the police wage, W^O = the 'outside' wage, t = period, f = force/area, X' and Z' are vectors of area & individual characteristics. β, γ, δ, θ, and υ are parameters to be estimated.

- Comments on this equation:

- $\beta > 0$ and $\gamma < 0$.

- Area & individual characteristics should be subsumed into 'outside' (competitive) wage but police wage is nationally regulated.

- ***Hence relative wage effects will be biased (i.e. β and γ) if we do not allow for all area and job-specific non-wage attributes of policing.***

- Moreover, there is an **observability** problem for both W^p_i and W^o_i. Identifying off *transitions* (e.g. by fixed effects) raises numerous methodological issues (see Disney and Gosling, 2003, CEPR WP#3787).

Institute for
Fiscal Studies

Empirical strategy 2

- In any event we are looking at would-be recruits with limited labour market histories

- So to proceed, we consider the prospective wage options of police applicants.

- We assume that the expected wage $E(W)$ is determined by the *average* police wage in the (police) area relative to the *average* 'outside' wage in the police area.

- Write:

$$E(W_{ift}) = Z'_{it}\beta + \delta t \boxed{+ \bar{F}_{ft} + \bar{P}_t + (\bar{F}_{ft} \times \bar{P}_{ft})}$$

- Again, competitive wage may incorporate personal and area characteristics but the regulated wage will not.

- We focus on the component highlighted in red.

Institute for Fiscal Studies

Empirical strategy 3

-   $$E(W_{ift}) = Z'_{it}\beta + \delta t + \bar{\bar{F}}_{ft} + \bar{P}_t + (\bar{\bar{F}}_{ft} \times \bar{P}_{ft})$$

-   Define $\alpha_{1f} = \bar{\bar{F}}_{ft}$ as the average local area wage premium or penalty.
    $\alpha_2 = \bar{P}_t$ as the average police officer premium (or penalty).
    $\alpha_{3f} = (\bar{\bar{F}}_{ft} \times \bar{P}_{ft})$ as the interaction of the local wage premium with any local variation in police earnings.

-   If police wage is identical everywhere, then α_2 is subsumed into the constant of eqn (2) and $(\alpha_1 + \alpha_3) = 0$ for police. The 'wage effect' on quality is wholly identified off variations in $-\alpha_1$ on the outside wage (higher local wage premium, lower recruit quality). (This is the strategy of e.g. Propper and van Reenen on NHS pay)

-   If α_3 is not zero (i.e. there is some local variation in police wages not controlled for by characteristics such as age), then the 'wage effect' on quality depends on the difference between the 'outside' wage (α_1) and the 'inside' wage ($\alpha_1 + \alpha_2 + \alpha_3$). Normalising on the national police 'effect', differences in quality then depend positively on α_3 (i.e. the area variation in police wage relative to outside wages)

Institute for Fiscal Studies

Empirical strategy 4

- Our estimated area-variations in relative police wage premia by force area will depend on:

  - ❖ Whether we focus on $-\alpha_1$ alone or use α_3 (data-set specific).

  - ❖ The wage data we use e.g. LFS or ASHE

  - ❖ What we include in the X-vector of controls

  - ❖ For example, using age, age^2 and sex in the controls, and ASHE, the correlation in premia measured by $-\alpha_1$ and $\alpha_3 = 0.8297$
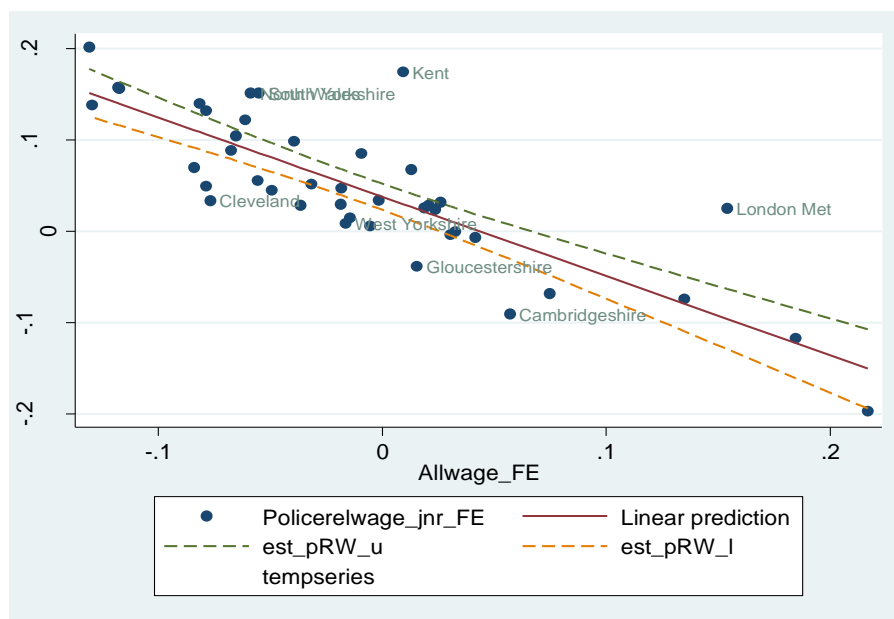
Variations in police wage average 'premia' across forces

Coefficients from specification using ASHE, quadratic in age, sex and measured α_3
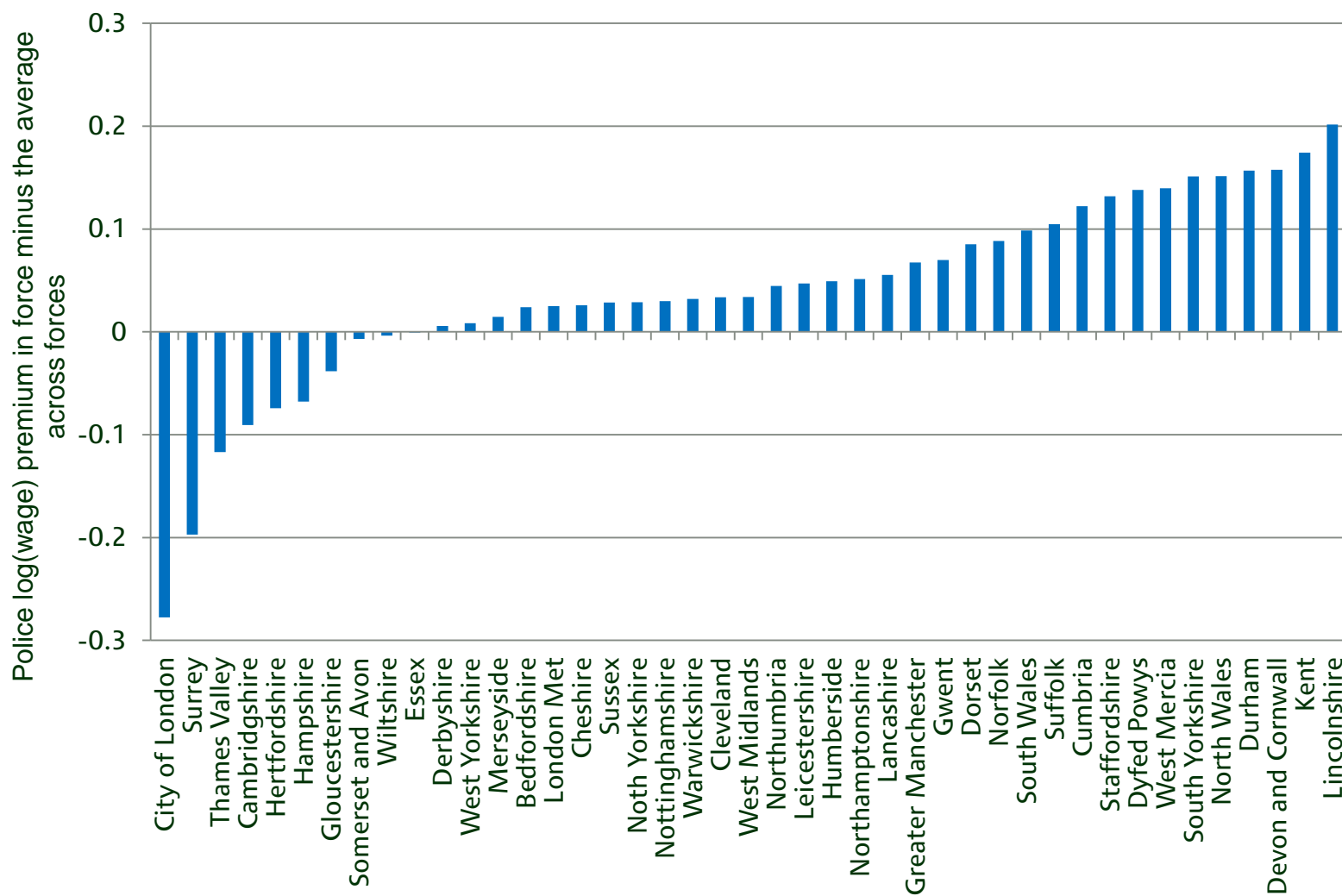
Estimated equations

- Candidate-level regressions:

$$score_c = \alpha + \varphi_y \sum_{y=2008}^{2010} i.year_y + \delta LocalP\ remium_f$$

  – With and without candidate characteristics

$$... + \beta_1 age + \beta_2 age + \sum \beta_e i.educ + \sum \beta_x i.ex\ perience + \sum \beta_n i.ethnicity$$

- Subsequently controlling for other factors:

  – Selection by police forces

  – Geographical variation in disamenity of policing

  – Available stock of quality workers

  – Other local labour market indicators

Institute for
Fiscal Studies

Data

- Annual Survey of Hours and Earnings (ASHE)

  - Large sample size so can estimate ln(W^{police}) and local variations in ln(W^{police}). Hence we can estimate both α_1 and α_3.

  - Limited characteristics on which to condition predicted outside wage (age, sex, no education).

  - (Although of course we know the education of candidates)

- Labour Force Survey

  - Sample too small to estimate local variations in ln(W^{police}) [Of course this doesn't matter if ln(W^{police}) is nationally fixed but we cannot thereby estimate α_3]

  - But can condition 'outside' wage on age, sex, education, ethnicity… …

Institute for
Fiscal Studies

Measures of the 'local premium' (1/2)

1) Using the Annual Survey of Hours and Earnings

- ASHE_1
  - Regress: $Ln(wage_i) = \alpha + \beta_1 age_i + \beta_2 age_i^2 + \beta_3 sex + \sum_{j=1}^{42} \gamma_j i.forcej$
  - Take difference in PA area fixed effect from the average $\gamma_j - \bar{\gamma}$
  - Larger implies lower relative wage for the police for that area (i.e. $-\alpha_1$)

- ASHE_2
  - Regress: $Ln(wage_i) = \alpha + \beta_1 age_i + \beta_2 age_i^2 + \beta_3 sex + \sum_{j=1}^{42} \gamma_j i.forcej + \phi i.police + \sum_{j=1}^{42} \varphi_j i.forcej * i.police$
  - Take difference in police premium in PA area from average $\varphi_j - \bar{\varphi}$
  - Larger indicates higher relative wage for the police for that area (i.e. α_3)

- ASHE_3
  - As ASHE_2, but with the sample restricted to those in SOC3 occupations

- ASHE_4
  - (Unconditional) average percentile of police officers in the PA area hourly earnings distribution (earlier graph)

Institute for
Fiscal Studies

Measures of the 'local premium' (2/2)

2) Using the Labour Force Survey

- LFS_1
  - Reg: $Ln(wage_i) = \alpha + (\beta_1 age_i + \beta_2 age_i^2) * \sum_{e=1}^{E} \beta_4 i.educe_i + \sum_{g=1}^{G} \beta_5 i.ethnicg_i + \sum_{j=1}^{42} \gamma_j i.forcej_i$
  - Take difference in PA area fixed effect from the average $\gamma_j - \bar{\gamma}$ (i.e. $-\alpha_1$)
  - Larger implies lower relative wage for the police for that area
- LFS_2
  - As LFS_1, but with the sample restricted to those in 'comparable' occupations (secondary and further education professionals, fire officers, senior fire officers, paramedics)
- (Many other specifications could also be run)

Institute for
Fiscal Studies

Results – baseline, ASHE, α_3

Estimates of δ	Written score	Oral score	RFD score	Overall score	Pr(pass)
Other covariates included:					
Year dummies only	10.778**	-4.444**	2.282**	-0.255	0.076*
Also controlling for candidate characteristics:					
Year dummies only	7.976**	-5.029**	2.230**	-0.649	0.047

Note: **1%, *5% Figures in table are estimates of coefficient δ from regressions $score_c = \alpha + \delta LocalP\,remium_f + ...$

Institute for Fiscal Studies

Using alternative measures of the 'local premium'

- Comparing specifications for "local premium" when regressing:

$$score_c = \alpha + \varphi_y \sum_{y=2008}^{2010} i.year_y + \delta LocalP\ remium_f$$

	ASHE_1	ASHE_2	ASHE_3	ASHE_4	LFS_1	LFS_2
Written test scores:						
Wage in PA area (compared to average)						
Police wage premium in PA area (compared to average)		10.778**				
Average position of police in earnings distribution						
RFD test scores:						
Wage in PA area (compared to average)						
Police wage premium in PA area (compared to average)		2.282**				
Average position of police in earnings distribution						

Institute for
Fiscal Studies

Using alternative measures of the 'local premium'

- Comparing specifications for "local premium" when regressing:

$$score_c = \alpha + \varphi_y \sum_{y=2008}^{2010} i.year_y + \delta LocalPremium_f$$

	ASHE_1	ASHE_2	ASHE_3	ASHE_4	LFS_1	LFS_2
Written test scores:						
Wage in PA area (compared to average) ($-\alpha_1$)	19.082**				13.547**	31.933
Police wage premium in PA area to average (α_3)		10.778**	12.145**			
Average position of police in earnings distribution				18.770**		
RFD test scores:						
Wage in PA area (compared to average) ($-\alpha_1$)	1.366**				1.035**	5.365
Police wage premium in PA area to average (α_3)		2.282**	5.076**			
Average position of police in earnings distribution				1.963*		

Results – baseline, ASHE, α_3

Estimates of δ	Written score	Oral score	RFD score	Overall score	Pr(pass)
Other covariates included:					
Year dummies only	10.778**	-4.444**	2.282**	-0.255	0.076*
… + London dummy	7.756**	-4.370**	2.096**	-0.479	0.062
Also controlling for candidate characteristics:					
Year dummies only	7.976**	-5.029**	2.230**	-0.649	0.047
… + London dummy	6.455**	-4.717**	2.116**	-0.630	0.048

Note: Figures in table are estimates of coefficient δ from regressions $score_c = \alpha + \delta LocalPremium_f + ...$

Institute for Fiscal Studies

Selection of candidates by police forces

- Forces may differ in who they put forward to the national assessment from their pool of initial applicants
  - All forces assess applications against national guidelines
    - Eligible for the police (age, nationality, criminal record etc)
    - Score above a certain level on initial application form
  - Some forces also have additional selection procedures
    - Additional exam, formal/informal interview, put forward only best candidates
- Forces also differ in how they recruit post-national assessment
  - All candidates have to do fitness/medical tests
  - Some forces also have formal interviews before recruitment
- Based on *current* online information:

Number of forces who:	Don't screen after NA	Screen after NA
Don't screen before NA	14	10
Screen before NA	12	7

Institute for
Fiscal Studies

Results – controlling for screening

	Written score	Oral score	RFD score	Overall score	Pr(pass)
Other covariates included:					
Year dummies only	10.778**	-4.444**	2.282**	-0.255	0.076*
… + London dummy	7.756**	-4.370**	2.096**	-0.479	0.062
… + Screening dummies	6.119**	-4.568**	2.323**	0.161	0.064*
Screen before NA	*-1.272***	*-0.147*	*0.420***	*0.734***	*0.008*
Screen after NA	*-0.510*	*-0.092*	*-0.998***	*-0.838***	*-0.025***
Also controlling for candidate characteristics:					
Year dummies only	7.976**	-5.029**	2.230**	-0.649	0.047
… + London dummy	6.455**	-4.717**	2.116**	-0.630	0.048
… + Screening dummies	5.515**	-4.747**	2.620**	0.368	0.065*

Variation in disamenity value of policing

- Police forces might be more attractive if:
  - Lower crime levels?
  - 'Softer' types of crime?
  - Staffing levels are higher?
  - Age/sex composition of the force is different?

- Use data on reported crime to explore the first two of these
  - Data on the number of offences *reported* in various categories for each police force each year

Institute for
Fiscal Studies

Variation in composition of reported crime

Institute for Fiscal Studies
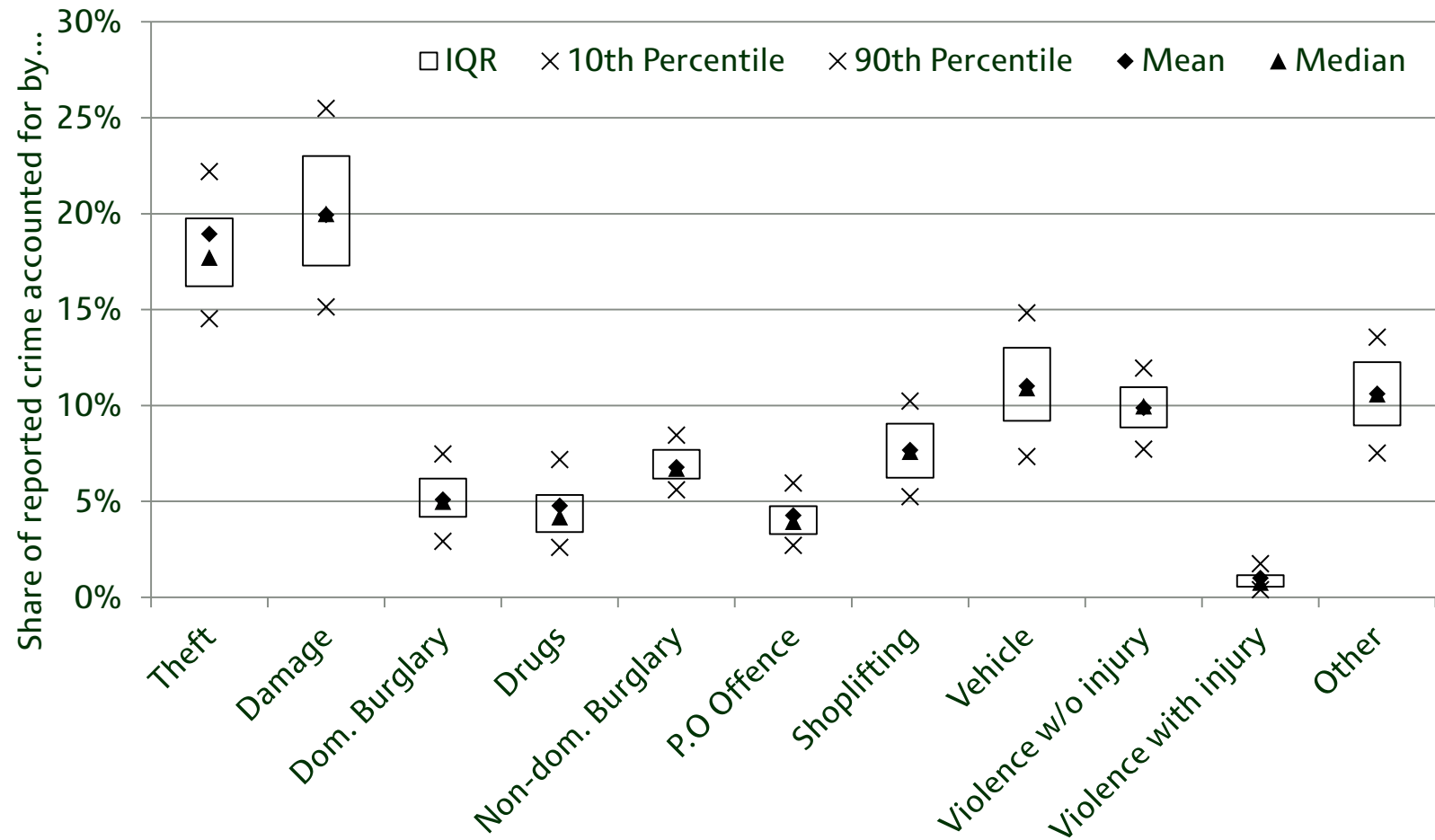
Geographical variation in composition of crime

Geographical variation in % of crime in 2007 that is violence (with or without injury)

Violence as % crime
15 - 19
12 - 15
9 - 12
6 - 9
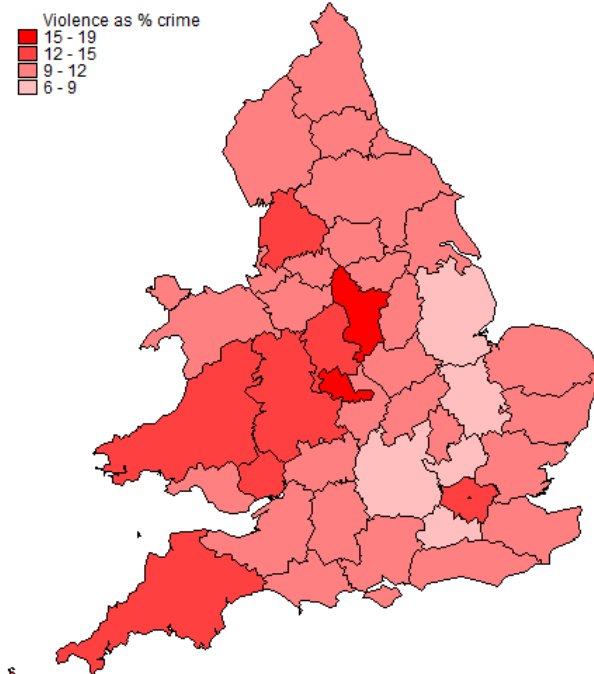
Geographical variation in % of crime in 2007 that is domestic burglary

Dom. burglary as % crime
9 - 12
6 - 9
3 - 6
0 - 3

Geographical variation in % of crime in 2007 that is theft

Theft as % crime
21 - 23
18 - 21
15 - 18
12 - 15

Institute for Fiscal Studies

Results – controlling for crime prevalence & type

	Written score	Oral score	RFD score	Overall score	Pr(pass)
Other covariates included:					
Year dummies only	10.778**	-4.444**	2.282**	-0.255	0.076*
... + London dummy	7.756**	-4.370**	2.096**	-0.479	0.062
... + Screening dummies	6.119**	-4.568**	2.323**	0.161	0.064*
... + Crime prevalence and type	11.405**	0.992	6.732**	2.330**	0.197**
Crimes per 1000 population	*-0.623**	*-0.075*	*0.216**	*-0.094*	*-0.016**
% theft	*0.396**	*-0.426**	*0.367**	*0.184**	*0.003*
% criminal damage or arson	*0.208*	*-0.481**	*0.157**	*0.056*	*-0.002*
% domestic burglary	*0.923**	*0.033*	*0.645**	*0.639**	*0.028**
% drugs offences	*0.048*	*-0.133**	*-0.144**	*0.017*	*-0.001*
% non-domestic burglary	*-0.646**	*-0.059*	*-0.115*	*0.094*	*-0.004*
% public order offences	*-0.162*	*-0.605**	*0.807**	*0.331**	*-0.000*
% shoplifting	*0.396**	*-0.261**	*0.100*	*0.090*	*0.001*
% vehicle crime	*0.241*	*-0.224**	*-0.005*	*-0.069*	*0.002*
% violence without injury	*-0.056*	*-0.424**	*-0.156**	*-0.016*	*-0.004*
% violence with injury	*-1.917**	*-0.519**	*-1.399**	*-1.370**	*-0.061**

Results – controlling for crime prevalence & type

	Written score	Oral score	RFD score	Overall score	Pr(pass)
Other covariates included:					
Year dummies only	10.778**	-4.444**	2.282**	-0.255	0.076*
… + London dummy	7.756**	-4.370**	2.096**	-0.479	0.062
… + Screening dummies	6.119**	-4.568**	2.323**	0.161	0.064*
… + Crime prevalence and type	11.405**	0.992	6.732**	2.330**	0.197**
Also controlling for candidate characteristics:					
Year dummies only	7.976**	-5.029**	2.230**	-0.649	0.047
… + London dummy	6.455**	-4.717**	2.116**	-0.630	0.048
… + Screening dummies	5.515**	-4.747**	2.620**	0.368	0.065*
… + Crime prevalence and type	12.309**	1.452*	7.834**	3.366**	0.232**

Institute for
Fiscal Studies

Results – controlling for population characteristics

	Written score	Oral score	RFD score	Overall score	Pr(pass)
Other covariates included:					
Year dummies only	10.778**	-4.444**	2.282**	-0.255	0.076*
… + London dummy	7.756**	-4.370**	2.096**	-0.479	0.062
… + Screening dummies	6.119**	-4.568**	2.323**	0.161	0.064*
… + Crime prevalence and type	11.405**	0.992	6.732**	2.330**	0.197**
… + Population characteristics	10.067**	0.225	7.358**	2.124*	0.168**
Prop. population with degree	0.014	-0.011	0.031	0.017	-0.001
Prop. population with A-levels	0.283**	0.085**	0.020	0.103**	0.002

Institute for
Fiscal Studies

Results – controlling for population characteristics

	Written score	Oral score	RFD score	Overall score	Pr(pass)
Other covariates included:					
Year dummies only	10.778**	-4.444**	2.282**	-0.255	0.076*
… + London dummy	7.756**	-4.370**	2.096**	-0.479	0.062
… + Screening dummies	6.119**	-4.568**	2.323**	0.161	0.064*
… + Crime prevalence and type	11.405**	0.992	6.732**	2.330**	0.197**
… + Population characteristics	10.067**	0.225	7.358**	2.124*	0.168**
Also controlling for candidate characteristics:					
Year dummies only	7.976**	-5.029**	2.230**	-0.649	0.047
… + London dummy	6.455**	-4.717**	2.116**	-0.630	0.048
… + Screening dummies	5.515**	-4.747**	2.620**	0.368	0.065*
… + Crime prevalence and type	12.309**	1.452*	7.834**	3.366**	0.232**
… + Population characteristics	10.566**	0.617	8.278**	2.973**	0.195**

Results – controlling for local labour market indicators

	Written score	Oral score	RFD score	Overall score	Pr(pass)
Other covariates included:					
Year dummies only	10.778**	-4.444**	2.282**	-0.255	0.076*
… + London dummy	7.756**	-4.370**	2.096**	-0.479	0.062
… + Screening dummies	6.119**	-4.568**	2.323**	0.161	0.064*
… + Crime prevalence and type	11.405**	0.992	6.732**	2.330**	0.197**
… + Population characteristics	10.067**	0.225	7.358**	2.124*	0.168**
… + Labour market indicators	7.881**	0.033	1.008*	1.169	0.169**
Unemployment rate	*0.226*	*-0.220*	*0.124*	*0.345**	*0.013**
Prop employment that is SOC1	*23.425*	*-0.585*	*2.824*	*9.331**	*0.491**
Prop employment that is SOC2	*-8.211*	*-5.481*	*17.354**	*13.218**	*0.331*
Prop employment that is SOC4	*-34.057*	*-4.606*	*-33.583**	*-35.938**	*-0.367*
Prop employment that is SOC5	*-24.560*	*-30.785**	*-33.005**	*-6.255*	*-0.676*
Prop employment that is SOC6	*62.554**	*5.297*	*29.333**	*39.636**	*0.861*
Prop employment that is SOC7	*39.427*	*-3.977*	*33.067**	*15.476*	*0.916*
Prop employment that is SOC8	*-75.378**	*14.649*	*-10.627*	*-9.791*	*-0.200*
Prop employment that is SOC9	*41.505*	*-3.346*	*10.824*	*37.790**	*0.952*

Institute for Fiscal Studies

Results – controlling for local labour market indicators

	Written score	Oral score	RFD score	Overall score	Pr(pass)
Other covariates included:					
Year dummies only	10.778**	-4.444**	2.282**	-0.255	0.076*
… + London dummy	7.756**	-4.370**	2.096**	-0.479	0.062
… + Screening dummies	6.119**	-4.568**	2.323**	0.161	0.064*
… + Crime prevalence and type	11.405**	0.992	6.732**	2.330**	0.197**
… + Population characteristics	10.067**	0.225	7.358**	2.124*	0.168**
… + Labour market indicators	7.881**	0.033	1.008*	1.169	0.169**
Also controlling for candidate characteristics:					
Year dummies only	7.976**	-5.029**	2.230**	-0.649	0.047
… + London dummy	6.455**	-4.717**	2.116**	-0.630	0.048
… + Screening dummies	5.515**	-4.747**	2.620**	0.368	0.065*
… + Crime prevalence and type	12.309**	1.452*	7.834**	3.366**	0.232**
… + Population characteristics	10.566**	0.617	8.278**	2.973**	0.195**
… + Labour market indicators	9.364**	0.643	9.219**	2.274*	0.212**

Institute for
Fiscal Studies

Results – controlling for local labour market indicators summarised: LFS (= $-\alpha_1$)

	Written score	Oral score	RFD score	Overall score	Pr(pass)
Other covariates included:					
Year dummies					
… + London dummy	2.228	-5.588**	0.511	-1.056*	-0.036
… + Screening dummies	-0.324	-6.169**	0.757	-0.233	-0.040
… + Crime prevalence and type	16.053**	-7.347**	15.738**	8.349**	0.237**
… + Population characteristics	14.143**	-8.247**	15.973**	7.859**	0.216**
… + Labour market indicators	14.377**	-11.139**	21.312**	8.368**	0.305**
Also controlling for candidate characteristics:					
Year dummies					
… + London dummy	-1.060	-6.482**	-0.492	-2.341**	-0.093
… + Screening dummies	-2.887*	-6.897**	0.039	-1.137*	-0.082
… + Crime prevalence and type	9.589**	-9.220**	12.789**	4.984**	0.101
… + Population characteristics	7.526*	-10.234**	12.760**	4.245**	0.072
… + Labour market indicators	7.119	-13.551**	16.994**	3.626**	0.128

Institute for
Fiscal Studies

Summary and policy implications

- National police pay scales result in geographical variation in the relative wage paid to the police compared to other occupations

- This is associated with higher quality of police officer applicants, as measured by scores at the national assessment

  - Particularly higher written scores and higher RFD scores

  - Even after controlling for candidate characteristics (not just about who is put forward on the basis of observables)

- Larger effect when control for prevalence and type of crime

  - Higher proportion of crime being violence associated with lower quality

  - Suggests higher wage premium in part offsets lower attractiveness of policing in some areas

- Does this matter?

  - Overall differences are "small"; coefficient on overall score suggests a difference between Surrey and Lincolnshire of less than 1ppt

  - Maybe there are enough 'good enough' applicants?

Institute for
Fiscal Studies