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Relocation of Public Sector Workers: Evaluating a place-based policy^δ

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Web Appendix – additional regressions

Table W.1: The impact of (2003-2007) relocations on total private sector, manufacturing and service employment, (2003-2007) employment changes - including a 50km+ distance band as a control group

	Total Private Sector			Manufacturing			Services		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Receiving areas									
0km	1.173** (0.544)	1.139** (0.543)	1.149** (0.544)	0.076 (0.090)	0.084 (0.090)	0.081 (0.092)	1.173** (0.521)	1.133** (0.517)	1.154** (0.518)
Spillovers									
0-1km	0.094*** (0.031)	0.078*** (0.030)	0.078*** (0.030)	-0.001 (0.004)	0.001 (0.004)	0.002 (0.004)	0.102*** (0.030)	0.083*** (0.028)	0.083*** (0.028)
0-2km	0.002 (0.006)	-0.010 (0.006)	-0.011* (0.006)	-0.005 (0.004)	-0.003 (0.004)	-0.004 (0.004)	0.007 (0.005)	-0.006 (0.006)	-0.006 (0.005)
0-3km	-0.004 (0.005)	-0.009* (0.005)	-0.009* (0.005)	-0.003 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.000 (0.004)	-0.006 (0.004)	-0.006 (0.004)
0-4km	0.003 (0.006)	0.003 (0.005)	0.003 (0.005)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	0.001 (0.006)	0.001 (0.005)	0.001 (0.005)
0-5km	-0.003 (0.002)	-0.002 (0.003)	-0.002 (0.003)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	-0.002 (0.002)	-0.001 (0.003)	-0.001 (0.003)
0-50km	-0.004*** (0.001)	-0.003** (0.001)	-0.003** (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.004*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)
Area controls		√	√		√	√		√	√
Pre-trends			√			√			√
Observations	167,224	167,224	167,224	167,224	167,224	167,224	167,224	167,224	167,224
# of clusters	212	212	212	212	212	212	212	212	212

Note: Robust standard errors are reported in parentheses; *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively. In columns (1)-(3), the dependent variable is defined as (2003-2007) changes in total private sector employment across all sectors of the economy except agriculture and forestry (SIC11-SIC93). In columns (4)-(6), the dependent variable is defined as (2003-2007) changes in manufacturing employment (SIC15-SIC37). In columns (7)-(9), the dependent variable is defined as (2003-2007) changes in service employment (SIC45-SIC93). Columns (1), (4) and (7) do not include 2001 area characteristics; Columns (2), (5) and (8) include area controls; and Columns (3), (6) and (9) include both area controls and pre-trends. Pre-trends are defined as (1998-2002) changes in total private sector employment (Column 3), manufacturing (Column 6) and services (Column 9). All regressions include 212 TTWA fixed effects and standard errors are clustered at the TTWA level (212 clusters). All specifications include a 50km+ distance band as a control group, but exclude all OAs located in London and the South East.

Sources: OGC Government relocation data, 2003-2007; BSD local unit data (private sector employers only), 1997-2011; UK Census of Population, 2001.

Table W.2: The impact by quartile class and distance band, (2003-2007) employment changes (full version of Table 6 in the main text)

	Bottom 1 st quartile		→ 2 nd quartile		3 rd quartile		Top 4 th quartile	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Receiving areas 0km								
FIRE	67.653***	(23.817)	122.969***	(41.040)	131.547***	(48.107)	267.652***	(97.455)
Catering	69.373**	(28.555)	106.959***	(27.579)	136.327***	(36.207)	166.701***	(53.494)
Construction	5.001	(3.181)	1.368	(3.766)	1.069	(2.810)	9.348	(5.668)
Transport	11.288	(11.572)	2.610	(7.079)	1.490	(12.478)	72.526**	(28.573)
Spillovers								
0-1km	1st quartile		2nd quartile		3rd quartile		4th quartile	
FIRE	-1.262	(1.397)	3.782*	(2.185)	0.740	(1.551)	5.893*	(3.012)
Catering	1.671	(1.235)	1.567*	(0.845)	1.032	(1.930)	6.374***	(1.904)
Construction	0.059	(0.255)	-0.140	(0.230)	-0.161	(0.259)	0.115	(0.257)
Transport	-0.528	(0.697)	0.379	(0.568)	-0.116	(0.701)	0.313	(1.159)
0-2km	1st quartile		2nd quartile		3rd quartile		4th quartile	
FIRE	0.800	(0.606)	-1.422**	(0.621)	0.658	(0.915)	-0.377	(0.919)
Catering	-1.042	(0.662)	-1.483***	(0.473)	-2.403***	(0.647)	-2.116***	(0.742)
Construction	0.074	(0.133)	0.074	(0.074)	-0.010	(0.100)	0.054	(0.164)
Transport	-0.351	(0.259)	-0.213	(0.249)	-0.771**	(0.346)	0.469	(0.368)
0-3km	1st quartile		2nd quartile		3rd quartile		4th quartile	
FIRE	-0.030	(0.481)	-0.282	(0.630)	-1.709***	(0.602)	-0.454	(1.052)
Catering	0.842	(0.559)	0.110	(0.622)	-1.143*	(0.589)	-1.203	(0.823)
Construction	0.023	(0.096)	-0.139	(0.111)	0.082	(0.105)	-0.076	(0.171)
Transport	0.330	(0.248)	0.229	(0.335)	-0.289	(0.292)	-0.222	(0.432)
0-4km	1st quartile		2nd quartile		3rd quartile		4th quartile	
FIRE	-0.443	(0.383)	-0.626	(0.777)	-0.637	(0.579)	0.498	(0.893)
Catering	-0.796*	(0.436)	-0.544	(0.533)	0.473	(0.548)	0.856	(0.751)
Construction	-0.112	(0.104)	0.173	(0.146)	-0.128	(0.102)	0.072	(0.150)
Transport	0.046	(0.166)	0.042	(0.244)	0.469	(0.289)	0.051	(0.352)
0-5km	1st quartile		2nd quartile		3rd quartile		4th quartile	
FIRE	0.625*	(0.348)	1.825*	(0.981)	1.202**	(0.595)	0.417	(0.647)
Catering	0.703**	(0.305)	1.232***	(0.368)	-0.201	(0.355)	-0.093	(0.485)
Construction	0.071	(0.072)	0.078	(0.118)	0.086	(0.090)	0.082	(0.101)
Transport	-0.128	(0.161)	0.318	(0.240)	-0.117	(0.192)	0.125	(0.243)
0-50km	1st quartile		2nd quartile		3rd quartile		4th quartile	
FIRE	0.797	(0.829)	1.636	(0.990)	0.340	(0.777)		
Catering	-0.426	(0.659)	-0.059	(0.604)	0.035	(0.489)		
Construction	0.107	(0.160)	0.145	(0.126)	0.043	(0.111)		
Transport	-0.058	(0.350)	0.190	(0.262)	0.158	(0.258)		

Note: Robust standard errors are reported in parentheses; *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively. Treatment intensity variables are split by distance and quartile class. For instance, the 0-1km treatment intensity variable is split into four components, each capturing a different quartile of the size of the relocations. All regressions include 2001 area controls, (1998-2002) pre-trends, 186 TTWA fixed effects and standard errors are clustered at the TTWA level. The sample includes 151,912 observations.

Sources: See Table 6 in the main text.

Table W.3: Balance Table

	1991 level		2001 level		1991-2001 changes	
	(1)		(2)		(3)	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
Demographic variables						
Population density	-0.124456***	(0.029782)	-0.155402***	(0.038451)	-0.030946**	(0.012616)
Share of population aged 24 or younger	0.000045	(0.000040)	0.000123*	(0.000062)	0.000078*	(0.000043)
Share of population aged 25 to 44	0.000042	(0.000028)	0.000040	(0.000056)	-0.000002	(0.000059)
Share of population aged 45 to 64	0.000011	(0.000037)	-0.000063	(0.000043)	-0.000074*	(0.000038)
Share of population aged 65 to 74	-0.000033*	(0.000018)	-0.000042***	(0.000013)	-0.000010	(0.000020)
Share of population aged 75+	-0.000056***	(0.000017)	-0.000057***	(0.000015)	-0.000001	(0.000018)
Share of college graduates	-0.000020	(0.000037)	-0.000042	(0.000070)	-0.000022	(0.000058)
Share of female population	-0.000020	(0.000019)	-0.000121***	(0.000040)	-0.000101**	(0.000050)
Labor Market Variables						
Inactivity-to-population ratio	-0.000117***	(0.000038)	-0.000178***	(0.000042)	-0.000061	(0.000046)
Unemployment-to-population ratio	-0.000024	(0.000020)	-0.000044***	(0.000010)	-0.000019	(0.000017)
Share of part-time workers	-0.000031	(0.000022)	-0.000077***	(0.000028)	-0.000046*	(0.000024)
Socio-economic Variables						
Share of non-whites over population	-0.000109*	(0.000062)	-0.000050	(0.000069)	0.000059	(0.000041)
Share of lone parent households over total households	-0.000041***	(0.000016)	-0.000044***	(0.000017)	-0.000003	(0.000014)

Note: Figures report the estimated coefficients and standard errors for the 0km treatment variable obtained from a model specification similar to that shown in Table 2, Column (1) in the main text. Dependent variables are expressed in levels (1991; 2001) and changes (1991-2001). For information on variable definitions, see details in Tables A.2 and A.3 in the Appendix. All regressions include 186 TTWA fixed effects and standard errors are clustered at the TTWA level (186 clusters). Number of observations in all specifications: 151,912.

Sources: OGC Government relocation data, 2003-2007; UK Census of Population, 1991 and 2001.

Table W.4: Comparison between treatment-effects estimation and relocation dummy estimation

	Total private (1)	Manufacturing (2)	Services (3)
Treatment-effects estimation			
ATET (receiving OAs versus non-receiving OAs)	264.573*** (56.162)	-3.655 (9.822)	293.362*** (55.250)
Potential Outcome Mean (for non-receiving OAs)	28.502*** (6.504)	-7.393*** (0.938)	35.308*** (6.678)
Observations	152,912	152,912	152,912
Relocation dummy estimation			
Treatment dummy on receiving OAs	274,139*** (48.858)	-5.104 (9.113)	303.592*** (48.576)
Observations	152,912	152,912	152,912
# of clusters	186	186	186

Note: ATET stands for Average Treatment Effect among the Treated. Treatment-effects estimation uses an Inverse-probability weighted regression-adjustment (IPWRA) estimator, a linear outcome model, and probit treatment model. Relocation dummy estimation uses a treatment variable and treatment intensity variables expressed as binary indicators. Treatment dummy estimates on receiving OAs (0km) are reported only. Dependent variables are defined as (2003-2007) changes in total private sector employment across all sectors of the economy except agriculture and forestry (Column 1); (2003-2007) changes in manufacturing employment (Column 2); and (2003-2007) changes in service employment (Column 3). All regressions include the variables listed in Table W.4 (2001 level) as controls. Relocation dummy regressions include TTWA fixed effects and standard errors are clustered at the TTWA level (186 clusters). Number of observations in all specifications: 151,912.

Sources: OGC Government relocation data, 2003-2007; BSD local unit data (private sector employers only), 1997-2011; UK Census of Population, 1991 and 2001.

Table W.5: Covariate balance summary

	Raw	Weighted		
Number of obs.	151,912	151,912		
Treated obs.	227	76,112.70		
Control obs.	151,685	75,799.30		
	Standardized differences		Variance ratio	
	Raw	Weighted	Raw	Weighted
Population density, 2001	-0.795	-0.065	0.274	1.552
Share of college graduates, 2001	0.494	0.054	1.645	1.065
Share of population aged 25 to 44, 2001	0.380	0.036	2.210	1.119
Share of population aged 45 to 64, 2001	-0.571	0.003	1.444	1.040
Share of population aged 65 to 74, 2001	-0.380	-0.015	1.221	1.250
Share of population aged 75+, 2001	-0.094	-0.019	1.423	0.939
Share of female population, 2001	-0.605	0.018	3.512	0.809
Inactivity-to-population ratio, 2001	-0.303	-0.067	1.452	1.151
Unemployment-to-population ratio, 2001	0.317	-0.087	1.281	0.387
Share of part-time workers, 2001	-0.656	-0.054	1.603	1.178
Share of lone parent households over total households, 2001	-0.375	-0.046	0.642	1.073
Share of non-whites over population, 2001	0.442	-0.007	1.094	0.468

Note: For information on variable definitions, see details in Table A.2 in the Appendix.

Sources: OGC Government relocation data, 2003-2007; BSD local unit data (private sector employers only), 1997-2011; UK Census of Population, 1991 and 2001. Number of observations: 151,912.

Table W.6: The impact of government relocations on high-skilled local residents, (2001-2011)

	College Graduates			Managers and professionals		
	(1)	(2)	(3)	(4)	(5)	(6)
Receiving areas						
0km	-0.017 (0.012)	-0.015 (0.012)	-0.010 (0.010)	-0.019 (0.011)	-0.015 (0.011)	-0.014 (0.011)
Spillovers						
0-1km	0.007 (0.004)	0.006 (0.004)	0.007* (0.004)	0.000 (0.002)	0.000 (0.002)	0.001 (0.002)
0-2km	0.002 (0.002)	0.002 (0.002)	0.003 (0.002)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
0-3km	-0.000 (0.002)	0.001 (0.001)	0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)
0-4km	-0.002 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.000 (0.001)
0-5km	0.001 (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
0-50km	-0.001 (0.001)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Area controls		√	√		√	√
Pre-trends			√			√
Observations	151,800	151,800	151,800	151,800	151,800	151,800
# of clusters	187	187	187	187	187	187

Note: Robust standard errors are reported in parentheses; *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively. In Columns (1)-(3), the dependent variable is defined as (2001-2011) changes in the number of residents with a college degree or above (Level qualifications 4 or 5). In Columns (4)-(6), the dependent variable is defined as (2001-2011) changes in the number of residents with a managerial or professional occupation. Columns (1) and (4) do not include controls; Columns (2) and (5) include area controls; and Columns (3) and (6) include both area controls and pre-trends. Pre-trends are defined as (1991-2001) changes in the number of residents with a college degree or above (Column 3); and (1991-2001) changes in the number of residents with a managerial or professional occupation (Column 6). All regressions include 187 TTWA fixed effects and standard errors are clustered at the TTWA level.

Sources: OGC Government relocation data, 2003-2010; UK Census of Population: 1991, 2001 and 2011.