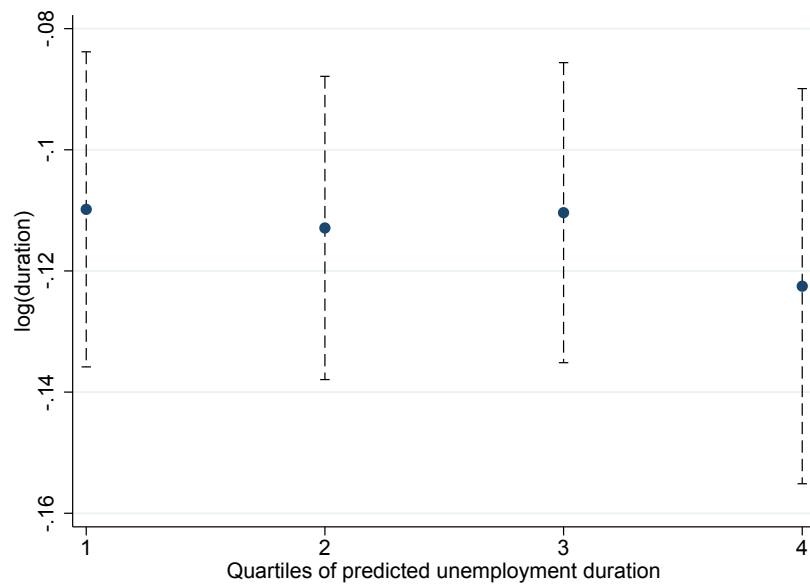


Figure 5: Caseworker value-added by quartiles of predicted unemployment duration



Notes: The figure shows IV-estimates of the effect on log unemployment duration of being assigned a caseworker above the median in the value added distribution by quartiles of job seekers predicted unemployment duration. The dashed lines are 95 percent confidence intervals where standard errors are clustered at the caseworker level. The model include interacted year fixed effects, office fixed effects, and a dummy for age being greater or equal to 25 and the sample is all offices with date-of-birth assignment as defined in section 4.

Table 1: Descriptive statistics

Job seeker characteristics						
<i>Panel A</i>	All offices		Date of birth offices		Compliers	
	Mean	SD	Mean	SD	Mean	SD
Age	31.82	12.24	31.39	11.98	30.35	12.16
Female	0.47	0.50	0.48	0.50	0.47	0.50
Swedish	0.86	0.34	0.87	0.34	0.88	0.32
Married	0.24	0.43	0.23	0.42	0.21	0.41
Children	0.36	0.48	0.35	0.48	0.36	0.48
Earnings (t-1)	95758.99	120035.72	93169.92	115928.82	92850.59	116943.14
Disabled	0.04	0.19	0.04	0.19	0.02	0.15
Eligible UI	0.66	0.47	0.67	0.47	0.64	0.48
Days unemployed	281.61	488.04	280.13	486.08	243.20	429.12
Compulsory school	0.30	0.46	0.28	0.45	0.33	0.47
Upper secondary school	0.53	0.50	0.53	0.50	0.52	0.50
University degree	0.17	0.38	0.19	0.39	0.15	0.36
# observations (unique)	1,600,132		425,120		711,099	
# observations	2,217,863		587,523		985,836	
Caseworker characteristics						
<i>Panel B</i>	All offices		Date of birth offices			
	Mean	SD	Mean	SD		
Age	47.06	10.18	46.96	10.25		
Female	0.62	0.49	0.62	0.49		
Swedish	0.88	0.32	0.87	0.33		
Experience						
0 – 2 years	0.12	0.32	0.13	0.33		
2 – 4 years	0.10	0.30	0.10	0.30		
4 – 6 years	0.09	0.29	0.09	0.29		
6 – 8 years	0.08	0.27	0.08	0.27		
8 – 10 years	0.08	0.26	0.08	0.28		
10+ years	0.53	0.50	0.51	0.50		
Recruited from unemployment	0.41	0.49	0.43	0.50		
Experience private sector	0.07	0.25	0.06	0.24		
Primary school	0.03	0.17	0.03	0.18		
Upper secondary school	0.33	0.47	0.31	0.46		
University degree	0.64	0.48	0.66	0.47		
Business degree	0.32	0.47	0.32	0.47		
Social degree	0.15	0.36	0.16	0.37		
Cognitive ability	5.43	1.55	5.38	1.53		
Non-cognitive ability	5.42	1.64	5.26	1.68		
# clients	97.08	107.28	114.05	111.35		
# observations (unique)	6,812		1,564			
# observations	22,962		5,175			
Office characteristics						
<i>Panel C</i>	All offices		Date of birth offices			
	Mean	SD	Mean	SD		
# caseworkers	12.61	10.87	16.32	11.38		
# job-seekers	1217.94	1281.46	1853.38	1600.21		
# observations (unique)	252		51			
# observations	1,821		317			

Notes: Sample statistics for job seekers, caseworkers and local offices in Sweden in 2003–2010. Earnings are in SEK. Date-of-birth offices are offices in column 3–4 are defined in section 4. Statistics for the complier population in Panel A is complied using the procedure in [Abadie et al. \(2002\)](#). Cognitive and non-cognitive ability scores are for a sample (60%) of male caseworkers for whom we have enlistment tests scores.

Table 2: First-stage regressions of actual caseworker characteristics on the date-of-birth-predicted caseworker characteristic

	Caseworker experience	Caseworker univeristy education
	(1)	(2)
<i>Instruments</i>		
Predicted caseworker experience	0.324*** (0.007)	0.001* (0.001)
Predicted caseworker university education	0.014 (0.053)	0.344*** (0.008)
Share correct predictions		.441
Joint F -statistic		1,134
F -statistic	1,145	1,077
# clusters	6,812	6,812
# observations	2,217,863	2,217,863

Notes: The sample consists of job seekers in Sweden 2003–2010. Actual caseworker characteristics have been regressed on predicted caseworker characteristics. For details on how predicted caseworker is defined, see section 4. All models include interacted year fixed effects, office fixed effects, and a dummy for age being less than 25. Joint F -statistic is from the joint test that all coefficients are equal to zero. Standard errors in parentheses are clustered at the caseworker level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ level.

Table 3: Randomization tests: date-of-birth rules and allocation of job seekers to caseworkers

	Dependent variable:	
	Predicted unemployment duration in days	
	Actual caseworker (1)	Predicted caseworker (2)
Caseworker experience	1.049*** (0.160)	0.070 (0.053)
Caseworker university education	12.515*** (1.689)	0.486 (0.562)
Mean outcome	242.03	242.03
<i>F</i> -statistic	32.970	1.002
<i>p</i> -value	0.0000	0.3672
# clusters	6,812	6,812
# observations	2,217,863	2,217,863

Notes: OLS regressions for job seekers' predicted unemployment duration on actual/predicted caseworker characteristics. The sample consists of job seekers in Sweden in 2003–2010. All models include interacted year fixed effects, office fixed effects, and a dummy for age being less than 25. *F*-statistic is for a joint test that all coefficients are equal to zero. Predicted unemployment durations are generated by taking the fitted values from a regression of actual unemployment duration on duration of last unemployment spell, amount of welfare benefits last year, regional unemployment rate, age, age squared and dummies for UI eligibility, disability, immigrant, female and 6 levels of education. Standard errors in parentheses clustered at the caseworker level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ level.

Table 4: Caseworker demographics, caseworker education and job seeker outcomes

	Leave unemployment within		log(duration)
	90 days (1)	180 days (2)	(3)
<i>Caseworker demographics</i>			
Age	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Female	0.010*** (0.003)	0.011*** (0.003)	-0.031*** (0.009)
Native	0.006 (0.005)	0.006 (0.005)	-0.009 (0.015)
<i>Caseworker level of education</i>			
Upper secondary	-0.002 (0.008)	0.006 (0.008)	0.003 (0.023)
University degree	-0.007 (0.008)	0.002 (0.008)	0.028 (0.023)
<i>Caseworker field of education</i>			
Business degree	0.001 (0.003)	-0.000 (0.004)	0.001 (0.010)
Social degree	0.005 (0.005)	-0.000 (0.005)	-0.009 (0.014)
Mean outcome	0.423	0.634	4.769
First stage F -statistic	133	133	133
# clusters	6,812	6,812	6,812
# observations	2,217,863	2,217,863	2,217,863

Notes: IV estimates where each characteristic of the actual caseworker is instrumented with the corresponding characteristic of the predicted caseworker. All models include interacted year fixed effects, office fixed effects, and a dummy for age being less than 25. First-stage F -statistic is a joint test for all instruments. Standard errors in parentheses are clustered at the caseworker level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ level.

Table 5: Caseworker experiences, labor market experience, abilities and job seeker outcomes

	Leave unemployment within		log(duration) (3)
	90 days (1)	180 days (2)	
Panel A: Caseworker experience			
2-4 years	0.009 (0.006)	0.015** (0.006)	-0.028* (0.017)
4-6 years	0.010 (0.007)	0.013** (0.007)	-0.028 (0.019)
6-8 years	0.003 (0.007)	0.013* (0.007)	-0.018 (0.019)
8-10 years	0.005 (0.007)	0.010 (0.007)	-0.021 (0.019)
10+ years	0.006 (0.005)	0.013** (0.005)	-0.028* (0.015)
Mean outcome	0.423	0.634	4.769
First Stage F -statistic	341	341	341
# observations	2,217,863	2,217,863	2,217,863
Panel B: Caseworker labor market experience			
From registered unemp.	0.000 (0.003)	-0.002 (0.003)	0.007 (0.009)
Experience from private sector	0.001 (0.006)	-0.002 (0.006)	-0.014 (0.017)
Mean outcome	0.423	0.634	4.769
First Stage F -statistic	290	290	290
# observations	2,217,863	2,217,863	2,217,863
Panel C: Caseworker abilities			
Cognitive	-0.002 (0.005)	0.003 (0.005)	0.002 (0.014)
Non-Cognitive	0.008 (0.005)	0.000 (0.005)	-0.010 (0.014)
Mean outcome	0.444	0.656	4.694
First stage F -statistic	204	204	204
# observations	254,165	254,165	254,165

Notes: IV estimates where each characteristic of the actual caseworker is instrumented with the corresponding characteristic of the predicted caseworker. Tenure as caseworker at the PES in years. Wages based on staff records in SEK 1000. Own unemployment is an indicator for more than 30 days of unemployment in the last 10 years. Experience from manufacturing or retail is an indicator from working in these sectors in the last 10 years. Abilities on a scale from 1 to 9 standardized to have a mean of zero and a standard deviation of one. All models include interacted year fixed effects, office fixed effects, and a dummy for age being less than 25. First-stage F -statistic is a joint test for all instruments. Standard errors in parentheses are clustered at the caseworker level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ level.

Table 6: Caseworker strategies on job seeker outcomes

	Leave unemployment within		log(duration)
	90 days (1)	180 days (2)	(3)
Supportive	0.004 (0.010)	0.007 (0.010)	-0.038 (0.028)
Restrictive	0.031*** (0.011)	0.018* (0.011)	-0.050* (0.030)
Active	0.026** (0.012)	0.042*** (0.011)	-0.076** (0.032)
Mean outcome	0.423	0.635	4.766
First stage F -statistic	153	153	153
# clusters	7,002	7,002	7,002
# observations	2,278,293	2,278,293	2,278,293

Notes: IV estimates where each characteristic of the actual caseworker is instrumented with the corresponding characteristic of the predicted caseworker. All strategies are indicators for above median propensity to assign to training (supportive), assign to work practice (restrictive) and to have meeting with their job seekers (active). All models include interacted year fixed effects, office fixed effects, and a dummy for age being less than 25. First-stage F -statistic is a joint test for all instruments. Standard errors in parentheses are clustered at the caseworker level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ level.

Table 7: Sensitivity check

	Main estimate (1)	Immigrant control (2)	Date-of-birth fixed effects (3)	Caseworker characteristics (4)	Date-of-birth offices (5)	Caseload control (6)
Panel A: Caseworker demographics						
Female	0.011*** (0.003)	0.010*** (0.003)	0.010*** (0.003)	0.009*** (0.003)	0.008** (0.004)	0.011*** (0.003)
# observations	2,217,863	2,217,863	2,217,863	2,217,863	588,945	2,217,863
Panel B: Caseworker strategy						
Active	0.042*** (0.011)	0.042*** (0.011)	0.042*** (0.011)	0.039*** (0.011)	0.028** (0.012)	0.042*** (0.011)
# observations	2,278,293	2,278,293	2,278,293	2,217,863	602,850	2,278,293

Notes: Column 1 reproduced our baseline estimates. Column 2 controls for immigrant status and column 3 includes date-of-birth fixed effects. In column 4 we include all caseworker characteristics included in Table 4 and 5. Column 5 restricts the analysis to date-of-birth-offices (as defined in Section 4). Column 6 hold constant caseworker caseload. All models include interacted year fixed effects, office fixed effects, and a dummy for age being less than 25. First-stage F -statistic is a joint test for all instruments. Standard errors in parentheses are clustered at the office level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ level.

Table 8: Distribution of caseworker fixed effects

	Adjusted		Unadjusted
	Level	Standard deviations	Level
	(1)	(2)	(3)
Leave unemployment within			
90 days	0.026	0.052	0.172
180 days	0.030	0.063	0.159
Log unemployment duration	0.110	0.085	0.471

Notes: The table reports estimates of the effect of moving one standard deviation in the estimated caseworker fixed effects on job seeker outcomes. IV-estimates using indicators for the predicted caseworker as instruments for the actual caseworker. The sample is all offices with date-of-birth assignment as defined in section 4). Column 1–2 are based adjusted fixed effects (see Appendix B), and Column 3 on unadjusted fixed effect estimates. All models include interacted year fixed effects, office fixed effects, and a dummy for age being less than 25.

Table 9: Caseworker and job seeker similarity: demographics and ability

	(1)	(2)	(3)
	All	Job seeker characteristic	
Panel A : Gender similarity		Female job seeker	Male job seeker
Match effect	0.004** (0.002)		
Female caseworker	0.011*** (0.003)	0.015*** (0.004)	0.006* (0.004)
Mean outcome	0.634	0.643	0.626
First stage F -statistic	1,269	1,269	1,269
# observations	2,217,863	1,040,284	1,177,579
Panel B : Immigrant similarity		Native job seeker	Foreign born job seeker
Match effect	-0.003 (0.004)		
Native caseworker	0.007 (0.006)	0.004 (0.005)	0.010 (0.008)
Mean outcome	0.634	0.664	0.540
First stage F -statistic	370	370	370
# observations	2,217,863	1,674,099	543,764
Panel C : Ability similarity		High ability job seeker	Low ability job seeker
Match effect	0.001 (0.004)		
High ability caseworker	0.005 (0.008)	0.006 (0.008)	0.004 (0.010)
Mean outcome	0.655	0.738	0.560
First stage F -statistic	418	418	418
# observations	280,104	148,745	131,359

Notes: IV estimates where each match-effect and main caseworker effects is instrumented with the corresponding variable for the predicted caseworker. High ability caseworker is above median caseworker cognitive ability, and high ability for the job seeker is above median predicted unemployment duration. All models include interacted year fixed effects, office fixed effects, and a dummy for age being less than 25. First-stage F -statistic is a joint test for all instruments. Standard errors in parentheses are clustered at the caseworker level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ level.

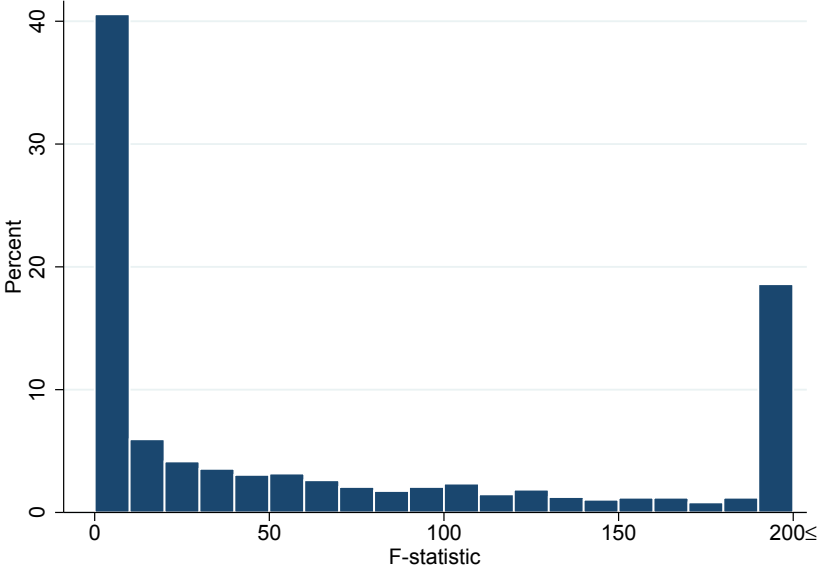
Table 10: Caseworker and job seeker similarity: experience and education

	(1)	(2)	(3)
	All	Job seeker characteristic	
Panel A: Experience from private sector		Private sector job seeker	Other sector job seeker
Match effect	0.008** (0.004)		
Caseworker w. private sector	0.000 (0.006)	0.008 (0.007)	-0.008 (0.007)
Mean outcome	0.653	0.648	0.657
First stage F -statistic	280	280	280
# observations	1,973,798	823,938	1,149,860
Panel B: University degree		University edu. job seeker	No university edu. job seeker
Match effect	0.005** (0.003)		
University degree caseworker	0.000 (0.004)	0.005 (0.006)	-0.005 (0.003)
Mean outcome	0.634	0.644	0.632
First stage F -statistic	1080	1080	1080
# observations	2,217,863	370,395	1,847,468

Notes: IV estimates where each match-effect and main caseworker effects is instrumented with the corresponding variable for the predicted caseworker. Caseworker has experience from the private sector if having ever worked manufacturing, construction, retail, hotel and restaurant within the last ten years. For job seekers experience from the private sector is based on the last job just prior to becoming unemployed. All models include interacted year fixed effects, office fixed effects, and a dummy for age being less than 25. First-stage F -statistic is a joint test for all instruments. Standard errors in parentheses are clustered at the caseworker level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ level.

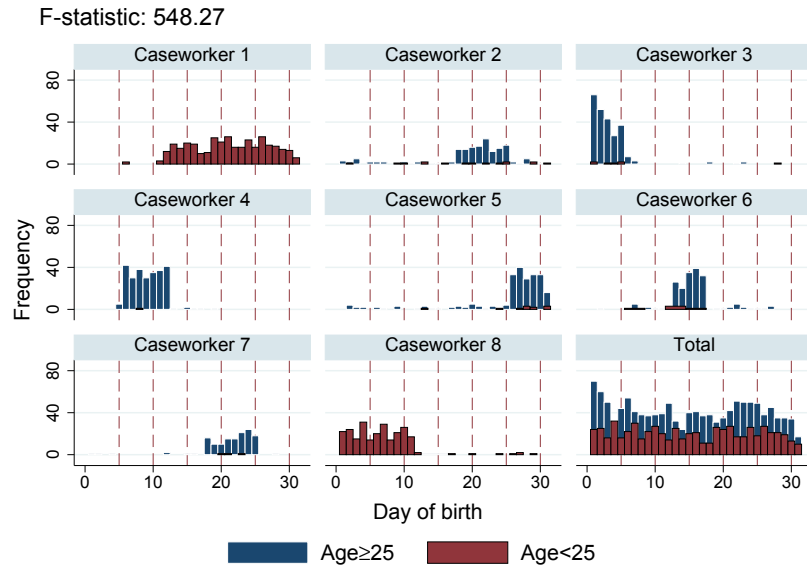
Appendix A: Additional Tables and Figures

Figure A-1: Prevalence of date-of-birth-rules



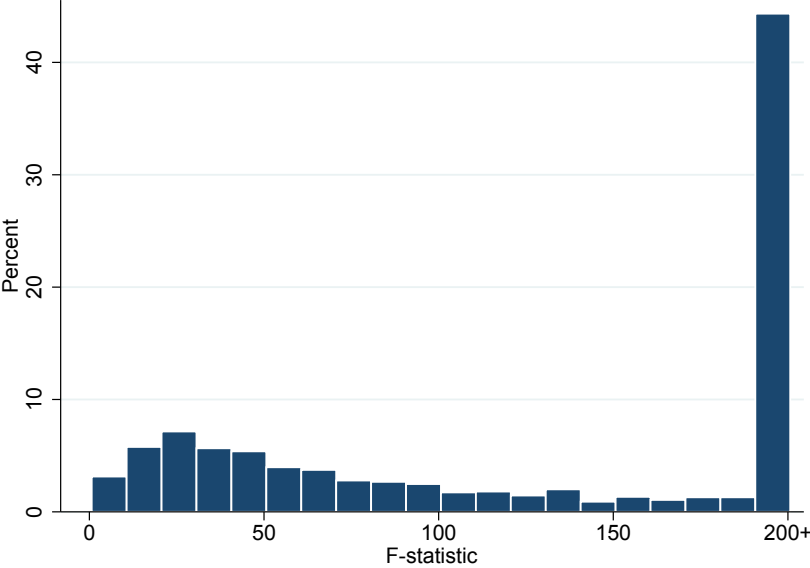
Note: The distribution of F-statistics from regressions of job seekers' date of birth (1–31) on caseworker dummies (within office and year). A low F-value indicates no date-of-birth-rule (an even distribution of dates of birth over caseworkers), and a high F-value indicates a date-of-birth-rule (an un-even distribution of date-of-birth over caseworkers).

Figure A-2: An example of an office with a separate date-of-birth-rule for youths



Notes: Number of job seekers (above/below 25 years of age) born on each day-in-month per caseworker at one office, in 2003.

Figure A-3: Strength of predicted caseworker instrument



Notes: The figure show separate first stage F-statistics where a dummy for the actual caseworker has been regressed on a set of dummies of predicted caseworker within and office and year.

Table A-1: First Stages : Caseworker demographics and caseworker education

	Dependent variable: Actual caseworker characteristic						
	Age (1)	Female (2)	Swedish (3)	Secondary degree (4)	University degree (5)	Business degree (6)	Social degree (7)
<i>Predicted caseworker characteristic</i>							
Age	0.403*** (0.008)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Female	-0.125 (0.119)	0.378*** (0.007)	0.006 (0.004)	0.002 (0.006)	-0.002 (0.006)	-0.000 (0.006)	-0.002 (0.004)
Native	-0.031 (0.176)	0.020** (0.009)	0.377*** (0.013)	-0.002 (0.008)	0.001 (0.008)	-0.008 (0.009)	-0.001 (0.007)
Upper secondary	-0.300 (0.453)	0.001 (0.019)	-0.003 (0.012)	0.393*** (0.017)	0.023 (0.025)	0.031** (0.015)	0.009 (0.009)
University degree	-0.147 (0.451)	0.002 (0.019)	-0.000 (0.012)	0.007 (0.015)	0.408*** (0.024)	0.017 (0.014)	0.007 (0.009)
Business degree	-0.062 (0.128)	0.001 (0.007)	-0.006 (0.004)	0.015** (0.007)	-0.014* (0.007)	0.384*** (0.008)	-0.001 (0.003)
Social degree	0.137 (0.190)	-0.007 (0.009)	-0.004 (0.006)	0.011 (0.007)	-0.009 (0.008)	0.006 (0.007)	0.377*** (0.012)
F-statistic	395	422	117	339	374	389	144
# offices	6812	6812	6812	6812	6812	6812	6812
# observations	2,217,867	2,217,867	2,217,867	2,217,867	2,217,867	2,217,867	2,217,867

Notes: The table shows first stage estimates, where we have regressed each actual caseworker characteristic (13 different regressions) on the full set of instruments, i.e. the 13 predicted caseworker characteristics. The most predictive instrument is the one corresponding to the actual caseworker characteristic (see diagonal). All models include interacted year fixed effects, office fixed effects, and a dummy for age being less than 25. Standard errors are clustered at the caseworker level and shown in parentheses. Asterisks indicate that the estimates are significantly different from zero at the * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ level.

Table A-2: Date-of-birth rules and random assignment of job seekers to caseworkers

	Independent variables:			
	Experience actual caseworker		Experience predicted caseworker	
	Coef. Est.	Std. Err.	Coef. Est.	Std. Err.
<i>Demographics</i>				
Male	0.000993***	(0.000351)	0.000098	(0.000134)
Disabled	0.001030***	(0.000181)	0.000033	(0.000054)
Native	0.000191	(0.000265)	-0.000032	(0.000089)
Age	0.176114***	(0.027857)	0.005892***	(0.001818)
<i>Unemployment and earnings history</i>				
Earnings (t-1)	866.902766***	(166.457698)	-10.263959	(30.832128)
Employed (t-1)	0.003549***	(0.000601)	-0.000056	(0.000115)
Welfare (t-1)	-0.000296	(0.000212)	0.000016	(0.000080)
<i>Level of education</i>				
Primary school < 9 years	0.000452***	(0.000081)	0.000026	(0.000039)
Compulsory school 9 years	-0.003704***	(0.000593)	-0.000158	(0.000097)
Upper secondary school 2 years	0.002109***	(0.000274)	0.000165	(0.000111)
Upper secondary school 3 years	0.000084	(0.000093)	-0.000073	(0.000045)
University < 3 years	0.001204***	(0.000419)	0.000052	(0.000092)
University \geq 3 years	0.000014	(0.000021)	-0.000011	(0.000016)
# observations	2,217,863		2,217,863	

Notes: The table shows separate OLS estimates for each job seeker characteristic on years of experience of the actual (column 1) and the rules-predicted caseworker (column 2). All models include interacted year fixed effects, office fixed effects, and a dummy for age being less than 25. Standard errors in parentheses are clustered at the caseworker level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ level.

Table A-3: Test of monotonicity assumption

<i>Panel A</i>	Quartile rank of predicted unemployment duration			
	1 st	2 nd	3 rd	4 th
Predicted caseworker experience	0.398*** (0.011)	0.354*** (0.008)	0.314*** (0.007)	0.254*** (0.007)
# clusters	6,232	6,617	6,775	6,788
# observations	543,510	542,050	541,056	543,049
<i>Panel B</i>	Quartile rank of job seeker age			
	1 st	2 nd	3 rd	4 th
Predicted caseworker experience	0.416*** (0.012)	0.313*** (0.007)	0.292*** (0.008)	0.285*** (0.007)
# clusters	6,082	6,735	6,541	6,504
# observations	584,445	531,837	573,013	528,564

Notes: First-stage estimates separately by quartiles of job seekers' predicted unemployment (panel A) and quartiles of job seekers' age (panel B). For details on how predicted caseworker is defined see section 4. All models include interacted year fixed effects, office fixed effects, and a dummy for age being less than 25. First-stage F -statistic is a joint test for all instruments. Standard errors in parentheses are clustered at the caseworker level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ level.

Table A-4: Early performance and the likelihood to stay as caseworker

	Stay more than 2 years (1)	Stay more than 4 years (2)
Early VA leave unemployment within 180 days	-0.158 ** (0.073)	-0.106 (0.070)
Early VA leave unemployment within 90 days	-0.093 (0.074)	-0.061 (0.070)
Early VA log unemployment duration	0.104 (0.074)	0.069 (0.070)
Mean outcome	0.52	0.33

Notes: Early VA are indicators for VA during years 1–2 of the career being above the median among all early career caseworkers. VA estimated using the method described in Section 6.1. Stay more than 2 or 4 years are indicators for continuing working as caseworker for more than 2 or 4 years, respectively. Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ level.

Table A-5: Caseworker and job seeker similarity: demographics and ability on log(duration)

	All job seekers (1)	Job seeker characteristic	
		(2)	(3)
Panel A : Gender similarity		Female job seeker	Male job seeker
Match effect	-0.009 (0.005)		
Female caseworker	-0.032*** (0.009)	-0.040*** (0.011)	-0.023** (0.010)
Mean outcome	4.769	4.730	4.803
First stage F -statistic	1269	1269	1269
# observations	2,217,863	1,040,284	1,177,579
Panel B : Immigrant similarity		Native job seeker	Foreign born job seeker
Match effect	0.012 (0.011)		
Native caseworker	-0.015 (0.015)	-0.003 (0.015)	-0.028 (0.023)
Mean outcome	4.769	4.677	5.051
First stage F -statistic	370	370	370
# observations	2,217,863	1,674,099	543,764
Panel C : Ability similarity		High ability job seeker	Low ability job seeker
Match effect	-0.005 (0.012)		
High ability caseworker	-0.014 (0.023)	-0.019 (0.023)	-0.009 (0.028)
Mean outcome	4.700	4.446	4.986
First stage F -statistic	418	418	418
# observations	280,104	148,745	131,359

Notes: IV estimates where each match-effect and main caseworker effects is instrumented with the corresponding variable for the predicted caseworker. High ability caseworker is above median caseworker cognitive ability, and high ability for the job seeker is above median predicted unemployment duration. All models include interacted year fixed effects, office fixed effects, and a dummy for age being less than 25. First-stage F -statistic is a joint test for all instruments. Standard errors in parentheses are clustered at the caseworker level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ level.

Table A-6: Caseworker and job seeker similarity: experience and education on log(duration)

	All job seekers (1)	Job seeker characteristic	
		(2)	(3)
Panel A: Experience from private sector		Private sector job seeker	Other sector job seeker
Match effect	-0.027*** (0.010)		
Caseworker w. private sector	-0.014 (0.016)	-0.041** (0.019)	0.013 (0.018)
Mean outcome	4.710	4.725	4.699
First stage F -statistic	280	280	280
# observations	1,973,798	823,938	1,149,860
Panel B : University degree		University edu. job seeker	No university edu. job seeker
Match effect	-0.016** (0.008)		
University degree caseworker	0.013 (0.011)	-0.004 (0.016)	0.029*** (0.009)
Mean outcome	4.769	4.726	4.778
First stage F -statistic	1080	1080	1080
# observations	2,217,863	370,395	1,847,468

Notes: IV estimates where each match-effect and main caseworker effects is instrumented with the corresponding variable for the predicted caseworker. Caseworker has experience from the private sector if having ever worked manufacturing, construction, retail, hotel and restaurant within the last ten years. For job seekers experience from the private sector is based on the last job just prior to becoming unemployed. All models include interacted year fixed effects, office fixed effects, and a dummy for age being less than 25. First-stage F -statistic is a joint test for all instruments. Standard errors in parentheses are clustered at the caseworker level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ level.

Appendix B: Estimation of caseworker value added

This appendix provides details for the estimation of caseworker value added outlined in Section 6.1. It is based on the empirical Bayes approach in Kane and Staiger (2008), which analyzes teacher value-added using student outcomes.

We first estimate the variance of the caseworker value-added, μ_j , from equation (2). In Kane and Staiger (2008), the covariance between the average student outcomes (residuals after covariate adjustment) for a teacher's class in year t and year $t - 1$ is used as an estimate of the variance of the teacher component. This covariance calculation is weighted by the number of students for each teacher. It assumes that the student outcomes for each teacher are independent across years, so that the covariance across years captures the variance in "true" teacher value added. In our caseworker setting with an empirical strategy based on the date-of-birth-variation, these yearly average outcomes are obtained from IV-estimation of separate caseworker fixed effects for each year using equation (2). Denote these yearly caseworker fixed effect estimates by \bar{v}_{jt} . Then, following Kane and Staiger (2008) we obtain the variance of caseworker value-added, μ_j , from the covariance of \bar{v}_{jt} for all t and $t - 1$:

$$\hat{\sigma}_{\mu_j}^2 = Cov(\bar{v}_{jt}, \bar{v}_{jt-1}). \quad (\text{B-1})$$

Instead of weighting with the number of observations, the weighting is based on the precision (the inverse of the variance) of the year-by-year caseworker fixed effects. This gives the variance of the "true" caseworkers effects.

The second step of the Kane and Staiger (2008) procedure is to form a weighted average of the yearly average student outcomes, weighting each yearly average by its precision. We proceed in the same way and weight the yearly caseworker estimates, \bar{v}_{jt} , by the inverse of the variance of each estimate:

$$\bar{v}_j = \sum_t w_{jt} \bar{v}_{jt}, \quad (\text{B-2})$$

where

$$w_{jt} = \frac{h_{jt}}{\sum_t h_{jt}} \quad (\text{B-3})$$

$$h_{jt} = \frac{1}{Var(\bar{v}_{jt})}, \quad (\text{B-4})$$

and $Var(\bar{v}_{jt})$ is the variance from the IV-estimation of the yearly caseworker effect.

The third step "shrinks" these estimated caseworker effects to obtain value-added estimates for each caseworker. Following Kane and Staiger (2008) we construct em-

pirical Bayes estimates for each caseworker's true value added (VA_j) by multiplying the weighted caseworker estimates, \bar{v}_j , by an estimate of its reliability:

$$VA_j = \bar{v}_j \frac{\hat{\sigma}_{\mu_j}^2}{Var(\bar{v}_j)}, \quad (\text{B-5})$$

where

$$Var(\bar{v}_j) = \hat{\sigma}_{\mu_j}^2 + \left(\sum_t h_{jt}\right)^{-1}. \quad (\text{B-6})$$

Specifically, $\frac{\hat{\sigma}_{\mu_j}^2}{Var(\bar{v}_j)}$ is the shrinkage factor that reflects the reliability of \bar{v}_j as an estimate of caseworker value-added, where the reliability depends on the variance of the "true" caseworker effects and the total variance of \bar{v}_j . Here, the total variance is the sum of the variance of each \bar{v}_j , i.e. $(\sum_t h_{jt})^{-1}$.