

Brothers in Arms: Spillovers from a Draft Lottery

Online Appendix

A. Additional tables and figures

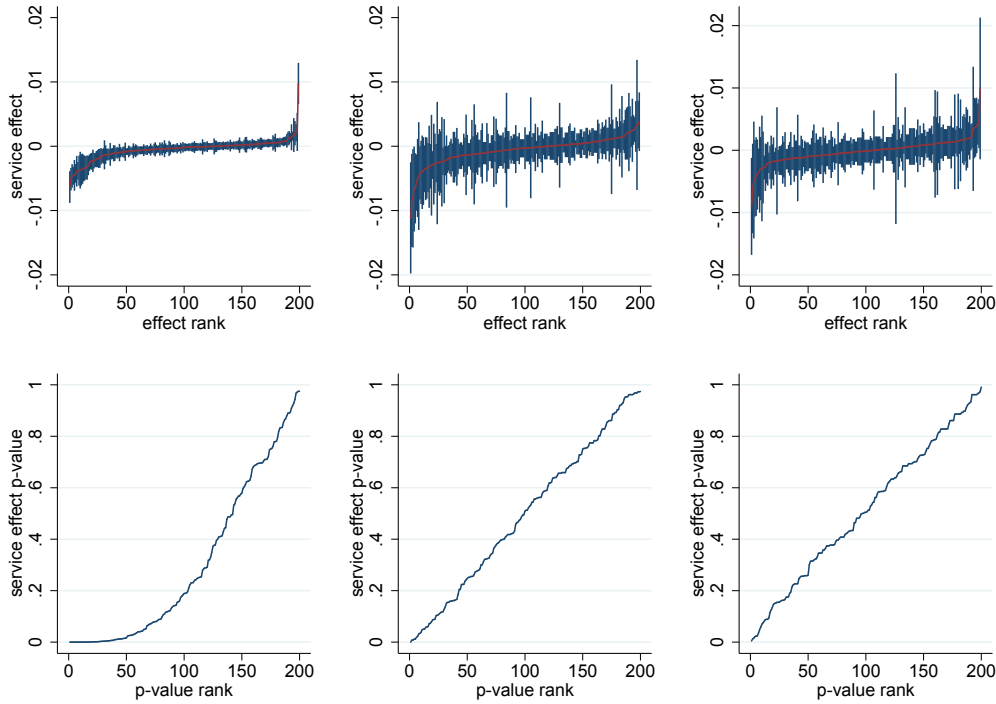


FIGURE A.1. SERVICE EFFECTS ON INDUSTRY OF EMPLOYMENT

Notes: The figure presents estimates from 600 separate regressions, each regression explaining a binary indicator for industry employment with a binary indicator for military service. The upper Panels show service coefficients sorted from lowest to highest for each of the 200 industries considered, and 95 percent confidence bands. Lower panels show associated p-values sorted from lowest to highest. Panels to the left use all fit-for-service men and present OLS estimates explaining their industry with their own service status. Panels in the center use our sample of elder brothers and present OLS estimates explaining elder brother industry with elder brother service status. Panels to the right use our younger brothers and present IV estimates explaining younger brother industry with elder brother service instrumented by elder brother draft status. Control variables are the same as in Table 3, Column 4.

TABLE A.1—RANDOMIZATION BALANCE CHECK: EFFECT OF PRE-DETERMINED CHARACTERISTICS ON THE ELDER BROTHER LOTTERY NUMBER

	(1) Elder	(2) Elder	(3) Younger	(4) Younger
AFQT	-0.00012 (0.00032)	-0.00010 (0.00034)	-0.00012 (0.00032)	-0.00010 (0.00034)
Height (cm)	0.00031 (0.00039)	0.00036 (0.00041)	0.00030 (0.00039)	0.00035 (0.00041)
Danish	0.01834 (0.01289)	0.03177* (0.01906)	0.01856 (0.01287)	0.03233* (0.01904)
Single parent raised	-0.00146 (0.00684)	-0.00258 (0.00711)	-0.00156 (0.00684)	-0.00267 (0.00711)
Out of home care	-0.00198 (0.01457)	-0.00315 (0.01526)	-0.00154 (0.01458)	-0.00274 (0.01526)
Younger brother draw			0.01231 (0.00881)	0.01144 (0.00904)
Birth weight (kg)		-0.00231 (0.00433)		-0.00226 (0.00433)
HH income (TDKK)		-0.00002 (0.00005)		-0.00002 (0.00005)
Mother schooling		0.00001 (0.00009)		0.00001 (0.00009)
Father schooling		0.00001 (0.00008)		0.00001 (0.00008)
F-Statistic	0.6116	0.4578	0.8356	0.5729
F-Stat p-value	0.6910	0.9032	0.5420	0.8374
Observations	13,124	12,478	13,124	12,478

Notes: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$. The table contains estimates from four separate OLS regressions explaining elder brother lottery number. These regressions also control for birth year, birth month, half year of the AFD and half year of potential service start. Columns 1-2 use elder brother characteristics, and columns 3-4 use younger brother characteristics. Columns 2 and 4 contain 646 fewer observations because of missing information for one or both brothers about birth weight, household income when aged 15, and maternal or paternal schooling.

TABLE A.2—RANDOMIZATION BALANCE CHECK: EFFECT OF PRE-DETERMINED CHARACTERISTICS INCLUDING PARENTAL DEFENSE INDUSTRY

	(1) Elder	(2) Younger	(3) Elder	(4) Younger
AFQT	0.00012 (0.00056)	-0.00016 (0.00062)	-0.00005 (0.00036)	-0.00005 (0.00036)
Height (cm)	-0.00064 (0.00070)	0.00026 (0.00074)	0.00023 (0.00044)	0.00022 (0.00044)
Danish	-0.00888 (0.03170)	0.01834 (0.03680)	0.03076 (0.02084)	0.03152 (0.02080)
Single parent raised	0.00261 (0.01279)	0.02264* (0.01271)	-0.00760 (0.00752)	-0.00774 (0.00751)
Out of home care	-0.01030 (0.02560)	0.03349 (0.03033)	-0.00724 (0.01706)	-0.00672 (0.01706)
Younger drafted/draw		0.00869 (0.01070)		0.01538 (0.00956)
Birth weight (kg)	0.00219 (0.00697)	0.00373 (0.00793)	-0.00206 (0.00455)	-0.00199 (0.00455)
HH income (TDKK)	-0.00006 (0.00011)	-0.00004 (0.00009)	0.00001 (0.00005)	0.00001 (0.00005)
Mother schooling	0.00008 (0.00015)	0.00001 (0.00016)	-0.00001 (0.00009)	-0.00001 (0.00009)
Father schooling	0.00005 (0.00014)	-0.00016 (0.00015)	0.00002 (0.00008)	0.00002 (0.00008)
Mother defense	-0.03488 (0.05829)	-0.03453 (0.06218)	0.01496 (0.03509)	0.01456 (0.03513)
Father defense	-0.01847 (0.03640)	-0.02464 (0.03779)	-0.00725 (0.02178)	-0.00662 (0.02179)
F-Statistic	0.2387	0.8104	0.3964	0.5808
F-Stat p-value	0.9948	0.6400	0.9581	0.8595
Observations	11,193	11,193	11,193	11,193

Notes: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$. The table contains estimates from four separate OLS regressions explaining elder brother draft status in columns 1-2 and elder brother lottery number in columns 3-4. These regressions also control for birth year, birth month, half year of the AFD and half year of potential service start. Columns 1 and 3 use elder brother characteristics, and columns 2 and 4 use younger brother characteristics. This table contains fewer observations than the previous table because of missing observations on parental industry.

TABLE A.3—SAMPLE CONSTRUCTION

(1) All males born 1976-1983 who are Danish citizens and resident at age 18	234,200
(2) and fit for service	155,750
(3) and not twins	152,334
(4) and first two maternal brothers	26,248
(1) and (2) and (3) and first three maternal brothers	1,005

Notes: The table shows changes in the number of observations when imposing each of our sample restrictions in turn.

TABLE A.4—DESCRIPTIVE STATISTICS - STANDARDIZED MEAN DIFFERENCES

	(1) Elder minus fit-for-service	(2) Younger minus fit-for-service	(3) Elder minus 5 pct. pop.	(4) Younger minus 5 pct. pop.
No. of obs.	13124	13124	7486	155750
Height	0.003	0.015*	0.068***	0.080***
AFQT score	0.120***	0.044***	0.470***	0.406***
No. of obs.	13124	13124	14390	155750
Raised in single-parent family	-0.106***	-0.026***	-0.135***	-0.053***
Placed in out of home care	0.000	-0.051***	-0.048***	-0.101***
Non-immigrant and non-descendant	0.000	0.000	0.000	0.000
No. of obs.	12478	12478	14390	155750
Birth weight	-0.126***	0.273***	-0.085***	0.344***
Household income at age 15	-0.137***	0.078***	-0.085***	0.133***
Mother's years of schooling	0.073***	0.087***	0.064***	0.078***
Father's year of schooling	0.085***	0.091***	0.036***	0.043***

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$. The table presents the standardized mean differences from the samples described in Table 1.

TABLE A.5—MAIN REGRESSIONS ALSO INCLUDING LOTTERY DRAW AS INSTRUMENT

	(1) Draft controls	(2) Basic	(3) Extended I	(4) Extended II	(5) Extended III
Panel A. First-stage regressions: outcome elder brother service					
Elder drafted	0.4727*** (0.0112)	0.4587*** (0.0131)	0.4577*** (0.0131)	0.4584*** (0.0131)	0.4546*** (0.0135)
Elder lottery draw	-0.1179*** (0.0191)	-0.1113*** (0.0211)	-0.1135*** (0.0210)	-0.1126*** (0.0210)	-0.1149*** (0.0216)
Adjusted R^2	0.2745	0.3028	0.3084	0.3096	0.3081
Mean of dep var	0.439	0.439	0.439	0.439	0.439
Panel B. Second stage IV regressions: outcome younger brother service					
Elder served	0.0331** (0.0142)	0.0329** (0.0155)	0.0339** (0.0154)	0.0338** (0.0154)	0.0355** (0.0159)
F-stat excl. inst.	1,656	1,438	1,450	1,453	1,365
Mean of dep var	0.428	0.428	0.428	0.428	0.428
Observations	13,124	13,124	13,124	13,124	12,478

Notes: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$. Specifications are the same as in Table 3 in the main text, here with younger brother lottery number as an additional control and elder brother lottery number as an additional instrument.

TABLE A.6—DESCRIPTIVE STATISTICS BY BROTHER FIT-FOR-SERVICE STATUS

	Elder descriptives		Younger descriptives	
	Younger fit (1)	Younger unfit (2)	Elder fit (3)	Elder unfit (4)
AFQT score	44.937 (8.186)	43.953 (8.241)	45.568 (8.366)	44.034 (8.766)
Height (cm)	180.461 (6.599)	180.549 (6.520)	180.382 (6.547)	180.323 (6.598)
Drafted=1	0.440	0.450	0.422	0.429
Served=1	0.427	0.415	0.439	0.426
Danish parents	0.958	0.995	0.956	0.996
Single parent family	0.168	0.172	0.139	0.153
Out of home care	0.030	0.053	0.036	0.060
Observations	13,124	5,012	13,124	5,667

Notes: This table presents means and standard deviations in parentheses according to brother fit-for-service status for brother pairs who are both Danish citizens and residents when they turn 18. Elder brothers are described in columns 1 and 2; in column 1 if the younger brother is fit for service; in column 2 if the younger brother is not fit for service. Younger brothers are described in columns 3 and 4; in column 3 if the elder brother is fit for service; in column 4 if the elder brother is not fit for service.

TABLE A.7—SELECTION CHECK: EXPLAINING YOUNGER BROTHER FIT-FOR-SERVICE STATUS (RESIDENTS AT AGE 9 AND 14).

	(1) age 14	(2) age 9
Panel A. OLS Regressions: Outcome younger brother fit-for-service=1		
Elder brother served	0.0104 (0.00675)	0.0102 (0.00675)
Adjusted R^2	0.0000719	0.0000677
Panel B. Reduced form regressions: Outcome younger brother fit-for-service=1		
Elder brother drafted	-0.00621 (0.00677)	-0.00562 (0.00677)
Adjusted R^2	0.00000854	0.0000166
Panel C. First stage regressions: Outcome elder brother service=1		
Elder brother drafted	0.518*** (0.00627)	0.518*** (0.00627)
Adjusted R^2	0.267	0.267
Mean of dep var	0.436	0.436
Panel D. Second stage IV regressions: Outcome younger brother fit-for-service=1		
Elder brother served	-0.0120 (0.0131)	-0.0108 (0.0131)
F-stat excl. inst.	6,831	6,827
Mean of dep var	0.698	0.699
Observations	18,789	18,777

Notes: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$. This table has the same structure and specifications as for Table 5 in the main text. Whereas Table 5 explains younger brother fit-for-service status for a sample of men who are Danish citizens and resident when they turn 18, this table samples men who are Danish citizens and resident when they are age 14 (column 1) or age 9 (column 2). All samples condition on elder brother being fit for service at age 18.

TABLE A.8—SELECTION CHECK: ELDER SERVICE EFFECTS ON YOUNGER MIGRATION AND DEATH

	(1) all younger brothers emigrate	(2) die	(3) unfit younger brothers emigrate	(4) die
Elder brother served	-0.00425* (0.00249)	0.00275 (0.00200)	-0.0154* (0.00842)	0.00878 (0.00680)
F-stat excl. inst.	6,827	6,827	1,920	1,920
Mean of dep var	0.00767	0.00495	0.0255	0.0165
Observations	18,777	18,777	5,653	5,653

Notes: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$. For a sample of brother pairs who are Danish citizens, resident at age 9 and the elder brother is fit for service, this table presents IV estimates for elder brother service effects on younger brother emigration and death after the elder brother turns 18. Columns 1 and 2 consider all younger brothers; columns 3 and 4 consider only younger brothers who are not fit for service. Control variables are the same as in Table 3, Column 4.

TABLE A.9—PLACEBO BROTHERS - SERVICE EFFECT P-VALUES FOR TRUE BROTHERS

Placebo draw group	Elder brother		Younger brother	
	raw	bootstrapped	raw	bootstrapped
Recruitment area	0.029	0.001	0.026	0.001
Recruitment area - year	0.034	0.000	0.025	0.000
Recruitment area - half year	0.020	0.000	0.029	0.000
AFD	0.033	0.000	0.005	0.000
Municipality	0.020	0.000	0.015	0.000
Month of birth	0.023	0.000	0.022	0.000
Half year of birth	0.014	0.000	0.019	0.000
Year of birth	0.014	0.000	0.019	0.001
Month (of year) of birth	0.032	0.000	0.028	0.002
Father schooling	0.022	0.000	0.018	0.000
Mother schooling	0.017	0.000	0.008	0.000
AFQT score	0.017	0.000	0.020	0.000
Height	0.014	0.000	0.014	0.000

Notes: Elder brothers are matched with placebo younger brothers and IV regressions explain placebo younger brother service status with elder brother service status instrumented by elder brother service status. 1000 placebo brothers are drawn from each different group listed in column 1. In columns 2 and 3 placebo elder brothers are drawn; in columns 4 and 5 placebo younger brothers are drawn. Columns 2 and 4 show raw p-values for true younger brothers among placebos. Columns 3 and 5 show p-values for true younger brothers among placebos correcting for placebo group clustering. Specifications are the same as for Table 3, Panel D, Column 4.

TABLE A.10—EXPLAINING YOUNGER BROTHERS’ OUTCOMES

	(1) OLS	(2) RF	(3) IV
Panel A. Explaining younger brother AFQT score			
Elder brother served	-0.316** (0.136)		-0.00726 (0.270)
Elder brother drafted		-0.00374 (0.140)	
Adjusted R^2	0.189	0.189	
Mean of dependent Variable	44.94	44.94	44.94
Panel B. Explaining younger brother height			
Elder brother served	-0.0332 (0.103)		0.127 (0.205)
Elder brother drafted		0.0655 (0.106)	
Adjusted R^2	0.279	0.279	
F-stat excluded instrument			4321
Mean of dependent Variable	180.5	180.5	180.5
Observations	13,124	13,124	13,124

Notes: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$. This table presents OLS, reduced form (RF) and IV estimates of elder brother service and draft status explaining younger brother AFQT scores in Panel A and younger brother height in Panel B. Controls are the same as for Table 3, Panel D, Column 4, except that we omit younger brother AFQT score (and its square) and younger brother height (and its square).

TABLE A.11—HETEROGENEOUS EFFECTS BY SELECTED BACKGROUND CHARACTERISTICS

	(1) Mother’s years of schooling >=12	(2) Mother’s years of schooling <12	(3) HH income <median	(4) HH income >=median	(5) Elder brother’s potential service year<1999	(6) Elder brother’s potential service year>=1999
Elder brother served	0.0264 (0.0202)	0.0373 (0.0241)	0.0276 (0.0219)	0.0361* (0.0219)	0.0294 (0.0189)	0.0331 (0.0270)
F-stat excl. inst.	1828	1426	1635	1593	1950	1296
Mean of dep. var	0.416	0.442	0.438	0.416	0.415	0.446
Observations	7,287	5,837	6,559	6,514	7,742	5,382

Notes: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$. The table presents IV estimates splitting the sample by mother’s schooling, household income at age 15, and elder brother’s potential year of service. Other explanatory variables are as in Table 3, Column 4.

TABLE A.12—LIST OF THE 200 INDUSTRIES

code	count	name	code	count	name	code	count	name	code	count	name
752200	13908	Defense	524410	557	Furniture store	521140	211	Storage, other	853110	141	Daycare for children and youth
454200	4236	Joiner	853150	549	Nursing home	744090	208	Advertising and promotion, other	611020	141	Ferries
745020	3655	Temporary work agency	524845	494	Sports equipment store	342000	206	Car body and coachwork	741100	141	Lawyer
453100	3395	Electrician	524620	491	Hardware store, retail	551010	202	Hotels, other	151390	141	Meat processing, other
452100	2864	Construction	803010	480	University	12510	200	Fur breeding	50100	137	Fishery
521210	2504	Warehouse	14110	466	Farming equipment	454310	198	Flooring	292310	136	Cooling machine manufacture
641100	2449	Postal services	158120	465	Bakery	923110	198	Theatre and concert halls	702010	135	Housing corporations
501020	2357	Car sales	11210	448	Plant nursery	158110	197	Bread factory	152010	134	Fish processing
521130	2340	Supermarket	801030	430	High school	714010	197	Video rental	925200	134	Museums
553010	2268	Restaurants	744010	410	Advertising agency	602420	195	Removals	361110	132	Chair manufacture
853225	2247	Pre-school care, combined	515400	406	Heating wholesale	292210	193	Conveyor and elevator factory	513810	132	Fishmonger, wholesale
505020	2102	Gas station	804230	376	Adult education	921300	192	Cinemas	212100	131	Paper and cardboard
453300	1700	Plumber	641200	366	Newspaper delivery	524610	191	Hardware, retail	652230	128	Building societies
602410	1670	Freight	554010	357	Bars	923300	188	Fairgrounds	601000	128	Railways
853220	1499	Orphanage	913100	354	Religious institutions	343000	187	Car spare part manufacture	452540	128	Scaffolding
452510	1467	Brick layer	14120	348	Gardner	20100	180	Forestry	751300	126	Public administration infrastructure
553020	1446	Cafe	853230	346	After school club	752500	178	Fire and rescue	748600	125	Organization support, other
521110	1356	Newsagent	516600	344	Farming equipment, wholesale	285100	178	Metal plating	633020	125	Travel agency
853215	1353	Kindergarten	926190	340	Sports facilities, other	524430	177	Home furnishing store	731000	122	R&D in science and technology
747010	1282	Cleaning	221210	339	Magazine publisher with printer	631200	177	Storage and warehousing	272200	120	Iron and steel pipe manufacture
651200	1251	Banks	501010	338	Car wholesale	748490	176	Business support, other	524825	120	Photography store
801010	1234	School for grades K-10	853140	338	Daycare for elderly and disabled	244200	176	Pharmaceuticals production	801020	118	Special school for the disabled
741200	923	Accountant and auditor	524230	330	Clothers store, unspecified	930500	175	Services, other	551120	116	Conference and course centre
502010	897	Car mechanic	514210	328	Cladding, wholesale	522600	174	Tobacconist	516510	116	Electrician supplies, wholesale
634020	885	Delivery	291300	327	Faucet and valve manufacture	502050	173	Car painting	748200	116	Packing
281100	857	Metal construction	252490	315	Plastic manufacture, other	522200	170	Butcher	702040	116	property letting, commercial
551110	853	Hotels with restaurants	853235	307	Home help	266120	169	Concrete	524530	115	Record company
361410	823	Home furniture factory	521220	301	Department store	922000	168	Radio and TV broadcasting	453200	114	Isolation
13000	804	Plant and animal nursery	311040	296	Windmill manufacture	312010	166	Electricity supply apparatus factory	513200	111	Butcher, wholesale
524520	789	Radio and TV store	517000	295	Wholesale, other	751200	166	Public administration, services	292220	111	Crane manufacture
524220	767	Menswear store	524865	288	Office equipment store	524700	162	Bookstore	516100	111	Machinery for metal, wholesale
12110	752	Cow breeding	291220	283	Pump manufacture	524870	161	Communication equipment store	221220	110	Magazine publisher without printer
454410	731	Painter	554020	282	Clubs	524860	159	Cycle and moped store	323010	109	Radio and TV manufacture
285200	707	Machine pre-processing	853210	268	Creche	551000	159	Hostels	292290	108	Heavy moving machinery, other
12300	701	Pig breeding	503010	267	Car spare part wholesale	748390	158	Office services, other	714090	106	Rental of domestic equipment
642000	694	Telecommunications	295690	266	Industrial machinery manufacture	452200	157	Roofing	222290	105	Printer, other
516410	669	Office equipment, wholesale	351100	266	Ship repair	555200	155	Catering	512100	104	Animal feed wholesale
722000	658	Software consultancy	222210	259	Book publisher	746000	155	Detective and security	361300	104	Kitchen equipment manufacture
741300	648	Marketing	660310	259	Insurance	252200	155	Plastic contained manufacture	515700	103	Garbage handling, wholesale
515310	645	Hardware wholesale	516590	251	Machines for wholesale, other	151200	155	Poultry slaughterhouse	454420	103	Glazier
851100	625	Hospitals	602200	251	Taxi	524850	155	Toy store	295610	103	Masonry
751100	608	General public service	524510	246	Household electrical store	723000	154	Data management	291110	103	Ship engine manufacture
155110	602	Dairy and cheese manufacture	900020	241	Repair services	703110	154	real estate agency	514610	102	Medical equipment wholesale
513900	595	Wholesale, unspecialized	11190	240	Agricultural supplies, other	554090	149	Coffee bars	923200	102	Theatre and concert maintenance
203020	582	Wood building construction	741490	238	Consulting, other	292320	148	Climate control manufacture	294000	101	Tool manufacture
11110	578	Seed grain supply	521120	234	Convenience store	513100	148	Greengrocer, wholesale	252390	100	Plastic building material factory
611010	577	Shipping, freight	742010	230	Consulting engineer	921100	147	Film and video production	524899	100	Store, other
926210	576	Sports clubs	926110	226	Gymnastics halls and pools	711000	146	Car rental	602100	99	Bus and metro
287590	566	Metal production, other	722200	219	Software, other	803050	146	Technical college	518800	98	Wholesale, unspecified
151110	562	Pig slaughterhouse	451100	216	Demolition and earth moving	361200	145	Office furniture manufacture	351200	97	Ship builder

Notes: The table lists the 200 industries employing the highest number of fit-for-service men, sorted by number of employees. Industry codes are according to the Danish industrial classification of economic activities (DB93) – a 6-digit classification.

TABLE A.13—OLS SPILLOVERS SPLIT BY PRESENCE OF OTHER SIBLINGS

	(1) Born 1976-83	(2) Any	(3) None
Panel A. Other siblings			
Elder brother service	0.0766*** (0.0214)	0.0822*** (0.0115)	0.101*** (0.0122)
Adjusted R^2	0.0573	0.0749	0.0895
Observations	2,112	6,977	6,147
Panel B. Sisters			
Elder brother service	0.0801*** (0.0267)	0.0809*** (0.0148)	0.0957*** (0.0102)
Adjusted R^2	0.0539	0.0751	0.0845
Observations	1,383	4,259	8,865
Panel C. Other brothers			
Elder brother service	0.0667* (0.0348)	0.0729*** (0.0151)	0.0997*** (0.0101)
Adjusted R^2	0.0495	0.0809	0.0810
Observations	839	4,054	9,070

Notes: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$. The table presents OLS estimates of spillovers from nine separate regressions for samples according to the presence of elder siblings (Panel A), sisters (Panel B), or other brothers (Panel C). Columns indicate whether there are siblings born 1976-83 (column 1), siblings born anytime (column 2), or no other siblings (column 3). These OLS estimates correspond with IV estimates from Table 15 in the main text.

TABLE A.14—OLS SPILLOVERS IN FAMILIES WITH MORE THAN TWO BROTHERS

	(1)	(2)	(3)	(4)	(5)
Sisters	Yes/No	Yes/No	Yes/No	No	No
Three brothers 1976-83	Yes/No	Yes/No	Yes	Yes	Yes
Under 36 months spacing	Yes/No	Yes	Yes	Yes/No	Yes
Elder brother service	0.0729*** (0.0151)	0.0840*** (0.0204)	0.0340 (0.0473)	0.0893** (0.0440)	0.0822 (0.0592)
Adjusted R^2	0.0809	0.0724	0.0279	0.0612	0.0168
Observations	4,054	2,295	513	549	351

Notes: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$. For a sub-sample with a third brother, the table presents spillover estimates from five separate OLS regressions with additional sample restrictions. Column headers indicate whether the restriction is imposed (yes), reversed (no), or ignored (yes/no). These OLS estimates correspond with IV estimates from Table 16 in the main text.

TABLE A.15—THREE FIT-FOR-SERVICE BROTHERS DESCRIPTIVE STATISTICS

	Eldest	Middle	Youngest
AFQT score	45.09 (9.05)	45.42 (8.54)	44.72 (8.67)
Height (cm)	179.74 (7.13)	179.73 (6.62)	180.36 (6.67)
Drafted=1	0.50	0.39	0.54
Served=1	0.50	0.46	0.48
Danish parents	0.89	0.89	0.89
Single parent family	0.13	0.16	0.15
Observations	335	335	335

Notes: The table presents means and standard deviations in parentheses for the sample of three brothers born 1976-83 who are fit for service.

TABLE A.16—THREE BROTHERS' RANDOMIZATION BALANCE CHECK—EXPLAINING ELDER BROTHER DRAFT STATUS WITH PRE-DETERMINED CHARACTERISTICS

	(1) Eldest explains eldest	(2) Middle explains eldest	(3) Middle explains middle	(4) Youngest explains middle
AFQT	0.00203 (0.02332)	0.02154 (0.03307)	0.03030 (0.02899)	0.01702 (0.03113)
Height (cm)	-0.11592 (0.11834)	-0.23686 (0.17442)	-0.18334 (0.19656)	-0.14263 (0.16272)
Danish	-0.00046 (0.10680)	0.00194 (0.10798)	-0.06152 (0.10165)	0.03885 (0.10985)
Single parent family	-0.05197 (0.08623)	-0.04185 (0.08613)	-0.02924 (0.07076)	-0.01513 (0.08297)
Out of home care	0.02411 (0.10155)	-0.08563 (0.17246)	0.02484 (0.14111)	0.10800 (0.15167)
Middle drafted		-0.00810 (0.06603)		
Youngest drafted				-0.03396 (0.06826)
F-Statistic	0.43822	0.49932	0.42732	0.39505
F-Stat p-value	0.87771	0.85637	0.88486	0.92284
Observations	335	335	335	335

Notes: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$. The table contains estimates from four separate OLS regressions explaining elder brother draft status. Columns 1-2 explain eldest brother draft status, and columns 3-4 explain middle brother draft status. Column 1 uses eldest brother characteristics, columns 2-3 use middle brother characteristics, and column 4 uses youngest brother characteristics. These regressions also control for birth year, birth month, half year of the AFD and half year of potential service start.

B. Compliers analysis calculations

This Appendix shows the calculations made for the compliers analysis, by applying the notations of ? to our context. Define treatment indicator S_s^B for service status s (taking the value 0 or 1) for brother B (taking the value Y (ounger) or E (lder)), and instrument D_d^B for draft status d (taking the value 0 or 1). We split the population into response types R_r^B where $r = NT$ indicates never-takers, $r = AT$ indicates always-takers and $r = C$ indicates compliers. Because of randomization, D^E is independent of R^E and we know the population frequencies of these response types for elder brothers. The fraction of elder brothers who do not serve among the sub-sample of elder brothers who are drafted, estimates the population share of elder brother never-takers:

$$\phi_{NT}^E = P [S_0^E | D_1^E] \quad (\text{A.1})$$

The fraction of elder brothers who serve among the sub-sample of elder brothers who are not drafted, estimates the population share of elder brother always-takers:

$$\phi_{AT}^E = P [S_1^E | D_0^E] \quad (\text{A.2})$$

The fraction of elder brothers who serve among the sub-sample of elder brothers who are drafted, estimates the combined population share of elder brother always-takers and compliers:

$$\phi_{AT}^E + \phi_C^E = P [S_1^E | D_1^E] \quad (\text{A.3})$$

The fraction of elder brothers who do not serve among the sub-sample of elder brothers who are not drafted, estimates the combined population share of elder brother never-takers and compliers:

$$\phi_{NT}^E + \phi_C^E = P[S_0^E | D_0^E] \quad (\text{A.4})$$

Subtracting (A.2) from (A.3) we obtain the population share of elder brother compliers:

$$\phi_C^E = P[S_1^E | D_1^E] - P[S_1^E | D_0^E] \quad (\text{A.5})$$

Distinguishing among compliers those who serve, *CI*, and those who do not serve, *CO*, the expectation of younger brother service status given elder brother draft status and elder brother service status can be estimated directly. Elder brothers who are not drafted and do not serve are a mixture of compliers who do not serve and never-takers, with mixing probabilities the relative proportions of these two sub-populations:

$$E[S_1^Y | D_0^E S_0^E] = \frac{\phi_C^E}{\phi_{NT}^E + \phi_C^E} E[S_1^Y | R_{C0}^E] + \frac{\phi_{NT}^E}{\phi_{NT}^E + \phi_C^E} E[S_1^Y | R_{NT}^E] \quad (\text{A.6})$$

Elder brothers who are not drafted and serve correspond to always-takers:

$$E[S_1^Y | D_0^E S_1^E] = E[S_1^Y | R_{AT}^E] \quad (\text{A.7})$$

Elder brothers who are drafted and do not serve correspond to never-takers:

$$E[S_1^Y | D_1^E S_0^E] = E[S_1^Y | R_{NT}^E] \quad (\text{A.8})$$

Elder brothers who are drafted and serve are a mixture of compliers who serve and always-takers, with mixing probabilities the relative proportions of these two sub-populations:

$$E [S_1^Y | D_1^E S_1^E] = \frac{\phi_C^E}{\phi_{AT}^E + \phi_C^E} E [S_1^Y | R_{C1}^E] + \frac{\phi_{AT}^E}{\phi_{AT}^E + \phi_C^E} E [S_1^Y | R_{AT}^E] \quad (\text{A.9})$$

Inverting equation (A.6) and substituting from equation (A.8) we can express expectations of younger brother service status conditional on elder brother complying by not serving:

$$E [S_1^Y | R_{C0}^E] = \frac{\phi_{NT}^E + \phi_C^E}{\phi_C^E} E [S_1^Y | D_0^E S_0^E] - \frac{\phi_{NT}^E}{\phi_C^E} E [S_1^Y | D_1^E S_0^E] \quad (\text{A.10})$$

Substituting from equations (A.1), (A.4) and (A.5) in equation (A.10) we obtain a function of objects that can be estimated directly:

$$E [S_1^Y | R_{C0}^E] = \frac{P [S_0^E | D_0^E] E [S_1^Y | D_0^E S_0^E] - P [S_0^E | D_1^E] E [S_1^Y | D_1^E S_0^E]}{P [S_1^E | D_1^E] - P [S_1^E | D_0^E]} \quad (\text{A.11})$$

Inverting equation (A.9) and substituting from equation (A.7) we can express expectations of younger brother service status conditional on elder brother complying by serving:

$$E [S_1^Y | R_{C1}^E] = \frac{\phi_{AT}^E + \phi_C^E}{\phi_C^E} E [S_1^Y | D_1^E S_1^E] - \frac{\phi_{AT}^E}{\phi_C^E} E [S_1^Y | D_0^E S_1^E] \quad (\text{A.12})$$

Substituting from equations (A.2), (A.3) and (A.5) in equation (A.12) we obtain a function of objects that can be estimated directly:

$$E [S_1^Y | R_{C1}^E] = \frac{P [S_1^E | D_1^E] E [S_1^Y | D_1^E S_1^E] - P [S_1^E | D_0^E] E [S_1^Y | D_0^E S_1^E]}{P [S_1^E | D_1^E] - P [S_1^E | D_0^E]} \quad (\text{A.13})$$

Hence we have obtained expected younger brother service status given the four elder brother response types as a function of objects that can be estimated directly. When applying the above

insight of ? to our context, we obtain expectations of compliers who serve and compliers who do not serve *separately*, instead of just their difference, as would be the case with the IV estimator. For the compliers analysis presented in Table ?? for S_1^Y we substitute family *background characteristics* (Panel A), elder brother background characteristics (Panel B) and younger brother background characteristics (Panel C). For the compliers analysis presented in Panel A of Table ?? for S_1^Y we substitute expectations of younger brother *outcomes*; the top row is younger brother service and the next for rows are combinations of younger brother service and draft status.

For Panel B of Table ?? we calculate expectations of younger brother response type *conditional* on elder brother response type. Because of randomization, D^Y is independent of R^Y and we know the population frequencies of these response types for younger brothers conditional on elder brothers being always-takers are as follows:

$$\phi_{NT}^Y(R_{AT}^E) = P[S_0^Y | D_1^Y R_{AT}^E] = P[S_0^Y | D_1^Y D_0^E S_1^E] \quad (\text{A.14})$$

$$\phi_{AT}^Y(R_{AT}^E) = P[S_1^Y | D_0^Y R_{AT}^E] = P[S_1^Y | D_0^Y D_0^E S_1^E] \quad (\text{A.15})$$

$$\phi_{AT}^Y(R_{AT}^E) + \phi_C^Y(R_{AT}^E) = P[S_1^Y | D_1^Y R_{AT}^E] = P[S_1^Y | D_1^Y D_0^E S_1^E] \quad (\text{A.16})$$

$$\phi_{NT}^Y(R_{AT}^E) + \phi_C^Y(R_{AT}^E) = P[S_0^Y | D_0^Y R_{AT}^E] = P[S_0^Y | D_0^Y D_0^E S_1^E] \quad (\text{A.17})$$

$$\phi_C^Y(R_{AT}^E) = P[S_1^Y | D_1^Y D_0^E S_1^E] - P[S_1^Y | D_0^Y D_0^E S_1^E] \quad (\text{A.18})$$

The expectation of younger brother being a never-taker given elder brother response type can be estimated as follows:

$$E [R_{NT}^Y | D_0^E S_0^E] = \frac{\phi_C^Y(R_{AT}^E)}{\phi_{NT}^Y(R_{AT}^E) + \phi_C^Y(R_{AT}^E)} E [R_{NT}^Y | R_{C0}^E] + \frac{\phi_{NT}^Y(R_{AT}^E)}{\phi_{NT}^Y(R_{AT}^E) + \phi_C^Y(R_{AT}^E)} E [R_{NT}^Y | R_{NT}^E] \quad (\text{A.19})$$

$$E [R_{NT}^Y | D_0^E S_1^E] = E [R_{NT}^Y | R_{AT}^E] = E [D_1^Y S_0^Y | D_0^E S_1^E] \quad (\text{A.20})$$

$$E [R_{NT}^Y | D_1^E S_0^E] = E [R_{NT}^Y | R_{NT}^E] = E [D_1^Y S_0^Y | D_1^E S_0^E] \quad (\text{A.21})$$

Inverting equation (A.19) and substituting from equation (A.21) we can express expectations of younger brother being a never-taker conditional on elder brother complying by not serving:

$$E [R_{NT}^Y | R_{C0}^E] = \frac{\phi_{NT}^Y(R_{AT}^E) + \phi_C^Y(R_{AT}^E)}{\phi_C^Y(R_{AT}^E)} E [R_{NT}^Y | D_0^E S_0^E] - \frac{\phi_{NT}^Y(R_{AT}^E)}{\phi_C^Y(R_{AT}^E)} E [R_{NT}^Y | D_1^E S_0^E] \quad (\text{A.22})$$

Substituting from equations (A.14), (A.17) and (A.18) into equation (A.22) we obtain a function of objects that can be estimated directly:

$$E [R_{NT}^Y | R_{C0}^E] = \frac{P [S_0^Y | D_0^Y D_0^E S_1^E] E [D_1^Y S_0^Y | D_0^E S_0^E] - P [S_0^E | D_1^Y D_0^E S_1^E] E [D_1^Y S_0^Y | D_1^E S_0^E]}{P [S_1^Y | D_1^Y D_0^E S_1^E] - P [S_1^Y | D_0^Y D_0^E S_1^E]} \quad (\text{A.23})$$

Similar expressions can be derived for other expected younger brother response types conditional on other elder brother response types.