Lifetime Earnings and Vietnam Era Draft Lottery. Evidence from Social Security Administration Records

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- Earnings equation:

$$y_{cti} = \beta_c + \delta_t + s_i\alpha + u_{it}$$

y_{cti}: earnings
β_c: cohort effect
δ_t: period effect: time dummies
s_i: military service dummy
u_{it}: error term.

- Since military service is a choice variable, the error term u_{it} and s_i can be correlated, resulting in the endogeneity bias.

Instrument: uncorrelated with the error term u_{it} but correlated with the service dummy s_i
Draft lottery:

- Since the draft lottery is random, it is independent with the error term.
- Any function of the draft lottery can be used as an instrument, as long as it is correlated with the military service.
- Since only the draft eligibles below the threshold lottery number has to serve, lottery number is correlated with s_i.
- Not all draft eligible individual served, and some draft noneligibles served. Pre-induction physical, mental aptitude exam: one half of all registrants failed.

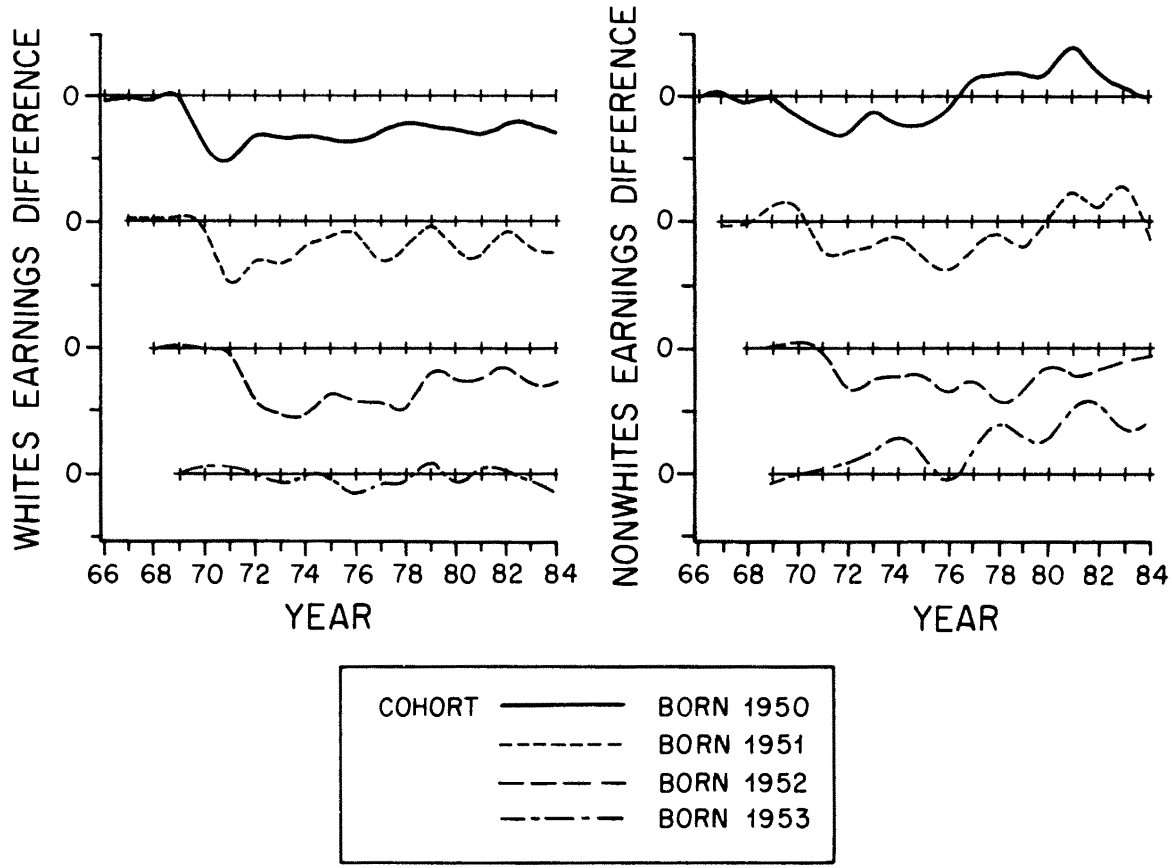
Data

- 1964-84: Social Security Administration's Continuum Work History Sample (SSA-CWHS)
  Earnings of men in employment covered, by FICA, taxable earnings from self employment.
- 1978- : total compensation from IRS,W-2 excluding earnings from self employed.
- Both aggregate data: by year of earnings, year of birth, race, 5 consecutive lottery numbers.

The Effect of Draft Eligibility on earnings

Time series plot the difference in earnings between draft eligible individuals and non-eligible ones.

- No difference in earnings until the year of conscription lottery.
- Draft eligible white males' earnings fall, and do not recover. Sometimes statistically significant and amounts to 2-3 % of earnings.
- Nonwhites: draft eligible males' earnings fall, but becomes eventually higher than noneligibles' earnings. Statistically insignificant.
- Men born in 1953: no decline in earnings. This could be because of the end of conscription in 1973.



Notes: The figure plots the difference in FICA taxable earnings by draft-eligibility status for the four cohorts born 1950–53. Each tick on the vertical axis represents $500 real (1978) dollars.

Model Specification and Estimation

$$y_{cti} = \beta_c + \delta_t + s_i\alpha + u_{it}$$

- Instrument: draft eligibility d_i, which is a function of draft lottery number.
- Single cohort estimate.

$$\widehat{\alpha} = \frac{\overline{y}^e - \overline{y}^n}{\widehat{p}^e - \widehat{p}^n}$$

- $\widehat{p}^e$, $\widehat{p}^n$: proportions of the individuals actually entering the military. Estimated using SIPP (Survey of Income and Program Participation) data.

$$E[y_{cti}|d_i] = \beta_c + \delta_t + E[s_i|d_i]\alpha + E[u_{it}|d_i]$$

$$\begin{aligned} E[y_{cti}|d_i = 1] &= \beta_c + \delta_t + p^e\alpha + 0 \\ E[y_{cti}|d_i = 0] &= \beta_c + \delta_t + p^n\alpha + 0 \\ \alpha &= \frac{y^e - y^n}{p^e - p^n} \end{aligned}$$

- White veterans: annual earnings loss of \$2000 1978 dollars. 15 % of annual W-2 compensation.
- Few are statistically significant.

TABLE 3—WALD ESTIMATES

Cohort	Year	Draft-Eligibility Effects in Current $: FICA Earnings (1)	Adjusted FICA Earnings (2)	Total W-2 Earnings (3)	$\hat{p}^e - \hat{p}^n$ (4)	Service Effect in 1978 $ (5)
1950	1981	−435.8	−487.8	−589.6	0.159	−2,195.8
		(210.5)	(237.6)	(299.4)	(0.040)	(1,069.5)
	1982	−320.2	−396.1	−305.5		−1,678.3
		(235.8)	(281.7)	(345.4)		(1,193.6)
	1983	−349.5	−450.1	−512.9		−1,795.6
		(261.6)	(302.0)	(441.2)		(1,204.8)
	1984	−484.3	−638.7	−1,143.3		−2,517.7
		(286.8)	(336.5)	(492.2)		(1,326.5)
1951	1981	−358.3	−428.7	−71.6	0.136	−2,261.3
		(203.6)	(224.5)	(423.4)	(0.043)	(1,184.2)
	1982	−117.3	−278.5	−72.7		−1,386.6
		(229.1)	(264.1)	(372.1)		(1,312.1)
	1983	−314.0	−452.2	−896.5		-2,181.8
		(253.2)	(289.2)	(426.3)		(1,395.3)
	1984	−398.4	−573.3	−809.1		−2,647.9
		(279.2)	(331.1)	(380.9)		(1,529.2)
1952	1981	−342.8	−392.6	−440.5	0.105	−2,502.3
		(206.8)	(228.6)	(265.0)	(0.050)	(1,556.7)
	1982	−235.1	−255.2	−514.7		−1,626.5
		(232.3)	(264.5)	(296.5)		(1,685.8)
	1983	−437.7	−500.0	−915.7		−3,103.5
		(257.5)	(294.7)	(395.2)		(1,829.2)
	1984	−436.0	−560.0	−767.2		−3,323.8
		(281.9)	(330.1)	(376.0)		(1,959.3)

Notes: Standard errors in parentheses.
Columns (1) and (3) are taken from Table 1.
Column (2) reports draft-eligibility treatment effects on earnings adjusted for censoring at the FICA taxable maximum. The adjustment procedure is described in the Appendix. Column (4) reports SIPP estimates of the effect of draft eligibility on veteran status, taken from Table 2. Column (5) reports estimates of the effect of military service on civilian earnings is implied by columns (2) and (4).

Efficient IV Estimate

The above estimates each cohort separately, which is inefficient.

$$\overline{y}_{ctj} = \beta_c + \delta_t + \widehat{p}_{cj}\alpha + \overline{u}_{ctj}$$

j: 73 different groups, based on lottery numbers.

- enlistment probability is estimated from the Defense Manpower Data Center (DMDC) administrative records and CWHS data on cohort size. Sipp sample size is too small.
- Model 1: allows α to vary by cohort. Earnings loss of \$ 1500-2100, mostly insignificant for whites. Insignificant for nonwhites.
- Model 2: restricts α to be the same for all cohorts. Similar coefficient estimates, significant. Insignificant for nonwhites.

TABLE 4—TWO-STAGE INSTRUMENTAL VARIABLES ESTIMATES

Cohort	FICA Taxable Earnings	Adjusted FICA Earnings	Total W-2 Compensation
Whites			
Model 1			
1950	−1709.2	−2093.7	−1895.0
	(946.8)	(1108.8)	(1333.1)
1951	−1457.1	−1983.7	−2431.4
	(959.3)	(1036.1)	(1152.1)
1952	−1724.0	−1943.0	−2058.7
	(863.1)	(927.2)	(1001.9)
1953	1223.8	900.7	−488.6
	(3232.1)	(3505.3)	(3936.0)
$\chi^2(873)$	578.3	630.3	569.5
Model 2			
1950–53	−1562.9	−1920.4	−2094.5
	(521.8)	(575.9)	(646.3)
$\chi^2(876)$	579.1	631.0	569.7
Nonwhites			
Cohort	FICA Taxable Earnings	Adjusted FICA Earnings	Total W-2 Compensation
Model 1			
1950	3893.7	3891.9	5711.8
	(5358.5)	(6244.5)	(7206.0)
1951	−891.3	−333.4	2609.0
	(4397.1)	(4664.2)	(4894.6)
1952	−3182.9	−3457.7	−3068.0
	(3997.4)	(4195.2)	(4229.2)
1953	−5928.3	−8571.4	−6325.8
	(10296.3)	(10697.1)	(11410.6)
$\chi^2(873)$	616.7	681.7	693.6
Model 2			
1950–53	−643.3	−999.7	366.7
	(2407.5)	(2602.5)	(2734.2)
$\chi^2(876)$	618.4	683.4	695.6

Notes: Standard errors in parentheses.
The table shows estimates of the effect of military service on average 1981–84 earnings in 1978 dollars. The estimation method is optimally weighted Two-Sample Instrumental Variables, described in the text. FICA and W-2 earnings are from the Social Security CWHS. The adjusted FICA series is described in the Appendix.

Military Service and Loss of Labor Market Experience.

Potential explanation of the negative earnings effect: loss of labor market experience due to military service.
Human Capital Earnings Function (Mincer equation)

$$y_{cti} = \delta_t + \omega_i \delta_0 + \beta_0 x_{ict} + \gamma x_{ict}^2 + u_{it}$$

y_{cti}: log earnings
ω_i: schooling
x_{ict}: civilian labor market experience
with l years of military experience, and s_i being the dummy for military service,

$$x_{ict} = x_{ct} - s_i \times l$$

Unrestricted reduced form

Then, the average earnings equation becomes for year t, cohort c, group j,1

$$\begin{aligned}\overline{y}_{ctj} &= \delta_t + \beta_0 x_{ct} + \gamma x_{ct}^2 - \left[\beta_0 l - \gamma l^2 + \beta_1 l\right] \hat{p}_{cj} \\ &\quad - \left[2\gamma l - \beta_1\right] \hat{p}_{cj} x_{ct} + \overline{u}_{ct}\end{aligned}$$

The unrestricted version of the above equation is

$$\overline{y}_{ctj} = \delta_t + \beta_e x_{ct} + \gamma x_{ct}^2 + \pi_1 \widehat{p}_{cj} + \pi_2 \widehat{p}_{cj} x_{ct} + \overline{u}_{ct}$$

Estimation Results

Reduced from veteran effect: $\alpha_{ct} = \pi_1 + \pi_2 x_{ct}$
Dependent variable: log mean earnings for each cell ctj.

	coef.	s.e	coef.	s.e.	coef	s.e.
exper β_0	0.1022	0.007	0.1016	0.007	0.1016	0.007
exper sqr γ	-0.0026	0.0003	-0.0025	0.0003	-0.0025	0.0003
vet slope β_1			-0.0035	0.0023		
vet exp loss	2.08	0.38	1.84	0.43		
π_1					-0.189	0.052
π_2					0.006	0.004
recovery age					50.1	15.9

- Effect of veteran status on earnings growth: negative, but not significant. Chi square test of $\beta_1 = 0$ not rejected.
- loss recovery age: 50.

Caveats

- Heterogeneity in the treatment effect coefficient:

$$y_{cti} = \beta_c + \delta_t + s_i \alpha_i + u_{it}$$

$$\alpha_i = \alpha_0 + \epsilon_i$$

Then, the estimated coefficient is

$$\alpha_0 + E(\epsilon_i | s_i = 1)$$

- Absence of covariates
  Suppose x is the education attainment behavior that is affected by military service. Then, the estimated coefficient is

$$\overline{\alpha} = [E(x_i|s_i = 1) - E(x_i|s_i = 0)]\,\delta + \alpha$$

- Earnings-Modifying Draft Avoidance Behavior
  Higher human capital accumulation to avoid draft. This will underestimate the coefficient estimate.