Does it Pay For Women to Volunteer?

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Introduction

- Measure economic and non-economic returns to volunteering

- Volunteering widespread but not yet well understood
  - 33% of US adult population volunteered in previous year (2005 PSID)
  - high percentages found in other data sets in US and Europe (OECD)

- How would volunteering respond to monetary (economic) incentives?
  - US tax code treats time and money asymmetrically
  - Would tax incentives help achieve UK Big Society?

Previous Literature

- Highlights two distinct motives for volunteering
  - consumption motive (warm glow)
  - investment motive (future earnings)
  - analyze each motive in isolation (Menchik and Weisbrod (1987), Freeman (1997)
- Problems with previous literature
  - future monetary payoff not taken into account
  - earnings in paid employment exogenous
  - ignore endogeneity of non-labor income and family composition

- This paper
  - post-volunteering earnings available as well as transitions (better data)
  - simultaneously decide on work for pay/no pay, marriage and fertility (Keane and Wolpin (2010))
  - new empirical strategy that nests both motives in one model

Data

- PSID 2001-2005 contains questions on volunteering for charitable organizations

- Defined as "coaching, helping at school, serving on committees, building and repairing, providing health care or emotional support, delivering food, doing office work, organizing activities, fundraising, and other kinds of work done for no pay."

- Restrict to white women aged 25-55 (2,479 women, unbalanced panel)

Table 1: Weekly Volunteer Hours

		Non-Zero Volunteer Hours						
			Std.	Percentile				
Year	% Vol	Mean	Dev.	10	25	50	75	90
2000	29.5	2.17	3.75	.29	.48	.96	1.92	4.81
2002	30.4	4.04	8.63	.19	.58	1.58	4.23	8.06
2004	34.7	3.49	7.41	.23	.58	1.73	3.69	7.31

Year	Help Poor	Rel igion	Child or Youth	Poor Health	Sen.	Soc. Chg.	Oth.
2000	.124	-	-	-	-	-	.876
2002-2004	.042	.410	.352	.044	.037	.032	.083

Table 3: Employment Choice Distribution

Age	Non-Emp (1)	Vol Only (2)	PT Only (3)	FT Only (4)	PT & Vol (5)	FT & Vol (6)	Woman-Years (7)
25-29	.117	.027	.229	.409	.090	.128	743
30-34	.129	.058	.213	.348	.109	.142	1,252
35-39	.088	.063	.210	.347	.112	.180	1,264
40-44	.091	.054	.195	.346	.155	.160	1,396
45-49	.092	.049	.175	.376	.123	.185	1,338
50-55	.093	.041	.174	.376	.110	.206	933
25-55	.101	.051	.198	.363	.120	.168	6,926

Table 4: Two-Year Employment Transition Matrix

	Non-Emp (1)	Vol Only (2)	PT Only (3)	FT Only (4)	PT & Vol (5)	FT & Vol (6)
Non-Emp	.496	.157	.186	.082	.056	.022
Vol Only	.159	.439	.070	.037	.229	.065
PT Only	.097	.024	.431	.266	.120	.063
FT Only	.054	.009	.146	.617	.034	.140
PT & Volunteer	.042	.066	.198	.106	.424	.164
FT & Volunteer	.022	.015	.075	.273	.122	.492

Table 5: Reduced Form Regressions

	Volunteer	Married	Give Birth
	(1)	(2)	(3)
Constant	-.701	-1.035	.337
	(.168)	(.142)	(.113)
I(12<Educ<16)	.237	.097	.023
	(.021)	(.028)	(.009)
I(Educ≥16)	.418	.151	.066
	(.024)	(.029)	(.010)
Age	.030	.076	-.013
	(.009)	(.007)	(.006)
Age-squared	-.0004	-.0008	.0004
	(.0001)	(.0001)	(.0001)
Married	.039		.045
	(.015)		(.004)
#kids	.077		.044
	(.012)		(.005)
#kids-squared	-.0095		-.0032
	(.0025)		(.0013)
ρ	.371	.805	.000
N	2,479	2,479	1,988
NT	6,926	12,395	8,953
R^2	.073	.024	.073

Table 5: Reduced Form Regressions (cont'd)

	Log Accepted Wage			
	(5)	(6)	(7)	(8)
Constant	8.990	8.988	7.646	8.029
	(.331)	(.443)	(.419)	(.493)
I(12<Educ<16)	.664	.678	.484	.563
	(.056)	(.068)	(.063)	(.086)
I(Educ≥16)	1.117	1.139	.935	1.007
	(.059)	(.073)	(.068)	(.091)
Age	-.009	-.003	.023	.008
	(.017)	(.022)	(.020)	(.024)
Age-squared	.0003	.0002	-.0001	.0001
	(.0002)	(.0003)	(.0002)	(.0003)
Volunteered		-.143	-.069	-.038
		(.034)	(.031)	(.028)
Worked PT			.681	.633
			(.093)	(.082)
Worked FT			1.365	.959
			(.090)	(.080)
σ				.669
N	2,305	2,032	2,032	2,032
NT	5,877	3,707	3,707	3,707
R^2	.098	.100	.271	.245

Choice Set

- Employment Choices $\left(d_a^k\right)$
  - no paid or unpaid work (non-employment)
  - volunteer only
  - part-time paid work only
  - full-time paid work only
  - part-time paid work and volunteer
  - full-time paid work and volunteer
- Full-time job offer probabilities

- Marriage Choices (m_a)
  - Stay Single, Get/Stay Married
  - marriage offer probabilities
  - draw permanent component to new husband's earnings
  - draw only when single (no "on-the-job" search)
  - marriage "quits" can arise from bad spouse earnings shocks

- Fertility Choices (b_a)($a \leq 45$)
  - conceive/don't conceive
  - birth occurs with certainty before start of $a + 1$
  - shocks to utility of conceiving

Basic Structure

- Utility Flow:

$$U_a = \frac{\mu_k C_a^{1-\lambda}}{1-\lambda} + \sum_{k \in K^v} d_a^k g_a + \psi^m + \psi^n + d_a^1 \varepsilon_u$$

- Budget Constraint:

$$C_a = \tau^{m_a}\{b(d_a^1 + d_a^2) + w_a^p \left(d_a^3 + d_a^5\right) + w_a^f \left(d_a^4 + d_a^6\right) + w_a^h m_a - c_k\}$$

Additional Parameterizations

- Wage and Job Offers ($k = p, f$):

$$\ln w_a^k = \Psi^k \left(E, A, x_a^v, x_a^p, x_a^f \right) + \varepsilon_a^k$$

- Warm Glow:

$$g_a = \Psi^g \left(E, a, n_a^{1,6}, n_a^{7,18} \right) + \varepsilon_a^g$$

- Husband Wage and Marriage Offers:

$$\ln w_a^h = \Psi^h \left(E, a \right) + \mu + \varepsilon_a^h$$

$$\varepsilon_a^h = \rho \varepsilon_{a-1}^h + \nu_a^h$$

- Utility of Marriage:

$$\psi^m = \Psi^m (x_a^m)$$

- Utility of Children:

$$\psi^n = \Psi^n (m_a, n_a) + \varepsilon_a^n$$

- Cost of Children:

$$c_k = \Psi^c \left(b_a, n_a^{1,6}, n_a^{7,18}, d_a^k\right)$$

- Standard Laws of Motion for:

$$(x_a^v, x_a^p, x_a^f, x_a^m, n_a, n_a^{1,6}, n_a^{7,18})$$

Solution

- Decision Rules (Bellman Equations)

$$V_a(\Omega_a) = \max_{d_a^k, m_a, b_a \in J} \left[V_a^j(\Omega_a) \right]$$

$$V_a^j(\Omega_a) = U_a^j + \delta E \left[V_{a+1}\left(\Omega_{a+1}\right) | j \in J, \Omega_a \right]$$

- Use approximate solution method
  - solve series of two period problems (Monte Carlo integration for EMAXs at $a + 1$)
  - imbed function of states at $a+2$ to capture omitted distant future
  - builds on Geweke and Keane (2001)

Estimation

- Solution of DCDP nested in likelihood iterations

- SML with CE (logistic form - biased CE model)

- Initial conditions: simulate model from $\underline{a} = 21$, data starts at $\tilde{a}_i \geq 25$

- Type probs function of education (CRE) and birth cohort (exogenous variation)

- Non-response probability function of simulated choices and interview length (exogenous variation)

$$\widehat{\ell}_i\left(D_i^* \mid E_i, A_l, \theta\right) = \frac{1}{R}\sum_{r=1}^{R}\prod_{a=\tilde{a}_i}^{\tilde{a}_i+5}$$

$$\left\{\sum_{j=1}^{6}\sum_{k=1}^{6}\pi_{jk}^{e} I\left[d_a^r = j, d_{ia}^* = k\right]\right\}^{I\left(d_{ia}^*\in D_i^*\right)}$$

$$\left\{\sum_{j=0}^{1}\sum_{k=0}^{1}\pi_{jk}^{m} I\left[m_a^r = j, m_{ia}^* = k\right]\right\}^{I\left(m_{ia}^*\in D_i^*\right)}$$

$$\left\{\sum_{j=0}^{1}\sum_{k=0}^{1}\pi_{jk}^{b} I\left[b_a^r = j, b_{ia}^* = k\right]\right\}^{I\left(b_{ia}^*\in D_i^*\right)}$$

$$\{\pi^{nr}\}^{I(NR_{ia}^*=1)}\{1-\pi^{nr}\}^{1-I(NR_{ia}^*=1)}$$

$$\{f^w\left(w_{ia}^*\right)\}^{I\left(w_{ia}^*\in D_i^*\right)}\left\{f^h\left(h_{ia}^*\right)\right\}^{I\left(h_{ia}^*\in D_i^*\right)}$$

$$\left\{\sum_{j=1}^{6}\pi_j^f I\left(d_{a-1}^r = j\right)\right\}^{I(d_a^r=4,6)}$$

$$\{\pi^m\}^{I\left(m_{a-1}^r=0, m_a^r=1\right)}$$

Table 6: SML Estimates

	$ln\left(w_a^p\right)$ Part-time Wage (1)	$ln\left(w_a^f\right)$ Full-time Wage (2)	g Warm Glow (6)
Constant	7.504 (.004)	8.398 (.008)	-1.407 (.004)
E_1	.427 (.002)	.486 (.002)	2.809 (.007)
E_2	.768 (.004)	1.010 (.003)	3.417 (.010)
A_1	-1.093 (.005)	-1.624 (.027)	
A_2	.601 (.004)	.664 (.003)	
A_3	1.185 (.018)	1.265 (.006)	
x_a^v	.083 (.0003)	.024 (.0001)	
x_a^p	.163 (.0007)	.029 (.0002)	
x_a^{p2}	-.010 (.00004)		
x_a^f	-.007 (.00004)	.031 (.0001)	
x_a^{f2}		-.0008 (.000004)	
a			-.0003 (.00003)
$n_a^{1,6}$			-.924 (.011)
$n_a^{7,18}$			2.809 (.007)

Results: Selection into Volunteering

- Model says volunteering optimal when
  - warm glow and expected future economic returns sufficiently outweigh disutility of extra work effort and childcare costs

- Highly educated women receive more warm glow

- Low market-productivity types have higher expected future economic returns (curvature of utility function: $1 - \widehat{\lambda} = .273$)

- Implies highly educated low market-productivity women volunteer most often

- Negative selection driven by differential marginal utilities of future consumption (outweighs heterogenous non-economic returns)

Table 12: Reduced Form Regressions (Simulated Data)

	Volunteer		Accepted Log Wage	
	(1)	(2)	(3)	(4)
Constant	.090	-.133	7.803	7.218
E_1	.271	.269	.638	.629
E_2	.424	.410	1.207	1.181
A_1	.083	.090	-1.000	-.838
A_2	-.045	-.052	.711	.620
A_3	-.052	-.074	1.342	1.210
a		-.005	.023	.033
a^2		.0001	-.0001	-.0002
m_a		.306		
$n_a^{1,6}$		-.197		
$n_a^{7,18}$		.276		
Volunteered			.029	.033
Worked PT				.266
Worked FT				.513
$\overline{R}^2$	.157	.294	.860	.885
N		480		
NT		16,320		

Table 13: Relative Importance and Tax Policy

	No Returns (1)	Non-Economic Returns ‘Only (2)	Both Returns (3)	Tax Credit (4)
Vol (Total)	.0000	.2775	.3030	.4108
Non-emp	.2641	.1861	.1362	.1104
Vol Only	.0000	.0968	.0410	.0509
Part-time	.0714	.0403	.0801	.0716
Full-time	.6645	.4962	.4807	.4072
PT & Vol	.0000	.0169	.0778	.1396
FT & Vol	.0000	.1638	.1842	.2203
Married	.662	.660	.647	.654
Fertility (Total)	.427	.425	.453	.466
Non-labor Inc	40,367	40,401	40,847	40,861
Accepted Wage	21,589	22,078	24,194	25,272
Lifetime Earnings	247,105	246,303	288,620	299,376
Lifetime Utility	1852.46	1860.64	1898.70	1923.78
Lifetime Benefit				10,756
Lifetime Subsidy				29,500
Net Cost				18,744

Conclusions

- Substantial economic and non-economic returns to volunteering
  - 8.3% in part-time work
  - 2.4% in full-time work
  - higher full-time job offer probs (5-7 % points)

- Uncovered adverse selection into volunteering consistent with negative returns in OLS

- Economic returns relatively more important for low productivity types, non-economic returns for high productivity types

- Overall, economic returns more important (82.3% of increase in mean lifetime utility)

- Childcare cost tax credit would increase volunteer labor supply by 36% and lifetime earnings by 3.7%, covering 36% of cost

Extensions

- Add borrowing and saving (can fund volunteering)

- Add charitable giving (substitute/complement to volunteering)

- Endogenize male labour supply (household model)