



## Life-cycle Decisions

*Female vs. Male*

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- 1 Two Models of Life-cycle Choices
- 2 Motivation of the Papers
- 3 Research Question and Approach
- 4 Models
- 5 Data
- 6 Estimation Results
- 7 Counter Factual Exercises
- 8 Comments

- ❶ Objective: compare two models of life-cycle decisions
  - ▶ One model for females one model for males
  - ▶ “Females Model”: Keane and Wolpin (2010)
  - ▶ “Males Model”: Keane and Wolpin (1997)
- ❷ Learn about modeling decisions
- ❸ Understand the main features of female and male life-cycle or career decisions

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- ❶ Large differences in economic and demographic characteristics of majority (white) compared to minority (black and Hispanic) women
- ❷ NLSY79 in 1990 (Ages 25 to 33):
  - ▶ Mean schooling years: white 13.4; black 12.8; Hispanic 12.1
  - ▶ Marriage percentages: white 65%; black 32%; Hispanic 55%.
  - ▶ Children: white 1.2; black and Hispanic 1.7
  - ▶ Employment: white 74%, black 66%, Hispanic 67%
  - ▶ AFDC previous year: white 4%, black 20%, Hispanic, 11%

- ➊ Analyze the “life-cycle” or career decisions of a core sample of white men

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- ▶ Model labor supply, marriage markets, preference heterogeneity, and the welfare system to answer:
  - ❶ How much observed of observed minority-majority differences in behavior can attributed to differences in labor market and marriage opportunities, and preferences?
  - ❷ How does to welfare system affects augment the differences minority-majority differences?
  - ❸ How will the new cohorts that grow up under the new welfare system (TANF) behaves compared to older cohorts?



- ▶ Combine the extensions to the basic Roy (1951) model in Heckman and Sedlaeck (1985) and Willis (1986) to assess self-selection in three dimensions, schooling, work, and occupational choice, and understand
  - ① Human capital investment
  - ② School attendance
  - ③ Work
  - ④ Occupational choices
  - ⑤ Future work decisions
  - ⑥ Wage patterns

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# Model: Females, Basics

- ▶  $j = 1, \dots, J$  defines the types of women
- ▶ At each time  $a$  each women  $j$  decides to:
  - ❶ work (if she gets an offer),  $h_a^p, h_a^f$
  - ❷ attend school to school,  $s_a$
  - ❸ be married (if someones proposes),  $m_a$
  - ❹ become pregnant (if at fecund age),  $p_a$
  - ❺ government help (if eligible)
- ▶ Life span: 14 to 62 (fecund stage: 14 to 45)
- ▶ Utility depends on:
  - ❶ Past and current choices
  - ❷ Number of children,  $N_a$
  - ❸ Consumption,  $C_a$
  - ❹ Completed level of Schooling,  $S_a$

$$\begin{aligned}U_a^j &= U_a \left( C_a, S_a, m_a, p_a, g_a, h_a^p, h_a^f; \varepsilon_a, \mathbf{1}(\text{type} = j), \Omega_a^a \right) \\c_a &= y_a^o(1 - m_a)(1 - z_a) + [y_a^o + y_a^m] m_a \tau_a^m \\&+ [y_a^o + y_a^z \tau_a^z] z_a + \beta_1 g_a - [\beta_3 (\mathbf{1}(S_a \geq 12))] \\&+ \beta_4 (\mathbf{1}(S_a \geq 16))\end{aligned}$$

# Model: Females, Job Offers and Wages

- ▶ Probabilities of receiving full and part time job offers:  
 $\pi^{wp}, \pi^{wf}$
- ▶ Earnings:  $y_a^o = 500w_a^p h_a^p + 1000w_a^f h_a^f$
- ▶ Hourly wage:  $\ln w_a^k = r^k + \Psi_a(\cdot) + \varepsilon_a^w$ , for  $k = p, f$  and where  $r^k$  is rental rate and  $\Psi_a(\cdot)$  is human capital stock
- ▶ Marriage:
  - ① offers to marry married depend on age and welfare status,  $\pi_a^m$
  - ② offers to continue married depend on age and marriage current duration
- ▶ Husband's human capital: (conditional on marriage offer) drawn from a distribution that depends on woman's race/ethnicity, schooling, age, state of residence, type,  $Psi_a^m$
- ▶ After marriage, husband's earnings are  
 $\ln y_a^m = \mu^m + \Psi_{0a}^m + \varepsilon_a^m$

- The welfare system is time and state particular

$$b_t^s (N_{at}^{18}, y_{at}^o, y_{at}^z) = \begin{cases} b_{0t}^s + b_{1t}^s N_{at}^{18} - b_{3t}^s \beta_2 y_{at}^z z_{at}, & y_{at}^o < y_{at}^{s1}(\cdot) \\ b_{2t}^s + b_{4t}^s N_{at}^{18} - b_{3t}^s \\ \times [y_{at}^o - y_{at}^{s1} + \beta_2 y_{at}^z z_{at}], & y_{at}^{s1}(\cdot) < y_{at}^o < y_{at}^{s2}(\cdot) \\ 0, & \text{otherwise} \end{cases}$$

- The parameters that define the welfare system evolve according to a VAR

$$\mathbf{b}_t^s = \lambda^s + \Lambda^s \mathbf{b}_{t-1}^s + \mathbf{u}_t^s \quad (1)$$

- (1) is estimated outside the model with simulated data

$$V_a(\Omega_a) = \begin{cases} \max_{l \in \mathcal{L}} U_a^j + \delta \mathbb{E}(V_{a+1}(\Omega_{a+1} | l \in \mathcal{L}, \Omega_a)), & a < A \\ U_A^j, & a = A \end{cases}$$

- ▶ The value of option  $l \in \mathcal{L}$  depends on the current state space:  $\Omega_A$ , which includes residence, the WS rule parameters, preference shocks, own husband's earnings shocks, parental income shocks, labor market, marriage, and parental co-residence opportunities
- ▶ Solution: set of "Emax's" for all  $l \in \mathcal{L}$  and all elements in  $\Omega_a$

# Model: Males, Basics

- ▶  $k = 1, \dots, J$  defines the types of men (by human capital at age 16)
- ▶ At each age  $a$  individuals choose among five mutually exclusive, exhaustive alternatives ( $m = 1, \dots, 5$ ):
  - 1 Blue collar job
  - 2 White collar job
  - 3 Military job
  - 4 Go to school
  - 5 Engage in household production
- ▶ Per period reward:

$$R(a) = \sum_{m=1}^5 R_m(a) d_m(a)$$

where  $R_m(a)$  is the per period reward in the  $m_{th}$  alternative and  $d_m(a)$  indicates the choice of the  $m_{th}$  alternative



- For  $m = 1, 2, 3$ :

$$\begin{aligned} R_m(a) &= w_m(a) \\ &= r_m \exp[e_m(16) + e_{m1}g(a) + e_{m2}x_m(a) \\ &\quad - e_{m3}x_m^2 + \epsilon_m(a)] \end{aligned}$$

- For  $m = 4, 5$ :

$$\begin{aligned} R_4(a) &= e_4(16) - tc_1 \mathbf{1}[g(a) \geq 12] - tc_2 \mathbf{1}[g(a) \geq 16] + \epsilon_4(a) \\ R_5(a) &= e_5(16) + \epsilon_5(a) \end{aligned}$$

- $r_m$ , rental rate of human capital; completed schooling years,  $g(a)$ ; work experience,  $x_m(a)$ ; skill endowment,  $e_m(16)$ ;  $tc_1, tc_2$  college/grad school costs;  $\epsilon_m(a)$  skill technology shock

$$V(\mathbf{S}_a) = \begin{cases} R_m(\mathbf{S}_a) + \delta \mathbb{E} [V((S(a+1)) | d_m(a), \mathbf{S}(a))], & a < A \\ R_m(\mathbf{S}_a), & a = A \end{cases}$$

- ▶ The value of option  $m$  depends on the current state space,  $\mathbf{S}_a$ : endowment at age 16 (occupation and type particular),  $\mathbf{e}(16)$ ; completed schooling years,  $g_a$ , experience in each (labor) occupation,  $\mathbf{x}(a)$ ; skill technology shocks (occupation particular),  $\epsilon(a)$
- ▶ Solution: set of “Emax’s” for  $m = 1, \dots, 5$  and all elements in  $\mathbf{S}_a$

- ▶ Extensions to fit the data adequately:
  - ❶ Skill technology functions:
    - ▶ Occupation particular skill depreciation
    - ▶ First year experience effect
    - ▶ Age effects
    - ▶ High School and College graduation effects
  - ❷ Mobility and search costs:
    - ▶ Direct monetary job-finding cost (when unemployed last period)
    - ▶ Additional monetary job-finding costs when no occupational specific experience
  - ❸ Non-pecuniary rewards for civilian workers (additive parameter)
  - ❹ Consumption value of school attendance (function of age)
  - ❺ Reentry costs to high school and post-secondary school
  - ❻ Remaining-at-home payoff as a function of age
  - ❼ Psychic reward of earning high school/college diploma; psychic cost of leaving the military early

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- ▶ NLSY79: represents the cohort of young (ages 14 to 21) individuals in 1979: 12,686 total observations
- ▶ 6,000 women (nationally representative sample plus over sample of poor white, blacks, and Hispanics)
- ▶ Data on all decisions available in very high frequency
- ▶ Period decision: trade-off between information precision and computational burden
  - ▶ 6 months from 14 to 45
  - ▶ 1 year from 45 to 62
- ▶ Restrict sample to U.S. states with largest sample representations: CA, MI, NY, NC, OH

# Choice Distribution by Age, Females

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**Table 1 KW(2010) goes here.**

# Estimated Monthly Benefits, Females

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**Table 2 KW(2010) goes here.**

- ▶
- ▶ NLSY79: represents the cohort of young (ages 14 to 21) individuals in 1979: 12,686 total observations
- ▶ Focus on core white males who reach 16 years on 1977-1981
- ▶ Period decision: one schooling years
  - ▶ Age span, 16 to 26 years old (follow up to 1988)



# Choice Distribution by Age, Males

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**Table 1 KW(1997) goes here.**

**Table 3 KW(1997) goes here.**

# Average Real Wages, Males

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**Table 4 KW(1997) goes here.**

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