A Good Job or A Rich Spouse?
An Analysis of the Labor and Marriage Markets in the US, 1960-2000

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Outline

- Facts, questions, idea
- Model
- A numerical exercise
- What I plan to do next
Facts

- I compare two Decennial Censuses of the US: 1960 and 2000

- Sample: white males and females, age 25-50, not in group quarters
Facts

- Share of married decreases
- Large flow of women into the labor force
- Small shift of employed men out of the labor force
Facts

Marriage Market:

<table>
<thead>
<tr>
<th></th>
<th>1960</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>86.51</td>
<td>66.62</td>
</tr>
<tr>
<td>Divorced</td>
<td>4.00</td>
<td>14.48</td>
</tr>
<tr>
<td>Singles</td>
<td>13.49</td>
<td>33.38</td>
</tr>
</tbody>
</table>

- Share of married decreases
## Facts

**Labor Market:**

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Employed</td>
<td>93.51</td>
<td>87.79</td>
<td>37.39</td>
<td>73.23</td>
</tr>
<tr>
<td>Unemployed</td>
<td>3.37</td>
<td>2.95</td>
<td>1.84</td>
<td>2.55</td>
</tr>
<tr>
<td>Out of LF</td>
<td>3.12</td>
<td>9.26</td>
<td>60.77</td>
<td>24.23</td>
</tr>
</tbody>
</table>

- Small shift of employed males out of the labor force
- Large flow of females into the labor force
Question

Does the change in labor market opportunities for women between 1960 and 2000 account for the observed change in marriage market outcomes?
Idea

- Both women and men became more choosy in the marriage market.

- Women can wait for “better” partners as their probability of getting a job offers increases.

- Men face a pool of “richer” women.
Very Preliminary Result

If utility is linear, wages are uniformly distributed, and each spouse gets half of the total labor income:

The increase in female marriage reservation value caused by an increase in the arrival rate of jobs for women is offset by a decrease in male marriage reservation value.
Model - Environment

- One-sided search on the labor market
- Matching on the marriage market (non-transferable utility)
- Exogenous separation in both markets

Measure 1 of Males and Females:
  - Single or Married
  - Employed or Unemployed
Time is continuous

Worker $j = f, m$ maximizes expected lifetime utility from consumption:

$$\max E_0 \int_0^\infty e^{-rt} u(c_j(t)) dt$$

$r$ is discount rate

$c(t)$ is the instantaneous consumption flow at time $t$

$u(\cdot)$ is the instantaneous utility function
Model - Environment Cont’d

- No access to financial markets
- No storage

∀ \( j = f, m: \)

\[
c_j = \begin{cases} 
  w_j & \text{single and employed} \\
  b & \text{single and unemployed} \\
  (w_j + w_{-j})h & \text{married and both employed} \\
  (w_j + b)h & \text{married and one empl. and one unempl.}
\end{cases}
\]

where \( h \in (0, 1], \) and \( b \) is unemployment benefit
Model: Labor Market

- $\delta_j$ is firing rate

- $\lambda_j$ is Poisson arrival rate of wage offers from wage distribution $F_j(w_j) \; \forall \; j = f, m$ with support $[0, \infty)$
Model: Marriage Market

- $\eta$ is divorce rate
- $s_j$ is measure of singles $j = f, m$
- $\kappa \in (0, 1)$
- the arrival rate of husbands/wives is:

$$\alpha_j = \kappa \cdot \frac{(s_f^{1/2} \cdot s_m^{1/2})}{s_j}$$
Some Notation

- $s_j$ is measure of singles $j = f, m$
- $se_j$ is measure of single employed $j = f, m$
- $su_j$ is measure of single unemployed $j = f, m$
- $S_j(\cdot)$ is value of being single
- $M_j(\cdot, \cdot)$ is value of being married
Married and Employed Females

Employed Husbands:

\[(r + \delta_f + \delta_m + \eta) M_f(w_f, w_m) = u [(w_f + w_m) h] + \delta_f M_f(b, w_m) + \delta_m M_f(w_f, b) + \eta S_f(w_f)\]
Married and Employed Females - Cont’d

Employed Husbands:

\[(r + \delta_f + \delta_m + \eta) M_f(w_f, w_m) = u [(w_f + w_m) h] + \delta_f M_f(b, w_m) + \delta_m M_f(w_f, b) + \eta S_f (w_f)\]

Unemployed Husbands:

\[(r + \lambda_m + \delta_f + \eta) M_f(w_f, b) = u [(w_f + b) h] + \lambda_m E[M_f(w_f, w_m)] + \delta_f M_f(b, b) + \eta S_f (w_f)\]
Married and Unemployed Females

Employed Husbands:

\[
(r + \lambda_f + \delta_m + \eta) M_f(b, w_m) = u[(b + w_m)h] \\
+ \lambda_f \int_{0}^{\infty} \max [M_f(w_f, w_m), M_f(b, w_m)] dF_f(w_f) \\
+ \delta_m M_f(b, b) + \eta S_f(b)
\]
Married and Unemployed Females - Cont’d

Employed Husbands:

\[(r + \lambda_f + \delta_m + \eta) M_f(b, w_m) = u [(b + w_m)h] + \lambda_f \int_0^\infty \max [M_f(w_f, w_m), M_f(b, w_m)] dF_f (w_f) + \delta_m M_f(b, b) + \eta S_f (b)\]

Unemployed Husbands:

\[(r + \lambda_f + \lambda_m + \eta) M_f(b, b) = u [(b + b)h] + \lambda_f \int_0^\infty \max [M_f(w_f, b), M_f(b, b)] dF_f (w_f) + \lambda_m E[M_f(b, w_m)] + \eta S_f (b)\]
Single and Employed Females

\[
\left( r + \alpha_f \frac{se_m}{s_m} + \alpha_f \frac{su_m}{s_m} + \delta_f \right) S_f(w_f) = u(w_f)
\]

\[
+ \alpha_f \frac{se_m}{s_m} \left\{ \int_{w_m^R}^{\infty} \max [M_f(w_f, w_m), S_f(w_f)] \, dF_m(w_m) \quad \text{if } w_f > w_m^MR \\
S_f(w_f) \quad \text{else} \right.
\]

\[
+ \frac{su_m}{s_m} \alpha_f \left\{ \max [M_f(w_f, b), S_f(w_f)] \quad \text{if } M_m(w_f, b) > S_m(b) \\
S_f(w_f) \quad \text{else} \right.
\]

\[
+ \delta_f S_f(b)
\]
Single and Unemployed Females

\[
\left( r + \alpha_f \frac{se_m}{s_m} + \alpha_f \frac{su_m}{s_m} + \lambda_f \right) S_f(b) = u(b)
\]

\[
S_f(b) = \begin{cases} 
\int_{w^R_m}^\infty \max [M_f(b, w_m), S_f(b)] \, dF_m(w_m) & \text{if } b > w^R_m \\
S_f(b) & \text{else}
\end{cases}
\]

\[
\begin{cases} 
\max [M_f(b, b), S_f(b)] & \text{if } M_m(b, b) > S_m(b) \\
S_f(b) & \text{else}
\end{cases}
\]

\[
\begin{cases} 
\lambda_f \int_0^\infty \max [S_f(w_f), S_f(b)] \, dF_f(w_f)
\end{cases}
\]
Equilibrium

An equilibrium is a set of:

- reservation wages $w^R_j(b, w_j), \forall j = f, m$

- marriage reservation values $w^{MR}_j(w_j, w_\neg j), \forall j = f, m$

- share of singles $s_j, \forall j = f, m$

- share of married $m_j, \forall j = f, m$

such that:

- cut-off rules are satisfied, and share of singles and married are such that:
\begin{itemize}
  \item $s_j = se_j + su_j, \ \forall \ j = f, m$
  \item $s_f = s_m$
  \item $m_j = me_j^e + mu_j^e + me_j^u + mu_j^u, \ \forall \ j = f, m$
  \item $m_f = m_m$
  \item $s_j + m_j = 1, \ \forall \ j = f, m$
\end{itemize}
Equilibrium - Cont’d

\[ m u_j^{u'} = m u_j^u \left[ 1 - \lambda_j Pr[w_j > w_j^R] - \lambda_{-j} Pr[w_{-j} > w_{-j}^R] - \eta \right] \]

\[ + \delta_j m e_j^u + \delta_{-j} m u_j^e + \alpha_j \frac{s u_{-j}}{s_{-j}} s u_j \]

\[ m e_j^{u'} = m e_j^u \left[ 1 - \delta_j - \eta - \lambda_{-j} Pr[w_{-j} > w_{-j}^R] \right] \]

\[ + \delta_j m e_j^e + m u_j^u \lambda_j f_j(w_j) + \alpha_j \frac{s u_{-j}}{s_{-j}} s e_j \]
\( me_j' = me_j [1 - \delta_j - \delta_j - \eta] \)
\[ + me_j^u \lambda_j f_j (w_j) + mu_j^e \lambda_j f_j (w_j) + \alpha_j \frac{se_j}{s_j} \]

\( mu_j' = mu_j [1 - \delta_j - \eta - \lambda_j Pr[w_j > w_j^R]] \)
\[ + \delta_j me_j + mu_j^u \lambda_j f_j (w_j) + \alpha_j \frac{se_j}{s_j} su_j \]
Equilibrium - Cont’d

\[ se_j' = se_j \left[ 1 - \alpha_j \frac{su_j}{s_j} - \alpha_j \frac{se_j}{s_j} - \delta_j \right] \]

\[ + su_j \lambda_j f_j (w_j) + (me_j^u + me_j^e) \eta \]

\[ su_j' = 1 - se_j' - me_j^u' - me_j^e' - mu_j^u' - mu_j^e' \]
Numerical Exercise - Parameters

- linear utility
- $w_j \sim U[0, 1] \ \forall \ j = f, m$
- $r = 0.004$
- $h = 0.5$
- $\lambda_f = \{0.05, 0.08\}$
- $\lambda_m = 0.10$
- $\delta = 0.02$
- $b = 0.20$
- $\eta = 0.002$
Female Marriage Reservation Value

![Graph showing the relationship between wage and female marriage reservation value. The x-axis represents wage, ranging from 0 to 1, and the y-axis represents female marriage reservation value, ranging from 0 to 1. The graph shows a linear increase in reservation value as wage increases.]
Female Marriage Reservation Value - Change $\lambda_f$

The graph illustrates the relationship between wage and female marriage reservation value for two different values of $\lambda_f$: $\lambda_f = 0.05$ and $\lambda_f = 0.08$. The values are plotted on the y-axis, and the wage is on the x-axis. The graph shows that as the wage increases, the female marriage reservation value increases for both values of $\lambda_f$. The line for $\lambda_f = 0.08$ is steeper, indicating a greater increase in reservation value for the same increase in wage compared to $\lambda_f = 0.05$.
Male Marriage Reservation Value - Change $\lambda_f$
Comparative Statics

Marriage Market:

<table>
<thead>
<tr>
<th></th>
<th>$\lambda_f = 0.05$</th>
<th>$\lambda_f = 0.08$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Singles</td>
<td>99</td>
<td>99</td>
</tr>
</tbody>
</table>
Comparative Statics - Cont’d

**Labor Market:**

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<tr>
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<th>$\lambda_f = 0.08$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed</td>
<td>67</td>
<td>67</td>
<td>56</td>
<td>64</td>
</tr>
<tr>
<td>Not Employed</td>
<td>33</td>
<td>33</td>
<td>44</td>
<td>36</td>
</tr>
</tbody>
</table>
Conclusions - Next

- Cannot get men marriage reservation value to increase;
- Nash bargaining: the increase in $\lambda_f$ changes the incentives of getting married of both men and women