Preferences & Beliefs in the Marriage Market for Young Brides

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ASSA
January 2020
Motivation

- **Early marriage** and **school dropout** common amongst young women
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- In rural Rajasthan, India:
  - 1 in 3 married by 18,
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• We aim to characterise the drivers of parental decisions underlying these patterns:

  1 What are parents’ preferences over age of marriage, education and match quality?

  2 What are parents’ subjective beliefs about the marriage market returns to youth and education of daughters?
Our Approach

- Challenging to infer much about either preferences or beliefs from observational data
  - identification problem, unobserved choice sets, social desirability bias
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- We take an experimental approach (~4600 caregivers):
  - Take a finite horizon, dynamic discrete choice model
  - Design two types of hypothetical choice experiments that when analysed in the structure of the model identify both preferences and beliefs
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  - Take a finite horizon, dynamic discrete choice model
  - Design two types of hypothetical choice experiments that when analysed in the structure of the model identify both preferences and beliefs

- Hypothetical framing/vignettes:
  - Limits social desirability bias
  - Limits the role of unobserved characteristics
  - Focus is on population averages (but allow for random preference heterogeneity).
Our Approach

- Identification from comparing choices in experiments with and without uncertainty over future marriage offers:
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  - “Ex Post”: Choice under certainty identifies preferences over daughters’ education, age of marriage and marriage match
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- Label our methodology as a “revealed belief” approach
- A random 50% of respondents do each type of experiment. Not a within design.
Contributions + Findings: Substantive

- Conditional on a marriage market match, weak preference for education
Contributions + Findings: Substantive

• Conditional on a marriage market match, weak preference for education

• However, parents believe in a substantial marriage market return to education
  • They believe that an 18 year old girl currently in College has a 60% chance of a marriage offer from a high quality groom compared to a negligible chance if she only has primary school level education
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- Parents prefer to delay their daughter’s marriage until age 18, but have no preference for delaying further
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- Patterns qualitatively consistent with elicited groom-side preferences, stated expectations and rates of assortative matching in survey data
• Existing methods of measuring expectations often focus on directly eliciting probabilities or ranges

• Two problems in our case:
  - Groom quality is multidimensional
  - Respondents have very low numeracy

• Our method is based on stated preference between relatable choices, does not require elicitation of probabilities and works with multi-dimensional uncertainty.

• Fun and easy to use across large samples
Preferences
Parents: Sachin + Priya  
Girl: Geeta 

1)

- Education: None, 1st, 5th, 7th, 8th, 9th, 10th, 11th, 12th, College
- Age: 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23

Husband:

- Education: None, 1st, 5th, 7th, 8th, 9th, 10th, 11th, 12th, College
- Age: 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23

2)

- Education: None, 1st, 5th, 7th, 8th, 9th, 10th, 11th, 12th, College

Likes school: Yes, Doesn't like school: No

School free: Yes, Payment required: No

Not much housework: Yes, Lots of housework: No
• Three stages (school, home and marriage) $\Rightarrow$ Three components of utility
Model

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  - Flow payoffs vary with school status, exogenous circumstances of the family and unobservable heterogeneity
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• Before a girl is married:
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• Once a girl is married:
  • ‘Terminal’ payoff in the last period captures preferences over age of marriage, education and match quality
Model

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- Before a girl is married:
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- Once a girl is married:
  - ‘Terminal’ payoff in the last period captures preferences over age of marriage, education and match quality

- Future payoffs discounted with discount factor $\beta = 0.95$
Preferences over realised paths represented by the discounted sum of flow and terminal payoffs.

For respondent $i$ in experiment $j$, the utility from option $k$ is:

$$U(X_{ijk}, Z_{ij}, \omega_i) = \sum_{t: d_{ijkt}=S} \beta^t u^S(Z^S_{ij}, \omega_i) + \sum_{t: d_{ijkt}=H} \beta^t u^H(Z^H_{ij}, \omega_i) + \beta^T u^M(X_{ijk})$$

- $X = [A, E, Q]$: age (A), education (E) and groom quality (Q)
- $Z$: parent specific shifters of flow payoffs
- $\omega$: parent specific preference heterogeneity
Respondent $i$ chooses option $k$ over $k'$ in experiment $j$ iff:

$$U(X_{ijk}, Z_{ij}, \omega_i) + \nu_{ijk} \geq U(X_{ijk'}, Z_{ij}, \omega_i) + \nu_{ijk'}$$
Identification

- Respondent $i$ chooses option $k$ over $k'$ in experiment $j$ iff:
  
  $$U(X_{ijk}, Z_{ij}, \omega_i) + \nu_{ijk} \geq U(X_{ijk'}, Z_{ij}, \omega_i) + \nu_{ijk'}$$

- Unobservables:
  
  - $\nu_{ijk}$ i.i.d. normal (scale normalised) over $i, j, k$: $\nu_{ijk} \sim N(0, 1)$
  - $\omega_i$ i.i.d. joint normal over $i$, constant over $j, k$
$U(X_{ijk}, Z_{ij}, \omega_i) = \sum_{t:d_{ijkl}=S} \beta^t u_{ij}^S + \sum_{t:d_{ijkl}=H} \beta^t u_{ij}^H + \beta^T u_{ijk}^M$
Preference Results: Education

\[ U(X_{ijk}, Z_{ij}, \omega_i) = \sum_{t:d_{ijkt}=S} \beta^t u_{ij}^S + \sum_{t:d_{ijkt}=H} \beta^t u_{ij}^H + \beta^T u_{ijk}^M \]
Preference Results: Match Quality

\[ U(X_{ijk}, Z_{ij}, \omega_i) = \sum_{t:d_{ijkt}=S} \beta^t u_{ij}^S + \sum_{t:d_{ijkt}=H} \beta^t u_{ij}^H + \beta^T u_{ijk}^M \]
Beliefs
Parents: Rohan + Maya   Girl: Priya

<table>
<thead>
<tr>
<th>Very poor</th>
<th>Quite poor</th>
<th>Average</th>
<th>Quite wealthy</th>
<th>Very wealthy</th>
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1) Marriage prospect: 

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</tbody>
</table>

2) Keep daughter in education next year

3) Take daughter out of school to help at home

Likes school | Doesn’t like school | School free | Payment required
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Not much housework | Lots of housework | Well behaved and polite | Is friends with a few boys
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<td><img src="image12.png" alt="Image" /></td>
<td><img src="image13.png" alt="Image" /></td>
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</tbody>
</table>
Reduced Form Results: Age & Education

Proportion Choosing to Marry

Daughter's Age

Grade 7  Grade 8  Grade 9
Grade 10  Grade 11  Grade 12
College  Currently in School  Out of School
Parents make their decision, \( d_t \), to maximise discounted EU.

Expected future utility conditional on choosing optimally now and in the future is given by:

\[
v_i(E, A, q, Z) = \max_{d_t \in O_t(E_t)} W_i(d_t, E, A, q, Z)
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where \( W_i(\cdot) \) is the presented discounted value of choosing \( d_t \) and then choosing optimally from period \( t + 1 \) onwards.
Model

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$$W_i^M \equiv u^M(E, A, q)$$

$$W_i^S \equiv \theta_i - C + \beta \sum_{q \in \{H, L\}} \pi(E + 1, A + 1, q)v_i(E + 1, A + 1, q, Z)$$
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$$W_i^H \equiv \theta_i + B + \beta \sum \pi(E, A + 1, q) v_i(E, A + 1, q, Z)$$
Subjective Beliefs

- We impose a set of functional forms on beliefs for estimation:

  \[ \pi(A, E, q = H) = \Phi(M_{\tau}) \]

  where

  \[ M_{\tau} = \tau_0 + \tau_a Age + \tau_e Ed + \tau_c Coll + \tau_i ln + \tau_{ia} ln \times Age + \tau_g Good \]

- Estimate \( \tau \) by Method of Simulated Moments, matching:
  - marriage probability of accepting marriage offer within age-education-government job cells
  - probability of keeping daughters in education

- ...taking the distribution of \( \omega \) and \( u(\cdot) \) as given
Subjective Belief: Prob High Quality Groom

![Graph showing the probability of high quality groom over daughter age for different grades and college.]

- 7th Grade
- 8th Grade
- 9th Grade
- 10th Grade
- 11th Grade
- 12th Grade
- College
- Friends with Boys

Alison Andrew

September 2019

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Validation

• To validate our revealed belief measures, we conduct two additional experiments
  • Elicitation of groom side preferences
  • Direct elicitation of expected match characteristics
### Marriage prospect 1:

<table>
<thead>
<tr>
<th>Age</th>
<th>12</th>
<th>13</th>
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### Economic Status

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<th>Status</th>
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<th>Quite poor</th>
<th>Average</th>
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### Social Behavior

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<th>Well behaved and polite</th>
<th>Is friends with a few boys</th>
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Validation: Groom’s side preferences
If _______ got married this year she probably marry someone like this...

Parents: ____________________ Girl: ____________________

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None | 1st | 5th | 7th | 8th | 9th | 10th | 11th | 12th | College |

Government Job | No Government Job

Well behaved and polite | Is friends with a few boys

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Validation: ‘Expected match’
Conclusions

- Estimate preferences and beliefs over age of marriage, education and match quality in a context with conservative gender norms and high rates of both early marriage and school dropout.

- Novel approach to separately identify preferences and subjective beliefs.

- Based on relatable choices, does not require elicitation of probabilities and works with multi-dimensional uncertainty.
Conclusions

• Absenting marriage market returns parents prefer...
  • to delay marriage until 18, not further
  • (weakly) to keep a daughter in school until end of high school, no further

• However, parents believe...
  • education increases marriage market prospects
  • but prospects deteriorate quickly with age on leaving education

• Schooling is hugely protective factor against early marriage
**Table: Sample descriptives of female caregivers**

<table>
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<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
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<tr>
<td>Age in years</td>
<td>41.92</td>
<td>8.365</td>
<td>4464</td>
</tr>
<tr>
<td>Own age at marriage in years*</td>
<td>15.57</td>
<td>3.361</td>
<td>4423</td>
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<tr>
<td>Years of school*</td>
<td>1.492</td>
<td>3.267</td>
<td>4605</td>
</tr>
<tr>
<td>Can read complete sentence (in Hindi)*</td>
<td>0.104</td>
<td>0.305</td>
<td>4353</td>
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<tr>
<td>Number of sons*</td>
<td>2.118</td>
<td>1.112</td>
<td>4343</td>
</tr>
<tr>
<td>Number of daughters*</td>
<td>2.447</td>
<td>1.320</td>
<td>4343</td>
</tr>
<tr>
<td>Owns asset that can dispose of at will</td>
<td>0.132</td>
<td>0.339</td>
<td>4604</td>
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<tr>
<td>Can go to market unaccompanied*</td>
<td>0.611</td>
<td>0.488</td>
<td>4463</td>
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<tr>
<td>At least some say over when child gets married</td>
<td>0.963</td>
<td>0.190</td>
<td>4536</td>
</tr>
<tr>
<td>At least some say over to whom child gets married</td>
<td>0.952</td>
<td>0.213</td>
<td>4532</td>
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<tr>
<td>At least some say over when child leaves school</td>
<td>0.942</td>
<td>0.235</td>
<td>4534</td>
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<tr>
<td>Has done any work (inc. on family farm) in last year</td>
<td>0.595</td>
<td>0.491</td>
<td>4604</td>
</tr>
<tr>
<td>Has worked for cash in last year</td>
<td>0.344</td>
<td>0.475</td>
<td>4604</td>
</tr>
<tr>
<td>Has child (male or female) who is married</td>
<td>0.364</td>
<td>0.481</td>
<td>4576</td>
</tr>
<tr>
<td>House has dirt floor*</td>
<td>0.507</td>
<td>0.500</td>
<td>4603</td>
</tr>
<tr>
<td>Scheduled caste or scheduled tribe*</td>
<td>0.352</td>
<td>0.478</td>
<td>4581</td>
</tr>
<tr>
<td>Other Backward Caste or Economically Backward Class*</td>
<td>0.451</td>
<td>0.498</td>
<td>4581</td>
</tr>
<tr>
<td>Hindu*</td>
<td>0.968</td>
<td>0.177</td>
<td>4602</td>
</tr>
</tbody>
</table>