Gender, Parental Investments, and the Intra-Household Allocation of Resources

Summer School on Socioeconomic Inequality

Jinan University

June 26, 2016

Loren Brandt

Department of Economics

University of Toronto

Motivation

- Parental investment in children common to all societies

- These investments can take a variety of forms
  - Health
  - Education
  - *Inter-vivos* (lifetime) transfers

- And have important implications for:
  - Income trajectories of children
  - Inter-generational class mobility
  - Inequality

- Often have a gender dimension
  - Sen's "Missing Girls"
  - Differences in educational attainment and literacy
  - Labor market outcomes

- Decisions tied to how households behave, and the motivations of parents
  - Altruisms
  - Old-age security
  - Dynastic considerations

- Potentially important role of inherited social norms, and lower social valuation of women; biases against women reflected in inheritances, land access, credit

- Economically, the big issue is: what are the mechanisms that are underlying these patterns and biases?

- An important dimension to this is what goes on within the household, and the way that households make resource allocation decisions among its members

- Implications for policy making: If the bias is a product of norms, as a policymaker, might be pessimistic about one's ability to influence; policy interventions may have a limited impact; there may be opportunities to influence however through affecting intra-household resource allocation

Plan for Today

- Short review of alternative models of the household

- Examine a number of recent empirical papers that look at these decisions in the context of China and other developing countries; focus on empirics

- These papers highlight the important role of family/household in the context of decisions with respect to:

  - Investment in children
  - Gender differences
  - Compensation for unequal investments in schooling, or earlier decisions by parents

- Review for each paper:
  - Motivating Question
  - Role of theory
  - Empirical Model and identification
  - Data
  - Key findings
  - Issues

Unitary Model of the Household

- Consider two-person household with preferences over X and Y

- $U(X_1, X_2, Y_1, Y_2)$ captures aggregated household preferences; household viewed as a "monolithic" entity

- Aggregation of preferences?
  - Consensus
  - Dictator

- Household Problem: Max $U(X_1, X_2, Y_1, Y_2)$ subject to $M = P_X X + P_Y Y$, where $X_1 + X_2 = X$, $Y_1 + Y_2 = Y$

- Solving for FOC:
  - $X^* = f(P_X, P_Y, M)$
  - $Y^* = f(P_X, P_Y, M)$

- Implied division of X and Y between household members:
  - $X_1^* = S_X X^*$
  - $Y_1^* = S_Y Y^*$

  where $S_j = h_j(P_X, P_Y, M, \text{preferences})$

Unitary Model of the Household: Key Implications

- Household resources are pooled, and distribution of income within the household (i.e. who earns what) is irrelevant to consumption decisions

- Sometimes referred to as 'distributional neutrality', so only total income, M, matters in determining X and Y

- Key prediction: Changes in the composition of incomes within the household do not affect spending patterns

- Can continue to get unequal outcomes
  - Reflection of preferences in the household
  - Differences in the marginal returns (productivity), which lead households to allocate more resources to more productive individuals
  - In this case, discrimination as "optimal"

Collective Model

- Recognizes individualistic elements within the household; the household is a group of individuals who bargain with each other over resources

- Critical assumption is that intra-household allocation of resources is Pareto efficient:
  - On the production side, households allocate resources across activities in order to equate returns on the margins
  - Each household member is maximizing their individual utility subject to their expenditure on goods and services

- Utility for each individual is defined to depend only on own consumption: $U_1(X_1, Y_1)$ and $U_2(X_2, Y_2)$

- Household: max $\mu U_1(X_1, Y_1) + (1 - \mu)U_2(X_2, Y_2)$ where, $\mu \in [0,1]$ reflects the bargaining power of individuals within the household; i.e. $\mu(P_X, P_Y, M, Z)$, and Z reflects the distribution of income or assets within the household

- Two conditions under which the collective model collapses to the unitary model:
  1. Preferences U_1 and U_2 are identical
  2. $\mu = 1$ (dictator)

Empirical Issues Relating to these Models

- Early tests of unitary versus collective looked at the influence of assets controlled by husband or wife; under the unitary model, this should not matter

- Concern of omitted variable bias -- assets or incomes under husband or wife may be correlated with unobserved variables influence expenditure decisions

- In marriage market, there may also be positive assortative matching, i.e. people with similar attributes marry each other
  - Case of husband who is a dictator under positive assortative matching
  - Women with more assets at marriage will select husband with preferences nearer to her own
  - Wife's assets correlated with expenditure decisions: Non-unitary model or preferences?

- Ideal experiment: Random transfer to male or female within households, e.g. Progressa

- Lundberg and Wales (1997): Uses difference-in-difference to see how expenditures on women's and men's clothing changed for families with and without children before and after the reform

Paper 1: Duflo (2003)

Context and Setting:

- Implementation of pension reform in South Africa in 1993 that tied benefits to incomes and age

- Transfers represented "permanent" change in non-labor income after household formation

Objective:

- Impact on child nutritional status, e.g. height for age and weight for height

- Does household operates as unitary entity?

- How does efficiency of public transfer programs depend on the gender of recipient?

Empirics and Identification Issues:

- Children living in household with pension recipients from disadvantaged household → omitted variable bias

- Child height is a stock, reflects accumulated decisions

- Household formation is endogenous

Weight for height regressions:

$$w_{ijk} = \pi_f\ E_f + \pi_m E_m + W_{ijk}\lambda + X_{ijk}\delta + \omega_{ijk}$$

where:

i = individual, j = household and k = cohort

E = 1 if eligible male/female in the household

W_{ijk} is a vector of variables capturing number of males and females 50+ in hh

X_{ijk} is a vector of family background variables

Note: hh composition variables included to control for hh background; otherwise confound effect of E on differences in hh background

Potential Issues

- Controlling for unobserved differences between eligible and ineligible households
- HH formation endogenous, and possibly affected by pension program $\rightarrow$ correlation between HH unobservables and the presence of an eligible members

TABLE 3. Effect of the Old-Age Pension Program on Weight for Height: OLS and 2SLS Regressions

	OLS						2SLS
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Girls							
Eligible household	0.14	0.35*	0.34*				
	(0.12)	(0.17)	(0.17)				
Woman eligible[a]				0.24*	0.61*	0.61*	1.19*
				(0.12)	(0.19)	(0.19)	(0.41)
Man eligible[b]				−0.011	0.11	0.056	−0.097
				(0.22)	(0.28)	(0.19)	(0.74)
Observations	1574	1574	1533	1574	1574	1533	1533
Boys							
Eligible household	0.0012	0.022	0.030				
	(0.13)	(0.22)	(0.24)				
Woman eligible[a]				0.066	0.28	0.31	0.58
				(0.14)	(0.28)	(0.28)	(0.53)
Man eligible[b]				−0.059	−0.25	−0.25	−0.69
				(0.22)	(0.34)	(0.35)	(0.91)
Observations	1670	1670	1627	1670	1670	1627	1627
Control variables							
Presence of older members[c]	No	Yes	Yes	No	Yes	Yes	Yes
Family background variables[d]	No	No	Yes	No	No	Yes	Yes
Child age dummy variables[e]	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Significant at the 5 percent level.

Note: The instruments in column 7 are woman eligible and man eligible (the first stage is in table A-1). Standard errors (robust to correlation of residuals within households and heteroscedasticity) are in parentheses.

[a]In column 7 this variable is replaced by a dummy for whether a woman receives the pension.

[b]In column 7 this variable is replaced by a dummy for whether a man receives the pension.

[c]Presence of a woman over age 50, a man over age 50, a woman over age 56, a man over age 56, and a man over age 61.

[d]Father's age and education; mother's age and education; rural or metropolitan residence (urban is the omitted category); size of household; and number of members ages 0–5, 6–14, 15–24, and 25–49.

[e]Dummy variables for whether the child was born in 1991, 1990, or 1989.

Table 3: Key observations

- Eligible HH indicator (male or female) positively correlated with weight for height

- Including separate eligibility measures; it is female eligibility that matters; moreover, effect only on girls

- Eligibility does not mean receiving a pension; eligible males may collect less often; solution: use dummy for receiving, and instrument with dummy for eligible male or female in household

- Differentiate between maternal and paternal grandparents; it is the maternal grandmother (mother's mother) that matters (See Table 4)

Height for Age Regressions

- Child's height influenced by genetic factors, but also investments over the life of the child; two key factors: nutrition and being free from infection (access to medical care)

- Consider a hh w/ two children, one born at the time of the pension reform or after; and an older child that is born well before;

- If pension program affected child nutrition, we expect that younger children to be better nourished over a larger fraction of their lives; therefore, the younger the child, the smaller their relative disadvantage in eligible families;

- Diff-in-diff identification strategy rests on comparing:

$$(w^{YE} - w^{OE}) - (w^{YI} - w^{OI})$$

- Want to compare outcomes before and after a policy change for a group affected (Treatment Group) to a group not affected (Control Group)

$$DD = [E(Y_1|T) - E(Y_0|T)] - [E(Y_1|C) - E(Y_0|C)]$$

- Helps to get rid of unobserved family background variables potentially influencing child investment

- Done by interacting eligibility status w/ the age of the child (Young*E); See equation (3) in the paper

- Re-estimate model with this modification, and find very similar results (See Table 5)

TABLE 5. OLS and 2SLS Regressions of the Effect of Pension Eligibility, Presence of an Old Grandparent, and Pension Receipt

	Treatment variable			
	Eligibility OLS (1)	Eligibility OLS (2)	Old grandparent OLS (3)	Receives pension 2SLS (4)
Girls				
Eligible household × *YOUNG*	0.68* (0.37)			
Woman treatment variable × *YOUNG*		0.71* (0.34)	0.40 (0.27)	1.16* (0.56)
Man treatment variable × *YOUNG*		0.097 (0.57)	−0.12 (0.35)	−0.071 (0.95)
Eligible household	−0.17 (0.16)			
Woman pension variable		−0.15 (0.17)	−0.039 (0.13)	−0.15 (0.17)
Man pension variable		−0.11 (0.24)	0.027 (0.15)	−0.11 (0.24)
Observations	1533	1533	1533	1533
Boys				
Eligible household × *YOUNG*	0.11 (0.31)			
Woman pension variable × *YOUNG*		0.18 (0.32)	0.026 (0.27)	0.28 (0.47)
Man pension variable × *YOUNG*		−0.30 (0.32)	0.18 (0.30)	−0.47 (0.71)
Eligible household	−0.15 (0.15)			
Woman pension variable		−0.14 (0.32)	−0.084 (0.69)	−0.15 (0.17)
Man pension variable		−0.073 (0.21)	−0.011 (0.14)	−0.057 (0.21)
Observations	1627	1627	1627	1627
Control variables				
Age dummy variables[a]	Yes	Yes	Yes	Yes
Family background variables[b]	Yes	Yes	Yes	Yes
Family background variables × age dummy variables	Yes	Yes	Yes	Yes

*Significant at the 10 percent level.

Note: Standard errors (robust to correlation of residuals within households and heteroscedasticity) are in parentheses.

[a]Dummy variables for whether the child was born in 1991, 1990, or 1989.

[b]Father's age and education; mother's age and education; rural or metropolitan residence; size of household; and number of members ages 0–5, 6–14, 15–24, 25–49, and over 50.

Final Issues: Household Endogeneity

- Family composition may have changed b/c of the pension program, which could invalidate identification strategy; for example, families in which grandparents or grandparents come to live with them may have differences in preferences that affect investment decisions towards kids

- Remedy: use as an instrument a variable that is correlated w/ the presence of an eligible member, but not affected by the household living arrangement decision; that is, does the child have at least one grandparent who is alive and eligible (by age), or likely to be eligible;

- This can be used to instrument for receipt of pension, and see how the results compare when using eligibility as the instrument

- Results fairly similar, with the effect associated w/ grandparent on maternal side, though standard errors (and level of significance) slightly larger (smaller)

Paper 2: **Jayachandran and Kuziemko (2012)**

Context and Setting:

- In many developing countries, prominent son preference; variety of reasons, most important of which is that sons typically have responsibility for parents as they grow older

- Son preferences often linked to differences in outcomes between boys and girls

- One dimension to this is differences infant mortality; infant girls more likely to die before age of 1 or 2; typical explanation: lower expenditure on health

- Possible channel is through fertility behavior

    - If parents do not have a son (or the desired number of sons), it can lead to pre and post-natal abortion
    - In cultures in which there is not abortion, it can lead parents to "try again" as soon as possible

- Potential implications for infant welfare through its effect on the duration of breastfeeding. Two important links:

1. Breastfeeding reduces post-natal fertility and so a mother that wants to become pregnant again will be more likely to discontinue breastfeeding;

2. Demands of pregnancy itself will do the same

Objective

- Analyze gender dimensions of decision to breast feed

- Examine health implications of access to breastfeeding for children

    - When hh do not have access to clean water (and food), a reduction in the duration of breastfeeding could increase the exposure of infant children to illness and disease;
    - Human milk also has immunological advantages

Key Contribution

- Identification of a new channel through which gender differences may arise; "passive" channel

- In India, huge differences between boys and girls in infant mortality; nearly 40% higher for girls;

Key predictions of Model (See Appendix):

PROPOSITION 1. Breastfeeding is increasing in birth order.

Follows from the fact that a mother's desired future fertility declines as she has more children.

PROPOSITION 2. At any birth order, a child is more likely to be breastfed if, all else equal, (i) the child is male; or (ii) more of his or her older siblings are male

PROPOSITION 3: The largest gap in breastfeeding of boys versus girls is at middle birth order. In other words, the gap is increasing with birth order for sufficiently low birth order, and decreasing in birth order for sufficiently high birth order.

At low birth order, mothers want to have more children regardless of the sex composition; at high birth order, the benefit of having one more son is outweighed by the costs of having more children

PROPOSITION 4: i. Breastfeeding is constant for birth order below the ideal family size and can strictly increase in birth order only after the ideal family size has been reached; ii. There is no gender gap in breastfeeding for birth order below the ideal family size. The gender gap in breastfeeding only arises after the ideal family size has been reached.

Key Data: 1992, 1998, and 2005 waves of the National Fertility and Health Survey (NFHS) of India

TABLE I
SUMMARY STATISTICS

	Birth Order ≤ 2	Birth Order > 2	Sons	Daughters
Months of breastfeeding	14.24	15.54	14.99	14.56
	[8.739]	[9.287]	[9.093]	[8.880]
Birth order	1.469	4.109	2.579	2.550
	[0.499]	[1.220]	[1.571]	[1.563]
Ideal no. of children	2.404	3.164	2.687	2.739
	[0.861]	[1.195]	[1.067]	[1.085]
Birth order minus ideal no. children	−0.915	0.882	−0.156	−0.226
	[0.894]	[1.354]	[1.402]	[1.422]
Male	0.513	0.522	1	0
	[0.500]	[0.500]	[0]	[0]
Mother has at least one son	0.631	0.915	1	0.481
	[0.483]	[0.279]	[0]	[0.500]
Child has no younger sibling	0.769	0.833	0.811	0.779
	[0.422]	[0.373]	[0.391]	[0.415]
Total number of vaccinations	3.972	3.090	3.689	3.520
	[2.345]	[2.457]	[2.412]	[2.449]
Age of child	1.950	1.920	1.939	1.936
	[1.262]	[1.252]	[1.255]	[1.261]
Age of mother	23.72	28.64	25.81	25.71
	[4.228]	[4.816]	[5.097]	[5.096]
Rural	0.637	0.743	0.677	0.684
	[0.481]	[0.437]	[0.467]	[0.465]
Mother's years of schooling	5.597	2.429	4.333	4.227
	[5.144]	[3.767]	[4.904]	[4.852]
Observations	64,439	45,744	56,896	53,287

Notes:

1. Censoring of children still being breastfeed; adj using hazard estimates, average ~ 23 months
2. Total fertility conditional on having at least one child is ~ 4

Link between Birth Order and Breast Feeding

$$Breastfeed_i = \Sigma\beta_k * 1(BirthOrder_i = k) + X_i\gamma + \alpha_i + \varepsilon_i$$

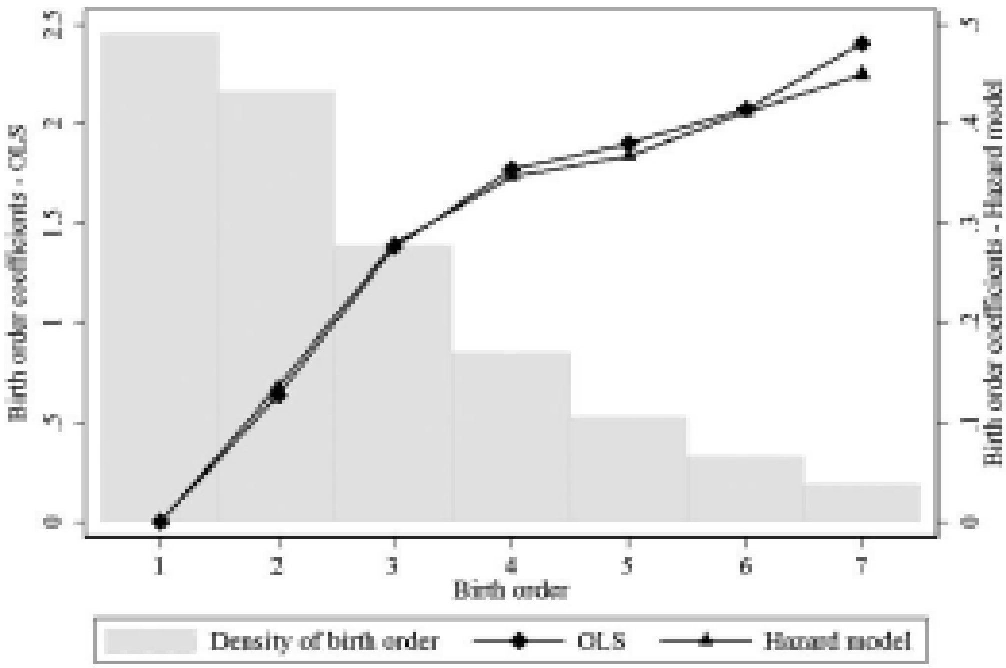


FIGURE I
Breastfeeding Duration, by Birth Order

Note: Plots coefficients from birth dummies from regression.
Coefficient normalized to zero for child of birth order 1

Breastfeeding as a function of gender

TABLE III

EFFECT OF GENDER AND SIBLING SEX COMPOSITION ON BREASTFEEDING DURATION

	OLS		Hazard	OLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Male	0.368***	0.389***	−0.103***	0.244***	0.262***	0.458***
	[0.0334]	[0.0373]	[0.00967]	[0.0486]	[0.0546]	[0.0675]
Mother has at least one son				0.280***		
				[0.0623]		
Male share of mother's children					0.231***	
					[0.0751]	
Male x 1st survey wave						−0.144
						[0.0695]
Male x 2nd survey wave						−0.0654
						[0.0929]
Covariates	No	Yes	Yes	Yes	Yes	Yes
Observations	110183	110183	109616	110183	110183	110183
R-squared	0.497	0.527		0.527	0.527	0.527

Notes. The unit of observation is the child and we cluster standard errors (in brackets) by mother to account for mothers who have more than one child in the sample. The specifications in columns (2)–(6) include linear and quadratic controls for mother's age and child's year of birth and a linear control for mother's years of education, as well as dummy variables corresponding to the year of the survey wave, the state of residence, and the child's birth order. The breastfeeding duration variable ranges from 0 to 36 so we include child-age-in-months dummy variables up to 36 months in all OLS regressions to account for the fact that some children are still being breastfed at the time of the survey (see text for fuller explanation). The hazard estimation automatically accounts for such right-censoring. Note that the hazard regressions estimate the probability of being weaned at time t conditional on still being breastfed at time $t-1$ and thus coefficient estimates should have the opposite sign of those of the OLS regressions. The reason the number of observations is not constant across specifications is that the hazard estimations drop observations that immediately exit (i.e., duration of breastfeeding = 0). $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

- Sons receive ~ 0.4 additional months of breastfeeding; hazard is negative, implying 10% less likely to be weaned in any given month

- Mother's already having a son increase current breastfeeding by .28 months → gender composition matters

Allowing for Birth-order and Gender Interactions

$Breastfeed_i = \ = \alpha Male + \Sigma\beta_k * 1(BirthOrder_i = k)$
$+ \Sigma\delta_k Male * 1(BirthOrder_i = k) + X_i \gamma + \ \alpha_i \ + \varepsilon_i$

- Model predicts gender differences lowest for both high and lower order births
- Inverted U

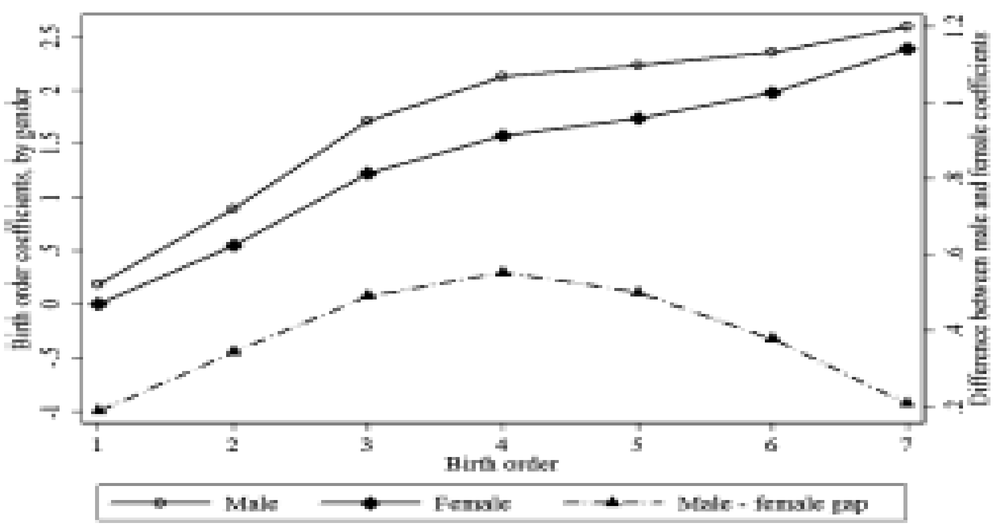


FIGURE IV
Gender Differences in Breastfeeding Duration, by Birth Order

Links between Breastfeeding with Child Mortality?

TABLE VII
CHILD MORTALITY BETWEEN 12 AND 36 MONTHS

	Household Lacks Piped Water			Household Has Piped Water		
	(1)	(2)	(3)	(4)	(5)	(6)
Male	−0.00851***	0.00369	−0.00522*	−0.00388***	0.000131	−0.00828*
	[0.000866]	[0.00291]	[0.00285]	[0.00103]	[0.00376]	[0.00437]
Male × birth order		−0.00619***			−0.00272	
		[0.00220]			[0.00316]	
Male × birth order^2		0.000476			0.000313	
		[0.000331]			[0.000529]	
Male × ($\Delta Ideal \geq 0$)			−0.00485			0.00581
			[0.00324]			[0.00462]
Covariates	Yes	Yes	Yes	Yes	Yes	Yes
$\hat{\beta}_{\text{unpiped}} - \hat{\beta}_{\text{piped}}$, coeff(s) of interest	−0.00465	−0.00350	−0.0106			
		0.000168				
F-test of above coeff difference(s) (p-value)	0.000560	0.0497	0.0600			
Observations	125857	125857	116957	35164	35164	33850
R-squared	0.00965	0.00992	0.00912	0.00749	0.00754	0.00782

- Sons ~ 1% less likely to die, consistent with breastfeeding advantage
- Inverted U-shape
- For localities with piped water, basically not much of an effect
- Breastfeeding gender gap explains ~ 15% of excess female mortality

Paper 3: Udry 1996

Context and Setting:

- The collective model *assumes* that allocation of resources within the household is Pareto efficient, but in the context of non-cooperative games this may not hold. Key assumption untested.

- Important feature of much of African agriculture is that some plots in a household are farmed by men and others by women

- Standard separation result of household models: production decisions are independent of preferences

- If Pareto efficiency, differences between plots in output and factor inputs should only depend only plot characteristics, and not gender.

Objective

- Test of Pareto efficiency by looking for differences within a household in yields and inputs between plots controlled by males and females

- One of the first papers to do so

Empirics

- Key Equation:

$$Q_{htci} = X_{hcti}\beta + \gamma\, G_{hcti} + \lambda_{hct} + \varepsilon_{hcti} \qquad (10)$$

where:

Q is output, X is a vector of plot attributes, G is gender and λ is a household, crop, and year fixed effect

- Exclusion restriction tested in the paper: $\gamma = 0$. Rejection implies non-separability in context of household model

- Data: Household panel from Burkina Fasa (Africa)

- Test depends on ability to control for differences in land quality through G_{hcti}; high bar for data

- Key descriptive Tables

    - Table 1: Document differences in output per hectare and input intensity by gender
    - Potential Reasons for difference?
        - Land quality
        - Shadow prices
        - Crop choice
    - Table 2: Differences in crop choice between men and women

Table 3

TABLE 3

OLS Fixed-Effect Estimates of the Determinants of Plot Yield and Ln(Plot Output) (× 1,000 FCFA)

Dependent Variable: Value of Plot Output/Hectare

	Household-Year-Crop Effects: All Crops (1)	Household-Year Effects: Millet Only (2)	Household-Year Effects: White Sorghum (3)	Household-Crop-Year Effects: Vegetables (4)	Household-Crop-Year Effects: All Crops: CES* (5)
Mean of dependent variable	89	31	41	134	1.67
Gender: (1 = female)	−27.70 (−4.61)	−10.36 (−2.53)	−19.38 (−4.43)	−34.27 (−2.21)	−.20 (−3.56)
Plot size:					
1st decile	133.99 (3.50)	−28.35 (−2.67)	−17.90 (−1.92)	237.10 (4.66)	
2d decile	69.10 (4.38)	8.64 (.82)	52.30 (3.16)	63.97 (2.38)	
3d decile	63.45 (5.52)	16.95 (1.81)	47.68 (4.77)	35.87 (1.52)	
4th decile	34.08 (2.88)	9.79 (1.12)	26.73 (3.12)	4.21 (.18)	
6th decile	−2.04 (−.29)	−.99 (−.11)	−6.38 (−1.16)	−6.65 (−.26)	
7th decile	−13.44 (−1.78)	−13.01 (−1.73)	−11.31 (−1.69)	−33.54 (−.90)	
8th decile	−17.23 (−2.59)	−12.97 (−1.34)	−28.58 (−4.82)	31.04 (.73)	
9th decile	−26.68 (−3.81)	−21.50 (−2.65)	−28.65 (−4.98)		
10th decile	−31.52 (−4.49)	−20.56 (−2.55)	−37.70 (−6.03)		
Ln(area)					.78 (29.52)
Toposequence:					
Uppermost	−41.35 (−2.18)	2.50 (.24)	−14.60 (−1.73)	−131.34 (−1.82)	−.46 (−2.71)
Top of slope	−26.35 (−1.27)	9.53 (.96)	−11.27 (−1.47)	−121.05 (−1.85)	−.29 (−1.92)
Mid-slope	−24.38 (−1.19)	5.39 (.64)	−8.62 (−1.15)	−119.68 (−1.88)	−.28 (−1.97)
Near bottom	−21.70 (−.90)	4.48 (.40)	−5.36 (−.71)	−93.96 (−1.30)	−.18 (−1.27)
Soil types:					
11	−32.20 (−.93)	−6.13 (−.92)			−.89 (−2.34)
12	41.82 (1.11)	4.92 (1.18)	47.04 (5.26)		.23 (.74)
13	102.92 (1.10)	7.43 (1.11)	−21.08 (−1.82)		.69 (1.01)
31	1.86 (.36)	10.65 (1.55)	−.00 (−.00)	−36.66 (−.66)	.08 (.83)
32	6.38 (.99)	10.26 (1.23)	−.37 (−.06)	−19.36 (−.38)	.07 (.74)
33	29.42 (2.14)	8.56 (.67)	21.29 (1.52)		.18 (1.14)
37	7.69 (1.37)	6.20 (.80)	−.87 (−.17)	−76.60 (−.49)	.13 (1.36)
45	5.66 (1.03)	7.42 (1.15)	1.36 (.26)	52.92 (.46)	.06 (.67)
46	−17.03 (−1.20)	−25.95 (−1.98)	−7.16 (−.73)		−.32 (−1.16)
51	8.57 (.90)	43.77 (1.72)	−10.35 (−1.20)	12.96 (.26)	.05 (.42)
Location:					
Compound	1.54 (.19)	9.69 (2.67)	−4.98 (−1.04)	32.48 (.38)	.23 (3.02)
Village	−1.82 (−.40)	6.07 (1.45)	−1.68 (−.62)	50.37 (1.58)	.16 (2.35)

Note.—*t*-ratios (in parentheses) and test statistics reported in the text are based on heteroskedastic-consistent estimates of the variance-covariance matrix. The omitted plot size category is the 5th decile. The omitted toposequence is bottom land. The omitted soil type is "all others," and the omitted location is "bush" (far from the village).

* Dependent variable of col. 5 is ln(value of plot output).

- Lower yield on female-controlled plots on order of 30%
- Implication: Reallocation of variable inputs from male to female controlled plots (or land from women to men) would increase output

Misallocation within village vs within household

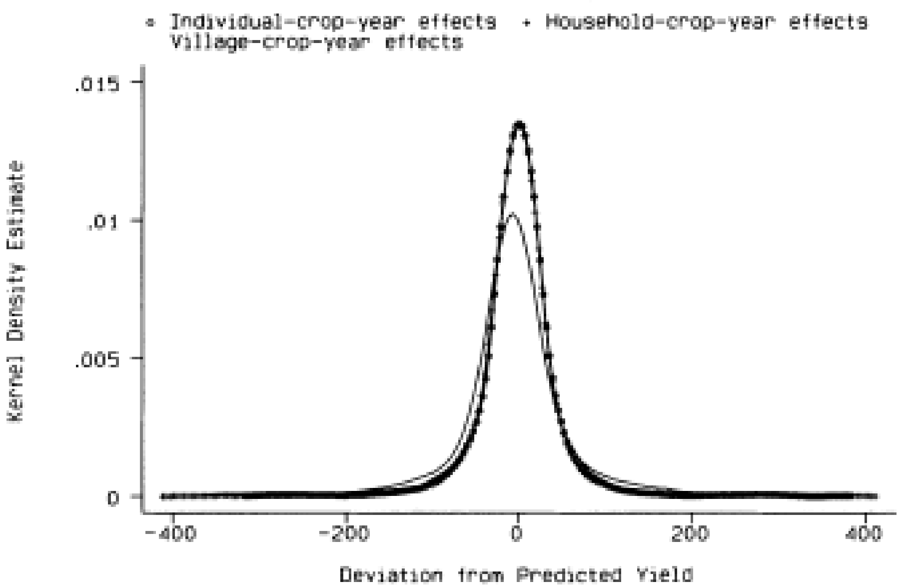


FIG. 1.—Estimates of the densities of yield function error terms

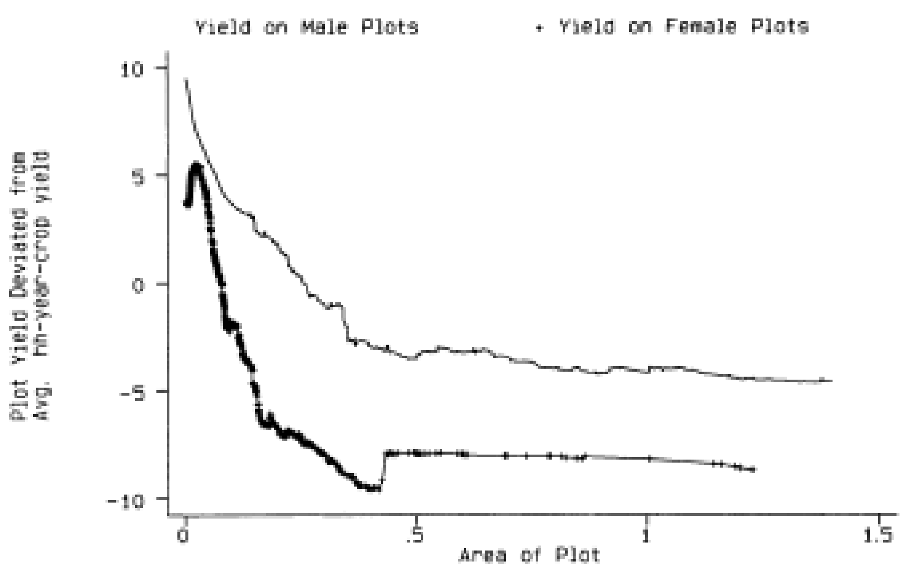


FIG. 2.—Regression of yield on area with household-year-crop effects

Table 6:

TABLE 6

LEAST-SQUARES TOBIT FIXED-EFFECT ESTIMATES OF THE DETERMINANTS OF PLOT INPUT INTENSITIES

	HOUSEHOLD-YEAR-CROP EFFECTS									
	Male Labor per Hectare (1)		Female Labor per Hectare (2)		Child Labor per Hectare (3)		Nonhousehold Labor per Hectare (4)		Manure (1,000 kg per Hectare) (5)	
Gender (1 = female)	−668.47	(−9.60)	70.23	(1.53)	−195.46	(−2.34)	−428.41	(−1.70)	−16.33	(−2.54)
Plot size:										
1st decile	1,209.72	(2.53)	1,462.21	(5.71)	740.80	(1.17)	193.35	(.43)	24.79	(2.42)
2d decile	417.18	(3.25)	1,131.01	(5.82)	143.12	(1.11)	487.39	(1.28)	7.99	(.96)
3d decile	245.94	(2.74)	799.12	(6.72)	133.16	(1.53)	689.39	(1.27)	2.58	(.48)
4th decile	96.53	(1.71)	407.87	(5.02)	72.51	(.68)	378.18	(1.07)	−6.18	(−1.12)
6th decile	−.55	(−.01)	−69.25	(−1.36)	−72.15	(−.98)	57.48	(.80)	−2.14	(−.33)
7th decile	−153.12	(−2.97)	−306.51	(−5.96)	−59.53	(−.60)	65.51	(.64)	−11.08	(−1.54)
8th decile	−375.53	(−6.23)	−386.78	(−6.61)	−184.61	(−1.61)	−43.81	(−.30)	−11.01	(−1.61)
9th decile	−413.36	(−6.79)	−373.57	(−5.16)	−269.99	(−1.83)	−255.15	(−.87)	−11.64	(−1.80)
10th decile	−490.11	(−7.72)	−418.06	(−6.08)	−219.27	(−1.86)	−220.64	(−1.07)	−16.41	(−2.45)
Toposequence:										
Uppermost	41.62	(.35)	−1.92	(−.02)	−55.52	(−.51)	20.20	(.12)	−9.22	(−.62)
Top of slope	29.36	(.30)	91.02	(1.07)	35.15	(.38)	144.02	(.83)	.26	(.02)
Mid-slope	36.08	(.38)	.57	(.01)	.10	(.00)	−15.45	(−.11)	1.14	(.11)
Near bottom	16.42	(.18)	75.94	(.86)	−98.03	(−1.05)	23.27	(.17)	2.88	(.27)
Soil Types:										
3	103.49	(.60)	−31.68	(−.23)	235.74	(.86)	175.29	(.50)	−11.80	(−1.18)
7	−65.79	(−.85)	−30.39	(−.28)	21.88	(.44)	66.04	(.47)	−.07	(−.01)
11	−28.77	(−.09)	−52.06	(−.34)	−778.86	(−4.36)	262.71	(.70)	−.70	(−.08)
12	1,051.98	(.82)	367.34	(1.63)	62.36	(.44)	368.47	(1.13)	16.32	(1.48)
13	274.48	(1.33)	−38.50	(−.29)			−187.07	(−.89)		
21	196.37	(.95)	−43.41	(−.49)	−42.87	(−.35)	37.73	(.27)	2.86	(.18)
31	83.16	(1.59)	68.24	(.92)	205.90	(2.29)	115.56	(1.00)	6.43	(1.29)
32	24.77	(.50)	−10.36	(−.15)	173.14	(1.07)	−51.08	(−.44)	.73	(.12)
33	250.40	(2.57)	163.76	(1.36)	206.68	(.78)	−113.92	(−.37)	17.28	(1.61)
35	179.46	(1.50)	303.86	(1.90)	248.38	(2.60)	195.14	(.58)	−12.75	(−.94)
37	82.49	(.70)	50.84	(.30)	114.53	(1.19)	31.14	(.20)	8.34	(1.44)
45	78.13	(1.34)	−8.33	(−.10)	79.85	(1.02)	41.90	(.25)	8.00	(1.83)
46	−187.14	(−1.84)	141.73	(.76)	42.70	(.09)	223.23	(1.27)	−15.45	(−.79)
51	95.73	(1.83)	−27.01	(−.33)	2.93	(.05)	126.70	(1.05)	.80	(.17)
Location:										
Compound	35.35	(.78)	37.16	(.90)	−18.82	(−.31)	−162.88	(−1.38)	.99	(.24)
Village	19.69	(.70)	12.18	(.45)	42.92	(.93)	25.80	(.30)	5.86	(1.60)
Mean of dependent variable	427.39		466.18		85.55		84.88		1.70	
when >0	506.62		517.17		202.88		213.11		7.78	

NOTE.—This is the least-squares implementation of Honoré's (1992) fixed-effect Tobit estimator. *t*-ratios are in parentheses.

- All else equal, lower level of input intensity on plots controlled by women.

- Implication: Household could increase output by reallocating inputs. Production efficiency not achieved. No pooling by household.

The Big Question:

- Why aren't households equalizing yields and factor returns across plots? If men are more productive, why don't we see a reallocation of land use rights (possibly through rental) from women to men?

- Impediment to "mutually advantageous trades" between members of a household

- Possible explanation is that security in property rights is based on use of land; as a result, a woman that rents her land to her husband may ultimately lose the land

- Alternatively, women may be hesitant to sell their land to their husband b/c of a scarcity of other assets in which to hold their wealth; land not only generates a stream of income for women, but also helps absorb their labour; in Africa, one gives land to one's child when entering a marriage, so one's child is assured of a flow of income

- Bottom line: it may be market imperfections that contribute to a breakdown of Pareto efficiency

Paper 4: Brandt, Siow and Wang (2015)

Motivation:

- Parents often make multiple investments in their children

- Invest in their health and schooling when they are younger

- Later in life, *Inter-vivos* (lifetime) transfers are also made
    - At time of marriage (bride-price and dowry)
    - Bequests (pre and post-mortem)

Objective:

Look at two important dimensions of parental investments

1. Substitution pattern between alternative form of investment: human capital (schooling) versus *inter-vivos* transfers

2. Substitution pattern of investments among sibling: equalizing or biased investments?

Setting: Rural China (Hebei)

Literatures:

- Role of inter-vivos transfers in advanced countries.
    - Transfers only partially compensate.
    - Key papers: Horchgeurtel and Ohlsson (2009), McCarry and Roberts(1997, 1995), and Wolff et al (2007)

- Intra-household resource allocation in China
    - Rural China: Qian(2008), Wei and Zhang (2011)
    - Urban China: Li et. al. (2010)

Empirical difficulties

- Datasets containing both education investments and inter-vivos transfers are rare

- In rural setting, household incomes are often jointly earned; individual incomes and consumption often unobserved

- Unobserved household heterogeneity: we expect richer households to endow children with both more schooling and transfers

- Implication: Need within household variation to try to identify

Contributions

- Design of unique survey to collect data on parental investments in rural China

- Develop behavioral framework to derive two alternative methods for estimating effects
  - Log-linear FE versus multiplicative FE
  - Critical assumption of log-linear FE model: child retain all of his/her income

- Test two models empirically; reject commonly used log-linear model

- Estimate of marginal compensation coefficient: 0.47
  - Parents partially but not fully compensate children for inequality in schooling investments
  - Lifetime intra-household consumption favors siblings with more education
  - Reject Beckers's unitary model with equal concerns

Simple Empirical Framework

- Consider a household h with two children, i = 1, 2
- Household endowment:
  - Parental wealth: m_h
  - Children's ability: a_{ih}
- Parental homothetic utility function:

$$U_h = u(c_h, c_{1h}, c_{2h})$$

- Parents spend s_{ih} on child i's schooling, which generates $R(s_{ih}, a_{ih})$ revenue for the family
- Total cost of s_{ih} is $C(s_{ih}, a_{1h}, a_{2h}, m_h)$
- Household budget constraint

$$c_h + c_{1h} + c_{2h} = m_h + \Sigma[R(s_{ih}) - C(s_{ih})] \equiv w_h$$

- "Two-step" maximization:
  - Schooling investments should be chosen to maximize total family wealth, w_h
  - Consumption levels are then selected to maximize utility. Optimal consumption of each child is achieved through providing the "right" amount of *inter-vivos* transfers

- Optimal consumption: $U_h = c_h^{1-k1-k2} c_{1h}^{k1} c_{2h}^{k2}$

$$c^*_{1h} = k_{1h}\, w^*_h$$
$$c^*_{2h} = k_{2h}\, w^*_h$$
$$c^*_h = (1 - k_{1h} - k_{2h}) w^*_h$$

where k_{ih} denotes proportion of total family wealth allocated to child i

- Beckers's benchmark model of equal concern: $k_{1h} = k_{2h}$

- These shares will depend on parental preferences, bargaining power among siblings, and future exchange considerations, each of which is influenced by the child's labor earnings.

- To capture this, let:

$k_{ih} = k'_{ih} + \mu R(s_{ih})/w_h$

where $R(s_{ih})/w_h$ is the child's earnings as a proportion of household wealth and μ is the share of own revenue from earnings captured by the child. The remainder is captured by the family. μ can also be thought of as an *intra-household redistributive* parameter.

Then the total consumption of child i is:

$$c^*_{ih} = k'_{ih}w_h = t^*_{ih} + \mu R(s_{ih})$$

- Becker's unitary model with equal concern:
  - $\mu = 0$
  - $k_{1h} = k_{2h}$

- Lifetime personal transfers from parents to children:

$$t_{ih} = c^*_{ih} - R(s_{ih}) = k_{ih}w_h - \mu_{ih}R^*_{ih}$$

$$= k'_{ih} - (1-\mu)R(S_{ih})$$

- Researchers do not observe lifetime transfers, but at best a fraction. Thus,

$$\alpha t_{ih} = \alpha k'_{ih} - \alpha(1-\mu)R(S_{ih})$$

Estimation:

1. Standard log-linear fixed effects model

$$\ln\alpha t_{ih} = \ln w_h + X_{ih}\rho - \beta \ln s_{ih} + \varepsilon_{ih}$$

where w_h is a measure of household wealth captured by the household FE; X captures fixed differences between children, e.g. birth order.

β is the *marginal compensation coefficient* and represents additional transfers a son receives when parents invest one more yuan in schooling on his brother

Important assumptions and implications of derivation:

- $\mu \approx 1$
- β is independent of share of transfers observed, i.e. adding more transfers should not affect estimate

2. Multiplicative fixed effects

$$\alpha t_{ih} = k_{ih}F_h - \beta s_{ih} + \varepsilon_{ih}$$

- Allow family FE to interact with observable sibling characteristics
- F_h parameters capturing hh wealth
- $\beta = \alpha\gamma(1-\mu)$, and is increasing in α. This represents a testable hypothesis.

Data

- 600 households randomly selected in 3 counties in Hebei; each household has at least one married child.

- We interview parents between the ages of 50-69 about each of their children.

- Obtain information on 1688 children. 576 HHs have more than one 1 child. We know the total educational investment on each child.

- Information on 1278 marriages. 456 HHs have more than 1 married child. We select up to 3 married children, and have detailed information on the composition and magnitude of marital transfers in each marriage.

- Focus on households that have more than one married son

Marital Transfers in Rural China

- Inter-generational transfers rather than inter-family transfers

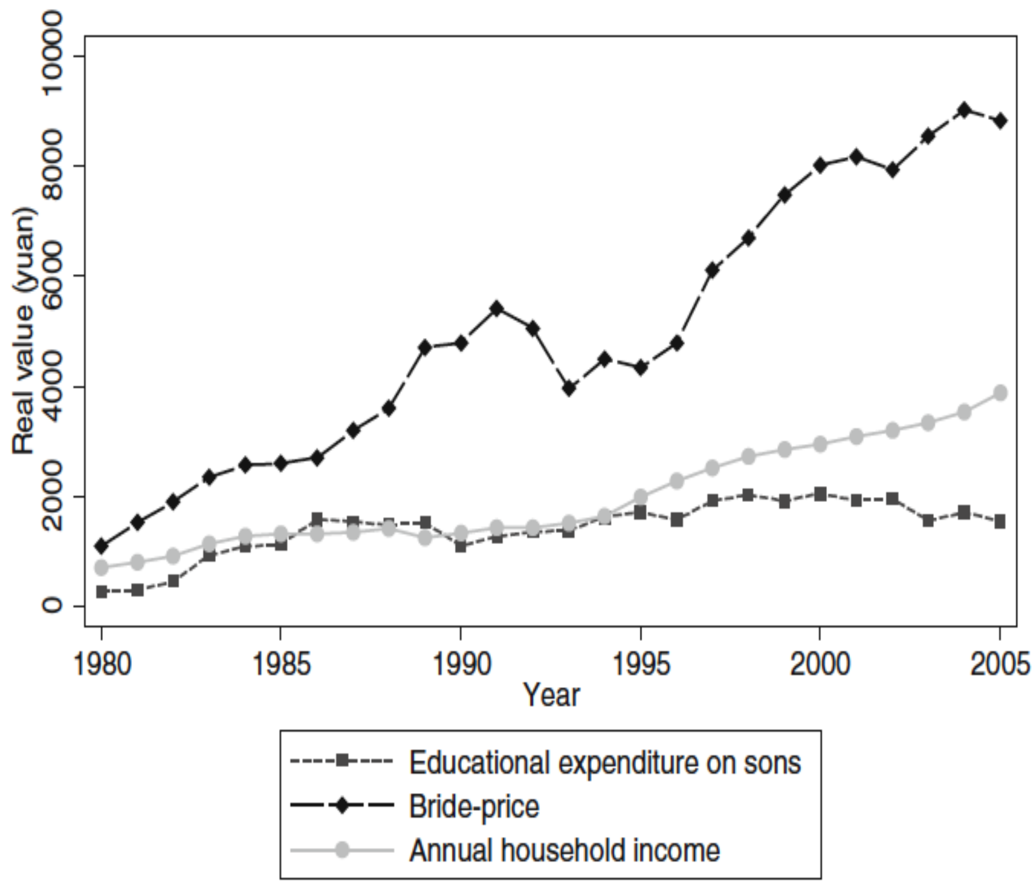
- Usually includes housing, furniture, home appliances, etc

- A significant transmission of wealth involved:
  - Parents save for years to finance the expenditure
  - Burden is heavier for groom's family b/c they are expected to build and furnish a new home for the couple

- The marital transfer is a major decision for parents in rural China.

Table 1 Variable definitions and summary statistics

Variable name	Unit	Definition or notes	Observations	Mean	Standard deviations	Standard deviations within households	Number of households with intra-households variations
Key variables							
Educational expenditure	Yuan[a]	Total educational expenditure	293	1,478	2,661	1,829	127
Marriage transfers	Yuan	Total monetary value of bride-price, including house, items, and cash	293	5,064	5,349	2,655	127
Land division	Yuan	Value of the land division[b]	186	2,221	1,989	987	83
Sons' attributes							
Age		Age	293	33.73	5.66	2.94	141
Age at marriage		Age at marriage	293	23.49	2.63	1.72	119
Height	cm	Height	293	170.37	5.86	2.78	110
Agricultural experience	Year	Agricultural experience before marriage	293	3.53	4.53	2.27	82
Non-agricultural experience	Year	Non-agricultural experience before marriage	293	3.17	3.36	2.00	101
Years of schooling	Year	Years of schooling.	293	8.40	2.92	1.64	83
Dummy variables used in the specifications							
D_Height		Indicator of the taller son[c]	293	0.39	0.49	0.44	110
D_Ag_Experience		Indicator of the son with more years of experience in agriculture	293	0.30	0.46	0.38	82
D_Nonag_Experience		Indicator of the son with more years of experience in non-agriculture	293	0.35	0.48	0.42	101
D_Live_with_Parents		Indicator of living with parents after marriage	293	0.36	0.48	0.30	52
D_1st_Son		Indicator of the first born son	293	0.47	0.50	0.49	138



Real value (yuan)
0
2000
4000
6000
8000
10000
1980
1985
1990
1995
2000
2005
Year
Educational expenditure on sons
Bride-price
Annual household income

Table 3 Marital transfers regression with additive fixed effects (log-on-log form)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A. Log(bride-price) as the dependent variable							
Log(edu_exp)	−0.31	−0.31	−0.26	−0.33	−0.22	−0.25	−0.20
$(-\beta_{t_1})$	[0.12]**	[0.12]**	[0.13]**	[0.12]***	[0.12]*	[0.12]**	[0.13]
D_Height		−0.12 [0.16]					−0.11 [0.15]
D_Ag_Experience			0.28 [0.21]				0.27 [0.22]
D_Nonag_Experience				−0.20 [0.17]			−0.14 [0.17]
D_Live_with_Parents					0.56 [0.29]*		0.62 [0.25]**
D_1st_Son						0.18 [0.14]	0.25 [0.14]*
R^2	0.67	0.67	0.67	0.67	0.68	0.68	0.69
Panel B. Log(bride-price + land) as the dependent variable							
Log(edu_exp)	−0.57	−0.58	−0.46	−0.58	−0.49	−0.57	−0.40
$(-\beta_{t_3})$	[0.13]***	[0.13]***	[0.14]***	[0.14]***	[0.12]***	[0.13]***	[0.14]***
D_Height		−0.17 [0.20]					−0.14 [0.18]
D_Ag_Experience			0.49 [0.22]**				0.47 [0.22]**
D_Nonag_Experience				−0.29 [0.22]			−0.14 [0.18]
D_Live_with_Parents					0.68 [0.27]**		0.66 [0.27]**
D_1st_Son						0.05 [0.15]	0.16 [0.15]
R^2	0.60	0.60	0.62	0.61	0.63	0.63	0.66
Panel C. Bootstrap results							
Mean $(\beta_{t_3}/\beta_{t_1})$	1.28	1.45	1.57	1.29	1.50	1.28	2.10
Prob $(\beta_{t_3}/\beta_{t_1} > 1)$	0.99	0.99	0.98	0.99	0.99	0.99	0.98

Table 3 (continued)

Table 6 Multiplicative specification with interaction effects (bride-price as the dependent variable)

	(1)	(2)	(3)	(4)	(5)	(6)
Edu_exp	−0.32	−0.32	−0.28	−0.24	−0.45	−0.32
($-\beta_{t_1}$)	[0.13]**	[0.12]***	[0.14]*	[0.09]***	[0.12]***	[0.17]*
δ						
D_Height	0.26					0.32
	[0.05]***					[0.08]***
D_Ag_Experience		0.02				−0.01
		[0.1]				[0.13]
D_Nonag_Experience			0.10			0.05
			[0.08]			[0.09]
D_Live_with_Parents				0.43		0.49
				[0.12]***		[0.13]***
D_1st_Son					−0.27	−0.29
					[0.07]***	[0.09]***
Interaction with edu_exp (γ)						
D_Height	−0.08					−0.08
	[0.2]					[0.17]
D_Ag_Experience		1.10				0.18
		[0.81]				[0.78]
D_Nonag_Experience			−0.32			−0.04
			[0.19]*			[0.21]
D_Live_with_Parents				0.64		0.44
				[0.64]		[0.48]
D_1st_Son					0.27	0.27
					[0.18]	[0.19]
R^2	0.77	0.77	0.76	0.79	0.78	0.82
F test 1†						0.00
F test 2‡						0.51

Table 7 Multiplicative specification with interaction effects (bride-price plus value of land as the dependent variable)

	(1)	(2)	(3)	(4)	(5)	(6)
Edu_exp	−0.45	−0.37	−0.32	−0.35	−0.68	−0.63
$(-\beta_{t_3})$	[0.17]***	[0.17]**	[0.18]*	[0.15]**	[0.22]***	[0.27]**
δ						
D_Height	0.02					0.10
	[0.07]					[0.12]
D_Ag_Experience		−0.07				−0.05
		[0.11]				[0.16]
D_Nonag_Experience			0.10			0.00
			[0.07]			[0.13]
D_Live_with_Parents				0.09		0.22
				[0.12]		[0.16]
D_1st_Son					−0.33	−0.41
					[0.06]***	[0.12]***
Interaction with edu_exp (γ)						
D_Height	0.21					0.16
	[0.22]					[0.32]
D_Ag_Experience		1.38				0.57
		[1.15]				[1.19]
D_Nonag_Experience			−0.33			0.05
			[0.21]			[0.3]
D_Live_with_Parents				1.01		0.86
				[0.89]		[0.7]
D_1st_Son					0.45	0.52
					[0.26]*	[0.3]*
R^2	0.77	0.77	0.76	0.78	0.82	0.85
F test 1†						0.00
F test 2‡						0.29

Summary:

- Reject standard log linear model
- Preferred estimate is $\beta = 0.47$, which implies that transfers are used to mitigate earnings inequality, but less than full compensation
- Recall that $\beta = \alpha\gamma(1-\mu)$, where γ = 1+return to education
- Estimates imply that sons retain significantly less than 100% of their earnings → some pooling of income by rural households
- Intra-household consumption across siblings favors more educated child
- Possible reasons compensation less than full:
    - Moral hazard issues
    - Inter-generational exchange

Paper 5: Li, Rosenzweig and Zhang (2010)

Context and Settting:

- Forced mass rustication or “send down” movement of the Cultural Revolution between 1966 and 1976 saw ~ 17 million youths sent to the countryside

- Children *within* a household were likely affected differently, i.e. some were sent down, and others were not; parents often had to make a choice

- In the aftermath, and out of feelings of altruism or guilt, parents may have tried to compensate through inter-household transfers

- Decision of who to send down within a household may have also reflected feelings of “favoritism

Objective

- Use new survey data on twins in urban China, many of whom experienced first-hand rustication, to identify distinct role of altruism, favoritism, and guilt in affecting intra-family resource allocations

Data

- Unique survey of twins in urban areas carried out by the NBS that further distinguishes between identical and non-identical twins

- Both samples of twins important, which differ in terms of unmeasured differences; unobserved differences larger among pair of non-identical twins compared to identical;

- Exploit earlier work of Berhman and Rosenzweig on leveraging this feature of twins data

Theory and Identification

- One-child model

$$\text{Max } U(c) + \delta V(W) + \alpha(r, t; e)$$

subject to parent's budget parent's budget constraint and child's income:

$$Y = c + t + Pr$$

$$W = \beta(e)r + t + \varepsilon$$

- β is the return to parental time
- $\delta > 0$ implies altruism; α_{re} and/or $\alpha_{te} > 0$ implies favoritism, and $\alpha_{tr} < 0$ implies guilt
- Identification? Even with exogenous variation in r, cannot identify all the parameters
- Two child model

$$\text{Max } U(c) + \Sigma\delta V(W_i) + \Sigma\alpha(r_i, t_i; e_i)$$

- Identification? With exogenous sources of variation in parental time, and child endowments that can be measured or controlled for, can identify all parameters of interest

- Consider following children's earning equation:

$$w_{ij} = X_{ij}\alpha + Z_{ij}\beta + \mu_i + e_{ij} + \varepsilon_{ij}$$

where j refers to family j, i to individual i, w_i is log of earnings of twin i in family j, X_j is a set of observed family variables, Z_{ij} is set of child-specific variables that affect earnings, including number of years sent down. μ_i is the family fixed effect, and e_{ij} is the child-specific term

- Problems in OLS estimation?
  - μ_i and e_{ij} likely correlated with Z
  - Children sent down longer may have come from more disadvantaged (poorer) households
  - Choice of who to send down may reflect bias, in which case Z may be correlated with e_{ij}

- Fixed effects estimator for identical twins

$$w_{1j} - w_{2i} = (Z_{1j} - Z_{2j})\beta + \varepsilon_{1j} - \varepsilon_{2j}$$

- As long as latter term is small, β provides estimate of effect of rustification

- Following Behrman et. al. (1994), can also compare simple OLS estimate with the "within twin" estimator from the identical twins for additional insights

- $\beta_{OLS} > \beta_{MZ} \rightarrow$ unobs family background positively correlated with years sent down $\rightarrow$ children from better families sent down longer

- Related, if $\beta_{DZ} < \beta_{MZ} \rightarrow$ parents favor stronger child

Table 1: Descriptive Statistics, by Twin pair Type

Variable	MZ twins Mean	MZ twins Standard deviation	DZ twins Mean	DZ twins Standard deviation
Sent-down years for whole sample	0.71	(2.11)	0.45	(1.75)
Proportion sent down for affected cohorts (age 41-56 in 2002)	0.51	(0.50)	0.46	(0.50)
Sent-down years for affected cohorts	1.74	(2.90)	1.67	(3.04)
Age	37.31	(10.22)	34.80	(10.04)
Proportion male	0.56	(0.50)	0.59	(0.49)
Years of education	11.24	(2.96)	11.35	(3.07)
Proportion with Party membership	0.18	(0.38)	0.14	(0.34)
Monthly wage in 2002 (includes bonus and subsidies in RMB)	888.50	(517.93)	835.33	(548.30)
Proportion employed	0.70	(0.46)	0.70	(0.46)
Proportion self-assessed as 'Healthy'	0.64	(0.48)	0.68	(0.47)
Proportion of twins with wedding gifts from parents	0.77		0.76	
Wedding gifts received (2002 *yuan*)	5,595	(9,696)	6,029	(10,430)
Proportion of twin pairs with wedding gifts different	0.75		0.74	
Within-twin difference in wedding gifts	2,818	(7,778)	3,145	(8,536)
Monthly wage at the time of wedding (2002 *yuan*)	322	(605)	335	(420)
Number of twins (Pairs)	1,838 (919)		1,152 (576)	

Table 2: Within-twin Variation in Rustication and Sent-Down Years for Affected Cohorts (Age 41-56 in 2002)

	MZ twins		DZ twins	
Variable	Count	Percent	Count	Percent
Within-twin variation in send-down dummy				
Neither sent down	123	33.98	61	38.85
One sent down	106	29.28	49	31.21
Both sent down	133	36.74	47	29.94
Total pairs	362	100	157	100
Within-twin variation in send-down years				
0 year	187	51.66	83	52.87
1-2 years	85	23.48	44	28.02
3-5 years	77	21.27	22	14.01
6- years	13	3.59	8	5.10
Total pairs	362	100	157	100

Consequences of Rustification

Table 3: Estimates of the Effect of Sent-Down Years on Log Wage, by Estimation Method and Twin Pair Type

	OLS (MZ Twins)			Fixed Effects (MZ Twins)			Fixed Effects (DZ Twins)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Sent-down years	0.005	0.017*	0.025***	0.032**	0.034***	0.042***	-0.003	-0.006	-0.008
	(0.010)	(0.009)	(0.010)	(0.013)	(0.012)	(0.014)	(0.036)	(0.034)	(0.035)
Age	0.003	0.008***	-0.003						
	(0.003)	(0.002)	(0.006)						
Male	0.186**	0.212***	0.213***						
	(0.044)	(0.038)	(0.038)						
Education		0.085***	0.085***		0.027*	0.030**		0.046***	0.045***
		(0.006)	(0.006)		(0.015)	(0.014)		(0.012)	(0.012)
Experience			0.028***			0.022			-0.017
			(0.009)			(0.021)			(0.026)
Experience squared			-0.001**			-0.000			0.000
			(0.000)			(0.001)			(0.001)
Observations	994	994	994	994	994	994	644	644	644
R-squared	0.04	0.22	0.23	0.01	0.02	0.02	0.00	0.04	0.04

Note: Standard errors in parentheses are robust to heteroscedasticity and clustering at the family level. * significant at 10% ** significant at 5% *** significant at 1%. All OLS regressions control for city dummies.

Compare three alternative estimates

- Positive return to being sent down
- $\beta_{OLS} < \beta_{MZ} \rightarrow$ kids from poorer families more likely to be sent down
- $\beta_{DZ} < \beta_{MZ} \rightarrow$ weaker kids within hh sent down $\rightarrow$ favoritism

Parental Transfers: Altruism, Favoritism and Guilt

Table 5: OLS and Fixed Effect Estimates of the Effect of Sent-Down Years on Log Parental Transfers and Gifts at Marriage, by Twin Pair Type

	OLS (MZ Twins)		Fixed Effects (MZ Twins)		Fixed Effects (DZ Twins)	
	(1)	(2)	(3)	(4)	(5)	(6)
Years sent down	-0.028 (0.034)	-0.002 (0.038)	0.117** (0.053)	0.119** (0.053)	0.001 (0.066)	0.002 (0.066)
Age at marriage	-0.215*** (0.031)	-0.239*** (0.030)	-0.234*** (0.043)	-0.236*** (0.043)	-0.099* (0.056)	-0.095* (0.057)
Male	1.196*** (0.263)	1.287*** (0.259)				
Education at marriage		0.192*** (0.045)		0.067 (0.069)		0.007 (0.069)
Log wage at marriage		0.095 (0.094)		-0.012 (0.116)		-0.094 (0.214)
Co-twin characteristics						
Years sent down	-0.145*** (0.035)	-0.121*** (0.036)				
Education at marriage		0.124*** (0.047)				
Log wage at marriage		0.106 (0.097)				
Observations	1106	1106	1106	1106	608	608
R-squared	0.15	0.19	0.10	0.11	0.02	0.02

Note: All OLS regressions include city dummies. Standard errors in parentheses are robust to heteroscedasticity and clustering at the family level. * significant at 10% ** significant at 5% *** significant at 1%.

- Positive coefficient on years sent down combined with positive return to rustification suggests guilt
- Insignificant role of earnings implies altruism not likely important
- $\pi_{DZ} < \pi_{MZ}$ → Favoritism of better-endowed child

Final Thoughts

- Behavior of household extremely important to income differences
- Potentially important differences both within and between households, with the later important to inter-generational mobility
- These differences can be magnified by the way the marriage market works; in particular, the degree of positive assortative matching, e.g. highly educated men marry highly educated women
- Policy can be important to helping to attenuate these differences, but must be predicated on better models of how households make their decisions