Of Women and Land: How Gender Affects Succession and Transfers in Iowa Farms?

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The College of Wooster, September 28, 2022

A Quick Introduction:
Dr. Wendong Zhang

- Grew up in a rural county in Shandong Province, China
- Attended college in Shanghai and Hong Kong
- Ph.D. in Ag Econ from Ohio State in 2015
- Worked at Iowa State for 7 years, leading the Iowa Land Value Survey
- Moved to Cornell University Dyson School of Applied Economics & Mgmt in July 2022 (50% extension appointment)
- Research and extension interests:

    land value/ownership https://www.card.iastate.edu/farmland

    ISU China Ag Center https://www.card.iastate.edu/china

    Cornell Institute for China Economic Research (CICER)
    http://china.dyson.cornell.edu/

    Cornell Atkinson Center for Sustainability https://atkinson.cornell.edu/

Career Advancement and Mentorship Program

The NAREA Career Advancement and Mentorship (CAM) Program, founded in 2010, is an innovative program designed to help early career scholars develop and enhance professional networks, receive one-to-one mentoring from an experienced member within the environmental and agricultural economics community, and organize and attend events at the NAREA annual meeting that focus on issues of concern to early career scholars. The program is held in concert with the NAREA Annual Meeting and also serves to increase engagement in NAREA.

We accept applications for new fellows for this two-year program in odd years. Fellows are matched with a mentor that they will work with in year one of the program. The objective of this one-to-one mentoring is to advancing objectives outlined in the mentee's Individual Development Plan (IDP). The CAM Fellows also work together in working groups over the course of the two years they are in the program to advance networking goals and to support one another in learning more about career objectives and how to reach them. Mentors and mentees are expected to be interested in playing a role in making economics a more diverse and welcoming field and in helping NAREA continue to be known as a welcoming and inclusive organization. See our **mentee expectations** and mentor expectations for more on what is, and is not, expected of program participants. A brief outline of program events is provided below.

https://narea.org/cam

Objectives and Implications

It starts with a simple question:

How does gender affect farm inheritance / succession in Iowa?

Objectives:
- to provide solid empirical evidence on gender imbalance in U.S. farm successions
- to study the underlying motifs that make a farmer choose a son instead of a daughter as the main successor of the farm with a focus on the U.S. Corn Belt.

Implications:
- What increases the chances for female successors?
- How can we close this gender gap?
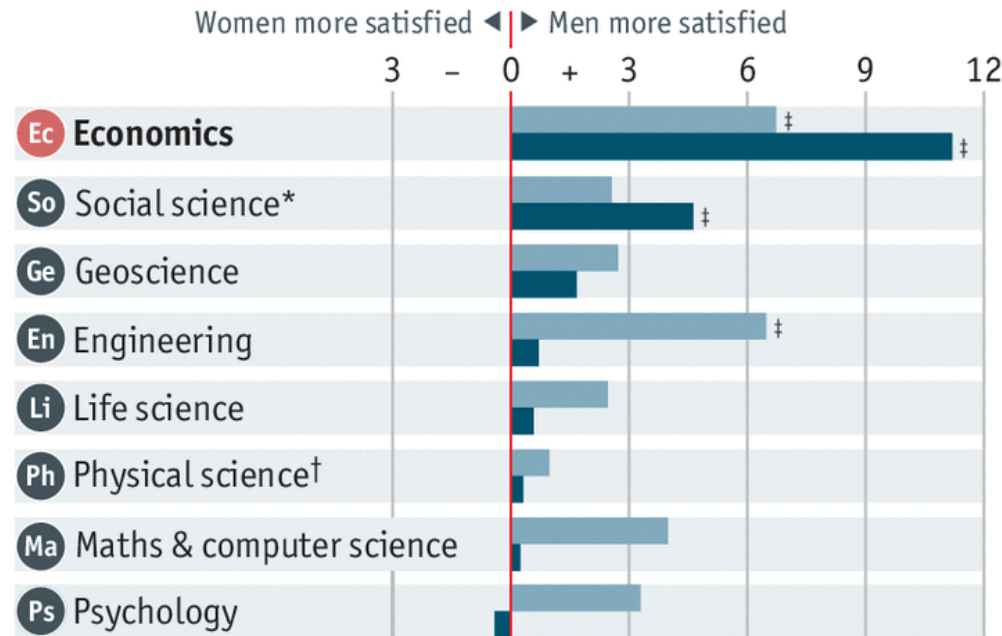
The Economist

Women and economics

The profession's problem with women could be a problem with economics itself

Unhappy lot

United States

Job satisfaction, difference between men and women responding "very" or "somewhat satisfied", % points
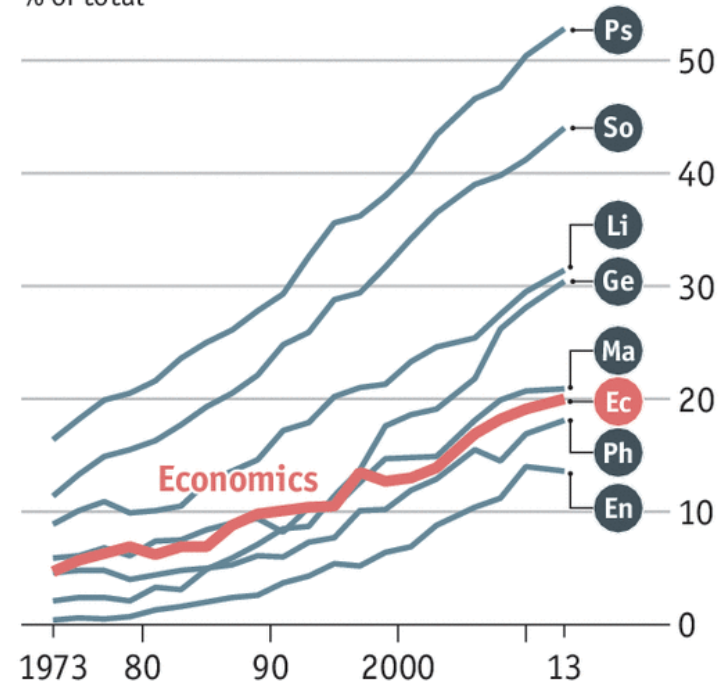
◼ 1997 ◼ 2010

Women more satisfied ◀ | ▶ Men more satisfied

Share of female academics with tenure or in tenure-track positions
% of total

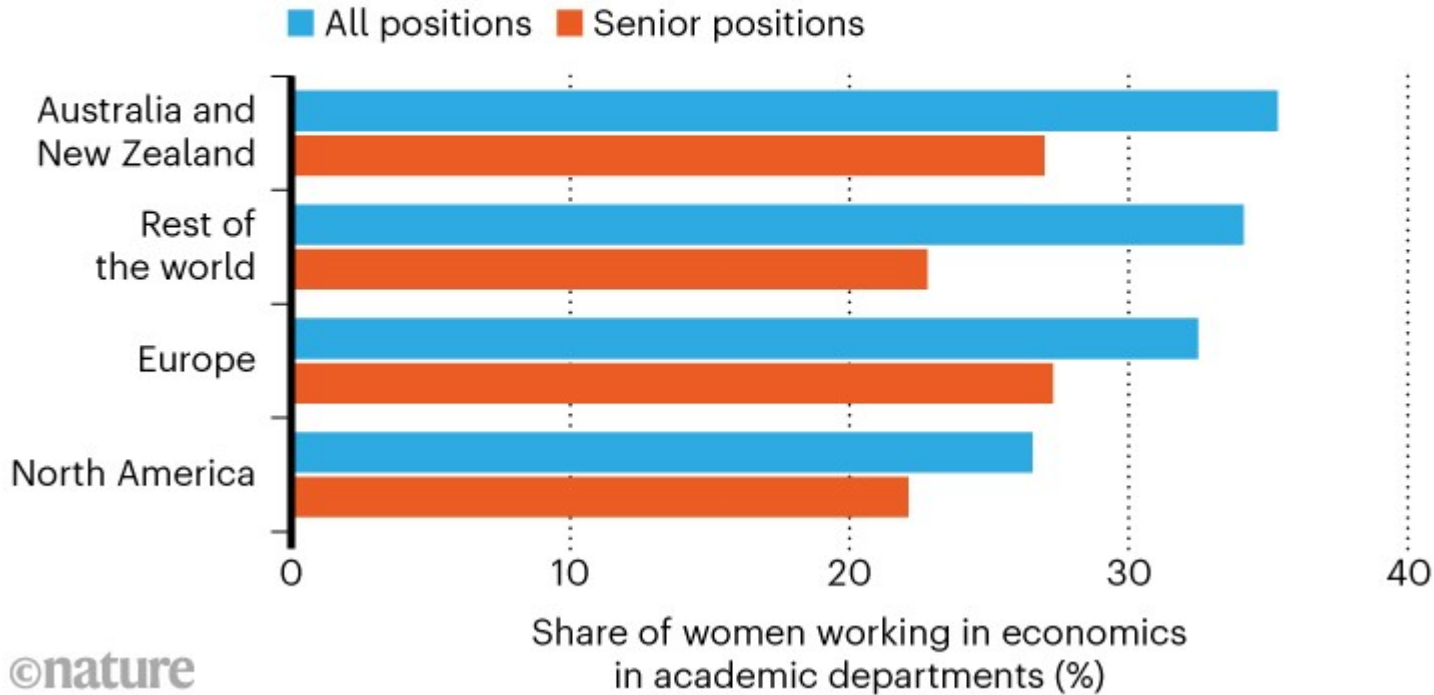Source: National Science Foundation, Survey of Doctorate Recipients

Excluding: *Economics †Geoscience
‡Statistically significant at 5% level

GLOBAL GENDER IMBALANCE

Women were under-represented in economics in research institutions around the world, particularly in senior positions.

■ All positions ■ Senior positions

Australia and New Zealand
Rest of the world
Europe
North America

0   10   20   30   40

Share of women working in economics in academic departments (%)

©nature

- Women only comprise 24%, 26%, and 20% of the soil scientists in academic faculty positions, federal agencies, and private industry, respectively (Vaughan et al. 2019).

- Women accounted for about one-third of undergraduates in the largest departments in 2020, one-third of agricultural economics doctorates in 2019, and about 20% of all full professors in agricultural economics (Offutt and McCluskey 2022).

The origin of the research

CARD Policy Briefs

Center for Agricultural and Rural Development
IOWA STATE UNIVERSITY

Iowa Farmers' Business and Farm Transfer Plans: A Comparison between 2019 and 2006

Beatrice Maule, Sophomore in Agricultural Business, Economics and International Agriculture, Department of Economics, Iowa State University, beamaule@iastate.edu

Wendong Zhang*, Assistant Professor, Department of Economics and Center for Agricultural and Rural Development, Iowa State University, wdzhang@iastate.edu

David Baker, Director, Beginning Farmer Center, Iowa State University, baker@iastate.edu

https://www.card.iastate.edu/products/publications/pdf/20pb30.pdf

- The greatest majority of respondents do not have a formal succession plan.
- While the majority of farmers had discussed their succession plan with their spouse or children, a little more than 20% of farmers had not discussed their plan with anyone.
- Respondents still identify sons as the main successor.
- When asked about future plans for the farm, most respondents indicated that they would share the farm equally among heirs, to keep it in the family no matter what

How Gender Affects Successions and Transfers of Iowa

By Beatrice Maule, Dr. Wendong Zhang and Dr. Qing Liu, Iowa State University

Image Credit: Dr Shane Conway, Rural Studies Centre, NUI Galway, Ireland

Beatrice Maule, ag bus junior, won the Agricultural & Applied Economics Association Undergraduate Student Paper Competition Award for her paper, "Of women and land: how gender affects successions and transfers of Iowa farms." Maule's advisor is **Wendong Zhang**, co-author: PhD student **Qing Liu**.

Beatrice Maule · 1st

Undergraduate Research Fellow at California Institute of Technology
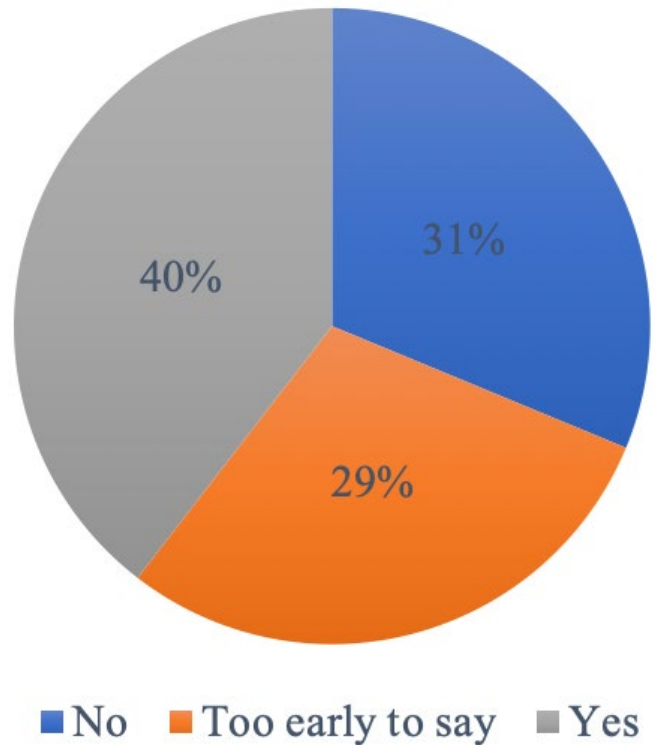
Des Moines Metropolitan Area · **Contact info**

Caltech

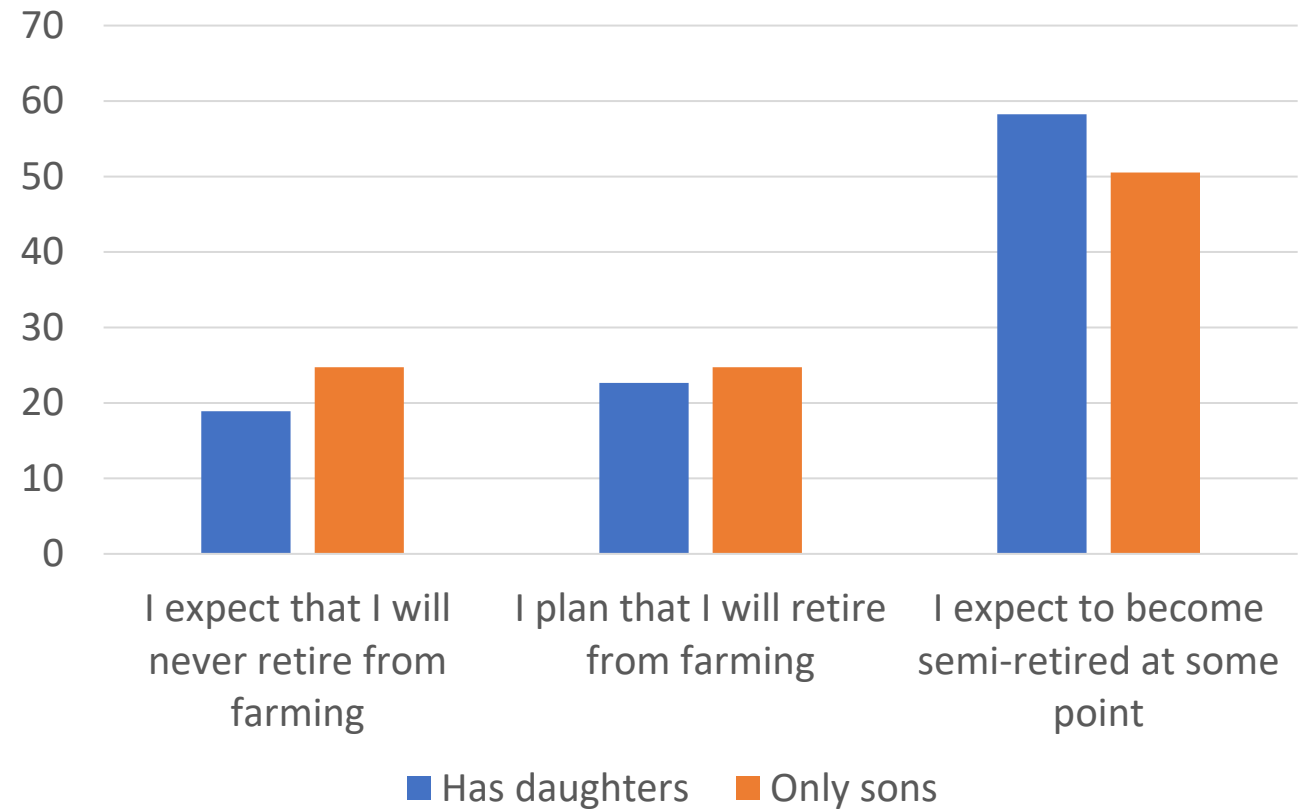Iowa State University

Data overview

589 farmers
Have actual or expected primary successors or not

Yes
n = 367 (62%)

No
n = 222 (38%)

Daughter
n = 30

Son
n = 235

Other female
n = 23

Other male
n = 29
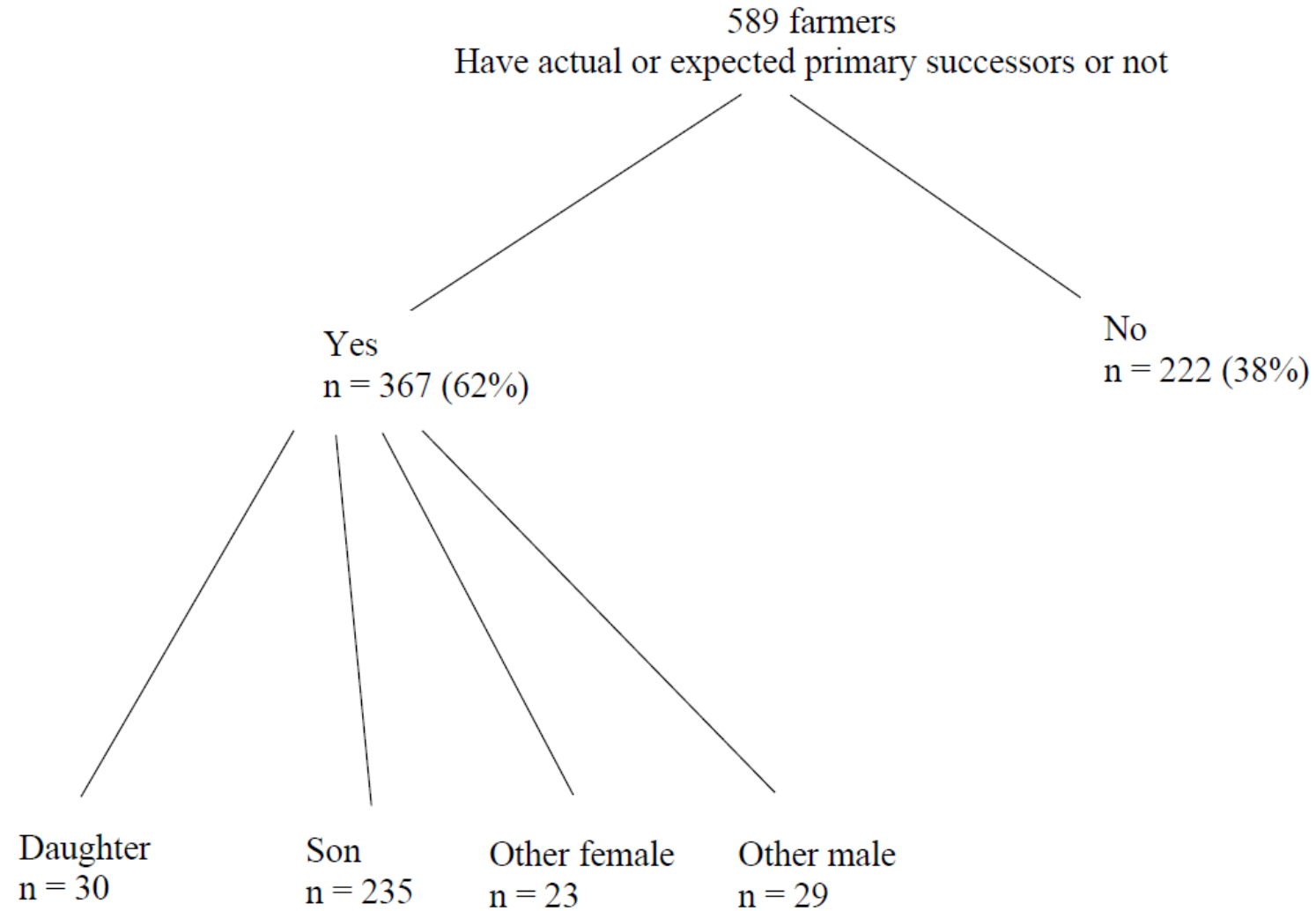
Retirement plans

Identification of Successor

- 31% No
- 29% Too early to say
- 40% Yes

■ No ■ Too early to say ■ Yes

Retirement Plans

■ Has daughters ■ Only sons

Successor choices
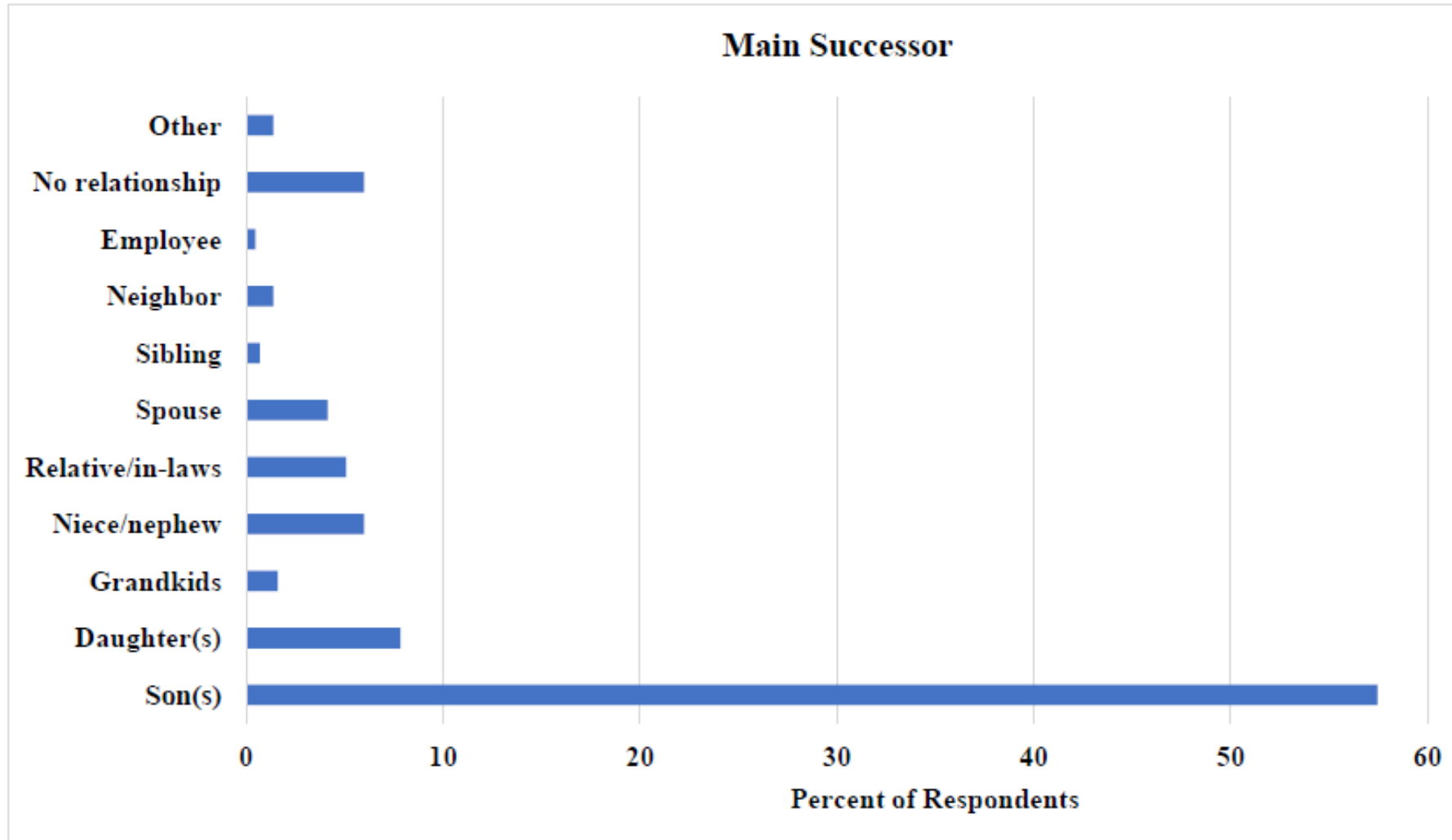
Main Successor

Note: Successor is defined as someone who will eventually take over the management of the farm.

Educational Preferences on Farmland Leasing, Conservation Practices, and Transition Plans: Voices of Iowa Women Farmland Owners

Jingyi Tong, Wendong Zhang

As Table 7 shows, most respondents have at least a potential successor for either farmland management (70%) or ownership (85%), and 67.8% of owners have a potential successor for both farmland management and ownership. Few owners have a potential successor for farmland management but not for ownership (2.3%), and 12.5% of owners have not considered potential successors for their farmland.

Table 7. Number of Owners with/without Potential Successors for Farmland Management or Farmland Ownership

Management of farmland	Total	Ownership of farmland	
		Have a potential successor	Do not have a potential successor
Total	100%	85.18%	14.82%
Have a potential successor	70.08%	67.80%	2.28%
Do not have a potential successor	29.92%	17.38%	12.54%

In our research, successor is defined in terms of management of farmland as opposed to ownership of farmland

Iowa Farmland Ownership and Tenure Survey, 1982-2017: A Thirty-Five Year Perspective
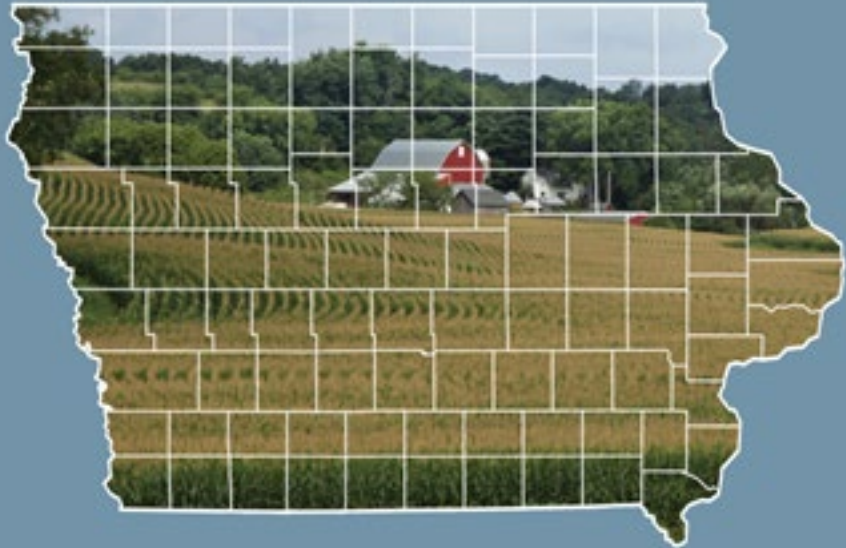
IOWA STATE UNIVERSITY
Extension and Outreach

https://store.extension.iastate.edu/product/6492

- 82% of Iowa land is debt-free
- 60% of land owned by owners 65+ years old, one-third of land owned by 75+ years old, 13% of land owned by women landowner 80+ years old
- Half of Iowa farmland is owned or co-owned by women
- 53% of Iowa land rented out – mainly cash rent
- 34% of Iowa land owned by landlords with no farming experience, 23% of land owned by retired farmers who do not currently farm
- 29% of Iowa land owned primarily for family/sentimental reasons

Choice of main successor who will take over management of farm by gender of children
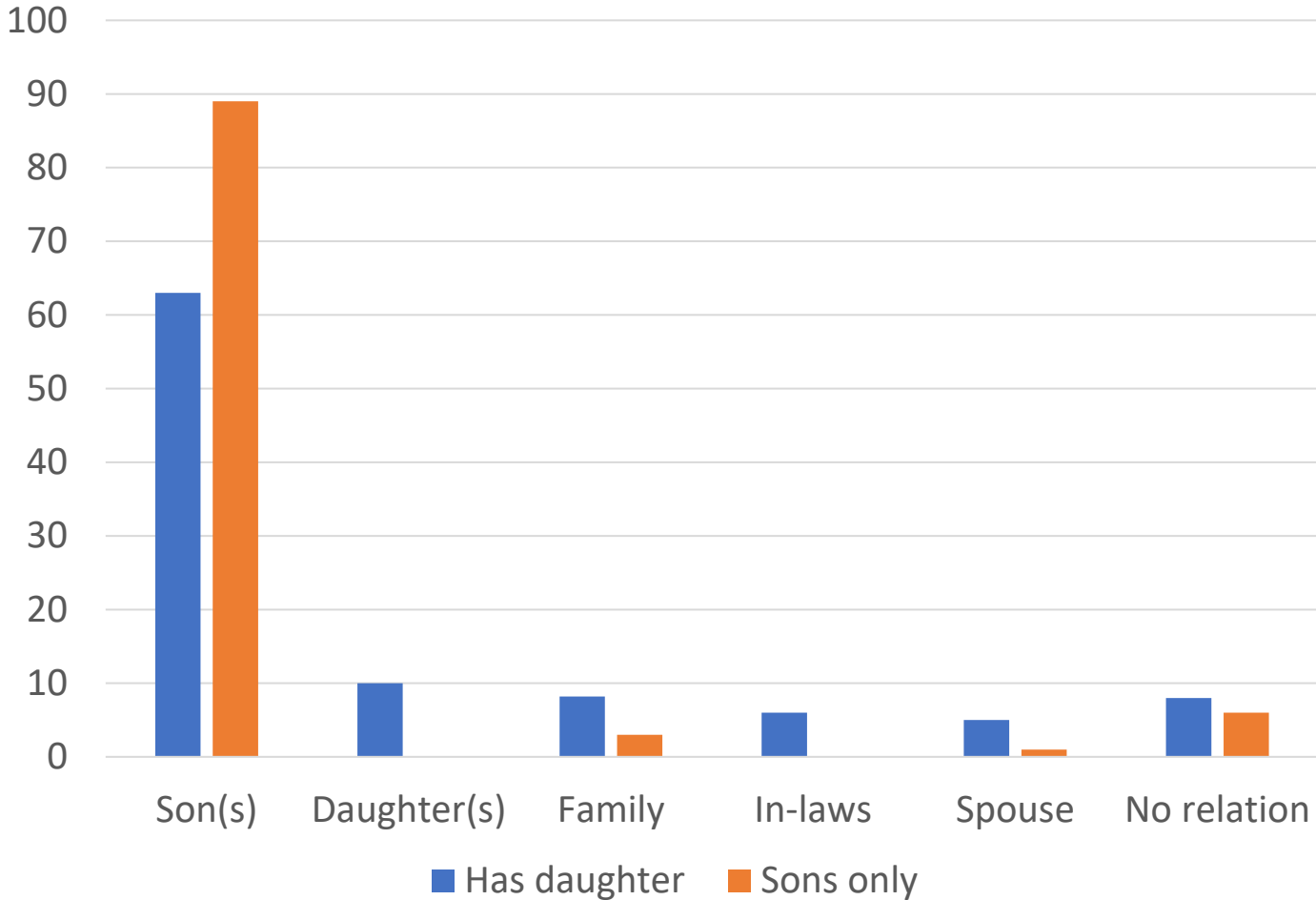
Educational Preferences on Farmland Leasing, Conservation Practices, and Transition Plans: Voices of Iowa Women Farmland Owners

Jingyi Tong, Wendong Zhang

Among the 302 respondents who have potential successors for ownership, sons and daughters are the top choices for successor (Figure 18). Responses in the "Other" category are mostly also sons and daughters with several respondents mentioning siblings, cousins, nieces, and nephews. Among those choosing sons and daughters, twice as many are choosing sons rather than daughters.
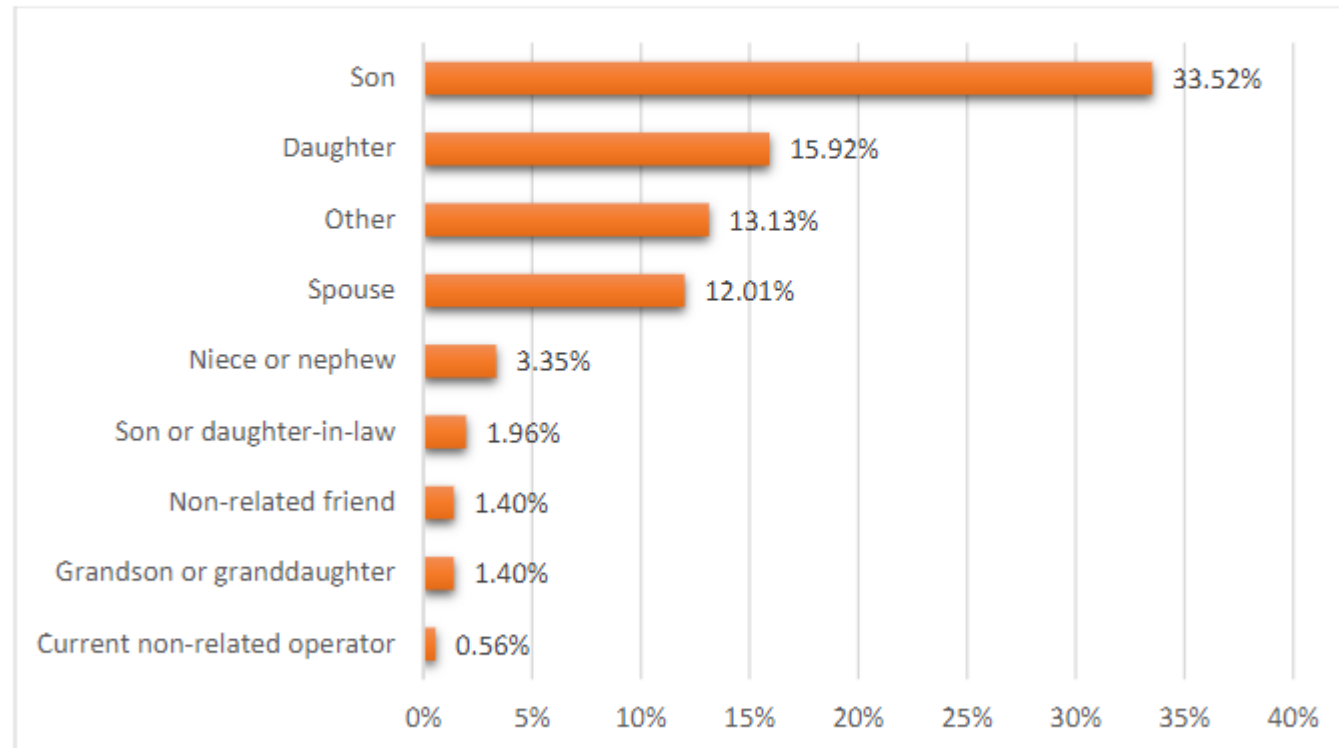

Figure 18. Most likely relationship of respondents' successors.
Note: We asked respondents to select the one person most likely to succeed them.

Another, more recent survey of women landowners shows that their successor is most likely sons too!

Theoretical Model – Overlapping Generations Model

Lifetime utility of parent=$u(b|s) = c^p + \sum_{j \in \{f,m\}} \beta_j^s I_{\{b=j\}} u(L|s) + \sum_{i,j \in \{f,m\}} \gamma_{i,j} I_{\{n_i>0\}} c_i^c + e_j$

L denotes the acres of land the parent possesses

$\beta_j^s u(L|s)$ with $\beta_j^s > 0.$ is the value of the farm as an asset within the family when choosing successor with gender j

c_i^c represents successors with gender i's total consumption.
$\gamma_{i,j}$ denotes how important successor i's consumption is if agent j is chosen as
the successor. Suppose $\gamma_{i,i} > \gamma_{i,j}$, that is, gender i's consumption values more if
she is chosen than that when j is chosen.
e_j denotes the error term measuring some unobservable factors

Probability of choosing females as successor:

$$Pr(u(b = f|s) - u(b = m|s) > 0)$$

$$= Pr\left(e < \beta_0 u(L|s) + \beta_1 I_{\{n_f>0\}} c_f^c + \beta_2 I_{\{n_m>0\}} c_m^c\right),$$

$\beta_0, \beta_1, \beta_2$ are the parameters that need to be estimated.

Hypotheses

Hypotheses (when the probability of choosing a female successor is larger)	Variables to test the hypothesis and expected sign of the coefficient
Hypothesis 1: If the innate productivity of the female is larger	work_farm: the primary successor works on the farm (+)
	succ_agjob: the successor has an agriculture-related job (+)
Hypothesis 2: If the parent cares more about women	female_farmer: the farmer is female (+)
	college_degree: the farmer has a college degree (+)
	partner_spouse: the farm is a partnership with a spouse (+)
Hypothesis 3: If the farm has a shorter history of farming	farm_good: the farm condition is considered good or excellent (−)
	yr_start_farm: year the farm was established (−)
Hypothesis 4: If the parent only has female successor	daughter_only: The farmer only has daughters (+)

How the Logit Model Works?

Econometrics Academy

https://sites.google.com/site/econometricsacademy/

A rational farmer would only choose successor type j when it yields the highest utility of all choices. This means that the probability of farmer i choosing successor type j is

$$P_{ij} = Prob(V_{ij} + \varepsilon_{ij} > V_{ik} + \varepsilon_{ik} \ \forall k \neq j) \tag{4}$$

$$= Prob(\varepsilon_{ik} < V_{ij} + \varepsilon_{ij} - V_{ik} \ \forall k \neq j)$$

After some algebraic manipulation of the integrals and under the aforementioned distributional assumptions, this logit choice probability P_{ij} leads to the following succinct, closed-form expression (Train 2009):

$$P_{ij} = e^{V_{ij}} \Big/ \sum_j e^{V_{ij}} \tag{5}$$

We could explain the representative utility using observable characteristics $V_{ij} = \beta'_{farmer} X_{i,farmer} + \beta'_{successor} X_{ij,successor} + \beta'_{farm} X_{i,farm}$. With this linear in parameters specification, the above logit probabilities in equation (2) now becomes the following, which will be the basis of our regression:

$$P_{ij} = \frac{e^{\beta'_{farmer} X_{i,farmer} + \beta'_{successor} X_{ij,successor} + \beta'_{farm} X_{i,farm}}}{\sum_j e^{\beta'_{farmer} X_{i,farmer} + \beta'_{successor} X_{ij,successor} + \beta'_{farm} X_{i,farm}}} \tag{6}$$

The logit model uses the logistic function:

$$P(y = 1) = G(x\beta) = \frac{\exp(x\beta)}{1 + \exp(x\beta)} = \frac{e^{x\beta}}{1 + e^{x\beta}}$$

The base model is a simple logistic regression (or logit model)
Fancy econometrics needed to account for the rare events nature

Firthlogit

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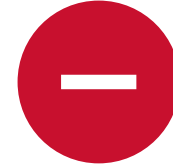Gender of farmer respondents

4.80%

95%

■ Male ■ Female
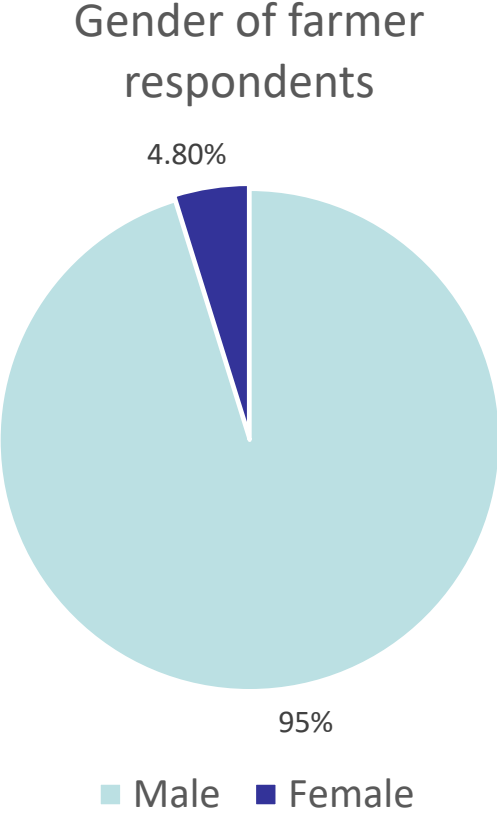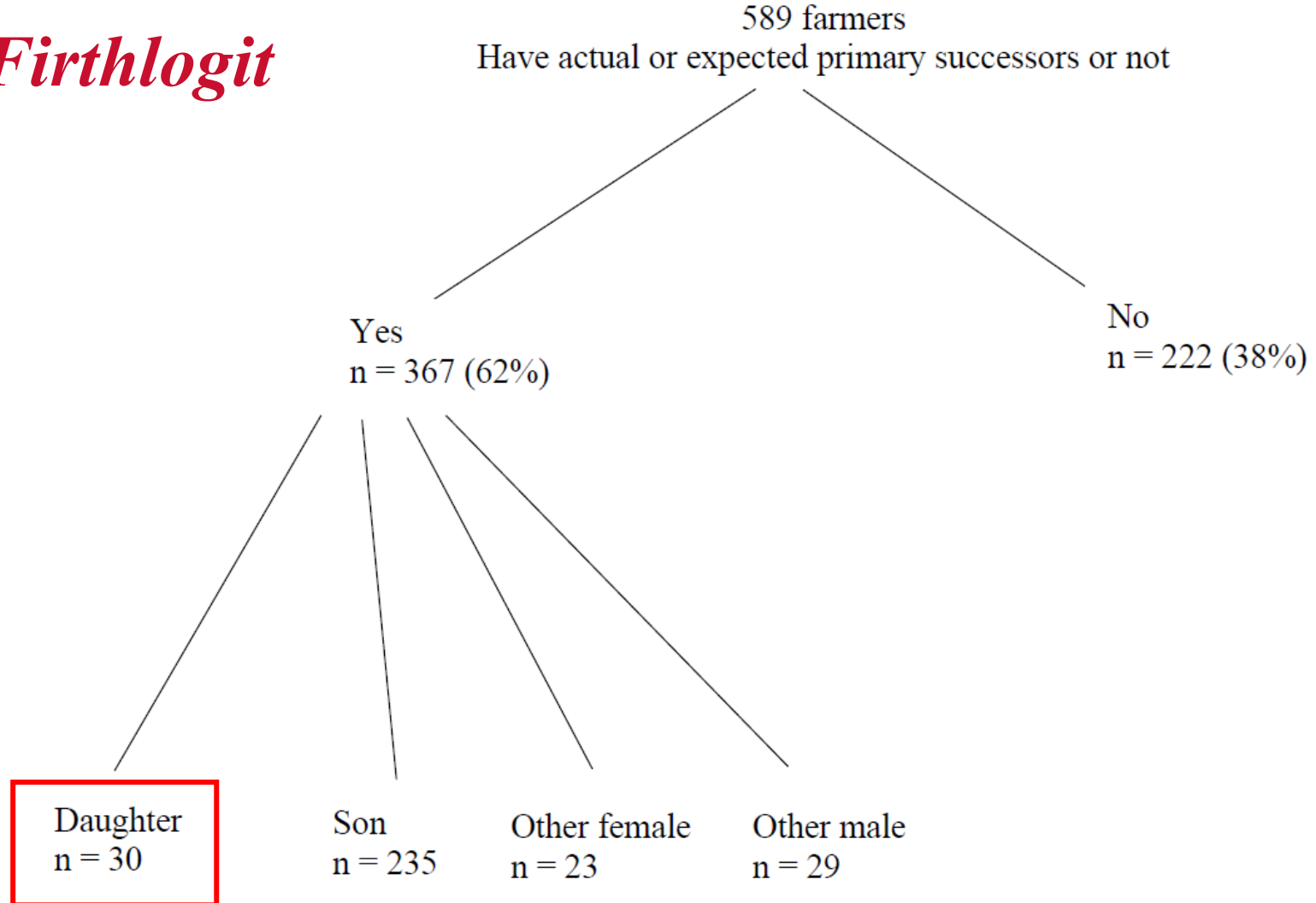
Positive vs negative factors: daughters

+

- The farmer is female
- Only have daughter(s)
- Have a college education
- Daughter works on the farm or has an agriculture related job
- Farmer is in a partnership with his wife

−

- Age of farmer
- Number of sons
- Whether son is the oldest child(when choosing a 2nd or 3rd successor)
- Year in which the farm was established (when accounting for crop reporting districts)
- Farm condition is good or excellent

Table 5. Marginal effects of key explanatory variables in driving farm successor choice (in percentage %)

Variables	Value	Succ_daughter	Succ_daughter_FE	Succ_23_daughter	Succ_all_daughter	Succ_female	Succ_son
female_farmer	0	5.389***	5.852***	10.123***	13.797***	8.265***	40.150***
	1	11.707***	12.350***	5.751	20.315***	14.695***	39.251***
daughter_only	0	3.318***	3.692***	10.293***	13.052***	5.972***	45.023***
	1	23.969***	24.774***	8.042***	19.952***	24.932***	2.003
partner_spouse	0	4.847***	5.336***	9.124***	12.859***	7.860***	41.276***
	1	8.933***	9.309***	12.571***	18.474***	11.212***	36.307***
succ_agjob	0	5.068***	5.434***	9.609***	13.364***	8.048***	36.288***
	1	17.886***	20.658***	12.438***	21.795***	18.106***	65.218***
work_farm	0	5.183***	5.564***	9.571***	13.138***	7.354***	37.436***
	1	11.899***	13.764***	12.116***	21.427***	20.024***	55.574***

Policy implications & conclusions

- Despite significant progress in gender equality in recent decades, our findings show there is still a cultural stereotype or implicit bias against women in agriculture. We find that landowners in Iowa are more likely to choose sons instead of daughters as their main successor.
- Our empirical results show that a farmer is more likely to choose a daughter as the main successor if the farmer is female or more educated.
- Our results also highlight the importance of agriculture-relevant skillsets and training of women as shown by the positive coefficients for ag-related jobs and/or education, especially in the era of digital agriculture demanding less manual labor
- Programs targeted to young female farmers can be used to address the knowledge gap, build leadership, and create an incentive to work on the family farm. Incentives targeted to young female graduates in agriculture-related fields, whether monetary or in other forms, could potentially help create a female farm workforce.

A Note for the Students!

- only two of 15 members serving on the Board of National Corn Growers Association are women
- the corresponding ratio for the National Soybean Association is two of 57!
- Even for the National Future Farmers of America, in which three of seven national officers are female, the board of directors only has four women out of 14 members

- the ideal skillsets for a successful farmer have shifted from physical demands and agronomy-centered knowledge to those focused on marketing, finance, computer skills, and entrepreneurship or deal-making.
- recruiting and promoting female faculty and providing a broader overview of STEM fields in introductory courses leads to higher female student recruitment and retention.

Chapter 82 - Gender in agriculture and food systems

Agnes R. Quisumbing [a] ... Cheryl R. Doss [b]

Show more ∨

:≡ Outline | ⟨ Share " Cite
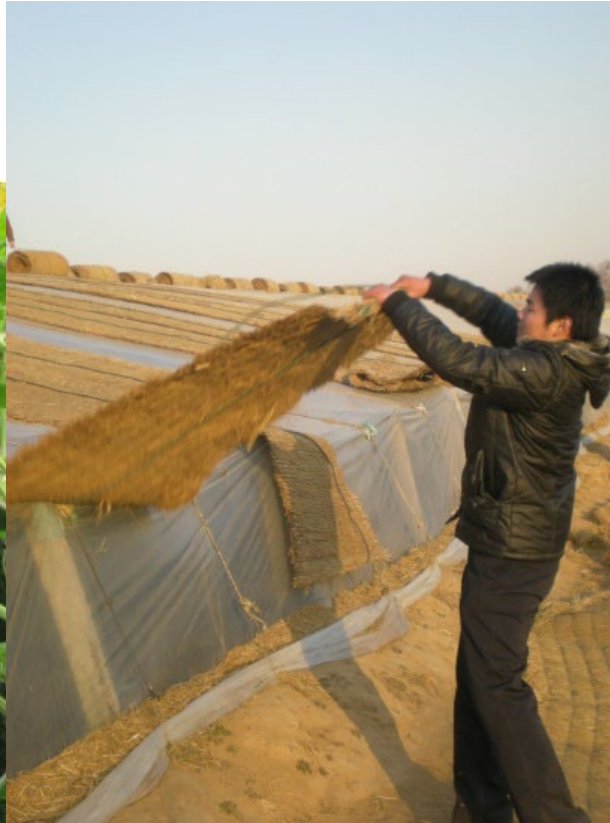
This chapter critically reviews the rapidly growing empirical literature on gender and agriculture in low- and middle-income countries. We first deal with models and measurement, including household models of production and consumption, contrasting models that assume Pareto efficiency with those that do not. We discuss the implications of complex household structures, the neglect of jointness of household decisions, and incomplete risk-sharing within the household. We also discuss advances in measurement and data collection, focusing on measuring assets, decision-making, empowerment, and time use.

We then review empirical studies applying gender analysis to production, markets, and well-being outcomes. We review studies on gender gaps in agricultural resources, agricultural productivity, and the gender dynamics of technology adoption. We then examine studies of gendered participation in markets, including impact evaluations of interventions to improve gender equity in marketing schemes. We review the literature on how women's empowerment and gender equality affect nutrition outcomes, and how gender dynamics affect the takeup and impact of nutrition-sensitive agricultural programs. We conclude and identify areas for future work.

https://doi.org/10.1016/bs.hesagr.2021.10.009

Changes in my hometown?

Greenhouse – plastic film - Shandong Province

莘县蔬菜
SHENXIAN VEGETABLES
中国蔬菜第一县

莘县蔬菜·健康生态

届山东聊城（莘县）蔬博览会云
暨莘县农产品区 品牌发布会

主办单
承办单

山东聊城莘县县长
高志国

给宝宝们送福利

In China, 500+ million consumers shop on mobile phones, even before the coronavirus

Thank you!

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https://wendongzhang.weebly.com/