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Gender and Sibling Dynamics in the Intergenerational Transmission of Entrepreneurship

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Abstract

This paper demonstrates that the transmission of self-employment from fathers to daughters is significantly reduced when there are sons in the family. I interpret this as evidence that the intergenerational transmission of entrepreneurship is driven at least in part by costly investments by parents, which can be crowded out by brothers. I investigate various types of parental investments that potentially underlie this transmission and conclude that sons crowd out human capital acquisition by daughters. If all daughters of self-employed men experienced the “sisters-only” level of transmission, the overall gender gap in self-employment would be reduced by nearly 20 percent.

1 Introduction

A persistent gender gap exists in entrepreneurship: men are almost twice as likely as women to start or own a business (Kauffman Foundation, 2017). To understand this gap, researchers have pursued explanations relating to gender differences in risk appetite, competitiveness, internal locus of control, and self-assessed ability (Bönte and Piegeler, 2013; Caliendo et al., 2015; Thébaud, 2010), as well as discrimination in access to financing (Bigelow et al., 2014; Buttner and Rosen, 1989; Carter et al., 2007). Not all gender differences advantage men relative to women; for instance, women score higher on some personality traits – openness and extraversion – that relate positively to entrepreneurship. Taking personality, demographics, and labor market characteristics all together, Caliendo et al. (2015) actually find that the unexplained gender gap in entrepreneurship grows larger after controlling for these covariates. Women’s stronger preferences for flexible work hours

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and higher levels of educational attainment deepen the puzzle over low rates of female entry into entrepreneurship.

I bring a new perspective to this question by turning to an important determinant of entrepreneurship more generally: a family history of business ownership. Cross-country evidence demonstrates that children of entrepreneurs are much more likely to be self-employed or start a business,¹ but the effect of entrepreneurial fathers is stronger on sons than daughters.² In this paper, I show that this gender gap in transmission is due at least in part to fraternal competition: girls with only sisters exhibit significantly stronger responses to paternal entrepreneurship than girls with brothers. This pattern is mediated by human capital transmission: girls with brothers are less likely to gain experience in the family business. I estimate that the crowd-out in entrepreneurship transmission by brothers could be responsible for almost one-fifth of the overall gender gap in self-employment rates.

My main source of data is the Panel Study of Income Dynamics, an intergenerational, longitudinal household survey that permits me to construct a panel of approximately 3,000 father-daughter pairs. I find that relative to daughters-only families, around 80 percent of the effect of fathers' self-employment experience on daughters' entrepreneurship outcomes is eliminated when sons are present. Moreover, the transmission to daughters in sisters-only households is quite large – roughly a doubling in self-employment probabilities – and is comparable to the transmission from fathers to sons. Since families can select into having sons by having more children, I also estimate a specification comparing the transmission among first-born girls whose next-oldest sibling is male versus female. Families with a first-born daughter and at least one additional child are ex-ante identical regardless of the sex of the second child, allowing me to interpret the effect of sibling sex on father-daughter transmission as causal. The results are very similar in this first-born-women specification.

I next proceed to explore the mechanisms responsible for the transmission and crowd-out of entrepreneurship. Some transmission mechanisms are unlikely to be affected by family composition: for example, the inheritance of innate ability or taste for entrepreneurship does not depend on the sex of one's siblings. On the other hand, for mechanisms involving costly investments by parents, the number and sex mix of children is likely to affect the amount invested per child and hence the strength of transmission. The existence of sibling crowd-out patterns suggests that costly parental investments are at least partly responsible for intergenerational entrepreneurship transmission. Accordingly, I look for evidence on which paternal investments in daughters are affected by sibling composition, focusing on transfers of money, business stakes, and human capital,

¹Dunn and Holtz-Eakin (2000): United States; Laferrère (2001): France; Niittykangas and Tervo (2005): Finland; Nanda and Sørensen (2010): Denmark; Lindquist et al. (2015): Sweden.

²Andersson and Hammarstedt (2011); Dunn and Holtz-Eakin (2000); Lindquist et al. (2015); Niittykangas and Tervo (2005).

which is assumed to be transmitted via training in the father’s business. I first rule out that the transmission and crowd-out of entrepreneurship occurs via business inheritance: I estimate that at most 8 percent of second-generation business owners may have inherited or co-owned a family business, and brothers have no effect on women’s probability of inheriting a business. I also find that sibling sex composition does not affect financial help provided by fathers to daughters. The effect of an additional sibling on the probability or amount of a transfer, while negative, does not depend on the sex of the sibling.

Meanwhile, human capital does appear to be a relevant channel that is crowded out by brothers. I find some evidence that brothers crowd out girls’ first-hand experience with their fathers’ businesses in two distinct analyses: one using retrospective self-reports of experience in the family business, and the other using time-use data to study whether daughters spend time at work with their fathers. Existing research documents a correlation between work experience in a family business and entrepreneurial outcomes (Fairlie and Robb, 2007) but cannot distinguish causal effects from selection – that is, individuals with a taste or aptitude for entrepreneurship are more likely to both work in the family business and ultimately start their own business. This project is novel in that father-daughter interaction is exogenously affected by the presence of brothers and shown to have a follow-on effect on female entrepreneurship.

I perform a back-of-the-envelope calculation to estimate how the crowd-out by sons of father-daughter entrepreneurship transmission contributes to the gender gap in self-employment. If all daughters of self-employed men experienced the sisters-only transmission effect, the gap in self-employment rates between sons and daughters of entrepreneurs would be approximately halved. Combining individuals with and without self-employed fathers, this counterfactual would reduce the overall gender gap in self-employment by about one percentage point, relative to the actual gap of 5.5 percentage points. Given the responsiveness of girls in sisters-only households to paternal inputs, interventions that replicate these inputs – for example, placing girls in internships at small businesses – may be effective in increasing female-led business creation.

The current shortage in entrepreneurial human capital held by women is significant both on a private and public level. The fact that more daughters of entrepreneurs select into self-employment when they have only sisters suggests that many women prefer entrepreneurship to employment when they have the necessary human capital. In other words, acquiring business human capital makes women at least weakly better off by making entrepreneurship a viable career choice. Additionally, there are economic consequences to this entrepreneurship shortfall: business creation is an important source of employment and productivity growth (Aghion et al., 2014; Erken et al., 2016; Glaeser et al., 2015). Women’s advances in educational attainment mean that there is more untapped potential for high-growth entrepreneurship than ever before (Mitchell, 2011).

2 Methodology and Data

To study the relationship between parent and child entrepreneurship, as well as the mediating effects of siblings, I use the Panel Study of Income Dynamics (PSID)³, a longitudinal, intergenerational survey of American households spanning the years 1968 to 2013. Self-employment in a given survey wave is defined as being self-employed in any job asked about in that wave: current main job, previous jobs held since the last interview, or additional current jobs. I define an individual as having a self-employed father if the father was self-employed in at least two survey waves while the respondent was between ages 8 and 18. This is designed to serve as a measure of respondents' exposure to entrepreneurship during their formative years.

I use a linear probability model to estimate the relationship between father and daughter entrepreneurship, allowing this relationship to vary depending on whether or not there are sons in the household. Specifically, I estimate a regression equation of the form

$$\text{Entrprnr}_{it} = \beta_0 + \beta_1 \text{Dad Entrprnr}_i + \beta_2 \text{Bro}_i + \beta_3 \text{Dad Entrprnr}_i \times \text{Bro}_i + \beta_4 X_{it} + \epsilon_i \quad (1)$$

where Entrprnr_{it} is an indicator for respondent i being self-employed in wave t , Dad Entrprnr_i indicates that the respondent's father was self-employed while she was a child (as defined above), Bro_i is an indicator for having at least one brother, and X_{it} is a vector of controls: year of birth, number of siblings, race, and a quadratic in age. The coefficient β_1 estimates the effect of having an entrepreneurial father for girls with only sisters; $\beta_1 + \beta_3$ gives the net effect of having an entrepreneurial father for girls with brothers. On its own, β_3 estimates the "crowdout effect": the reduction in the transmission of entrepreneurship that occurs when girls have at least one brother.

One issue with the specification above is that it is possible that the presence of a brother is endogenous: some families may have a preference for sons and will continue having children until they get one. In this case, the fathers of girls with and without brothers are not strictly comparable. If fathers with a son preference would treat daughters differently even in the absence of sons, the effect of father's attitude will be confounded with the effect of brothers in specification (1) (Brenøe, 2017). To address this issue, I use a second specification that restricts the sample to first-born daughters and estimates the effect of the sex of the next-oldest sibling. Since the sex of the second child is random, it is uncorrelated with fathers' pre-existing gender attitudes. Differences between first-born girls with a next-younger brother versus sister can be attributed to the sex of the sibling, not parental attitudes.

³Survey Research Center, Institute for Social Research (2017).

3 Results

The results of the main specification, equation (1), can be found in Table 1. The coefficient on “Dad self-employed” shows the effect of having a self-employed father on the probability of being self-employed in a given year for women with sisters only. The magnitude of the effect in column (1), 9.4 percentage points, is very large relative to the baseline rate of self-employment among women with no brothers and no self-employed father: 7.0 percent. The main effect of “Brother” is not significant, meaning that brothers do not affect their sisters’ self-employment probabilities in the absence of a self-employed father. Finally, the coefficient on the crowd-out term, “Dad self-employed \times Brother” is a statistically significant -7.6 percentage points. Summing this with the main effect of “Dad self-employed,” the net effect of a self-employed father is only 1.8 percentage points for

Table 1: Effect of brothers on father-daughter self-employment transmission

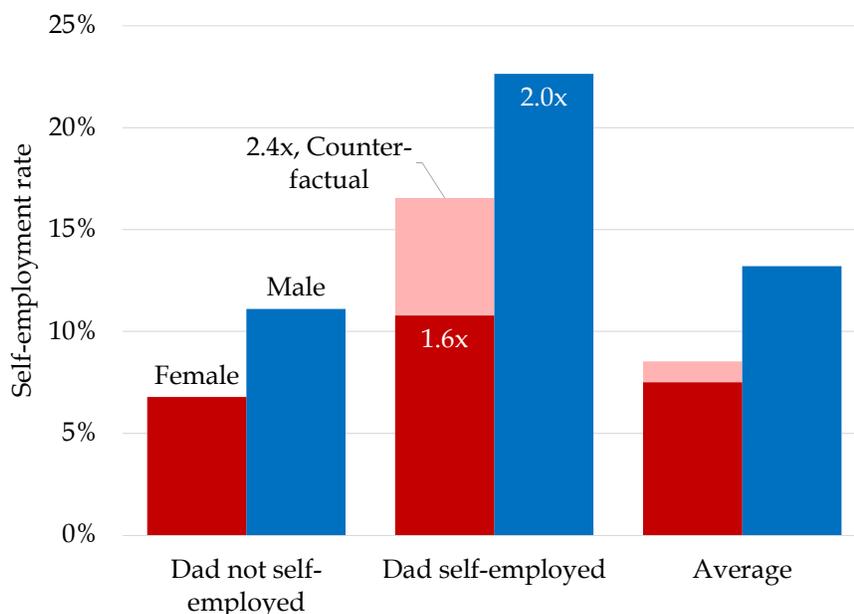
| | Self-employed | |
|---|--------------------|-------------------------|
| | Women w/ sibs | Firstborn women w/ sibs |
| Dad self-employed | 0.094** (0.036) | 0.086** (0.029) |
| Brother | 0.011 (0.012) | |
| Next sib is male | | 0.023 (0.014) |
| Dad self-employed \times Brother | -0.076* (0.038) | |
| Dad self-employed \times Next sib is male | | -0.077* (0.037) |
| Siblings | -0.000 (0.001) | -0.001 (0.005) |
| Baseline mean | 0.070 | 0.057 |
| Daughters | 3,051 | 881 |
| Fathers (Clusters) | 1,937 | 881 |
| Observations | 33,084 | 8,924 |

Source: PSID. *Note:* Dependent variable is an indicator for being self-employed in a given survey wave. Dad self-employed is an indicator for the respondent’s father being self-employed in at least two survey waves while the respondent was between ages 8 and 18. The first column includes all female respondents with siblings and estimates the effect of having at least one brother. The second column includes only first-born female respondents with siblings and estimates the effect of the next-oldest sibling being male. Baseline mean is the dependent variable mean for respondents without a self-employed father or a brother (or whose second sibling is female). All specifications include controls for age, age², race, and year of birth. Standard errors clustered at the father level. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

women with brothers. The point estimates are quite similar and also statistically significant in the alternative specification studying first-born daughters and their next-oldest sibling. This suggests that the estimates in the first column are not strongly biased by unmeasured differences in fathers of only daughters versus daughters and sons.

Figure 1 shows what would happen to the gender gap in self-employment in a counterfactual scenario in which all daughters of self-employed men experience the “sisters-only” transmission effect. The dark bars present the actual self-employment rates among women and men with and without self-employed fathers (first and second pair of bars), and on average (third pair of bars). Relative to children of non-self-employed men, daughters and sons of self-employed men are on average 1.6 and 2.0 times as likely to be self-employed. Meanwhile, the middle pink bar shows that if they have only sisters, daughters of self-employed men are 2.4 times as likely to be self-employed. This serves as a counterfactual for the potential level of father-daughter self-employment transmission in the absence of competition from brothers. Among respondents with self-employed fathers, the gender gap in self-employment would fall by about half. When these respondents are pooled with those without self-employed fathers, the effect of this counterfactual scenario is to

Figure 1: Counterfactual gender gap in self-employment



Source: PSID. *Note:* Dad self-employed is defined as the respondent’s father being self-employed in at least two survey waves while the respondent was between ages 8 and 18. Dark bars present the actual self-employment rates for each group. Middle pink bar presents the actual self-employment rate among daughters of self-employed men without brothers, which serves as a counterfactual for potential transmission from fathers to daughters. Right pink bar averages this counterfactual rate and the actual self-employment rate among daughters of non-self-employed men based on the shares of daughters with and without a self-employed father.

increase female self-employment rates by about 1 percentage point, closing 18 percent of the 5.5 percentage point gap. Thus, a non-trivial portion of the overall gender gap in self-employment can be explained by differential treatment experienced by daughters of entrepreneurs with and without brothers.

4 Mechanisms

I now turn to the mechanisms that could be driving both the intergenerational transmission of entrepreneurship and its crowd-out by brothers. I consider three possible mechanisms: business inheritance, financial transfers, and human capital investments.

Business inheritance I begin by ruling out one seemingly plausible explanation: that the inheritance of self-employment reflects transfers of business ownership from parents to children. To quantify the potential role of business inheritance in intergenerational entrepreneurship transmission, I create a sample of “second-generation business owners”: business-owning respondents whose fathers ever owned a business prior to or during the current survey wave. Even among those respondents who do start a business in the same year their father exits his business, only around one-quarter start a business in the same industry. Overall, only 3.6 percent of second-generation business owners start their business in the same year their father exited his business and in the same industry, and hence could have plausibly inherited a family business. It is possible that businesses change hands after a period of co-ownership, instead of the father handing over the entire business at once. However, only 4.1 percent of second-generation business owners ever report co-owning a business with any family member other than a spouse. In summary, the phenomenon of business inheritance appears to be quite rare, consistent with results by Fairlie and Robb (2007) and Dunn and Holtz-Eakin (2000): summing the rates of potential inheritance and co-ownership, at most 7.7 percent of second-generation business owners may have inherited a business or stake. Additionally, I find no effect of brothers on a woman’s probability of inheriting a business, conditional on having a self-employed father.

Financial transfers I next test the effect of siblings on financial transfers from fathers to daughters. For this analysis I use the Health and Retirement Study, a panel study of older Americans, due to its large sample size and clean records of “financial help” given to children. I construct a sample of all available father-daughter pairs, including those with no siblings for this analysis. As my outcome I use three different measures: an indicator for the father making any transfer in a given year, the dollar amount of the transfer, and the amount of the transfers in logs, with zeros dropped. I find that siblings do indeed matter, both for the probability of receiving a transfer and

for the amount. However, the effects of brothers and sisters are identical: an additional sibling of either sex reduces the probability of receiving a transfer in a given year by about 2 percentage points, relative to the mean annual transfer probability of 46.2 percent among daughters with no siblings. Interestingly, self-employed fathers make more frequent and larger transfers to their children than other fathers. However, the gender composition of children does not affect the amount of resources directed towards daughters.

Human capital When it comes to human capital investments, I find more direct evidence of crowd-out by brothers. I consider children working in the family business to be a form of investment since fathers likely have to spend time training their children to make them effective helpers. To study these investments, I use the National Longitudinal Survey of Youth 1979 (NLSY79), a panel survey that began with a sample of 12,686 14- to 22-year-olds in 1979. I estimate the effect of brothers on the probability that a female NLSY79 respondent reports having worked in the family business, conditional on her family owning a business. I test this question in two specifications in Table 2: the first estimates the effects of having at least one brother among all women with siblings. The second estimates the effect of having the second sibling be male among first-born women with younger siblings. In both specifications, I find that girls with a brother are around 7 percentage points less likely to work in the family business, relative to a rate of 32 percent among girls with

Table 2: Effect of brothers on girls working in family business

| | Ever worked in family business | |
|-----------------------|--------------------------------|-------------------------------|
| | Women w/ sibs | Firstborn women w/ sibs |
| Brother | -0.075 ⁺ (0.039) | |
| Next sib is male | | -0.070 (0.052) |
| Siblings | 0.001 (0.005) | 0.035 ⁺ (0.020) |
| Baseline mean | 0.316 | 0.267 |
| Daughters | 1,126 | 272 |
| Households (Clusters) | 1,023 | 272 |
| Observations | 1,126 | 272 |

Source: NLSY79. *Note:* Dependent variable is an indicator for the respondent reporting having worked in a family member's business in a retrospective entrepreneurship segment administered in 2010–2014. The first column includes all female respondents with siblings and estimates the effect of having at least one brother. The second column includes only first-born female respondents with siblings and estimates the effect of the next-oldest sibling being male. Baseline mean is the dependent variable mean for respondents without a brother (or whose second sibling is female). All specifications include controls for race and year of birth. Standard errors clustered at the household level. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

only sisters. I interpret this as evidence that boys crowd out their sisters' learning experiences with the family business, which could translate into lower rates of entrepreneurship later in life.

5 Conclusions

In this paper, I demonstrate that brothers crowd-out the transmission of self-employment from fathers to daughters. This crowd-out appears to be related to human capital investments by fathers: among those whose families owned a business, women with only sisters are 7.5 percentage points more likely than women with brothers to have gained experience working in that business. While this experience gap alone cannot explain the entire transmission gap, it suggests that self-employed fathers with sons allocate attention away from daughters in a way that reduces the probability of daughters becoming entrepreneurs. Female entrepreneurs also are significantly less likely than their male counterparts to receive non-financial help from their entrepreneurial fathers. Meanwhile, business inheritance and general financial help do not appear to explain the crowd-out of transmission by brothers, although there is evidence of a gender gap in parental investments in their children's businesses.

This finding is significant to our understanding of the intergenerational transmission of entrepreneurship more generally. Since the relationship between father and daughter self-employment varies with the sex mix of siblings, this implies that the transmission of entrepreneurship is mediated by active investments that can be crowded out, not just passive mechanisms like heritable ability or role modeling. My results also imply that a portion of the gender gap in transmission, and in overall rates of self-employment, can be attributed to differences in paternal investments in sons versus daughters. My empirical strategy does not allow me to estimate the total gender gap in paternal investments, but the level of investment received by daughters with only sisters can perhaps be thought of as a lower bound for the level received by sons. These investments have a powerful effect on female entrepreneurship: among women with only sisters, those with a self-employed father are more than twice as likely to be self-employed. This large effect size could be explained by the fact that the tools acquired by these daughters are broadly applicable: the majority of daughters induced into self-employment work in different broad occupations and industries than their self-employed fathers. In other words, paternal self-employment experience promotes entrepreneurship even among women who have different occupational interests or skills than their fathers.

The effects I observe are economically large: if all daughters of self-employed men experienced the sisters-only transmission effect, the overall gender gap in self-employment would be reduced by almost one fifth. Increasing women's entrepreneurial capacity by replicating parents'

inputs – particularly through education and training at a young age – could have a significant impact on firm creation and productivity growth. Equalizing opportunities for aspiring entrepreneurs would also ensure that the rewards to entrepreneurship are fairly distributed and that high-potential individuals are not left on the sidelines.

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