Gender and Sibling Dynamics in the Intergenerational Transmission of Entrepreneurship

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Abstract

This project uses gender and sibling dynamics to explore the intergenerational transmission of entrepreneurship. I find 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 specific types of parental investments – transfers of money, businesses, and human capital – 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.

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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 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] However, this transmission is stronger for same-sex parent-child pairs: in particular, fathers affect sons more strongly than daughters (Andersson and Hammarstedt, 2011; Dunn and Holtz-Eakin, 2000; Lindquist et al., 2015; Niittykangas and Tervo, 2005). This transmission differential contributes mechanically to the gender gap in entrepreneurship, but its underlying source is unclear. The gap in transmission from fathers to daughters versus sons could have two components. First, the same paternal inputs may have different effects on sons' and daughters' entrepreneurship outcomes. Second, there could be gender differences in the level of inputs provided by fathers. These inputs include transfers of human capital, financial capital, or other assets.

Since inputs cannot be measured perfectly, it is not possible to either estimate the gender gap in inputs or isolate the gender gap in transmission while holding inputs constant. Instead, I use an empirical strategy that varies inputs while holding gender constant: I estimate the effect of brothers on the strength of father-daughter transmission. If fathers prioritize sons, then girls with only sisters will face reduced competition for paternal resources. These sisters-only daughters serve as a counterfactual for the potential level of father-daughter entrepreneurship transmission in the absence of competition from brothers. Since families can select into having sons by having more children, I also estimate a specification comparing the transmission to first-born girls whose next-oldest sibling is male versus female. Families with a first-born daughter and at least one

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

additional child are ex-ante identical regardless of the sex of the second child, allowing me to interpret differences in transmission with respect to sibling sex as causal.

Using data on approximately 3,000 father-daughter pairs in the Panel Study of Income Dynamics, an intergenerational, longitudinal household survey, I find that brothers significantly reduce the strength of the intergenerational transmission of entrepreneurship from fathers to daughters. 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. The results are very similar when comparing first-born women with next-younger brothers versus sisters. 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. This suggests that, when offered, paternal investments are valuable inputs into female entrepreneurship.

I next look for evidence on which paternal investments are affected by sibling composition, focusing on transfers of money, business stakes, and human capital, 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. Since I cannot observe business inheritance directly, I define a potential inheritance as acquiring a same-industry business in the year one's father exits his business, or co-owning a business with a family member other than one's spouse. According to these measures, at most 7.7 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 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. However, I do find evidence of a gender gap in family business loans and investments. Among entrepreneurs, having a parent with business ownership experience boosts men's probability of receiving business financing from family members, but has no effect for women.

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 work 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 expect that these results are at least somewhat generalizable from daughters to sons: human capital investments by fathers in their sons are likely to play an important role in the father-son transmission of entrepreneurship. This would be consistent with other literature highlighting the role of human capital in occupational transmission. For instance, Bell et al. (2016) show that children of inventors are not only more likely to file a patent, but that these patents disproportionately occur in the same sub-class as their fathers' patents. This similarity is much more plausibly attributable to human capital transmission than to genetic ability or role modeling. Laband and Lentz (1983a) frame intergenerational entrepreneurship as a special case of occupational transmission: because proprietors have closer ties between their personal and work life, there is greater scope for human capital transmission to children. While this may be true, it is not the case that children of entrepreneurs follow narrowly into their parents' line of work. Consistent with Dunn and Holtz-Eakin (2000) and Andersson and Hammarstedt (2011), I find that while there is a slight increased propensity for occupational inheritance among self-employed father-daughter pairs, the vast majority of self-employed daughters of entrepreneurs work in distinct broad occupations and industries. Because the intergenerational transmission of entrepreneurship does not occur strictly along occupational lines, I conclude that the business human capital being transmitted is broadly applicable across occupations.

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 current 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 and shrinking the gap further. Indeed, these results are consistent with Wilson et al. (2007) who argue that experience in an entrepreneurial setting is essential in developing self-efficacy and increasing women's willingness to pursue entrepreneurship.

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).

The remainder of the paper is organized as follows. Section 2 reviews the theoretical and empirical literature on intergenerational entrepreneurship and sibling dynamics that provides a framework for this study. Section 3 describes the Panel Study of Income Dynamics in more detail and introduces the other data I will use to test mechanisms. Section 4 briefly lays out my main empirical strategy. Sections 5 and 6 present the empirical results relating to sibling crowd-out and the mechanisms behind this phenomenon. After reviewing some robustness checks in Section 7, I discuss my results in Section 8 and conclude in Section 9.

2 Background and related literature

Intergenerational transmission of entrepreneurship Three main classes of mechanisms have been proposed for the intergenerational transmission of entrepreneurship. First, there appears to be a genetic component: using data on biological and adoptive parents of Swedish adoptees, Lindquist et al. (2015) estimate that around one-third of the total relationship between parent and child entrepreneurship can be explained by pre-birth factors. For children raised by their biological parents, genetic determinants of entrepreneurship are in general difficult to distinguish from the second mechanism: role modeling. Certain traits such as aptitude, self-esteem, and rebelliousness are strongly predictive of entrepreneurship (Levine and Rubinstein, 2017), and these may be passed from parents to children via genes or role modeling (Wyrwich, 2015). Besides cultivating these traits in their children, a more direct form of role modeling may exist whereby entrepreneurial parents make entrepreneurship a more salient or legitimate career choice (Sørensen, 2007).

In this project, I focus on a third class of mechanisms: costly investments by parents in their children. Dunn and Holtz-Eakin (2000) propose a model in which the choice to become self-employed depends on entrepreneurial ability and, in the presence of liquidity constraints, assets; both ability and assets can be actively transmitted from entrepreneurial parents to their children. For instance, parents may build their children's business human capital by training them inside the family business. Empirically, working in the family business is an important predictor of future entrepreneurship and, especially, entrepreneurial success (Fairlie and Robb, 2007). Entrepreneurial parents may also have accumulated greater wealth that they can invest in their children's businesses. Additionally, they may be more willing to make such an investment, controlling for wealth, if their entrepreneurial history is associated with greater risk appetite or business savvy. Financial transfers

have typically not been found to be quantitatively important in explaining the intergenerational transmission of entrepreneurship, but I will examine this mechanism nonetheless. Finally, while it is natural to expect that the intergenerational transmission of self-employment reflects transfers of family businesses from parents to children, this is relatively rare. Indeed, the majority of second-generation business owners actually work in a different industry than their parents did, suggesting that the transmission is not limited to children narrowly following in their parents' footsteps (Dunn and Holtz-Eakin, 2000; Fairlie and Robb, 2007).

Unlike genes and role modeling, costly investments are rivalrous in the sense that attention or money consumed by one child cannot be consumed by another child simultaneously. I consider any inputs that are completely non-rivalrous to be part of role modeling. For example, if children learn about business by overhearing their father's business conversations, this would be a non-rival mechanism. I interpret the fact that brothers crowd out transmission of entrepreneurship from fathers to daughters as evidence that rival mechanisms are active, although my empirical strategy does not test for or rule out passive mechanisms such as heritable ability or role modeling. Next, I describe why it may be the case that brothers influence transfers from fathers to daughters.

Sibling gender and parent-child interactions The gender mix of siblings in a household could shape girls' outcomes in multiple ways. In this project I focus on how the presence of a son influences the relationship between fathers and daughters. Having a son may lead fathers to reallocate their attention away from daughters if fathers are more interested in interacting with sons or if parents "believe they are better able to offer guidance and advice to their same-sex children," promoting a gender-specialized parenting strategy when both sons and daughters are present (McHale et al., 2003, 132). On the other hand, girls may benefit from having brothers because sons increase marital formation and stability, perhaps because men feel more responsibility for or attachment to their male children (Dahl and Moretti, 2008; Morgan et al., 1988). This could produce a spillover in which girls with brothers are more likely to be part of an intact family and living with their father. For similar reasons, sons have been shown to increase paternal involvement in childrearing overall. Girls with brothers may therefore interact more with fathers either incidentally or because fathers with sons increase their attention to daughters due to a norm that children be treated equally (Harris and Morgan, 1991; McHale et al., 2003). Data from time use diaries has shown that brothers increase father-daughter co-participation in leisure activities but reduce quality time, including time spent on homework and reading (Brenøe, 2017; Harris and Morgan, 1991; Mammen, 2011).

Overall, the evidence is mixed as to whether the gender of a girl's siblings affects her level of educational attainment (Butcher and Case, 1994; Hauser and Kuo, 1998; Kuo and Hauser, 1996; Peter et al., 2015; Steelman et al., 2002). In contrast, two recent papers show that brothers

have a significant negative effect on girls' probability of studying STEM (Science, Technology, Engineering, and Mathematics). Brenøe (2017) finds a small negative effect of brothers on Danish women's enrollment in STEM education: a reduction of around half a percentage point relative to the STEM enrollment rate of 33 percent among women with sisters. Oguzoglu and Ozbeklik (2016) estimate much larger effects of brothers concentrated on women with fathers in STEM occupations: having a brother roughly eliminates the positive effect of STEM fathers on daughters' STEM college major choice of around 16 percentage points for American women in the National Longitudinal Survey of Youth 1979 (NLSY79) data and around 10 percentage points for Australian women in the Household Income and Labor Dynamics in Australia (HILDA) data.

These results are consistent with the gender-specialized parenting channel described above: fathers with sons are less likely to transmit occupation-related human capital and preferences to their daughters. It is also possible that the gender of siblings directly affects career choices by influencing children's gendered identity and interests. Brothers may pique girls' interest in traditionally male topics, or alternatively prompt them to "develop different attributes and interests in an effort to establish their own niches in the family and reduce sibling rivalry" (McHale et al., 2003). If this mechanism were operative for STEM (or entrepreneurship) career choice, one would expect brothers to affect female entry into these masculine fields even in families without a father in STEM (or self-employment), which Oguzoglu and Ozbeklik (2016) and I do not observe. The possibility remains that daughters of self-employed men shy away from entrepreneurship when they have brothers because of a reluctance to compete in the same space, not because fathers are less encouraging or willing to invest in them. I do find direct evidence that entrepreneurship-related human capital inputs are lowered for these girls: girls with brothers are less likely to spend time with their self-employed fathers at work or gain any experience working in the family business. However, it is not possible to say whether these inputs were withheld by fathers or rejected by daughters.

The literature on parents' allocations of inter vivos transfers and bequests has centered on (1) altruism, (2) exchange, and (3) evolutionary motives. These three motives, respectively, predict that parents will use transfers to (1) equalize marginal utilities of children; (2) incentivize child actions, such as eldercare; and (3) promote continuation of the genetic line, for instance by rewarding children who produce grandchildren (Becker, 1974; Cox and Rank, 1992; Light and McGarry, 2004). The net effect of sibling gender composition on these motives is ambiguous. To the extent that men have higher earnings and lower marginal utility of income, women with brothers may receive a larger share of transfers than women with sisters because of the altruism motive. On the other hand, if transfers to sons are more productive – for instance, if investments have a larger effect on the probability of starting a successful business for sons than for daughters – then parents might optimally reallocate resources toward sons, at least earlier in the life cycle (Becker

and Tomes, 1976). Meanwhile, if women are more likely to than men be caregivers for elderly parents, having more sisters will make any given woman less likely to be the target of transfers intended to incentivize caregiving. The net effect of sibling sex mix on transfers will be tested empirically in Section 6.

3 Data

3.1 Panel Study of Income Dynamics

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)[2], a longitudinal, intergenerational survey of American households spanning the years 1968 to 2013. Starting in 1968, a sample of around 5,000 families were interviewed on topics such as employment (including self-employment), income and assets (including business ownership), fertility and marital history, and more. All members of these initial families were followed as they formed new households, and children and partners of these individuals were added to the survey. Interviews were conducted annually until 1997, and biannually thereafter.

Variables and definitions 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 also consider alternative measures of entrepreneurship: incorporated self-employment and business ownership. However, business ownership information is only collected beginning in 1985, which limits the usable sample size.

Siblings are defined based on the Childbirth and Adoption History file, a detailed retrospective collection of fertility. I define as siblings all children who share a father, whether adopted or biological. This is because the stepfather relationship may differ: stepbrothers or half-brothers with a different father may not have as prominent of an effect on the father-daughter relationship as full brothers or half-brothers who share a father.

The main demographic data I use are age, sex, year of birth, and three categories for race: white, black, and other. In some robustness checks I include controls for state of residence and occupation. The PSID relies on the 1970 and 2000 Census occupation codes, which I crosswalk to a

[2]Survey Research Center, Institute for Social Research (2017).

balanced panel of 264 occupations created by Dorn (2009) and Autor and Dorn (2013). I aggregate these to a set of 32 broad occupations for some analyses (see Appendix Table A1). An individual's occupation in a given year is defined based on his or her current or most recent main job. I follow a similar procedure for crosswalking and aggregating industries for jobs (See Appendix Table A2). Meanwhile, businesses owned by respondents are recorded in 33 broad industries which are largely consistent over time.[3]

Sample selection My analysis sample consists of adult (head, wife, or "wife" – cohabiting partner of head) female respondents whose fathers were observed at least four times while the respondent was between ages eight and eighteen. The four-observation restriction is made to reduce noise in the measure of father self-employment, in particular to reduce the chances that a father who really did have self-employment experience is classified as not self-employed simply because he happened not to be observed during a self-employment spell. I also restrict the sample to include only women with siblings to ease interpretation: women with brothers are compared to women with only sisters. Women with no siblings are quite rare during my observation period and their families could potentially differ in important ways. Table 1 reports summary statistics for this sample of women.

The initial 1968 sample of the PSID consisted of two samples: a nationally representative sample of 2,930 families and an over-sample of 1,872 low-income families. Later, samples of Latinos and immigrants were added to the survey. Given the shorter time frame for which these additional samples are observed, almost none of them enter into the analysis. The questionnaire is structured so that the most detailed employment data are collected for the head, wife, and "wife". However, self-employment status is not collected for wives until 1976, and continuously starting in 1979; earlier self-employment data are captured for female heads only. Since respondents must be observed in adulthood, and their fathers observed in their childhood, the usable sample grows over time as girls transition from their childhood home into adulthood. Figure 1 shows the number of observations per survey year used in the analysis. My final sample consists of about 3,000 daughters, 1,900 fathers, and 33,000 observations.

3.2 Additional data

In addition to the PSID, I use three other survey data sets to study inputs to entrepreneurship. These data are useful because of their greater sample size or more detailed measures of paternal inputs to entrepreneurship. When studying the relationship between sibling sex composition and

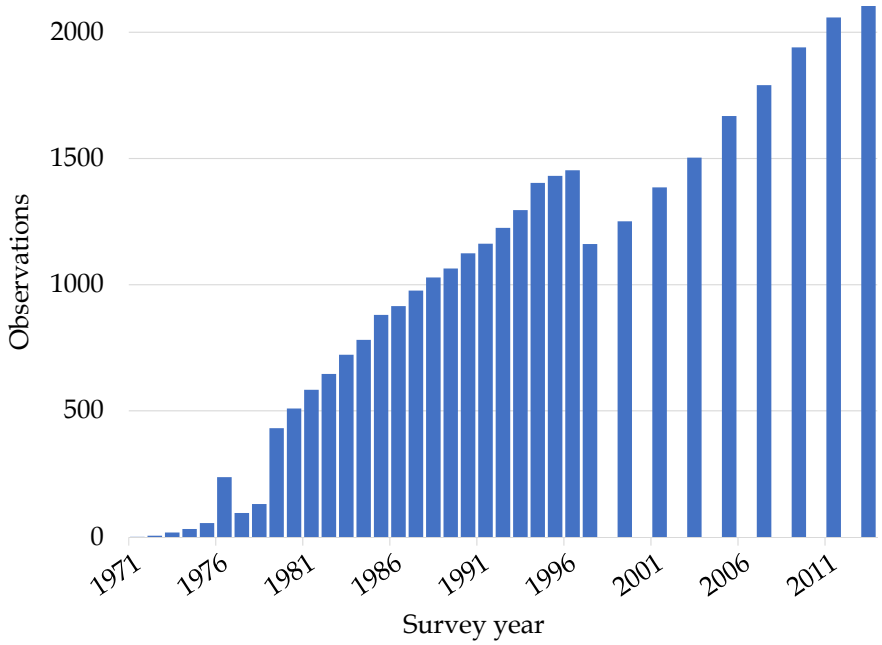
[3]One industry, Food Services and Drinking Places, was added in 2003. For consistency, I recode businesses in this industry to Retail Trade, which appears to have been the classification for this industry prior to 2003.

Table 1: Summary statistics of analysis sample

	Mean	Min	Max
Daughters (N=3,051)			
White	0.67	0	1
Black	0.29	0	1
Year of birth	1971	1953	1995
Dad self-employed	0.17	0	1
At least one brother	0.80	0	1
Number of siblings	3.27	1	19
Daughter-years (N=33,084)			
Age	32.37	16	60
Wave	1997	1971	2013
Working	0.84	0	1
Self-employed	0.07	0	1

Source: PSID. *Note:* Analysis sample includes all adult female respondents (heads, wives, or "wives") with siblings whose fathers were observed in at least four waves while the respondent was between ages 8 and 18. Dad self-employed is defined as the respondent's father being self-employed in at least two waves while the respondent was between ages 8 and 18. A respondent is defined as working if she held at least one job since the previous wave. She is defined as self-employed if she worked for herself in at least one job since the previous wave.

Figure 1: PSID analysis observations per survey year



Source: PSID. *Note:* Bars show number of observations per survey year included in the main PSID analysis. Survey becomes biannual starting in 1999. Analysis sample includes all adult female respondents (heads, wives, or "wives") with siblings whose fathers were observed in at least four waves while the respondent was between ages 8 and 18.

paternal inputs, it is not necessary to observe daughter entrepreneurship outcomes. Therefore, the requirements of the data are not as great for this portion of the analysis.

National Longitudinal Survey of Youth 1979 The National Longitudinal Survey of Youth 1979 (NLSY79)[4] is a panel survey that began with a sample of 12,686 14- to 22-year-olds in 1979. This sampling frame nests within the PSID sample in terms of birth year: Figure 2 depicts the number of observations used in the PSID analysis by year of birth, where the red bars highlight the birth years represented in the NLSY79 sample. The PSID includes both slightly older and much younger cohorts than the NLSY79, but the oldest cohorts take the most weight in the analysis since they are observed for the most years. Another difference between the NLSY79 and PSID respondents is that roughly 4 percent of NLSY79 respondents immigrated to the United States since 1968. Since the PSID did not add its immigrant sample until 1997, post-1968 immigrants make up less than one percent of my PSID analysis sample.[5]

NLSY79 respondents were interviewed annually until 1994, and bi-annually thereafter; the most recent data available are for 2014. Data are collected on work, education, household composition, health, attitudes, and more. Only very limited information are available on the respondents' parents, and in particular the data lack parental self-employment status. However, a retrospective business ownership module was administered starting in 2010. In additional to collecting detailed information about businesses owned by respondents since age 18, this module asks respondents whether any family members had ever owned a business, and if so whether the respondent ever worked for those family members. In addition, it is possible to relate this experience in a family business to respondents' own entrepreneurship outcomes.

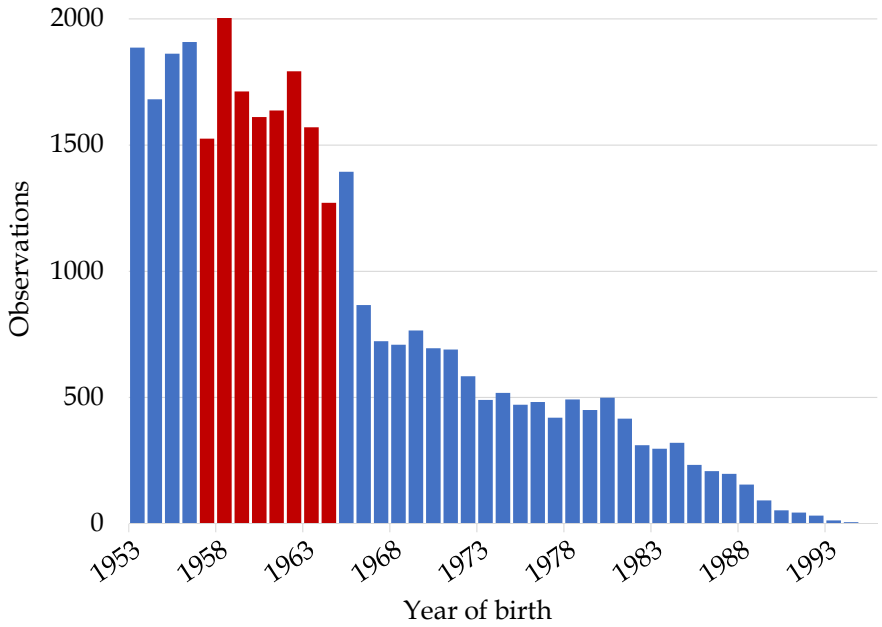
American Time Use Survey The American Time Use Survey (ATUS) measures time spent in various activities by prompting respondents to give a complete accounting of their activities – including paid work, housework, leisure, etc. – in the previous day.[6] Households are sampled monthly as they exit the Census' Current Population Survey (which is itself an eight-month panel survey of civilian, non-institutionalized households). Since 2003, the ATUS has selected one eligible person from each of about 26,000 households per year to be interviewed. In addition to collecting this respondent's activities, the survey asks with whom s/he engaged in each activity. Time spent in paid work was excluded from the "with whom" questions until 2010. However, beginning in 2010 it is possible to observe which, if any, of the respondent's children accompanied him or her to work. I consider this to be a measure of occupational training provided by the parent. Finally, the data also include the respondent's self-employment status and whether s/he owns a business. My

[4]Bureau of Labor Statistics, U.S. Department of Labor (2014).

[5]Since the PSID Latino sample was only included from 1990–1995, this component is even smaller.

[6]In this project, I use ATUS-X, a harmonized version of the ATUS produced by IPUMS (Hofferth et al., 2013).

Figure 2: PSID analysis observations per birth year



Source: PSID. *Note:* Bars show number of observations by respondent birth year included in the main PSID analysis. Red bars highlight the years of birth represented in the NLSY79.

analysis sample consists of about 3,200 fathers who worked in the reference day and have at least one daughter and at least two children (aged zero to seventeen), spanning the years 2010–2016. These data therefore reflect the experiences of much more recent cohorts than the PSID and the NLSY79.

Health and Retirement Study The Health and Retirement Study (HRS) is a longitudinal survey of older Americans; younger cohorts are added to the study over time. I use the data because of its relatively large sample size and detailed recording of financial transfers to children.[7] My analysis sample consists of around 17,000 father-daughter pairs, most of whom are observed several times over the period 1992–2012. Unlike in the PSID, I do not have data on the fathers' self-employment status during their children's younger years. Instead, I define a father as self-employed if he reports being self-employed in any wave of the HRS. Respondents who do not report any employment during the HRS are dropped from the analysis. In my analysis sample, the daughters' average age is 36 (interquartile range: 29–43) and the fathers' average age is 63 (interquartile range: 57–70).

[7] I use the RAND HRS Family Data File, which is a cleaned data set containing HRS respondents and their children (RAND, 2016).

Panel Study of Entrepreneurial Dynamics The Panel Study of Entrepreneurial Dynamics (PSED)[8] follows a representative sample of nascent entrepreneurs over six years. The PSED II cohort of around 1,200 was selected based on a phone screening in 2005–2006 seeking individuals who "considered themselves to be creating new businesses, had been active in firm creation over the past 12 months, expected to own part of the new firm, and were operating a new venture that was not yet profitable" (Reynolds, 2017). The average age at the time of the screening was 44, and the sample is 37 percent female. The entrepreneurs are surveyed about business milestones, sources and amounts of funding, and, importantly for my purposes, whether or not their parents had ever owned a business. Data are also collected on the other individuals involved in the business: co-owners, key non-owners (individuals who "made a distinctive contribution to the founding of the new business"), and helpers (individuals who "have provided significant support, advice, or guidance on a regular basis to this (new) business"). These data include the contributions of these individuals, as well as their relationship to the respondent and some basic demographics. Since the exact relationship is not available, I assume that any male relative between 20 and 40 years older than the respondent is the respondent's father.

4 Methodology

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

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

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

[8] Institute for Social Research (2011).

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.

This alternative specification introduces its own issues. First, the results are estimated for first-born girls; transmission of entrepreneurship could potentially depend on birth order, and thus these results would not be generalizable to second-born or later daughters. Second, the sex of the second sibling could induce a change in family size: families whose first two children are of the same sex are six to seven percentage points more likely to have a third child than families who have both a boy and a girl among their first two children (Angrist and Evans, 1998). The coefficient on "second child is male" × "dad entrepreneur" therefore captures the direct effect of sibling sex as well as the effect of family size on entrepreneurship transmission. I address these issues by directly examining the relationship between birth order or family size and the intergenerational transmission of entrepreneurship in Section 7.

5 Results

The results of the main specification, equation (1), can be found in Table 2. 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 × 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 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.

In Table 3, I substitute various other entrepreneurship outcomes for daughters in place of self-employment. However, I continue using self-employment as the measure of father entrepreneurship since business ownership is not available until 1985 and thus many fewer fathers have this

Table 2: Effect of brothers on father-daughter self-employment transmission

	Self-employed	
	Women w/ sibs	Firstborn women w/ sibs
Dad self-employed	0.094**	0.086**
	(0.036)	(0.029)
Brother	0.011	
	(0.012)	
Next sib is male		0.023
		(0.014)
Dad self-employed × Brother	-0.076*	
	(0.038)	
Dad self-employed × 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, age^2, race, and year of birth. Standard errors clustered at the father level. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 3: Effect of brothers on father-daughter entrepreneurship transmission: Business ownership

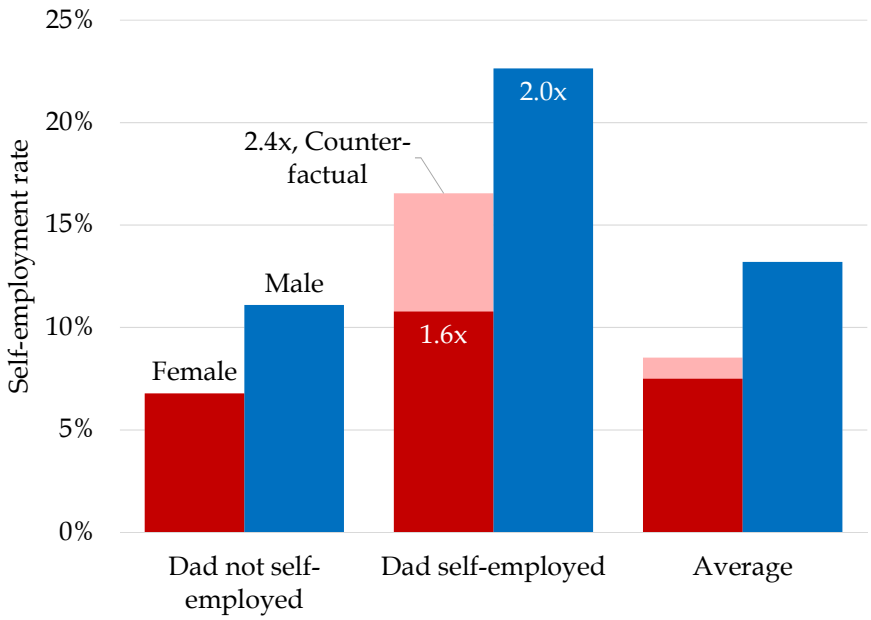
	Own bus	Work in bus	Fam owns bus	Incorp. SE
Dad self-employed	0.088*	0.100*	0.106*	0.054
	(0.036)	(0.043)	(0.049)	(0.033)
Brother	0.008	0.004	0.013	0.005
	(0.009)	(0.011)	(0.015)	(0.003)
Dad self-employed × Brother	-0.056	-0.074^{+}	-0.062	-0.048
	(0.037)	(0.045)	(0.051)	(0.034)
Siblings	-0.001	-0.001	-0.003^{+}	-0.000
	(0.001)	(0.002)	(0.002)	(0.000)
Baseline mean	0.044	0.060	0.101	0.011
Daughters	3,029	2,881	3,051	3,038
Fathers (Clusters)	1,931	1,862	1,937	1,932
Observations	28,821	17,630	33,770	29,130

Source: PSID. *Note:* Dependent variables are, from left to right: An indicator for owning a business (stake); An indicator for owning a business (stake) and putting in labor hours for that business; An indicator for some member of the household in which respondent is head or wife owning a business (available in more survey years than first two measures); An indicator for incorporated self-employment. 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. Brother is an indicator for having at least one brother. Baseline mean is the dependent variable mean for respondents without a self-employed father or a brother. All specifications include only female respondents with siblings and include controls for age, age^2, race, and year of birth. Standard errors clustered at the father level. $+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

variable available. The first column uses an indicator for whether the respondent owned a business or a stake of a business, alone or with others. The second column additionally requires that the respondent report working in that business. In the third column, I use a broader measure: does anyone in the household own a business. This permits a larger sample size since earlier waves of data collected business ownership at the household level only, without reference to which member owned the business. Finally, I use incorporated self-employment as my outcome measure. Incorporated self-employment may fit better the notion of entrepreneur as someone undertaking a risky, potentially high-growth endeavor, as the benefits of incorporation are greater to these individuals (Levine and Rubinstein, 2017). The patterns in Table 3 are quite consistent with Table 2: having a brother crowds out around three-quarters of the transmission of entrepreneurship from fathers to daughters. However, most of the coefficients on the interaction term are not significant. Appendix Table A3 replicates these regressions using first-born daughters and the sex of their next youngest sibling. Again, the coefficients are of similar magnitude but not significant.

Figure 3 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).

Figure 3: 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.

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 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.

To understand better the nature of the effects I estimate, I employ a multinomial probit specification to study the effect of father self-employment and brothers on the probability of belonging to each of three categories: never employed during the wave; employed and never self-employed during the wave; and having at least one spell of self-employment during the wave. This third category is the main measure of self-employment used in the analysis above, while here non-

Table 4: Marginal effects of father self-employment on daughter labor force outcomes, with/without brothers

	Not employed	Employed	Self-employed
Dad self-employed × Brother	-0.012	-0.006	0.017+
	(0.015)	(0.018)	(0.010)
Dad self-employed × No Brother	0.000	-0.065+	0.065*
	(0.027)	(0.033)	(0.028)
Daughters		3,186	
Fathers (Clusters)		2,072	
Observations		34,159	

Source: PSID. *Note:* Coefficients are marginal effects of father self-employment from a multinomial probit regression whose dependent variable takes on three values: daughter is not employed during the wave; daughter is employed and never self-employed during the wave; daughter is self-employed at some point during the wave. Marginal effects are evaluated for female respondents with and without brothers and estimate the effect of having a self-employed father on the probability of belonging to each of the three outcome categories. Regression includes only female respondents with siblings and includes controls for age, age^2, race, and year of birth. Standard errors clustered at the father level. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

self-employment is divided into employment and non-employment. The purpose of making this distinction is to study whether self-employment is transmitted by drawing women from employment to self-employment, from non-employment to self-employment, or both. Table 4 presents the marginal effects of father self-employment on each of these three outcomes, estimated separately for women with and without brothers. Within each row, the coefficients sum to zero because these three outcomes are mutually exclusive and exhaustive. For women with brothers, having a self-employed father increases the probability of being self-employed in a given survey wave by 1.7 percentage points. The small negative effects on the probability of belonging to the other two categories are statistically indistinguishable from zero or each other. Meanwhile, for women with only sisters, having a self-employed father increases the probability of being self-employed by 6.5 percentage point, and these women are all drawn out of employment. In other words, for daughters with only sisters, the effect of father self-employment seems to be on the type of work they choose – self-employment versus regular employment – not the choice of whether to work at all.

6 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 four possible mechanisms: business inheritance, financial transfers, human capital investments, and occupational transmission.

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. Busi-

nesses may be passed on either by the parent transferring the business to the child all at once, or by making the child a co-owner, and I examine both of these possibilities. To check for potential business transfers, I switch from a static concept of business ownership in a given year to instead studying entry and exit of business ownership. Unfortunately, it is not possible to observe the date of business creation or dissolution. Instead, I define "starting a business" as owning a business (stake) in year t but not in year $t-2$.[9] Similarly, ending a business is defined as owning a business (stake) in year $t-2$ but not in year t. Based on this measure, 3.4 percent of adult PSID respondents start a business in a given year. This is somewhat higher than the Kauffman Foundation (2017) estimate of new entrepreneurship rates of around 2 percent per year. This may be because of false transitions out of and into business ownership in my data, or because respondents are credited with starting a business when they merely acquired a stake in an existing business.

Using these measures, I examine whether starting a business often coincides with the timing of a father ending his business. This coincidental timing could suggest that the respondent took over his or her father's business. In the first column of Table 5, I regress an indicator for starting a business on an indicator for father ending a business in that same year. The estimate 0.019 suggests that there is indeed a heightened probability of starting a business in the same year the father ends his business. However, closer inspection reveals that this result does not necessarily reflect business takeovers. When I add a control for whether or not the father owned a business two years ago, the effect loads on that variable. In other words, respondents whose fathers own(ed) a business are more likely to start their own business, but this is not any more likely to occur in the year the father ends his business.

To quantify the potential role of business inheritence 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.

[9] I utilize a two-year lag in order for the definition to be consistent across the annual and bi-annual waves of the PSID, since business ownership status is only collected every other year starting in 1997.

Table 5: Business inheritance as a mechanism for entrepreneurship transmission

	Start business	
Dad end bus	0.019**	-0.004
	(0.006)	(0.008)
L2.Dad owns bus		0.026***
		(0.005)
Male	0.017***	0.017***
	(0.003)	(0.003)
Siblings	-0.001*	-0.001*
	(0.001)	(0.001)
Baseline mean	0.040	0.036
Children	5,389	5,389
Fathers (Clusters)	2,422	2,422
Observations	37,325	37,289

Source: PSID. *Note:* Dependent variable is an indicator for the respondent starting a business in a given survey year. Dad end bus is an indicator for the respondent's father exiting his business in a given year. See text for details of variable construction. L2.Dad owns bus is an indicator for the respondent's father owning a business two years prior. Sample includes male and female respondents whose fathers are observed in the same survey year and the survey two years prior. Baseline mean is the dependent variable mean for daughters whose fathers did not exit a business and, in the second column, did not own a business two years prior. All specifications include controls for age, age^2, race, and year of birth. Standard errors clustered at the father level. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Additionally, I find no effect of brothers on a woman's probability of inheriting a business, conditional on having a self-employed father. Brothers have a small negative but imprecise crowd-out effect on the probability of daughters co-owning a business with family members (results available upon request).

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 (HRS) due to its large sample size and clean records of "financial help" given to children.[10] 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. Table 6 shows 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.

[10] A similar result can be obtained using the PSID, which only collects information on "help received from relatives" without specifying the exact source of the money. See Appendix Table A4.

Table 6: Siblings and father-daughter financial transfers

	Any transfer	Transfer amt ($)	ln(Transfer amt)
Dad self-employed	0.039**	1284.580***	0.266***
	(0.012)	(230.394)	(0.053)
Brothers	-0.020***	-139.060***	-0.061***
	(0.002)	(15.626)	(0.012)
Dad self-employed × Brothers	-0.004	-127.009*	-0.007
	(0.004)	(54.791)	(0.023)
Sisters	-0.023***	-140.441***	-0.065***
	(0.003)	(19.828)	(0.013)
Dad self-employed × Sisters	0.001	-114.590^{+}	0.008
	(0.004)	(58.987)	(0.024)
Baseline mean	0.462	3952.900	8.100
Daughters	17,337	17,337	7,747
Fathers (Clusters)	8,008	8,008	5,069
Observations	93,544	93,544	18,848

Source: HRS. *Note:* Dependent variables are, from left to right: an indicator for the HRS respondent providing financial help to the daughter in a given year; the amount, including zeros, of the transfer in 2000 dollars; and the log amount of the transfer, excluding zeros. Dad self-employed is an indicator for the HRS respondent being self-employed in at least one wave. Brothers and Sisters are the number of siblings the daughter has. Baseline mean is the dependent variable mean for daughters without a self-employed father and no siblings. All specifications include controls for daughter age, age^2, and year of birth, and father race. Standard errors clustered at the father level. $+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

However, the gender composition of children does not affect the amount of resources directed towards daughters. In fact, daughters are, if anything, slightly advantaged relative to sons in terms of the probability of receiving financial help from fathers (Appendix Table A5).

One caveat is that loans or investments by parents in their childrens' businesses may not be considered "help" by survey respondents, so the measure in the HRS may not capture this type of transfer. Loans or investments may not be subject to the equal treatment norms or altruism considerations that apply to other kinds of financial transfers; in other words, parents may find it easier to rationalize funding their sons' business ventures while neglecting their daughters'. Unfortunately, I do not have access to detailed data on entrepreneurs' finances that includes sibling sex mix. Instead, I use the Panel Study of Entrepreneurial Dynamics to look for differential parental engagement in sons' and daughters' businesses. In the first column of Table 7, the dependent variable is an indicator for the respondent having received a loan or investment from a family member. This indicator aggregates personal or business loans made by family members with financial contributions made by family members serving as co-owners, key non-owners, or helpers. Meanwhile, the second dependent variable is an indicator for the respondent's father being involved in the business in a strictly non-financial capacity as a co-owner, key non-owner, or helper.

Table 7: Parental assistance to entrepreneurs

	Fam loan/invest	Dad help (non-financial)
Par owned bus	0.071**	0.073***
	(0.028)	(0.018)
Female	0.037	0.021
	(0.032)	(0.018)
Par owned bus × Female	-0.067	-0.089***
	(0.045)	(0.026)
Baseline mean	0.145	0.030
Observations	1,168	1,186

Source: PSED. *Note:* Fam loan/invest is an indicator for ever receiving a loan or investment from a family member. Dad help (non-financial) is an indicator for the respondent's father ever being involved as in the business as a co-owner, "key non-owner", or "helper", but not making a financial contribution. See text for details of variable construction. Par owned bus is an indicator for an affirmative response to the question, "Did your parents ever work for themselves or run their own businesses, alone or together?" Baseline mean is the dependent variable mean for male respondents whose parents did not own a business. All specifications include controls for age, age^2, and race. Robust standard errors in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

I estimate how parental business ownership experience[11] and entrepreneur gender interact to affect these types of involvement. Among male entrepreneurs, those whose parents owned a business are 7.1 percentage points more likely to receive a loan or investment from family members: a roughly 50 percent increase relative to the baseline rate of 14.5 percent among male respondents without an entrepreneurial family background. Although the interaction coefficient Par owned bus × Female is not significant, the point estimate suggests that female entrepreneurs receive no such benefit from parental business ownership experience: the coefficient is negative and nearly cancels out the main effect for male entrepreneurs. Meanwhile, the gender gap in non-financial help from fathers is even sharper. Parental entrepreneurship experience more than triples the probability of the respondent's father being involved for males (a 7.3 percentage point effect relative to the baseline rate of 3.0 percent), but no such effect is present for female entrepreneurs. In other words, while being a second-generation entrepreneur confers important benefits for men, women do not experience any increase in financial or non-financial help. While I cannot study the effect of brothers using these data, if sons and daughters in the same family are competing for parental resources, women may experience crowd-out by brothers.

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 two data sources. First, I study the effect of brothers on the

[11]This variable is only collected for parents together; it is not known whether the father, mother, or both had entrepreneurship experience.

Table 8: 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	0.035^{+}
	(0.005)	(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. $+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

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 8: 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 only sisters.

Could this gap in experience translate into the lower rates of self-employment transmission I observe among women with brothers? In Table 9, I estimate the relationship between family history of business ownership and experience in that business on entrepreneurship outcomes for women. Compared to women whose families owned a business but who did not have work experience in that business, women with such experience are 3.7 percentage points more likely to be self-employed in a given year – roughly a 50 percent increase. Experience in the family business is associated with large effects on other outcomes as well: incorporated self-employment, ever owning a business, and considering oneself to be an entrepreneur. These results cannot be considered causal because women who have an interest in entrepreneurship may be more likely to both work in the family business and, later, start their own business. However, the results do suggest that brothers are crowding out girls' participation in an important entrepreneurship human capital-building activity.

As a second test of this mechanism, I use the American Time Use Survey to study whether sons make daughters less likely to spend time at work with their self-employed fathers. I use two

Table 9: Effect of family business experience on female entrepreneurship

	Self-employed	Incorporated	Ever own bus	Consider self entrepr
Fam owned bus	0.019***	0.004***	0.044***	0.054***
	(0.005)	(0.001)	(0.013)	(0.014)
Worked in fam bus	0.037***	0.016***	0.102***	0.136***
	(0.010)	(0.004)	(0.028)	(0.030)
Siblings	-0.001	-0.000	-0.003	-0.001
	(0.001)	(0.000)	(0.002)	(0.002)
Baseline mean	0.050	0.003	0.094	0.112
Daughters	4,001	4,001	3,996	3,939
Households (Clusters)	3,363	3,363	3,359	3,323
Observations	96,789	96,789	3,996	3,939

Source: NLSY79. *Note:* Dependent variables are, from left to right: An indicator for being self-employed in a given year; an indicator for being incorporated self-employed in a given year; an indicator for ever owning a business; and an indicator for the respondent considering herself to be an entrepreneur. The third and fourth measures are taken from a retrospective entrepreneurship segment administered in 2010–2014. Fam owned bus is an indicator for a member of the respondent's family owning a business, and Worked in fam bus is an indicator for having worked in that business. These measures are taken from the retrospective segment. Baseline mean is the dependent variable mean for respondents whose family did not own a business. Sample includes only female respondents with siblings, and all specifications include controls for age, age^2, race, and year of birth. Standard errors clustered at the household level. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

measures of paternal entrepreneurship – self-employment and business ownership – and compare the effects of brothers on girls above and below age 13. In Table 10, I show that entrepreneurial fathers with only daughters are more likely to bring their teenage daughters to work, but not their younger daughters. This suggests that the time spent together at work is related to human capital formation, rather than childcare or supervision of younger children. Second, I find that there is a large but imprecisely estimated negative effect of brothers on teenage girls' probabilities of spending time at work with their entrepreneurial fathers. While not significant, these results are consistent with the pattern for NLSY79 respondents in Table 8 and suggest that sons crowd out human capital investments by entrepreneurial fathers in their daughters.

Occupational transmission One possibility consistent with the results above is that transmission of entrepreneurship reflects a more general phenomenon of occupational transmission from parents to children. If children follow their parents' occupations, and occupations vary in how likely their members are to be self-employed, the intergenerational correlation in self-employment rates could be no more than an artifact of occupational transmission. I show that this is not the case: the intergenerational transmission of entrepreneurship in not merely mediated by occupational transmission.

I begin by comparing rates of occupation and industry sharing by fathers and daughters in the PSID, broken down by the self-employment status of the father and daughter. Father's self-

Table 10: Effect of sons on daughters going to work with fathers

	Go to work with dad			
	Daughter(s) 13-17		Daughter(s) u13	
Dad self-employed	0.079^{+}		0.034	
	(0.045)		(0.027)	
Dad self-employed × Brother u18	-0.070		-0.004	
	(0.050)		(0.032)	
Dad owns bus		0.053		0.026
		(0.037)		(0.020)
Dad owns bus × Brother u18		-0.028		-0.012
		(0.043)		(0.025)
Brother u18	0.009	-0.000	0.013	0.014
	(0.015)	(0.016)	(0.009)	(0.009)
Baseline mean	0.039	0.036	0.063	0.063
Observations	906	913	2,733	2,754

Source: ATUS. *Note:* Dependent variable is an indicator for a father spending at least one hour at work with at least one daughter of the specified ages in the reference day. Dad self-employed is an indicator for a father being self-employed in his main job at the time of the survey. Brother u18 is an indicator for there being a son under age 18 living in the household. Sample includes all male respondents who worked in the reference day and who have at least one daughter in the specified age range and at least two children under 18 living at home. All specifications include controls for year, month, day of week, race, and number of siblings. Robust standard errors in parentheses. $+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

employment status is defined as in the main PSID analysis above – while the daughter is aged 8 to 18 – and his occupation (industry) is defined as his modal broad occupation (industry) during those years.[12] The unit of analysis is a daughter-year: daughters may share an occupation or industry with their fathers in some years, but not others, and may move in and out of self-employment over time. Years in which the daughter was not working are dropped.

Table 11 shows that the highest rate of occupation sharing exists for self-employed father-daughter pairs: 13.07 percent. Although this is about twice as high as the probability of sharing an occupation in the other cells, the majority of self-employed father-daughter pairs work in different occupations. The industry-sharing differential is even smaller: daughters are only one or two percentage points more likely to work in the same industry as their self-employed fathers if they are also self-employed, relative to the other cells.

Tables 12 and 13 study more formally how entrepreneurship transmission relates to occupation and industry sharing. Specifically, I use a multinomial probit regression to estimate the effect of father self-employment on the probabilities of the four combinations of two binary outcomes for daughters: working in the same (or different) occupation as their fathers, and being self-employed

[12]The names and sizes of these broad occupations and industries can be found in Appendix Tables A1 and A2.

Table 11: Father-daughter occupation and industry sharing rates

	% in same occupation		% in same industry	
	Daughter not SE	Daughter SE	Daughter not SE	Daughter SE
Father not SE	6.49	5.50	6.86	5.68
Father SE	5.61	13.07	6.74	7.72

Source: PSID. *Note:* Father's occupation (industry) is his modal broad occupation (industry) while the daughter was between ages 8 and 18. Fathers are defined as self-employed if they were self-employed in at least two survey waves while the daughter was between ages 8 and 18. Daughter occupation, industry, and self-employment status are defined annually: observations are at the daughter-year level.

Table 12: Marginal effects of father self-employment on daughter occupation-sharing and self-employment, with/without brothers

	Diff occ, not SE	Same occ, not SE	Diff occ, SE	Same occ, SE
Dad self-employed × Brother	-0.009	-0.009	0.012	0.007*
	(0.015)	(0.010)	(0.011)	(0.003)
Dad self-employed × No Brother	-0.084*	-0.020	0.072**	0.032
	(0.039)	(0.016)	(0.026)	(0.033)
Daughters		2,930		
Fathers (Clusters)		1,872		
Observations		27,399		

Source: PSID. *Note:* Coefficients are marginal effects of father self-employment from a multinomial probit regression whose dependent variable takes on four values: daughter works in same (different) broad occupation as father × daughter is self-employed (works as an employee). Marginal effects are evaluated for female respondents with and without brothers and estimate the effect of having a self-employed father on the probability of belonging to each of the four outcome categories. Standard errors clustered at the father level. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

(or working as an employee). Results in Section 5 demonstrated that self-employed fathers make daughters more likely to be self-employed, but are they also leading daughters to select the same occupation or industry? Table 12 shows that the effect having a self-employed father on the probability of being self-employed in a different occupation is roughly double the effect on the probability of being self-employed in the same occupation – 1.2 percent versus 0.7 percent for daughters with brothers, and 7.2 percent versus 3.2 percent for daughters with only sisters. However, these effects are not statistically distinguishable from each other. The effect for industry choice is similar but more pronounced. For daughters with only sisters, having a self-employed father increases the probability of being self-employed but in a different industry than their fathers by 8.9 percentage points. This is significantly larger than the effect on the probability of being self-employed in the same industry, 1.4 percentage points. Among those with brothers, the pattern is the same but the effects are not significantly different. Taken together, this evidence suggests that self-employment is not merely transmitted via occupation or industry: most of the daughters induced into self-employment work in different occupations or industries than their fathers.

Table 13: Marginal effects of father self-employment on daughter industry-sharing and self-employment, with/without brothers

	Diff ind, not SE	Same ind, not SE	Diff ind, SE	Same ind, SE
Dad self-employed × Brother	-0.006	-0.014	0.017	0.002
	(0.016)	(0.011)	(0.011)	(0.003)
Dad self-employed × No Brother	-0.129**	0.026	0.089**	0.014
	(0.048)	(0.033)	(0.034)	(0.015)
Daughters	2,939			
Fathers (Clusters)	1,884			
Observations	27,449			

Source: PSID. *Note:* Coefficients are marginal effects of father self-employment from a multinomial probit regression whose dependent variable takes on four values: daughter works in same (different) broad industry as father × daughter is self-employed (works as an employee). Marginal effects are evaluated for female respondents with and without brothers and estimate the effect of having a self-employed father on the probability of belonging to each of the four outcome categories. Standard errors clustered at the father level. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

7 Robustness checks

In this section, I lay out some robustness checks to my analysis above. First, I look for differential rates of transmission and crowd-out by family size and birth order. Although my main analyses control for number of siblings, I did not allow the effect of father's self-employment status, or the presence of brothers, to vary with respect to the number of siblings a woman has or what her birth order was. In Table 14, I estimate my main specification separately for women with one, two, and three or more siblings. The main effect of dad self-employment is strongest for daughters with two sisters, but the point estimate is not significantly different than the effect for daughters with one sister or three or more sisters. In Table 15 I repeat these specifications separately for first, second, third, and fourth or higher born women. The effects of paternal self-employment are largest for first- and second-born daughters with only sisters, but again there are not significant differences across specifications. Only around seven percent of daughters with three or more siblings have only sisters, so it is not surprising that the "sisters-only" main effect of father self-employment is imprecisely estimated in the last columns of Tables 14 and 15. Overall, the results are consistent with the main results: father's self-employment has a substantial effect on girls with only sisters, but a much smaller effect for those with brothers.

Table 16 collects three alternative specifications to test the main results. In the first column, I classify all farmers and doctors as not self-employed, even if they report themselves to be self-employed. This is because these occupations do not fit the traditional paradigm of entrepreneur, and because these occupations may be transmitted through channels unrelated to business human capital: specifically, through intergenerational transfers of farms, or through connections that help

Table 14: Father-daughter entrepreneurship transmission and crowdout, by number of siblings

	Self-employed		
	1 sib	2 sibs	>=3 sibs
Dad self-employed	0.088	0.145**	0.044
	(0.063)	(0.047)	(0.055)
Brother	-0.006	0.048***	-0.004
	(0.021)	(0.014)	(0.019)
Dad self-employed × Brother	-0.055	-0.130*	-0.027
	(0.066)	(0.051)	(0.057)
Baseline mean	0.079	0.039	0.079
Daughters	748	746	1,557
Fathers (Clusters)	616	537	784
Observations	5,989	6,905	20,190

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. Brother is an indicator for having at least one brother. The three columns include female respondents with one, two, or three or more siblings, respectively. Baseline mean is the dependent variable mean for respondents without a self-employed father or a brother. All specifications include controls for age, age^2, race, and year of birth. Standard errors clustered at the father level. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 15: Father-daughter entrepreneurship transmission and crowdout, by birth order

	Self-employed			
	1st born	2nd born	3rd born	4th+ born
Dad self-employed	0.108*	0.104*	0.077	0.010
	(0.053)	(0.047)	(0.075)	(0.098)
Brother	0.028+	0.000	-0.003	-0.032
	(0.016)	(0.016)	(0.030)	(0.037)
Dad self-employed × Brother	-0.078	-0.079	-0.053	-0.009
	(0.057)	(0.050)	(0.079)	(0.100)
Siblings	-0.002	0.001	0.002	-0.002
	(0.005)	(0.004)	(0.005)	(0.002)
Baseline mean	0.058	0.069	0.085	0.116
Daughters	892	849	505	665
Fathers (Clusters)	892	849	505	433
Observations	8,968	8,221	5,562	8,748

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. Brother is an indicator for having at least one brother. The four columns include female respondents who are first, second, third, or fourth or higher born, respectively. Baseline mean is the dependent variable mean for respondents without a self-employed father or a brother. All specifications include controls for age, age^2, race, and year of birth. Standard errors clustered at the father level. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 16: Father-daughter entrepreneurship transmission and crowdout: Robustness checks

	Self-employed		
	Ex farm, med	State FEs	Dad occ FEs
Dad self-employed	0.091*	0.092**	0.088*
	(0.039)	(0.035)	(0.037)
Brother	0.013	0.009	0.012
	(0.009)	(0.012)	(0.012)
Dad self-employed × Brother	-0.077+	-0.071*	-0.072+
	(0.040)	(0.036)	(0.038)
Siblings	0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)
Baseline mean	0.070	0.070	0.070
Daughters	3,051	3,051	2,994
Fathers (Clusters)	1,937	1,937	1,903
Observations	33,084	33,084	32,498

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. Brother is an indicator for having at least one brother. These specifications make the following modifications to the baseline specification (from left to right): farming and medical occupations are treated as not self-employed; state fixed effects are added; and fixed effects are added for the father's modal broad occupation while the respondent was between ages 8 and 18. Baseline mean is the dependent variable mean for respondents without a self-employed father or a brother. All specifications include only female respondents with siblings and include controls for age, age^2, race, and year of birth. Standard errors clustered at the father level. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

children enter the medical profession (Laband and Lentz, 1983b; Lentz and Laband, 1989). Second, I include fixed effects for the respondent's current state of residence to address the fact that self-employment may be spatially correlated; if parents and children live in the same state, their self-employment might be codetermined by local labor market factors. Third, I run a specification with fixed effects for the father's modal broad occupation while the respondent was between ages 8 and 18. In this specification, effects of father self-employment are estimated within occupations, to rule out the possibility that the estimated effects of self-employment are spuriously picking up occupation effects. In all three specifications, the results are quite stable: father's self-employment increases the rate of self-employment by around 9 percentage points for women with only sisters, and about 1.5 to 2 percentage points for women with brothers.

8 Discussion

What are the welfare implications of this transmission and crowd-out of self-employment? The evidence on the returns to self-employment is mixed: Hamilton (2000) estimates an earnings loss associated with self-employment, while Levine and Rubinstein (2017) find a premium to incorporated

self-employment, and a small wage loss when workers switch to unincorporated self-employment. Second-generation entrepreneurs – especially daughters who did not compete with brothers – may be more productive than average because of their inherited business human capital (Fairlie and Robb, 2007). Even if entrepreneurs earn less, earnings penalties may be offset by nonpecuniary benefits (Hurst et al., 2011) or by the option value of experimentation with entrepreneurship (Dillon and Stanton, 2017; Manso, 2016). If these benefits are large enough, daughters may be better off as entrepreneurs than as wage workers even if they earn less in a given year. With this caveat in mind, I proceed to study the relationship between father entrepreneurship, brothers, and daughters' income and wealth. This reduced-form analysis picks up the effect of family composition on earnings and wealth both via the choice of self-employment or employment and conditional on this choice. In Table 17, I estimate an insignificant positive effect of father self-employment on daughters' labor income, family income, and wealth when there are no sons in the family, and an insignificant negative effect of sons on this relationship. These results are noisy but suggest that daughters of entrepreneurs with only sisters are, if anything, better off financially than their counterparts with brothers.

While the evidence on the net returns to self-employment (including non-pecuniary benefits) is inconclusive, one way to interpret my main results is that more daughters of entrepreneurs with only sisters opt into self-employment and hence must prefer it to regular employment. In other words, relative to those with brothers, these daughters have an additional feasible career choice – entrepreneurship – and must be weakly better off. They could be made worse off if the transmission of entrepreneurship human capital crowded out other human capital. However, I find no significant gap in educational attainment between daughters of self-employed men with and without brothers (Table 17, column (4)). This suggests that entrepreneurship-related human capital is not taking the place of formal human capital accumulation through schooling. Additionally, as demonstrated in Section 6, most second-generation entrepreneurs are opening their own businesses, not inheriting a family firm. That is, daughters with only sisters are not being pressured to continue running the family business, which could be worse than the outside option, as in Fernando (2016) (for land inheritance in India) or the film "It's a Wonderful Life".[13]

[13]Thanks go to Josh Lerner for suggesting this analogy. The film's protagonist, George Bailey, becomes mired in the family business, Bailey Brothers' Building and Loan, after his father's death. The business's financial troubles nearly drive George to suicide.

Table 17: Effect of father self-employment and brothers on daughter outcomes

	Labor income ($ thousands)	Family income ($ thousands)	Wealth ($ thousands)	Yrs Schooling
Dad self-employed	2.33	7.74	281.41	0.48^{+}
	(2.83)	(9.99)	(209.93)	(0.29)
Brother	1.51	-2.36	5.46	-0.12
	(1.17)	(7.41)	(30.70)	(0.19)
Dad self-employed × Brother	0.39	-11.68	-250.09	-0.08
	(3.21)	(10.44)	(211.92)	(0.32)
Siblings	-0.64^{***}	-1.38^{**}	-13.34^{***}	-0.13^{***}
	(0.18)	(0.53)	(3.50)	(0.03)
Baseline mean	18.70	62.53	126.76	13.66
Daughters	2,543	3,051	2,945	3,038
Clusters (Fathers)	1,642	1,937	1,887	1,930
Observations	26,162	33,787	16,961	32,352

Source: PSID. *Note:* Dependent variables are the respondent's annual labor income, total family income, and family wealth, in thousands of 2000 dollars, and the respondent's years of schooling. 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. Brother is an indicator for having at least one brother. Baseline mean is the dependent variable mean for respondents without a self-employed father or a brother. Regression includes only adult female respondents with siblings and includes controls for age, age^2, race, and year of birth. Standard errors clustered at the father level. $+\ p < 0.10$, $*\ p < 0.05$, $**\ p < 0.01$, $***\ p < 0.001$.

9 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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Table A1: Distributions of Major Occupations in PSID

Occupation	Share of employment	% Self-employed	% Female
Executive, Administrative, and Managerial Occupations	10.6	24.9	35.9
Management Related Occupations	1.8	13.3	45.6
Engineers and Computer Scientists	2.1	10.0	15.4
Scientists and Analysts	0.5	8.7	32.2
Medical professions	2.2	15.6	72.6
Teachers and Professors	4.6	4.6	73.0
Humanities and Social Science Professions	2.1	21.4	51.9
Arts and Entertainment Professions	1.2	38.5	53.9
Technicians and Related Support Occupations	3.2	4.1	53.2
Sales Occupations	7.3	15.4	58.6
Office Support Occupations	9.6	4.3	88.9
Services Support Occupations	2.8	2.4	88.0
Communications and Shipping Support Occupations	2.8	2.2	46.0
Housekeeping and Cleaning Occupations	3.6	11.7	87.1
Protective Service Occupations	1.7	2.6	22.8
Food Preparation and Service Occupations	4.3	2.9	74.2
Healthcare Support Occupations	2.7	5.0	90.0
Cleaning and Maintenance Occupations	2.5	14.0	22.4
Personal Care Occupations	1.0	51.0	80.8
Recreation and Hospitality Occupations	0.3	6.0	59.0
Child Care Workers	1.7	45.3	98.0
Farm Operators and Managers	1.0	75.6	7.4
Agricultural Occupations	1.2	10.0	24.0
Mechanics and Repairers	3.8	13.2	3.0
Construction Trades	3.8	22.3	2.1
Extractive Occupations	0.1	3.1	3.4
Machinery Production Occupations	2.1	3.2	13.4
Craft Production Occupations	0.8	20.7	37.9
Food Production Occupations	0.5	4.4	37.1
Machine Operators, Assemblers, and Inspectors	9.3	2.6	46.6
Transportation Occupations	4.7	7.7	10.3
Material Moving Occupations	3.8	6.8	13.1

Source: PSID. *Note:* Includes all person-years of data. Share of Employment = Share of employment that is in this occupation. % Self-employed = Share of workers in this occupation who are self-employed. % Female = Share of workers in this occupation who are female.

Table A2: Distributions of Major Industries in PSID

Industry	Share of employment	% Self-employed	% Female
AGRICULTURE, FORESTRY, AND FISHERIES	3.0	40.6	18.8
MINING	0.6	6.8	14.2
CONSTRUCTION	6.3	27.2	7.7
MANUFACTURING, Food and kindred products	1.7	3.2	36.6
MANUFACTURING, Textiles	2.3	2.5	71.3
MANUFACTURING, Paper and printing	1.9	7.8	39.1
MANUFACTURING, Chemicals and allied products	1.1	1.7	29.9
MANUFACTURING, Petroleum and coal products	0.2	2.7	11.6
MANUFACTURING, Rubber, plastic, and leather	0.9	1.7	43.4
MANUFACTURING, Lumber and wood	1.4	9.9	19.1
MANUFACTURING, Stone, clay, glass and concrete products	0.5	7.2	21.1
MANUFACTURING, Metal industries	1.9	2.8	19.4
MANUFACTURING, Machinery	3.3	2.9	35.2
MANUFACTURING, Transportation equipment	2.5	1.5	24.7
MANUFACTURING, Professional and photographic equipment, and watches	0.4	2.1	38.2
MANUFACTURING, Other	0.8	10.1	39.4
Transportation	4.6	8.4	26.7
Communications	1.4	3.2	47.1
Utilities and sanitary services	1.5	2.2	15.8
WHOLESALE TRADE, Durable goods	1.5	13.6	24.5
WHOLESALE TRADE, Nondurable goods	2.0	11.6	32.6
RETAIL TRADE	13.3	11.8	58.0
Finance	2.4	5.9	69.0
Insurance	1.7	11.1	61.9
Real estate	1.3	28.0	47.4
Business services	3.0	18.4	49.1
Automobile and repair services	1.6	35.0	11.3
PERSONAL SERVICES	5.6	31.3	83.3
ENTERTAINMENT AND RECREATION SERVICES	0.9	19.4	45.3
Medical services	9.2	5.7	81.7
Professional services	3.2	27.4	52.6
Education and family services	11.1	5.6	72.3
PUBLIC ADMINISTRATION	5.7	1.6	40.8
ACTIVE DUTY MILITARY	0.2	1.7	19.3

Source: PSID. *Note:* Includes all person-years of data. Share of Employment = Share of employment that is in this industry. % Self-employed = Share of workers in this industry who are self-employed. % Female = Share of workers in this industry who are female.

Table A3: Effect of brothers on father-daughter entrepreneurship transmission: Business ownership; First-born daughters

	Own bus	Work in bus	Fam owns bus	Incorp. SE
Dad self-employed	0.070*	0.099**	0.092*	0.049*
	(0.029)	(0.038)	(0.041)	(0.023)
Next sib is male	0.009	0.006	0.000	-0.000
	(0.013)	(0.015)	(0.020)	(0.004)
Dad self-employed × Next sib is male	-0.051	-0.076	-0.075	-0.039
	(0.036)	(0.048)	(0.051)	(0.026)
Siblings	-0.003	-0.000	-0.004	-0.001
	(0.005)	(0.006)	(0.007)	(0.002)
Baseline mean	0.044	0.058	0.113	0.011
Daughters	877	848	881	880
Fathers (Clusters)	877	848	881	880
Observations	7,861	5,102	9,123	7,948

Source: PSID. *Note:* Dependent variables are, from left to right: An indicator for owning a business (stake); An indicator for owning a business (stake) and putting in labor hours for that business; An indicator for some member of the household in which respondent is head or wife owning a business (available in more survey years than first two measures); An indicator for incorporated self-employment. 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. Brother is an indicator for having at least one brother. Baseline mean is the dependent variable mean for respondents without a self-employed father or a brother. All specifications include only first-born female respondents with siblings and include controls for age, age^2, race, and year of birth. Standard errors clustered at the father level. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A4: Family financial help received by women

	Any transfer	Transfer amt ($)	ln(Transfer amt)
Dad self-employed	0.022	297.002*	0.436**
	(0.015)	(129.238)	(0.168)
Brothers	-0.004*	-16.514*	-0.064*
	(0.002)	(6.469)	(0.025)
Dad self-employed × Brothers	0.005	15.420	0.034
	(0.008)	(51.790)	(0.105)
Sisters	-0.007**	-15.297*	-0.065***
	(0.002)	(6.038)	(0.017)
Dad self-employed × Sisters	-0.008	-76.255**	-0.116
	(0.005)	(27.829)	(0.076)
Baseline mean	0.201	766.572	7.302
Daughters	3,163	3,163	1,335
Fathers (Clusters)	2,065	2,065	1,102
Observations	29,818	29,818	2,833

Source: PSID. *Note:* Dependent variables are, from left to right: an indicator for the respondent receiving financial help from family in a given year; the amount, including zeros, of the transfer in 2000 dollars; and the log amount of the transfer, excluding zeros. 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. Brothers and Sisters are the number of siblings the respondent has. Baseline mean is the dependent variable mean for respondents without a self-employed father and no siblings. All specifications include controls for age, age^2, race, and year of birth. Standard errors clustered at the father level. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A5: Gender and father-child financial transfers

	Any transfer	Transfer amt ($)	ln(Transfer amt)
Dad self-employed	0.031***	783.558***	0.266***
	(0.006)	(114.654)	(0.033)
Male	-0.014***	-51.842	0.001
	(0.004)	(38.701)	(0.022)
Dad self-employed × Male	0.001	-145.071	-0.031
	(0.006)	(104.473)	(0.036)
Siblings	-0.022***	-176.838***	-0.065***
	(0.001)	(11.385)	(0.006)
Baseline mean	0.192	967.804	7.704
Children	35,510	35,510	15,576
Fathers (Clusters)	9,552	9,552	7,149
Observations	191,568	191,568	37,428

Source: HRS. *Note:* Dependent variables are, from left to right: an indicator for the HRS respondent providing financial help to the daughter in a given year; the amount, including zeros, of the transfer in 2000 dollars; and the log amount of the transfer, excluding zeros. Dad self-employed is an indicator for the HRS respondent being self-employed in at least one wave. Brothers and Sisters are the number of siblings the daughter has. Baseline mean is the dependent variable mean for daughters without a self-employed father and no siblings. All specifications include controls for child age, age^2, and year of birth, and father race. Standard errors clustered at the father level. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.