

Gaining the (Over)Confidence to Start your Business

Isaac Hacamo and Kristoph Kleiner*

This version: July 2019

Abstract

This paper shows that entrepreneurial overconfidence is not a fixed trait, but instead shaped by social interactions. We establish that young managers randomly connected to peers confident in their entrepreneurial abilities are more likely to become entrepreneurs. By surveying treated individuals, we confirm workers gain interest in entrepreneurship through greater confidence. We reject alternative explanations including access to entrepreneurial knowledge and decreased risk aversion. Our results suggest shocks to confidence offer potential benefits by increasing participation in entrepreneurial training and the proportion of female entrepreneurs. Overall, we offer the first experimental evidence that peers increase entrepreneurship by promoting overconfidence.

JEL Classification: L26, D81, D84, D91, C92

Keywords: Entrepreneurship, Preferences, Peer Effects, Random Assignment, Entrepreneurial Education, Entrepreneurial Gender Gap

*Department of Finance, Kelley School of Business, Indiana University, 1309 East 10th Street, Bloomington, IN 47405. Email: IHacamo@indiana.edu and KleinerK@Indiana.edu. We thank Ken Ahern, Leonce Barger, Tony Cookson, Francesco D'Acunzio, Jacqueline Doremus, Will Gerken, Jessica Jeffers, Inessa Liskovich, Elizabeth Lyons, Daniel Metzger (Discussant), Jean-Noel Barrot (Discussant), Paige Ouimet, Pratish Patel, Francisco Queiró, Ramana Nanda, Henry Sauermann, Jesper Sorensen, Olav Sorensen, Xinxin Wang (Discussant), and Xiaoyun Yu for very helpful suggestions. We also thank seminar and conference participants at California Polytechnic State University, FDIC, Indiana University, Kenan Institute Frontiers of Entrepreneurship Conference, Midwest Finance Association Meetings, NOVA School of Business and Economics, Queen Mary University of London, University of Kentucky, Entrepreneurial Financial Management Conference at ESMT Berlin, and European Finance Association Meetings in Warsaw.

1 Introduction

Innovative entrepreneurs have the potential to dramatically enhance the productivity of firms and, consequentially, economic growth (Aghion et al., 1998; Baumol, 1968; Lucas, 1988; Schoar, 2010). However, entrepreneurship is also characterized by a significant failure rate (Shane, 2008), low compensation compared to waged employment (Hamilton, 2000), and high exposure to nondiversified investments (Moskowitz and Vissing-Jørgensen, 2002). As standard theories of risk and return are not able to explain the high rate of entry (Hall and Woodward, 2010), the signature question facing researchers is why individuals choose to start a firm in the first place.

The most prevalent explanation is that individuals often overestimate their likelihood of success (Astebro et al., 2014). Highly confident individuals are attracted to the highly skewed returns to entrepreneurship despite the low average risk-adjusted returns.¹ In line with these arguments, surveys have confirmed entrepreneurs are confident in their likelihood of success (Åstebro et al., 2007), are more confident relative to the general population (Holm et al., 2013), and generally hold optimistic views in life (Puri and Robinson, 2007).² While valuable, these correlational findings abstract from identifying what drives variation in entrepreneurial overconfidence across the population, or even if overconfidence can be manipulated by outside factors. The current indirect evidence suggests these traits may be determined prior to adulthood as entrepreneurship is strongly predicted by genetics (Lindquist et al., 2016; Nicolaou et al., 2008), gender (Fairlie and Robb, 2009), and exposure to entrepreneurs during childhood years (Decker et al., 2016).³

This paper illustrates how entrepreneurial overconfidence is influenced by social interactions, leading to increased entrepreneurship among skilled workers. Under an experimental setting that randomizes the social networks of young managers, we observe peers confident in their abilities increase the rate of entrepreneurship in the economy. By directly surveying individuals, we confirm treated workers directly state they are more interested to start a business due to greater confidence. We also reject alternative explanations based on a peer's role in providing entrepreneurial knowledge or resources, as well as a

¹For instance, Shane (2008) estimates over 50 percent of new firms fail within five years, while 0.03 percent achieved more than \$100 million in sales.

²Closely related, researchers have found that overconfidence is common among managers (Ben-David et al., 2007; Malmendier and Tate, 2005) and this bias explains the risky investment decisions (Malmendier and Tate, 2008; Malmendier et al., 2011).

³For instance, Lindquist et al. (2015) estimate that 35% of an individual's decision start an incorporated firm can be explained by family background.

change in risk aversion. We argue positive shocks to entrepreneurial confidence may offer benefits to the entrepreneurial sector. First, confident peers increase the rate of joining a start-up or taking coursework in entrepreneurship, leading to an increased likelihood of entrepreneurial success. Second, we confirm the women in our sample are less confident and less likely to enter entrepreneurship; however, connections to a confident peer disproportionately impacts female students, increasing the proportion of female entrepreneurship. Overall, we offer the first experimental evidence that peers increase the rate of entrepreneurship and link these variables through gains to confidence.

Our analysis requires (i) causal identification of peer effects, (ii) detailed employment data, and (iii) measures of an individual's experiences or views on entrepreneurship directly before interaction. To meet the first criteria we study students enrolled in the Master of Business Administration (MBA) program at Indiana University (IU).⁴ At IU, every entering MBA student is randomly assigned to a cohort and a team in their first year in the program.⁵ Students in the same cohort take the core MBA classes together, while students in the same team are assigned to work together on course projects and a large case study at the end of the first semester. Given that students do not choose these groups, some students will be more exposed to peer effects for reasons exogenous to their ability, effort, or interests.

To analyze each individual's career path before and after peer involvement with their peers, we obtain detailed individual-level employment records from a large online business networking service. From this online platform, we observe employment history (job title, location, start and end dates, firm name) and education (undergraduate institution, MBA major, graduation year). We also collect information on the employment and survival of each new firm. We then merge this data with the information about cohort and team assignments, and admissions information obtained from the MBA office at Indiana University. Finally, we use the online networking service to collect detailed information employment information for each firm created by an individual in the sample.

To classify students confident in their entrepreneurial abilities, we incorporate admissions data detailing the intended major of the student prior to entering the MBA program. According to the sample, thirty-five percent intend to complete a major (either first or second) in entrepreneurship. We verify that these students are significantly more likely to start a new firm following graduation. In addition, we

⁴Ahern et al. (2014); Lerner and Malmendier (2013); Shue (2013) also explore a related setting. We differ from this past literature by precisely identifying peer interaction within groups of four individuals.

⁵A cohort has an average of approximately sixty students, while a team has four students on average. Depending on the year, an MBA class at IU has approximately 180 students.

survey incoming current students and confirm that students intending to major in entrepreneurship are significantly more (over)confident about their entrepreneurial abilities (according to three separate measures) even after controlling for other observable characteristics. In comparison, we find no evidence that individuals who want to major in entrepreneurship are less risk/ambiguity averse than the rest of the population, limiting the role of risk preferences in our setting.⁶ We also do not observe greater optimism about the future, or different preferences for independence or variety for these students. We then aggregate the number of confident peers within teams and cohorts.⁷

We estimate having one cohort member with high entrepreneurial confidence (but without prior entrepreneurial experiences) increases the rate of entry into entrepreneurship by 0.4 percentage points within three years after graduation. Given the rate of firm creation during the three years following MBA graduation (3.4 percentage points), peers increase firm creation by roughly twelve percent relative to the mean. In contrast, we estimate that interaction with a cohort member experienced in entrepreneurship actually decreases the rate of entrepreneurship by 0.6 percentage points, confirming the findings of [Lerner and Malmendier \(2013\)](#). By controlling for the intended major of each student, we can confirm students are modifying their future career plans in response to peer interaction.⁸

Given that each cohort has approximately sixty students, these results suggest that the effects would be larger if students were to interact in smaller groups in which they could establish tighter relationships. Since IU also forces students to interact in small study teams of approximately four students, we can test this prediction. We show that a confident team member increases the overall rate of entering entrepreneurship by 1.2 percentage points, that is, when interactions are tighter, treatment increases firm creation by roughly thirty-five percent relative to the mean.

We next assess the economic implications of peer influence on entrepreneurship. First, we evaluate the long-term effects by extending the time period for each student to start a new firm. We find that peers predominantly impact the rate of firm creation within the three years following graduation, and the differences between the treated and untreated students remain five years following graduation, sug-

⁶In this way, our results find further support for ([Holm et al., 2013](#); [Koudstaal et al., 2015](#)), who find no evidence that entrepreneurs are more risk averse than the rest of the population.

⁷To classify students that previously started a new business that ultimately failed, we use resumé and firm information from the online networking service. We estimate that 3.4 percent of the students in our sample had an unsuccessful entrepreneurial experience before the MBA.

⁸In addition, to further rule out the role of learning we confirm treatment continues to increase the rate of firm creation even when (i) peers ultimately change to a major outside entrepreneurship or (ii) choose not to start a firm within five years of graduation.

gesting that peers cause the creation of firms that would otherwise not exist in the economy. Second, we measure entrepreneurial success by firm survival (lasting at least five years) and size (hiring at least ten employees), and confirm that student interactions impact the rate of successful firm creation. Third, entrepreneurs in our sample are more successful than the average entrepreneur in the economy. For example, two percent of the firms created by IU-MBA graduates experience a successful exit by either being acquired or successfully completing an IPO. In addition, four percent of the firms receive venture capital funding, a rate six times higher than the average new firm in the economy (Robb and Robinson, 2012). Our results highlight the economic significance of peer influence on entrepreneurship.

To confirm the peer effect corresponds to increased entrepreneurial confidence, we conduct two separate analyses. First, we survey the treated students in our sample (those with a team member intending to major in entrepreneurship) and establish three key findings. According to the responses, 78 percent of students report the team member increased their likelihood of start a firm, while no students reported a decrease in likelihood. In addition, among impacted students, 46 percent report a change in views towards entrepreneurship, compared to eight percent reporting an increase in knowledge (and 46 percent report both channels). Most significantly for our study, 57 percent of students report that the interest in entrepreneurship is predominantly due to updated confidence on their personal ability to succeed. In comparison, roughly 25 percent of students report increased willingness to accept the risk of starting a business. The results help establish a direct connection between peer influence and increased entrepreneurial confidence. Second, we return to our empirical methodology, but include two alternate treatment measures. Specifically, we identify peers that intended to major in entrepreneurship, but (i) did not start a firm within five years of graduation or (ii) switched to a different major by the time of graduation. We argue these students may still influence the entrepreneurial confidence of other students, but are less likely to offer valuable advice to students about the entrepreneurial process. We confirm students connected to these peers are still more likely to enter entrepreneurship.

Given our evidence, it is important to assess whether increased confidence affects the quality of entrepreneurship. On the one hand, individuals who overestimate their entrepreneurial ability should create lower-quality firms as their realized return to entrepreneurship is lower than estimated at entry. On the other hand, developing an early career interest in entrepreneurship, even if driven by overconfidence, might lead to acquiring more entrepreneurial skills early in the career (i.e., entrepreneurial education, employment in start-ups, improving professional network, or better career timing to start a firm), which

might lead to the creation of high-quality firms. Our results support the latter hypothesis as we find that firms founded by a treated individuals are more likely to survive and expand. In addition, we provide supporting evidence on the micro-foundations of the hypothesis. Since we can measure intended and actual majors as well as employment at graduation, we verify that individuals intending to major in entrepreneurship increase the likelihood that their peers (i) switch majors to entrepreneurship,⁹ and (ii) work at a start-up after graduation.¹⁰ Furthermore, we confirm that students initially employed with a start-up or major in entrepreneurship are more likely to later create a firm relative to other MBA students. Our results offer novel evidence that altering entrepreneurial confidence early in the career will indirectly impact the proportion of successful entrepreneurs. In this way, we add to the literature evaluating the effects of entrepreneurial programs on later firm creation (Huber et al., 2014; Lyons and Zhang, 2018).

Lastly, we analyze how a shock to entrepreneurial confidence impacts the diversity of entrepreneurs. As prior evidence highlights both lower rates of entrepreneurship and self-confidence among women (Fairlie and Robb, 2009), we evaluate whether peer influence has a disproportionate effect on the gender composition. Assuming students endogenously sort into groups based on similar characteristics (i.e. male students interacting with other male students), the gender gap may be driven by peer effects as female workers will have less interaction with past or future entrepreneurs. We first confirm women are (i) less likely to major in entrepreneurship and (ii) less likely to enter entrepreneurship even after controlling for major. Second, we analyze our earlier surveys and confirm current and incoming female MBA students are significantly less confident in their entrepreneurial abilities compared to the male students. Third, we estimate larger peer effects for women, suggesting that forced interaction is especially valuable when students are otherwise less likely to connect with entrepreneurs. While past research has argued the entrepreneurial gender gap may be related to social networks (Markussen and Røed, 2017), we are the first to illustrate the role of peer effects in explaining the gender gap in an experimental setting.

2 Literature Review

Our paper contributes to two separate literatures: (i) the behavioral traits of entrepreneurs and (ii) the role of social influence on entry to entrepreneurship. To begin, past research has analyzed whether en-

⁹As mentioned below, students graduating with an entrepreneurship major are four times more likely to start a firm within five years relative to the student population.

¹⁰We exclude company founders in this analysis.

trepreneurs have unique behavioral traits from the rest of the population including optimism about the future (Puri and Robinson, 2007), risk aversion (Parker, 2009), ambiguity aversion (Knight, 1921), preferences for independence (Cooper and Saral, 2013), or preferences for variety (Åstebro and Thompson, 2011). Closest to our own research are papers analyzing whether entrepreneurs are overconfident in their abilities (Åstebro et al., 2007; Holm et al., 2013). We make two contributions to this literature. First, we offer novel evidence that entrepreneurial confidence is not a fixed trait, but is impacted by social relationships. In this way, we build on a recent literature arguing that the behavioral preferences of individuals vary across time (Cohn et al., 2015; Guiso et al., 2018). Second, any behavioral differences between entrepreneurs and non-entrepreneurs may be driven by the fact that entrepreneurs have unique career experiences from the rest of the population. By observing the future entrepreneurial plans of skilled workers (rather than past experiences), we can measure differences in these individuals prior to starting a firm. According to our findings, workers intending to start a firm are more confident in their entrepreneurial abilities; however, we find no evidence of differences in optimism, risk or ambiguity aversion, or preferences for variety or independence. Therefore our results highlight the primary role of overconfidence in explaining entry to entrepreneurship.

Next, we add to the literature documenting peer influence on entrepreneurship rates (Giannetti and Simonov, 2009; Kacperczyk, 2013; Lerner and Malmendier, 2013; Markussen and Røed, 2017; Nanda and Sorensen, 2010). Especially close to our experimental setting is Lerner and Malmendier (2013), who find that peers with prior entrepreneurial experience decrease the rate of firm creation by offering advice on entrepreneurial ideas; to our knowledge, this result is unique as other past research documents peer influence increases entrepreneurship. We add to their work, and make three primary contributions to this literature. We are the first to causally identify that peers can affect a behavioral trait, such as overconfidence, which in turn may impact entry to entrepreneurship. In addition, we are the first to confirm peers can causally increase the rate of entrepreneurship in an experimental setting. And, lastly, we reconcile a discrepancy in this literature by showing the dual existence of negative and positive peer effects; to reconcile this disparity, we develop a strategy to separately identify between shocks to confidence and access to information.

3 Data

This paper relies on the random assignment of MBA students, data on new firm creation and success, and information on each student's intended major. We first introduce our experimental setting by closely following [Hacamo and Kleiner \(2017\)](#), then summarize the datasets, and finally confirm students intending to major in entrepreneurship are more confident than the rest of the population.

3.1 Data Sources

Kelley School of Business MBA Program. Upon entry to the Full-Time MBA program, students are assigned to a cohort of roughly sixty students and take the first semester courses together; each graduating class is composed of three or four cohorts in total. Students are also assigned to a team of four students and team members must complete multiple case competitions and group homework assignments together. Assignment to a cohort and group is based on maximizing diversity within cohorts and is similar to methods in other MBA programs ([Ahern et al., 2014](#); [Shue, 2013](#)). For students graduating in 2003-2010, assignment was based across five characteristics: gender, race (for domestic students), citizenship (classified as US or International), GMAT scores (grouped in quartiles), and undergraduate major (business, STEM disciplines, and all other majors). Starting with the class of 2011, the MBA office added Keirse Personality Type as a sixth characteristic. While the system is electronic, staff members are also allowed to make manual corrections to achieve balance. Important to our study, students are not sorted based on their intended MBA major or future employment goals. This is a particular benefit of the data, as randomizing based on majors or employment goals will generate little variation across teams and cohorts ([Chetty et al., 2011](#)).

Student Admissions and Transcript Data. We collect additional information about students from applications and Indiana University transcripts. Application information includes personal characteristics (citizenship, gender, ethnicity, etc.), GMAT scores, and intended MBA major. We create seven fixed effects for nationality (US, India, China, South Korea, Japan, Taiwan, and Other) as all other nations compose less than one percent of the sample. Race is included only for domestic managers and is defined as: Asian, Black, Hispanic, White, and Other. Other includes multi-racial, Native American, and Pacific Islander, which each comprise less than one percent of the sample. We split GMAT scores into quartiles

and create a fixed effect for each subset. Finally, we distinguish between three undergraduate majors: STEM, Business/Economics, and Other and create three separate fixed effects.

Online Business Networking Service Data. To observe career outcomes over several years we match each student to his or her corresponding profile from a large online social network. The profiles include self-reported data on both employment and education. All data is publicly available and obtained through web searches and then parsed into a panel dataset.¹¹ From this data we identify students starting new firms. We define firm creation using the following criteria. First, we include individuals that classify their job title as 'founder' of a firm. Second, we include in our list of entrepreneurs any 'chief executive officer', 'chief financial officer', or 'owner' that joined their firms the same year of founding. Each firm's startup year is either directly observed in the firm's profile on the business networking website, or estimated using the earliest date any employee joined the firm (as observed on the website). Finally, we include individuals with job titles like 'self-employed' and 'entrepreneur' and job titles that contain the phrase 'independent'. We impose additional restrictions on these criteria. In particular, if the firm already has employees prior to a person joining, we require that person to be explicitly classified as an owner or founder in order to count him/her as an entrepreneur.

Data Cleaning. To match each student in the sample to his or her online profile, we find all online profiles that state the individual attended the Indiana University MBA program. We then manually match profiles based on first and last name and year of graduation (when available on the profile). We drop any graduates without online profiles as well as cases where the profiles list incorrect graduation years. Finally, we confirm that the undergraduate college/university from the admissions data matches the listed undergraduate college/university according to the online profile. In total, we are able to match nearly 95% of MBA graduates to their online profiles.

3.2 Data Summary

Student Demographics. We first summarize firm creation across the population in four separate figures. We include only students without prior experience in entrepreneurship in our sample. Figure 1 plots the rate of entrepreneurship by the year of graduation among all students in the MBA program. We

¹¹For a more detailed description of the data, we refer readers to [Hacamo and Kleiner \(2016\)](#).

require the students to start the firm within the first three years of graduation as the most recent class graduated in 2013. Rates of new firm creation are lowest among the class of 2004 and highest among the class of 2010. From the time-series, we identify a counter-cyclical pattern of firm creation.

We next measure entrepreneurship rates across subsets of the sample. First, Figure 2 distinguishes students with (i) no intention to major in entrepreneurship, and (ii) intending to either first or second major in entrepreneurship. We find students intending to major in entrepreneurship are nearly twice as likely to start a firm within five years of graduation. Second, Figure 3 splits the sample into students that (i) graduated the MBA with a major in entrepreneurship and (ii) those that majored in other fields. We find entrepreneurship majors are four times as likely to start a firm within five years of graduation. Third, Figure 4 distinguishes students (i) entering a start-up firm upon graduation, and (ii) those entering alternative employment. We find students entering a start-up are seventy-five percent more likely to start a firm within five years of graduation relative to the rest of the population.

We summarize the rates of entrepreneurship in Table 1. Our sample initially includes all MBA students graduating between 2003 and 2013. The sample initially includes 2,189 students. Excluding students with prior experience as an entrepreneur, we reduce the sample to a final 2,102 students. Among the students in our final sample, 1.2% of students found a new firm directly after graduation and 1.8% within a year of graduation. After three (five) years of graduation, rates of new firm creation increase to 3.4% (4.3%). Last, we define a small firm as any firm employing at most ten employees and define a young firm as any firm that started after the student graduated from the MBA. We define a start-up as any firm classified as either young or small. We find that sixteen percent of the sample joins (rather than starts) a start-up firm within the three years following graduation.

According to the data, fourteen percent of students intended to first major in entrepreneurship, while another eighteen percent intended to second major in entrepreneurship. According to the online networking service only four percent of students actually graduate with a first major in entrepreneurship. Turning to the team and cohort results, each team has an average of four students, while each cohort has an average of sixty-two students. First, the average team includes 0.1 students with prior experience in entrepreneurship, compared to the 2.1 students in the average cohort. Second, the average team includes 0.5 students intending to first major in entrepreneurship, compared to 10.5 students in the average cohort. Third, the average team includes 0.6 students intending to second major in entrepreneurship, compared to 12 students in the average cohort.

New Firm Demographics. We summarize data on the new firm demographics in Figures 5 and 6. First, we estimate that over 90% of firms survive over one year, 70% survive three years, and over 40% survive for five years following creation. Second, we define employment as the total number of employees working at the establishment in a given year. To measure employment, we use the networking website to find all users who report that they are working (or have worked) for the new firms created by our entrepreneurs. Within our sample, over 90% hire an employee (other than the founder), 50% hire five employees, and over 40% hire at least ten employees during the life of the firm.

In addition, we note a small proportion of these firms are particularly successful. For example, two percent of the firms created by IU-MBA graduates experience a successful exit by either being acquired or successfully completing an IPO; in addition, four percent of the firms received VC funding. Finally, in unreported results, we also match each new firm to a two-digit NAICS code. New firms predominantly arise in the industries: Professional, Scientific, and Technical Services (23%), Information (17%), Health Care (14%), Finance and Insurance (12%), Retail Trade (7%), Administrative (7%), and Educational Services (7%).

3.3 Behavioral Traits of Entrepreneur Majors

Entrepreneurial Confidence. Given our focus on entrepreneurial confidence, it is necessary to confirm that students intending to major in entrepreneurship are actually more confident than the rest of the student population. However, this is challenging for two reasons. First, confidence is generally difficult to directly observe. Second, past students intending to major in entrepreneurship are also more likely to gain entrepreneurial experience following graduation; differences between these groups may therefore be driven by later career experiences rather than initial beliefs.

To overcome both obstacles, we survey current and incoming Indiana University MBA students from the classes of 2020 and 2021 in the summer of 2019. We reached out to a total of 339 students across both classes and received a total of 179 responses, a response rate of 53%. Within each survey we ask three questions to measure entrepreneurial (over)confidence:

Q1: How confident are you in your ability to start a company?

Q2: Do you believe you would be worse, equal, or better at starting a company relative to the other MBA students at Kelley?

Q3: Among past IU graduates that started a firm, only 5 to 10% employ 10 or more workers within the first year. What is the likelihood you personally start a firm that employs 10 or more workers within the first year?

The first question (Q1) develops a measure of *absolute confidence* on entrepreneurial ability since we do not incite a comparison with others neither provide a benchmark. We expect students who are either overconfident or aware of their high entrepreneurial ability to rank higher on this measure. We offer five potential answers, (i) Not Confident, (ii) Not Very Confident, (iii) Somewhat Confident, (iv) Confident, and (v) Very Confident. The second question (Q2) measures a student's *relative confidence* compared to other students in the same MBA class. We offer six multiple choice options: (i) Bottom 10% of students, (ii) Better than 10% of students, (iii) Better than 30% of students, (iv) Better than 50% of students, (v) Better than 70% of students, and (vi) Better than 90% of students. As in the first question, both overconfident individuals as well as those aware of their high entrepreneurial ability are likely to score higher in this question. The third question (Q3) measures whether students are confident in their abilities to start highly successful firms, and aims to separate *overconfident* individuals. We offer eight potential answers: (i) 0-1%, (ii) 1-2%, (iii) 2-5%, (iv) 5-10%, (v) 10-15%, (vi) 15-20%, (vii) 20-30%, and (viii) above 30%. We conjecture that students who respond above 10-15% are overconfident on their entrepreneurial ability. Our underlying assumption is that those who believe that their likelihood of starting a highly successful firm is well above the best entrepreneurs who attend the IU MBA are overconfident.

As discussed above, we are primarily interested in whether students intending to major in entrepreneurship are more confident than other students. Therefore, for each question we rank each potential multiple choice answer and create a categorical variable that varies between 1 and n, where n is the highest ranked answer.¹² Additionally, we use Q3 to pinpoint overconfidence by creating an outcome variable that equals one if the answer is above 10-15% and zero otherwise. We then estimate the relationship between intending to major in entrepreneurship and each measure of confidence under a linear regression model. We present the results in Panel A of Table 2. Each regression model controls for a wide range of controls including graduation year, gender, nationality, and race. The results in the first two columns report the estimations for Q1 and Q2, and show that students intending to major in entrepreneurship demonstrate higher absolute and relative entrepreneurial confidence. The last two columns in Panel A of Table 2 report the results for Q3. The third column reports the results when the outcome variable includes all possi-

¹²The answers listed in the previous paragraph are already sorted from lowest to highest rank.

ble answers categorized as described above. The fourth column reports the results when the outcome variable is a binary variable equal to one when the response is above 10-15%. All four results are statistically significant, and provide support for higher rates of entrepreneurial confidence among students intending to major in entrepreneurship, and the last two results suggest that these students are indeed overconfident.

Alternate Behavioral Traits. Students intending to major in entrepreneurship may differ from other students in ways other than entrepreneurial confidence. This presents a concern in our identification strategy as students may influence these alternative behavioral traits. Therefore, we examine whether students intending to major in entrepreneurship differ from other students in their (i) optimism about the future, (i) risk and ambiguity aversion, and (ii) preferences for independence and variety. We include the following questions in the survey:

Q4: Over the past 90 years, the US stock market has observed an average return of 9% a year. What will be the average annual US stock market return over the next ten years?

Q5: Among people born in the US in 1919, 1.4% are still alive in 2019. What is the likelihood you live to age 100?

Q6: How much would you pay for a lottery ticket that gives you a 50% probability of winning \$500 and 50% of winning nothing?

Q7: How much would you pay for a lottery ticket that gives you a $x\%$ probability of winning \$500? (x is between 25% and 75%)

Q8: How important is it for you to be in control of your daily schedule?

Q9: How important is it for you to have a job providing a variety of different tasks?

Each question is related to a potential behavioral characteristic that predicts entrepreneurship according to the literature. Q4 offers a measure of optimism about the economy ([Bengtsson and Ekeblom, 2014](#)). Q5 measures non-economic optimism ([Puri and Robinson, 2007](#)). Q6 measures risk aversion ([Parker, 2009](#)), while Q7 is about ambiguity aversion ([Knight, 1921](#)). Q8 details preferences for independence ([Cooper and Saral, 2013](#)) and Q9 concerns preferences for variety ([Åstebro and Thompson, 2011](#)).

As before, we offer several multiple choice answers for each question, and the list of all possible answers is available in the online appendix. We then rank each answer and convert to a positive integer. We estimate the relationship between intending to major in entrepreneurship and each characteristic. We then present the results in Panel B of Table 2. As before, we control for a wide range of controls including graduation year, gender, race, and nationality. Across all six measures, we only find one statistically significant link: students intending to major in entrepreneurship are less optimistic about future stock market returns, rather than more optimistic. Otherwise, we find no evidence that students intending to major in entrepreneurship hold different behavioral traits from the rest of the population.

4 Methodology

4.1 Empirical Specification

Forced social interactions offer a potentially valuable intervention in shaping an individual's entrepreneurial confidence as (i) peers influence the rate of firm creation (Giannetti and Simonov, 2009; Nanda and Sorensen, 2010) and (ii) prior experiments already confirm social networks can influence an agent's willingness to accept risk (Ahern et al., 2014; Mitton et al., 2018). However, focusing on social networks leads to two primary concerns. First, social networks may influence the rate of entrepreneurship through access to information and resources without altering confidence (Gompers et al., 2005). For instance, individuals with past entrepreneurial experience may discourage others from pursuing poor entrepreneurial endeavors (Lerner and Malmendier, 2013). To separately identify a change in confidence from learning mechanisms, we distinguish between (i) peers interested in starting a firm in the future but without prior entrepreneurial experience and (ii) peers with prior experience in entrepreneurship. We argue that while groups may impact entrepreneurial confidence, only the latter holds detailed knowledge about the entrepreneurial process. In a subsequent analysis presented below, we directly survey treated individuals to confirm this conjecture.

Second, to identify whether peers have a causal effect on the decision to start a firm, we must address the endogeneity concerns associated with peer effects (Hellerstein et al., 2015; Manski, 1993). In our setting, we exploit the forced assignment of incoming students into cohorts and teams at Indiana University. Students in the same cohort take the core MBA classes together, while students in the same team are assigned to work together on course projects and a large case study at the end of the semester. Specifically,

we follow the standard approach in the literature and estimate peer effects from these cohorts and teams through a linear-in-means regression framework (Graham, 2008; Manski, 1993):

$$\begin{aligned} Entrepreneur_i &= \alpha + \beta \times Treatment_i + \gamma \times Experienced Peer_i \\ &+ \rho \times Intended Entrepreneur_i + Controls_i + YearFE_i + \varepsilon_i \end{aligned} \quad (1)$$

where $Entrepreneur_i$ is a binary variable that takes a value of one when student i starts a new firm following MBA graduation. While the results primarily focus on firm creation within three years of graduation, we also vary the time frame from one to five years after graduation. Our primary independent variable of interest is $Treatment_i$, a discrete variable denoting the number of cohort (or team) members of student i that intend to major in entrepreneurship and have no prior entrepreneurial experience. We test the hypothesis that $\beta > 0$, which implies that individuals intending to major in entrepreneurship increase their peers' likelihood of firm creation.

First, to distinguish a change in attitudes from a transfer of entrepreneurial knowledge we follow past literature and control for $Experienced Peer_i$: a discrete variable denoting the number of cohort (team) members of student i that created a failed firm prior to entering the MBA program. Based on Lerner and Malmendier (2013) we expect $\gamma < 0$, which implies that individuals with prior unsuccessful entrepreneurship experience decrease the likelihood of entrepreneurship of her peers. Second, to explicitly identify a change in career plans, we control for whether the student intends to major in entrepreneurship. Specifically, we include the variable $Intended Entrepreneur_i$, which takes a value of one if student i intends to either first or second major in entrepreneurship according to her MBA application.

Additionally, we include a year of graduation fixed effect since students are only randomly assigned within the same graduating class. We also include several other controls in the analysis to account for individual characteristics used by the MBA office in the assignment to teams and cohorts, namely: gender, citizenship, race, GMAT, and undergraduate major fixed effects. Finally, all errors are clustered at the cohort (team) level.

5 Results

To test our hypotheses, we use three sets of results. First, we evaluate the influence of peers on new firm creation under a range of empirical specifications. Second, we test whether the results are driven by a change in entrepreneurial confidence. Third, we examine whether a shock to confidence leads to an increased rate of successful firms and a higher proportion of female entrepreneurs.

5.1 Peer Effects on Firm Creation

Peer Effects at the Cohort Level. In Table 3, we evaluate how peers influence firm creation. In Panel A, we define peers at the cohort-level, which include on average sixty-one students. The first and second column detail the results under a linear probability model, while the third and fourth columns offer the results under a probit regression model. The dependent variable of interest is a binary variable denoting the student founded a firm within three years of graduation. We use three years as the most recent MBA class graduated in 2013 and we collected employment data in 2016, allowing all students the same number of years to start a new firm. In Columns (1) and (3) of both panels, we include year fixed effects as students are only randomly assigned within the same graduating class. We also control for whether the student intended to major in entrepreneurship according to her application. In Columns (2) and (4), we add controls for experienced peers as well as demographics used in the sorting process: gender, nationality, race, GMAT score, and undergrad major.

According to Column (2) of panel A, we estimate that students with a cohort member intending to major in entrepreneurship (and without prior entrepreneurial experience) are 0.4 percentage points more likely to enter entrepreneurship. As the likelihood of starting a firm within three years of graduation is 3.4%, each cohort member increases the rate of peer new firm creation by 12% relative to the mean. Since these peers have no prior entrepreneurial experiences, the results lend support to our argument that peers influence entrepreneurial confidence. To the best of our knowledge, this is the first evidence that peers increase firm creation in an experimental setting.¹³

In comparison, students with a cohort member with prior experience in entrepreneurship are 0.6 percentage points less likely to enter entrepreneurship, a decrease of over 20% relative to the mean. Recall from our earlier discussion that past research including [Nanda and Sorensen \(2010\)](#) report a positive

¹³While other researchers identify a similar positive relationship from peers within the same school ([Kacperczyk, 2013](#)), neighborhoods ([Markussen and Røed, 2017](#)), or family ([Lindquist et al., 2015](#)), peers are not randomly assigned.

correlation between an individual's past entrepreneurial experience and the incidence of firm creation of his workplace peers. However, in subsequent work, [Lerner and Malmendier \(2013\)](#) demonstrate in a randomized setting that an individual with entrepreneurial experience causally reduces the entry to entrepreneurship of her peers. Our results replicate the findings of [Lerner and Malmendier \(2013\)](#), and provide support for the existence of positive and negative peer effects, reconciling opposing findings documented in the literature ([Lerner and Malmendier, 2013](#); [Nanda and Sorensen, 2010](#)).

Peer Effects at the Team Level. In addition to cohorts, students are also assigned to a team of roughly four students, and students in the team complete group assignments and case studies together during the whole first year of the MBA. Given this close relationship, we expect peers to have a larger impact, relative to cohort members, on the career outcomes of fellow team members. We evaluate the influence of team peers on rates of new firm creation in Panel B of Table 3.

According to Column (2), we estimate that adding a peer intending to major in entrepreneurship increases the rate of firm creation among other team members by 1.2 percentage points, a 35% increase relative to the mean. We also estimate that adding a peer with entrepreneurial experience to a team decreases the rate of firm creation among other team members by two full percentage points, a decrease of over 50% relative to the mean. We note two deviations from the cohort results in Panel A of Table 3. First, the coefficients are significantly larger in size than the results from Panel A of Table 3. Second, the coefficients are no longer statistically-significant at the one percent level. Both results are likely driven by differences in the definition of a peer: as team are composed only four students (rather than sixty in the cohort), we expect greater peer influence due to team members, yet also more noise within the estimation.

Nonlinear Specification. Given the likelihood of firm creation is only 3.4% according to Table 3, the binary dependent variable takes a value of one for only a small set of students potentially raising concerns that the linear probability model is a misfit for this application. To mitigate these concerns, we also introduce a probit regression model in the third and fourth column of Panel A and B to ensure the results are robust to the modeling choice in the baseline estimation. We confirm that a student with a cohort (and team) member intending to major in entrepreneurship is more likely to start a new firm; meanwhile, a cohort (and team) member with prior experience in entrepreneurship decreases the likelihood other students start a new firm. The results suggest the prior estimates under the linear probability model do

not depend on the particular empirical specification.

5.2 Economic Implications of Peer Effects

Temporary or Permanent Effects? The results highlight the influence of peers on firm creation. One explanation for our findings is that peers may simply impact the timing of firm creation; alternatively, peers may impact the ultimate decision to enter entrepreneurship, leading to the creation of firms that otherwise would not exist in the economy. If peer influence leads to a permanent increase in firm creation, then the estimated peer effects will remain persistent in the long-run. If peers only accelerate the timing of firm creation (as opposed to the overall likelihood), then we should observe peer effects dissipate as the horizon increases.

In Panel A of Table 4 we estimate the impact of peer influence on new firm creation at one to five years following MBA graduation. First, we estimate that treatment increases the rate of new firm creation among fellow cohort members by 0.2 percentage points after one year, compared to 0.4 percentage points after three years, and 0.4 percentage points after five years.¹⁴ Given the results persist after five years, we conclude that peers have a permanent impact on firm creation leading to the creation of firms that otherwise would not exist in the economy.

Do Peers Affect the Creation of Successful Firms? Thus far, we define entrepreneurs in the sample by requiring (i) the student is identified as the founder of the firm and (ii) no other employees joined the firm prior to the student. One potential concern is that peers may only influence the creation of small and unsuccessful firms. However, if the economic value of firm creation is contingent on the survival and employment growth, we can evaluate whether peers impact the rate of successful firm creation in our setting. To this end, we tighten the restriction of entrepreneur in Panel B of Table 4 by also requiring the firm (i) survives for at least x years, or (ii) employs at least x workers.

In Columns (1)-(3), we estimate the impact of peers on establishing employer firms. Cohort members intending to major in entrepreneurship increase the rate of employer firms with at least six employees by 0.4 percentage points and employer firms with at least ten employees by 0.3 percentage points.¹⁵ In Columns (4)-(6), we estimate the impact of peers on establishing resilient firms—firm that survive for at

¹⁴In addition, we estimate that experienced peers decrease the rate of new firm creation among fellow cohort members by 0.4 percentage points after one year, compared to 0.6 percentage points after three years and 0.6 percentage points after five years.

¹⁵Cohort members with prior experience in entrepreneurship decrease the rate of employer firms with six or more employees by 0.4 percentage points and the rate of 10+ employee firms by 0.3 percentage points.

least five years. We estimate the likelihood of starting a firm lasting at least five years increases by 0.3 percentage points when a cohort member intends to major in entrepreneurship (compared to a similar rate of 0.4 percentage points for firms lasting at least one year).¹⁶ In sum, peers influence the rate of employer firm creation, highlighting the potential for real effects on the economy.

5.3 Do Peers Affect Entrepreneurial Confidence?

While the results above provide compelling evidence that peers influence the rate of firm creation, the precise channel linking these two variables is less clear. In this section, we attempt to better isolate a change in confidence through two additional analyses.

Survey of Students in Sample. First, we augment our current dataset by surveying the treated students in the data. We contact each student with a team member intending to major in entrepreneurship; among the 495 students contacted, we received 185 replies, for a response rate of 37%. We then ask three questions:

Q1: In your first-year at IU-Kelley, one of your teammates was interested in becoming an entrepreneur and wanted to choose entrepreneurship as his/her MBA major. Did the team member impact the likelihood that you would started (or already started) a company?

Q2: How did he/she affect your likelihood?

Q3: If he/she changed your views of entrepreneurship, in what what way?

The multiple choice answers to the questions are reported in the online appendix. The survey results have three primary benefits. The first question confirms that peers intending to major in entrepreneurship increase interest the likelihood of firm creation. As students that have not started a new firm may still have an interest in entrepreneurship, we can potentially identify a significantly larger peer effect than is directly observable from the employment histories. The second question helps distinguish between a change in behavioral traits and learning. The third question helps isolate which behavioral traits change. Specifically, we test whether peers influence (i) entrepreneurial confidence, (ii) risk aversion, (iii) opti-

¹⁶The likelihood of starting a firm lasting at least five years decreases by 0.6 percentage points when a cohort member has prior experience in entrepreneurship (compared to a rate of 0.8 percentage points for firms lasting at least one year).

mism about the returns to entrepreneurship, or (iv) preferences toward non-monetary awards (such as valuing independence and variety).

We summarize the survey data in Figures 8, 9, and 10. First, we estimate that 22.4 percent of respondents reply that the peer team member increased their interest in starting a firm; in comparison, 77.6 percent of students report no impact and no students report a decrease. We note we are able to compare these findings directly to our regression analysis. From Table 3, we estimated that a team member increases the likelihood of firm creation by 1.2 percentage points; therefore the survey results the majority of students that choose to not enter entrepreneurship are still influenced by treatment.

Second, according to the survey, among the students reporting the team member had an effect, 46 percent of students find that the team member changed his/her views of entrepreneurship, eight percent report he/she learned about entrepreneurship from the team member, and 46 percent found both channels are present. Therefore, while it is difficult to fully distinguish between these channels, we find that peers disproportionately impact behavioral characteristics.

Third, we distinguish how peers influence a student's views towards entrepreneurship. For students that responded with a change in views towards starting a firm, we offered five possible answers: (i) made me confident about my abilities (shock to entrepreneurial confidence), (ii) decreased my concerns about the risk of owning business (shock to risk aversion), (iii) helped me realize I would enjoy entrepreneurship (shock to preferences related to entrepreneurship such as preferences for independence and variety), (iv) increased my expectations of monetary incentives (shock to optimism), or (v) other. According to the results 56.5% of the population reported a change in entrepreneurial confidence. In comparison, we find smaller effect on risk aversion (26.1%), entrepreneurial preferences (4.4%), optimism (0%), and other (4.4%). Overall, the survey results further support our argument that the increase in firm starts is due to a change in entrepreneurial confidence.

Isolating Confidence from Learning. Second, distinguishing between shocks to information flows and confidence is difficult as both are likely present, yet neither is generally observable to the econometrician. To identify a change in a student's entrepreneurial confidence, we have focused our analysis on peer effects through cohort (and team) members that intend to major in entrepreneurship and then control for connections to past entrepreneurs. However, it is possible intended entrepreneurs may still provide information to peers. To overcome this concern, we modify our baseline analysis by excluding the peers

most likely to have valuable information to offer other students. In Columns (1) and (2) of Table 5, we define treatment as the number of cohort members that (i) intend to major in entrepreneurship and (ii) do not start a firm within five years following graduation. We estimate that treatments still increases the rate of firm creation by 0.6 percentage points. In Columns (3) and (4), we instead define treatment as the number of cohort members (i) intending to major in entrepreneurship and (ii) graduate from the MBA with a different major. According to this definition, peers increase firm creation rates by 0.4 percentage points. The results continue to hold even after excluding peers holding relevant information.

5.4 Do Peers Affect the Success of Entrepreneurs?

Peer Effects on the Proportion of Successful Firm Creation. The results above (i) find confident peers increase the rate of entrepreneurship in the economy and (ii) offer evidence that this relationship is due to increased confidence. Based on these results, we next examine the implications of a shock to entrepreneurial confidence on the economy. While a complete welfare analysis is beyond the scope of this paper, we first evaluate whether the treated peers in our sample start more successful firms relative to firms started by untreated peers. We analyze only individuals starting a firm within the first three years following MBA graduation. According to Column (2) of Table 6 we find cohort members intending to major in entrepreneurship increase the rate of success (defined as surviving at least five years) by 6.9 percentage points. According to our estimates in Column (4), cohort members intending to major in entrepreneurship increase the rate of success (now defined as employing five or more workers) by 12.5 percentage points. We find consistent evidence that a shock to entrepreneurial confidence increases the proportion of successful new firms.

Peer Effects on Majoring in Entrepreneurship. Our prior results highlight the influence of peers on successful firm creation. These estimates differ from [Lerner and Malmendier \(2013\)](#), who instead observe (i) peers with prior experience in entrepreneurship decrease the rate of unsuccessful firm creation and (ii) peers have no impact on successful firm creation. One possible explanation for our results is that as peers influence future career plans, they also impact educational choices and employment in start-ups, leading to greater knowledge about entrepreneurship. When acquiring knowledge in this fashion also increases the chance of firm survival and growth (conditional on starting a firm), peers will alter the proportion of successful entrepreneurship. This argument is based on Panel B of Table 6, which illustrates that

majoring in entrepreneurship is correlated with entrepreneurial success, conditional on starting a firm. In Columns (1) and (2), we measure success as employment size; in Columns (3) and (4), we measure success as survival. According to the results, students intending to major in entrepreneurship are 42% more likely to employ five or more workers and 43% more likely to survive at least five years.

To test whether peers affect the desire of students to major in entrepreneurship, we exploit data on the intended major of each student prior to interaction. In Panel A of Table 7, we first confirm that, relative to other majors, entrepreneurship majors are six percentage points more likely to start a firm within a year of graduation and eleven percentage points more likely to start a firm within five years. In Panel B of Table 7, we next evaluate how peers influence the decision to major in entrepreneurship. According to the second column, treatment increases the likelihood of switching to an entrepreneurship major by 2.1 percentage points. As students are required to choose a major in the first year of the MBA program, the results confirm that peers immediately influence the decision to learn about entrepreneurship. The timing of the major choice also helps explain why peer influence during the first year of the MBA program can impact the rate of entrepreneurship years later.

Peer Effects on Joining a Young or Small Firm. For additional evidence, we next determine whether peers impact the choice to join a young firm (started after MBA graduation) or small firm (ten or fewer employees). Our analysis is guided by evidence suggesting individuals learn about firm creation through prior experience with start-ups (Guiso et al., 2015), and the assumption that employment with a start-up will lead to similar experiences as starting a firm—including a greater variety of responsibilities, experience with launching new products, exposure to income risk, and independence within the organization. In line with this argument, Panel A of Table 8 demonstrates that joining a young or small firm following MBA graduation increases the likelihood of starting a new firm by 2.7 percentage points within five years after graduation. For comparison, the effect is roughly a quarter the effect of majoring in entrepreneurship as measured above. We note students designated as a founder or owner of the company are not identified as joining a small/young firm.

We evaluate the impact of peers on joining a start-up following MBA graduation in Panel B of Table 8. According to Column (2), a cohort member intending to major in entrepreneurship increases this likelihood by 0.6 percentage points. Given 16% of the sample joins a young or small firm, this results in a 4% increase relative to the mean. Besides offering additional evidence that peers influence the decision

to learn about entrepreneurship, the results confirm the role of peers in allocating workers to young and small firms.

Take together, these results contribute to the literature measuring the effects of learning about entrepreneurship on firm creation. Past research has found mixed evidence of these effects: while some studies illustrate that entrepreneurial training leads to increased firm creation (Huber et al., 2014; Lyons and Zhang, 2018), other researchers find more limited (or even negative) relationships (Fairlie et al., 2015; Oosterbeek et al., 2010; Von Graevenitz et al., 2010). By exploiting the random assignment of peers in classrooms, we offer new evidence that entrepreneurial learning (through education and on-the-job experience) does in fact increase the rate of firm creation.

5.5 Do Peers Affect the Proportion of Female Entrepreneurs?

Entrepreneurial Confidence across Gender. To determine the implications of a shock to entrepreneurial confidence, we next analyze the impacts of confident peers on the rate of female entrepreneurship. Past researchers have found significantly lower rates of entrepreneurship among women compared to men in the economy (Fairlie and Robb, 2009). We hypothesize the gap may be partially driven by peer effects: assuming individuals endogenously choose to sort into groups based on similar characteristics (i.e. males interacting with other males), female workers will then have less interaction with past or future entrepreneurs (Markussen and Røed, 2017). For the women in our setting, the forced assignment of students into teams and cohorts may be the only chance to interact with entrepreneurial students, leading to greater peer effects, and ultimately, entrepreneurial diversity.

Before analyzing peer influence by gender, we offer three initial findings. First, according to Panel A of Table 9 female students are 5.4 percentage points less likely to intend to major in entrepreneurship. Second, we return to our survey results in Panel B and C of Table 9. We document that the women in the classes of 2020 and 2021 appear less confident in their entrepreneurial abilities compared to the male students.¹⁷ These results hold after controlling for the intended major of the student and suggest that a shock to entrepreneurial confidence may have a disproportionate impact on female workers. Third, we confirm that men are roughly twice as likely to start a new firm relative to female students in the sample. In Panel A of Table 10 we estimate that women are 1.2 percentage points less likely to start a firm in the first year after graduation and 3.2 percentage points less likely five years after graduation

¹⁷In addition, we find evidence that women are more risk averse and more ambiguity averse than their male counterparts.

even after controlling for the intention to major in entrepreneurship. Therefore, we find evidence that the entrepreneurial gender gap widens over the student's career.

Peer Effects on Firm Creation across Gender. We measure peer effects separately among male and female students. According to the the first and second column of Panel B of Table 10, peer influence disproportionately affects female students. We estimate peers majoring in entrepreneurship increase firm creation by 0.8 percentage points among female students compared to a 0.3 percentage points effect among the male students in the sample.¹⁸

The results above highlight the significance of peer effects on female students. Assuming students choose to form sub-groups with similar students within classroom settings (Carrell et al., 2013), we may also find larger peer effects among similar students (i.e. female peers have larger effects on other female students in the same cohort). We test this hypothesis in the third and fourth column of Panel B by distinguishing between male peers and female peers within the cohort. Focusing on female entrepreneurship, we find that a female peer intending to major in entrepreneurship increases firm creation by one percentage point (compared to 0.7 percentage points for the male peer). Overall, we offer suggestive evidence that the gender of the peer impacts the rate of firm creation.

5.6 Robustness Tests

Peers with other Intended Majors. Our framework exploits our unique data on the intended major of each student in the sample prior to peer interaction. To identify individuals with confidence in starting a new firm, we analyze students intending to major in entrepreneurship. If this interpretation is correct, then student peers intending to major in other subjects (finance, marketing, management, operations, and strategy) should not affect the rate of firm creation.

In Table 11 we find no statistical evidence that cohort members intending to major in subjects outside entrepreneurship influence the likelihood of firm creation.¹⁹ We consider each subject in a separate regression and combine both first and second intended majors. Across all specifications, no coefficient

¹⁸In unreported results, we establish similar results among racial minority students. First, we estimate white students are slightly more likely to start a new firm than international and U.S. minority students. Second, while we find limited evidence of peer affects on white students, peers with an intended major in entrepreneurship increase firm creation among minority students by 0.4 percentage points.

¹⁹In unreported results, we conduct a similar analysis identifying peers at the team level. Again, no coefficients are statistically significant at the 10% level.

is statistically significant at the 10% level. The lack of results under all specifications suggest that the intention to major in entrepreneurship is a unique and valid measure of interest in starting a new firm.

6 Concluding Remarks

This paper offers causal evidence that overconfidence is time-varying and influenced by social interactions, leading to increased entrepreneurship among skilled workers. Our results have significant implications outside the particular experimental setting. First, as students in our setting will routinely interact with peers outside their team or cohort, our estimates offer only a lower bound on the influence of peer interaction on firm creation. Policies that promote interaction between skilled workers, even within narrow contexts, will likely impact entrepreneurial confidence (and therefore entrepreneurship rates) across the economy. Second, we find the sign of peer influence is ambiguous and depends on peer attitudes towards entrepreneurship. Policy makers must be aware of the divergent impact of peers when designing policies promoting firm creation. Third, as peer influence predominantly affects female students, our results highlight the potential for policies supporting entrepreneur diversity. Fourth, our findings suggest that a shock to entrepreneurial confidence in the economy causally increases both the likelihood of starting a firm and the chance of success.

Appendix

Our analysis includes two separate surveys. First, we survey the Indiana University MBA class of 2020 and 2021 during the summer of 2019. Of the 339 students contacted across both classes, we received a total of 179 responses, or a response rate of 53%. Second, we survey past alumni that were previously connected to a team member intending to major in entrepreneurship. Among the 495 prior students contacted from the classes of 2003-2013, we received 185 responses, or a response rate of 37%. We outline the questions, potential multiple choice options, and responses for each survey below.

Survey of Current Students.

Q1: How confident are you in your ability to start a company?

- Not confident
- Not very confident
- Somewhat confident
- Confident
- Very confident

Q2: Do you believe you would be worse, equal, or better at starting a company relative to the other MBA students at Kelley?

- Bottom 10% of students
- Better than 10% of students
- Better than 30% of students
- Better than 50% of students
- Better than 70% of students
- Better than 90% of students

Q3: Among past IU graduates that started a firm, only 5 to 10% employ 10 or more workers within the first year. What is the likelihood you personally start a firm that employs 10 or more workers within the first year?

- 0-1%
- 1-2%
- 2-5%
- 5-10%
- 10-15%
- 20-30%
- Above 30%

Q4: Over the past 90 years, the US stock market has observed an average return of 9% a year. What will be the average annual US stock market return over the next ten years?

- 2-4% each year
- 4-6% each year
- 6-8% each year
- 8-10% each year
- 10-12% each year
- 12-14% each year
- 14-16% each year
- above 16% each year

Q5: Among people born in the US in 1919, 1.4% are still alive in 2019. What is the likelihood you live to age 100?

- 0-1%
- 1-2%
- 2-5%
- 5-10%
- 10-15%
- 15-20%

- 20-30%
- 30-50%
- >50%

Q6: How much would you pay for a lottery ticket that gives you a 50% probability of winning \$500 and 50% of winning nothing?

- Less than \$50
- 50-\$100
- 100-\$150
- 150-\$200
- 200-\$250
- More than \$250

Q7: How much would you pay for a lottery ticket that gives you a $x\%$ probability of winning \$500? (x is between 25% and 75%)

- Less than \$50
- 50-\$100
- 100-\$150
- 150-\$200
- 200-\$250
- More than \$250

Q8: How important is it for you to be in control of your daily schedule?

- Not at all important
- A little important
- Somewhat important
- Important

- Very Important

Q9: How important is it for you to have a job providing a variety of different tasks?

- Not at all important
- A little important
- Somewhat important
- Important
- Very Important

Survey of Former Students.

Q1: In your first-year at IU-Kelley, one of your teammates was interested in becoming an entrepreneur and wanted to choose entrepreneurship as his/her MBA major. Did the team member impact the likelihood that you would started (or already started) a company?

- Yes
- No

Q2: How did he/she affect your likelihood

- I learned from my team member about entrepreneurship
- I changed by views towards entrepreneurship
- Both a change in views and learning

Q3: If he/she changed your views of entrepreneurship, in what what way?

- He/she influenced my confidence about my abilities
- He/she changed by views about the risk of business ownership
- He/she changed my views about the financial benefits
- He/she changed my views about the non-monetary benefits
- Other

References

- Philippe Aghion, Peter Howitt, Maxine Brant-Collett, and Cecilia García-Peñalosa. *Endogenous growth theory*. MIT press, 1998.
- Kenneth R Ahern, Ran Duchin, and Tyler Shumway. Peer effects in risk aversion and trust. *The Review of Financial Studies*, 27(11):3213–3240, 2014.
- Thomas Åstebro and Peter Thompson. Entrepreneurs, jacks of all trades or hobos? *Research policy*, 40(5):637–649, 2011.
- Thomas Åstebro, Scott A Jeffrey, and Gordon K Adomdza. Inventor perseverance after being told to quit: The role of cognitive biases. *Journal of behavioral decision making*, 20(3):253–272, 2007.
- Thomas Astebro, Holger Herz, Ramana Nanda, and Roberto A Weber. Seeking the roots of entrepreneurship: Insights from behavioral economics. *Journal of Economic Perspectives*, 28(3):49–70, 2014.
- William J Baumol. Entrepreneurship in economic theory. *The American economic review*, pages 64–71, 1968.
- Itzhak Ben-David, John R Graham, and Campbell R Harvey. Managerial overconfidence and corporate policies. Technical report, National Bureau of Economic Research, 2007.
- Ola Bengtsson and Daniel Ekeblom. The bright but right view? a new type of evidence on entrepreneurial optimism. 2014.
- Scott E. Carrell, Bruce I. Sacerdote, and James E. West. From natural variation to optimal policy? the importance of endogenous peer group formation. *Econometrica*, 81(3):855–882, 2013.
- Raj Chetty, John N Friedman, Nathaniel Hilger, Emmanuel Saez, Diane Whitmore Schanzenbach, and Danny Yagan. How does your kindergarten classroom affect your earnings? evidence from project star*. *The Quarterly journal of economics*, 126(4):1593–1660, 2011.
- Alain Cohn, Jan Engelmann, Ernst Fehr, and Michel André Maréchal. Evidence for countercyclical risk aversion: An experiment with financial professionals. *American Economic Review*, 105(2):860–85, 2015.
- David J Cooper and Krista Jabs Saral. Entrepreneurship and team participation: An experimental study. *European Economic Review*, 59:126–140, 2013.
- Ryan Decker, John Haltiwanger, Ron Jarmin, Javier Miranda, Aaron Chatterji, Edward Glaeser, William Kerr, Yves Zenou, Jackline Wahba, and Ramana Nanda. The importance of family background and neighbourhood effects as determinants of entrepreneurship. 2016.
- Robert W Fairlie and Alicia M Robb. Gender differences in business performance: evidence from the characteristics of business owners survey. *Small Business Economics*, 33(4):375, 2009.
- Robert W Fairlie, Dean Karlan, and Jonathan Zinman. Behind the gate experiment: Evidence on effects of and rationales for subsidized entrepreneurship training. *American Economic Journal: Economic Policy*, 7(2):125–161,

2015.

- Mariassunta Giannetti and Andrei Simonov. Social interactions and entrepreneurial activity. *Journal of Economics & Management Strategy*, 18(3):665–709, 2009.
- Paul Gompers, Josh Lerner, and David Scharfstein. Entrepreneurial spawning: Public corporations and the genesis of new ventures, 1986 to 1999. *The Journal of Finance*, 60(2):577–614, 2005.
- Bryan S Graham. Identifying social interactions through conditional variance restrictions. *Econometrica*, 76(3): 643–660, 2008.
- Luigi Guiso, Luigi Pistaferri, and Fabiano Schivardi. Learning entrepreneurship from other entrepreneurs? Technical report, National Bureau of Economic Research, 2015.
- Luigi Guiso, Paola Sapienza, and Luigi Zingales. Time varying risk aversion. *Journal of Financial Economics*, 128(3): 403–421, 2018.
- Isaac Hacamo and Kristoph Kleiner. Finding success in tragedy: Forced entrepreneurs after corporate bankruptcy. *Working Paper*, 2016.
- Isaac Hacamo and Kristoph Kleiner. Competing for talent: Firms, managers, and social networks. *Working Paper*, 2017.
- Robert E Hall and Susan E Woodward. The burden of the nondiversifiable risk of entrepreneurship. *American Economic Review*, 100(3):1163–94, 2010.
- Barton H Hamilton. Does entrepreneurship pay? an empirical analysis of the returns to self-employment. *Journal of Political Economy*, 108(3):604–631, 2000.
- Judith K Hellerstein, Mark J Kutzbach, and David Neumark. Labor market networks and recovery from mass layoffs before, during, and after the great recession. Technical report, NBER, 2015.
- Hakan J Holm, Sonja Opper, and Victor Nee. Entrepreneurs under uncertainty: An economic experiment in china. *Management Science*, 59(7):1671–1687, 2013.
- Laura Rosendahl Huber, Randolph Sloof, and Mirjam Van Praag. The effect of early entrepreneurship education: evidence from a field experiment. *European Economic Review*, 72:76–97, 2014.
- Aleksandra J Kacperczyk. Social influence and entrepreneurship: The effect of university peers on entrepreneurial entry. *Organization Science*, 24(3):664–683, 2013.
- Frank H Knight. Cost of production and price over long and short periods. *Journal of Political Economy*, 29(4): 304–335, 1921.
- Martin Koudstaal, Randolph Sloof, and Mirjam Van Praag. Risk, uncertainty, and entrepreneurship: Evidence from a lab-in-the-field experiment. *Management Science*, 62(10):2897–2915, 2015.
- Josh Lerner and Ulrike Malmendier. With a little help from my (random) friends: Success and failure in post-business school entrepreneurship. *Review of Financial Studies*, page hht024, 2013.

- Matthew J Lindquist, Joeri Sol, and Mirjam Van Praag. Why do entrepreneurial parents have entrepreneurial children? *Journal of Labor Economics*, 33(2):269–296, 2015.
- Matthew J Lindquist, Joeri Sol, Mirjam Van Praag, and Theodor Vladasel. On the origins of entrepreneurship: evidence from sibling correlations. 2016.
- Robert E Lucas. On the mechanics of economic development. *Journal of monetary economics*, 22(1):3–42, 1988.
- Elizabeth Lyons and Laurina Zhang. Who does (not) benefit from entrepreneurship programs? *Strategic Management Journal*, 39(1):85–112, 2018.
- Ulrike Malmendier and Geoffrey Tate. Ceo overconfidence and corporate investment. *The journal of finance*, 60(6): 2661–2700, 2005.
- Ulrike Malmendier and Geoffrey Tate. Who makes acquisitions? ceo overconfidence and the market’s reaction. *Journal of financial Economics*, 89(1):20–43, 2008.
- Ulrike Malmendier, Geoffrey Tate, and Jon Yan. Overconfidence and early-life experiences: the effect of managerial traits on corporate financial policies. *The Journal of finance*, 66(5):1687–1733, 2011.
- Charles F Manski. Identification of endogenous social effects: The reflection problem. *The review of economic studies*, 60(3):531–542, 1993.
- Simen Markussen and Knut Røed. The gender gap in entrepreneurship—the role of peer effects. *Journal of Economic Behavior & Organization*, 134:356–373, 2017.
- Todd Mitton, Keith Vorkink, and Ian Wright. Neighborhood effects on speculative behavior. *Journal of Economic Behavior & Organization*, 151:42–61, 2018.
- Tobias J Moskowitz and Annette Vissing-Jørgensen. The returns to entrepreneurial investment: A private equity premium puzzle? *American Economic Review*, 92(4):745–778, 2002.
- Ramana Nanda and Jesper B. Sorensen. Workplace peers and entrepreneurship. *Management Science*, 56(7):1116–1126, 2010.
- Nicos Nicolaou, Scott Shane, Lynn Cherkas, Janice Hunkin, and Tim D Spector. Is the tendency to engage in entrepreneurship genetic? *Management Science*, 54(1):167–179, 2008.
- Hessel Oosterbeek, Mirjam Van Praag, and Auke Ijsselstein. The impact of entrepreneurship education on entrepreneurship skills and motivation. *European economic review*, 54(3):442–454, 2010.
- Simon C Parker. *The economics of entrepreneurship*. Cambridge University Press, 2009.
- Manju Puri and David T Robinson. Optimism and economic choice. *Journal of Financial Economics*, 86(1):71–99, 2007.
- Alicia M Robb and David T Robinson. The capital structure decisions of new firms. *Review of Financial Studies*, page hhs072, 2012.
- Antoinette Schoar. The divide between subsistence and transformational entrepreneurship. *Innovation policy and*

the economy, 10(1):57–81, 2010.

Scott Shane. *Fool's Gold?: The truth behind angel investing in America*. Oxford University Press, 2008.

Kelly Shue. Executive networks and firm policies: Evidence from the random assignment of MBA peers. *Review of Financial Studies*, 26(6):1401–1442, 2013.

Georg Von Graevenitz, Dietmar Harhoff, and Richard Weber. The effects of entrepreneurship education. *Journal of Economic Behavior & Organization*, 76(1):90–112, 2010.

Table 1: Data Summary

This table reports the summary statistics of all variables in our sample. *Entrepreneur within X-y of MBA* is a dummy variable equal to one if an individual is an entrepreneur X years after graduating from the MBA program. *Joined Start-Up* is a dummy variable equal to one if, at the MBA graduation, an individual joins a firm that is younger than 2 years old or employs less than 10 workers. *Intended Entrepreneur* is a dummy variable equal to one if a student declares in her MBA application an intent to major in entrepreneurship as first or second major. *Graduated Entrepreneur Major* is a dummy variable equal to one if a student effectively graduates with a major in entrepreneurship. *Experienced Peer (Team/Cohort)* measures the number of peers a student has in her first year MBA team/cohort with failed entrepreneurial experience. *Treatment (Team/Cohort)* measures the number of peers a student has in her first year MBA team/cohort who intend to major in entrepreneurship.

	N	Mean	Std	50th
Entrepreneur within 1y of MBA	2102	0.018	0.13	0
Entrepreneur within 2y of MBA	2102	0.026	0.16	0
Entrepreneur within 3y of MBA	2102	0.034	0.18	0
Entrepreneur within 4y of MBA	2102	0.039	0.19	0
Entrepreneur within 5y of MBA	2102	0.043	0.20	0
Joined Start-Up	2102	0.16	0.36	0
Graduated Entrepreneur Major	2102	0.047	0.21	0
Intended Entrepreneur	2102	0.35	0.48	0
Peer Intending to Major in Entre (Cohort)	2102	22.3	8.04	21
Peer Intending to Major in Entre (Team)	2102	0.69	0.46	1
Experienced Peer (Cohort)	2102	2.12	1.82	2
Experienced Peer (Team)	2102	0.092	0.29	0
Team Size	2102	4.04	0.79	4
Cohort Size	2102	61.6	8.60	61
MBA Graduation Year	2102	2008.0	3.22	2008

Table 2: Are Entrepreneurship Majors More Confident?

This table reports the behavioral traits of students intending to major in entrepreneurship. In Panel A, we estimate whether students intending to major in entrepreneurship are more confident in their entrepreneurial abilities. The first column measures general entrepreneurial confidence, the second column measures entrepreneurial confidence relative to other MBA students, and the third column measures confidence in achieving extreme entrepreneurial success. In Panel B, we estimate whether students intending to major in entrepreneurship are associated with other behavioral traits. The first column measures economic optimism, the second column measures non-economic optimism, the third column measure risk aversion, the fourth column measures ambiguity aversion, the fifth column measures a preference for independence, and the sixth column measures a preference for workplace variety. We control for differences in graduation year, gender, nationality, and race. We use * to denote significance at the 10% level, ** to denote significance at the 5% level, and *** to denote significance at the 1% level.

Panel A: Entrepreneurial Confidence and Overconfidence

	Entrepreneurial Confidence		Entrepreneurial Overconfidence	
	Absolute	Relative	Measure 1	Measure 2
Intended Entrepreneur	0.205* (1.81)	0.305* (1.81)	0.612** (2.40)	0.133* (1.75)
Year FE	Yes	Yes	Yes	Yes
Gender FE	Yes	Yes	Yes	Yes
Nationality FE	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes
N	179	179	179	179
R-squared	.091	.13	.13	.072

Panel B: Alternative Behavioral Traits

	Optimism		Risk/Ambiguity Aversion		Preferences	
	Economic	Noneconomic	Risk	Ambiguity	Independence	Variety
Intended Entrepreneur	-0.406** (-2.26)	0.222 (0.51)	0.086 (0.29)	0.144 (0.55)	-0.076 (-0.53)	-0.088 (-0.57)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Gender FE	Yes	Yes	Yes	Yes	Yes	Yes
Nationality FE	Yes	Yes	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes	Yes	Yes
N	179	179	179	179	179	179
R-squared	.044	.032	.11	.055	.061	.022

Table 3: Do Peers Affect Firm Creation?

This table reports how positive and experienced peers affect firm creation. In Panel A, we identify peers at the cohort-level; in Panel B, we identify peers at the team-level. In the first and second columns of both panels, we estimate a linear probability model; in the third and fourth columns, we estimate a probit model. *Treatment* measures the number of peers in her first year MBA cohort (in Panel A) or team (in Panel B) who intend to major in entrepreneurship. *Experienced Peer* measures the number of peers in her first year MBA cohort (in Panel A) or team (in Panel B) with a failed entrepreneurial experience. *Intended Entrepreneur* is a dummy variable equal to one if a student declares in her MBA application an intent to major in entrepreneurship. We use * to denote significance at the 10% level, ** to denote significance at the 5% level, and *** to denote significance at the 1% level. We cluster standard errors at the cohort-level in Panel A and the team-level in Panel B.

Panel A: Cohort Peer Effects

	Linear		Probit	
	(i)	(ii)	(i)	(ii)
Treatment	0.003* (1.96)	0.004*** (3.37)	0.041** (2.08)	0.069*** (3.68)
Experienced Peer		-0.006*** (-3.20)		-0.098*** (-2.93)
Intended Entrepreneur	0.020** (2.67)	0.018** (2.42)	0.270*** (2.87)	0.250** (2.46)
Year FE	Yes	Yes	Yes	Yes
Gender FE	No	Yes	No	Yes
Nationality FE	No	Yes	No	Yes
Race FE	No	Yes	No	Yes
GMAT FE	No	Yes	No	Yes
Undergrad Major FE	No	Yes	No	Yes
N	2102	2102	1919	1892
R-squared	.016	.035		

Panel B: Team Peer Effects

	Linear		Probit	
	(i)	(ii)	(i)	(ii)
Treatment	0.013* (1.95)	0.012* (1.78)	0.239 (1.61)	0.263* (1.73)
Experienced Peer		-0.020** (-2.20)		-0.472* (-1.65)
Intended Entrepreneur	0.025*** (3.11)	0.022*** (2.85)		0.379*** (3.04)
Year FE	Yes	Yes	Yes	Yes
Team Size FE	Yes	Yes	Yes	Yes
Gender FE	No	Yes	No	Yes
Nationality FE	No	Yes	No	Yes
Race FE	No	Yes	No	Yes
GMAT FE	No	Yes	No	Yes
Undergrad Major FE	No	Yes	No	Yes
N	2102	2102	1919	1808
R-squared	.018	.041		

Table 4: Do Peers Affect the Entry of Successful Firms?

This table presents the peer effects on cumulative firm creation and successful firm creation. In Panel A, we assess whether peers affect firm creation temporarily or permanently by estimating firm creation within X years following MBA graduation. We allow X to be 1,2,3,4,5 years. In Panel B, we measure successful firm creation as employing at least X employees, or surviving for a minimum of X years. *Treatment* measures the number of peers in her first year MBA cohort who intend to major in entrepreneurship. *Experienced Peer* measures the number of peers in her first year MBA cohort with a failed entrepreneurial experience. *Intended Entrepreneur* is a dummy variable equal to one if a student declares in her MBA application an intent to major in entrepreneurship. We use * to denote significance at the 10% level, ** to denote significance at the 5% level, and *** to denote significance at the 1% level. We cluster standard errors at the cohort level.

Panel A: Do peers affect firm creation temporarily or permanently?

	Firm Creation X Years after MBA Graduation				
	1 Year	2 Years	3 Years	4 Years	5 Years
Treatment	0.002** (2.28)	0.001* (2.02)	0.004*** (3.37)	0.004*** (3.27)	0.004*** (3.16)
Experienced Peer	-0.004** (-2.59)	-0.005*** (-3.04)	-0.006*** (-3.20)	-0.005** (-2.42)	-0.006** (-2.51)
Intended Entrepreneur	0.014** (2.15)	0.023*** (3.72)	0.018** (2.42)	0.024** (2.39)	0.032*** (3.04)
Year FE	Yes	Yes	Yes	Yes	Yes
Gender FE	Yes	Yes	Yes	Yes	Yes
Nationality FE	Yes	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes	Yes
GMAT FE	Yes	Yes	Yes	Yes	Yes
Undergrad Major FE	Yes	Yes	Yes	Yes	Yes
N	2102	2102	2102	2102	2102
R-squared	.034	.039	.035	.037	.04

Panel B: Do peers affect the entry of successful firms (employment and survival)?

	Employment			Survival		
	2+ Emp	6+ Emp	10+ Emp	1+ Years	3+ Years	5+ Years
Treatment	0.003** (1.98)	0.004*** (2.61)	0.003*** (2.76)	0.004** (2.16)	0.003* (1.70)	0.003* (1.91)
Experienced Peer	-0.007** (-2.39)	-0.004* (-1.71)	-0.003 (-1.48)	-0.008** (-2.35)	-0.006* (-1.88)	-0.006** (-2.20)
Intended Entrepreneur	0.015** (2.25)	0.017*** (3.11)	0.012** (2.41)	0.016* (1.85)	0.013* (1.76)	0.014** (2.18)
Constant	-0.132 (-0.89)	-0.130 (-1.08)	-0.115 (-1.06)	-0.180 (-0.99)	-0.124 (-0.78)	-0.109 (-0.78)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Gender FE	Yes	Yes	Yes	Yes	Yes	Yes
Nationality FE	Yes	Yes	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes	Yes	Yes
GMAT FE	Yes	Yes	Yes	Yes	Yes	Yes
Undergrad Major FE	Yes	Yes	Yes	Yes	Yes	Yes
N	2102	2102	2102	2102	2102	2102
R-squared	.035	.041	.038	.034	.024	.02

Table 5: Do Peers Impact Learning about Entrepreneurship?

This table presents the rate of firm creation and peer under an alternate treatment measure. In the first and second column, *Treatment* measures the number of peers in her first year MBA cohort who intend to major in entrepreneurship, yet do not start a firm within five years of graduation. In the third and fourth column, *Treatment* measures the number of peers in her first year MBA cohort who intend to major in entrepreneurship, yet do not graduate with a major in entrepreneurship. *Experienced Peer* measures the number of peers in her first year MBA cohort with a failed entrepreneurial experience. *Intended Entrepreneur* is a dummy variable equal to one if a student declares in her MBA application an intent to major in entrepreneurship. We use * to denote significance at the 10% level, ** to denote significance at the 5% level, and *** to denote significance at the 1% level. We cluster standard errors at the cohort level.

	Without Firm Creation		Without Graduating with Major	
	(i)	(ii)	(i)	(ii)
Treatment	0.004** (2.54)	0.006*** (3.17)	0.002 (1.59)	0.004** (2.65)
Experienced Peer		-0.009*** (-3.04)		-0.007*** (-3.22)
Intended Entrepreneur	0.021*** (2.74)	0.020** (2.45)	0.019** (2.68)	0.018** (2.37)
Year FE	Yes	Yes	Yes	Yes
Gender FE	No	Yes	No	Yes
Nationality FE	No	Yes	No	Yes
Race FE	No	Yes	No	Yes
GMAT FE	No	Yes	No	Yes
Undergrad Major FE	No	Yes	No	Yes
N	2102	2102	2102	2102
R-squared	.017	.037	.016	.035

Table 6: Do Peers Affect the Rate of Entrepreneurial Success?

This table presents the influence of peers on the proportion of successful firm creation. We condition the sample on the set of students starting a firm within three years of graduation. In the first and second column, we define success as employing at least five employees. In the third and fourth column, we define success as surviving at least five years. *Treatment* measures the number of peers in her first year MBA cohort who intend to major in entrepreneurship. *Experienced Peer* measures the number of peers in her first year MBA cohort with a failed entrepreneurial experience. *Intended Entrepreneur* is a dummy variable equal to one if a student declares in her MBA application an intent to major in entrepreneurship. We use * to denote significance at the 10% level, ** to denote significance at the 5% level, and *** to denote significance at the 1% level. We cluster standard errors at the cohort level.

	5+ Years		5+ Employees	
	(i)	(ii)	(i)	(ii)
Treatment	0.019 (0.66)	0.069* (1.91)	0.054 (1.69)	0.125*** (3.88)
Experienced Peer		-0.060 (-1.37)		-0.150*** (-3.20)
Intended Entrepreneur	0.073 (0.49)	0.423*** (3.00)	0.230* (1.73)	0.429** (2.52)
Year FE	Yes	Yes	Yes	Yes
Gender FE	No	Yes	No	Yes
Nationality FE	No	Yes	No	Yes
Race FE	No	Yes	No	Yes
GMAT FE	No	Yes	No	Yes
Undergrad Major FE	No	Yes	No	Yes
N	72	72	72	72
R-squared	.084	.5	.14	.43

Table 7: Do Peers Influence a Change in Major Towards Entrepreneurship?

This table shows that individuals who graduate with a major in entrepreneurship at IU are more likely to become entrepreneurs and that peers can influence a change in major towards entrepreneurship. In Panel A, we estimate the effect of majoring in entrepreneurship on firm creation within X years following graduation. In Panel B, we estimate peer effects on graduating with a major in entrepreneurship. *Graduated Entrepreneur Major* is a dummy variable equal to one if a student effectively graduates with a major in entrepreneurship. *Intended Entrepreneur* is a dummy variable equal to one if a student declares in her MBA application an intent to major in entrepreneurship. *Treatment* measures the number of peers in her first year MBA cohort who intend to major in entrepreneurship. *Experienced Peer* measures the number of peers in her first year MBA cohort with a failed entrepreneurial experience. We use * to denote significance at the 10% level, ** to denote significance at the 5% level, and *** to denote significance at the 1% level. We cluster standard errors at the cohort level.

Panel A: Does majoring in entrepreneurship impact firm creation?

	Firm Creation X Years after MBA Graduation				
	1 Year	2 Years	3 Years	4 Years	5 Years
Graduated Entrepreneur Major	0.061** (2.25)	0.096*** (3.02)	0.092*** (2.88)	0.085*** (2.67)	0.111*** (3.18)
Intended Entrepreneur	0.008 (1.21)	0.014* (1.77)	0.008 (0.89)	0.014 (1.42)	0.020* (1.94)
Year FE	Yes	Yes	Yes	Yes	Yes
Gender FE	Yes	Yes	Yes	Yes	Yes
Nationality FE	Yes	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes	Yes
GMAT FE	Yes	Yes	Yes	Yes	Yes
Undergrad Major FE	Yes	Yes	Yes	Yes	Yes
N	2102	2102	2102	2102	2102
R-squared	.043	.054	.044	.043	.05

Panel B: Do peers influence others to major in entrepreneurship?

	Graduating with an Entrepreneurship Major	
	(i)	(ii)
Treatment	0.024** (2.50)	0.021** (2.16)
Experienced Peer		-0.026* (-1.88)
Intended Entrepreneur	0.079*** (6.14)	0.080*** (6.14)
Year FE	Yes	Yes
Gender FE	No	Yes
Nationality FE	No	Yes
Race FE	No	Yes
GMAT FE	No	Yes
Undergrad Major FE	No	Yes
N	2102	2102
R-squared	.04	.059

Table 8: Do Peers Influence the Likelihood of Working in a Startup?

This table shows that individuals who join a start-up at graduation are more likely to become entrepreneurs in the long-run and that peers can influence cohort members' tastes to join a start-up at graduation. Specifically, in Panel A, we estimate the likelihood that an individual who joined a start-up at graduation becomes an entrepreneur within X years following graduation. In Panel B, we estimate whether peers affect the likelihood that cohort members join a start-up at graduation. A start-up is defined as a firm that is younger than 2 years old or employs less than 10 workers. *Joined Start-Up* is a dummy variable equal to one if, at the MBA graduation, an individual joins a start-up. *Intended Entrepreneur* is a dummy variable equal to one if a student declares in her MBA application an intent to major in entrepreneurship. *Treatment* measures the number of peers in her first year MBA cohort who intend to major in entrepreneurship. *Experienced Peer* measures the number of peers in her first year MBA cohort with a failed entrepreneurial experience. We use * to denote significance at the 10% level, ** to denote significance at the 5% level, and *** to denote significance at the 1% level. We cluster standard errors at the cohort level.

Panel A: Does working in a startup affect the likelihood of becoming an entrepreneur?

	Firm Creation X Years after MBA Graduation				
	1 Year	2 Years	3 Years	4 Years	5 Years
Joined Start-Up	0.011 (1.25)	0.019* (1.69)	0.021 (1.64)	0.023* (1.71)	0.027* (1.88)
Intended Entrepreneur	0.013** (2.00)	0.021*** (2.75)	0.015* (1.72)	0.020** (2.14)	0.028*** (2.76)
Year FE	Yes	Yes	Yes	Yes	Yes
Gender FE	Yes	Yes	Yes	Yes	Yes
Nationality FE	Yes	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes	Yes
GMAT FE	Yes	Yes	Yes	Yes	Yes
Undergrad Major FE	Yes	Yes	Yes	Yes	Yes
N	2102	2102	2102	2102	2102
R-squared	.034	.04	.035	.037	.04

Panel B: Do peers influence the likelihood of working in a startup?

	Joining a New/Small Firm	
	(i)	(ii)
Treatment	0.004 (1.39)	0.006* (2.01)
Experienced Peer		-0.012** (-2.14)
Intended Entrepreneur	0.023 (1.36)	0.021 (1.24)
Year FE	Yes	Yes
Gender FE	No	Yes
Nationality FE	No	Yes
Race FE	No	Yes
GMAT FE	No	Yes
Undergrad Major FE	No	Yes
N	2102	2102
R-squared	.0034	.023

Table 9: Does Entrepreneurial Confidence Vary Across Gender?

This table measures entrepreneurial confidence across gender. In Panel A we analyze the relationship between gender and intending to major in entrepreneurship. In Panel B, we analyze the relationship between gender and (i) general entrepreneurial confidence (Column 1), (ii) relative entrepreneurial confidence (Column 2), and (iii) extreme entrepreneurial confidence (Column 3). In Panel C, we analyze the relationship between gender and (i) economic optimism, (ii) non-economic optimism, (iii) risk aversion, (iv) ambiguity aversion, (v) preference for independence, and (vi) preference for workplace variety. *Intended Entrepreneur* is a dummy variable equal to one if a student declares in her MBA application an intent to major in entrepreneurship. We use * to denote significance at the 10% level, ** to denote significance at the 5% level, and *** to denote significance at the 1% level. We cluster standard errors at the cohort level.

Panel A: Intended Major across Gender

	Intended Entrepreneur	
	(i)	(ii)
Female Student	-0.075*** (-2.80)	-0.054* (-1.98)
Year FE	Yes	Yes
Nationality FE	No	Yes
Race FE	No	Yes
N	2102	2102
R-squared	.041	.057

Panel B: Entrepreneurial Confidence across Gender

	Entrepreneurial Confidence		Entrepreneurial Overconfidence	
	Absolute	Relative	Measure 1	Measure 2
Female Student	-0.353*** (-3.71)	-0.570*** (-3.78)	-0.327 (-1.42)	0.010 (0.17)
Intended Entrepreneur	0.205* (1.81)	0.305* (1.81)	0.612** (2.40)	0.133* (1.75)
Year FE	Yes	Yes	Yes	Yes
Nationality FE	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes
N	179	179	179	179
R-squared	.091	.13	.13	.072

Panel C: Alternate Behavioral Traits across Gender

	Optimism		Risk/Ambiguity Aversion		Preferences	
	Economic	Noneconomic	Risk	Ambiguity	Independence	Variety
Female Student	0.111 (0.61)	0.352 (0.91)	-0.411 (-1.56)	-0.414* (-1.79)	0.090 (0.71)	0.209* (1.85)
Intended Entrepreneur	-0.406** (-2.26)	0.222 (0.51)	0.086 (0.29)	0.144 (0.55)	-0.076 (-0.53)	-0.088 (-0.57)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Nationality FE	Yes	Yes	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes	Yes	Yes
N	179	179	179	179	179	179
R-squared	.044	.032	.11	.055	.061	.022

Table 10: Do Peer Effects Vary Across Gender?

This table presents the rate of firm creation and peer effects across gender. In Panel A, we estimate the rate of firm creation within X years following graduation by gender. In Panel B, we estimate male and female peer effects on firm creation. In the first and second column, we consider both male and female peers. In the third and fourth column, we distinguish between male and female peers. *Treatment* measures the number of peers in her first year MBA cohort who intend to major in entrepreneurship. *Experienced Peer* measures the number of peers in her first year MBA cohort with a failed entrepreneurial experience. *Intended Entrepreneur* is a dummy variable equal to one if a student declares in her MBA application an intent to major in entrepreneurship. We use * to denote significance at the 10% level, ** to denote significance at the 5% level, and *** to denote significance at the 1% level. We cluster standard errors at the cohort level.

Panel A: Firm Creation across Gender

	Firm Creation (X+ Years)				
	1+ Years	2+ Years	3+ Years	4+ Years	5+ Years
Female Student	-0.012* (-1.68)	-0.020** (-2.43)	-0.027*** (-2.80)	-0.030*** (-2.97)	-0.032*** (-3.07)
Intended Entrepreneur	0.013** (2.11)	0.022*** (2.96)	0.015* (1.79)	0.021** (2.30)	0.029*** (3.04)
Year FE	Yes	Yes	Yes	Yes	Yes
Nationality FE	Yes	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes	Yes
GMAT FE	Yes	Yes	Yes	Yes	Yes
Undergrad Major FE	Yes	Yes	Yes	Yes	Yes
N	2102	2102	2102	2102	2102
R-squared	.034	.038	.033	.035	.038

Panel B: Peer Effect on Firm Creation across Gender

	All Peers		Peers by Gender	
	Female	Male	Female	Male
Treatment	0.008*** (3.12)	0.003* (1.83)		
Experienced Peer	-0.017*** (-2.98)	-0.003 (-1.04)		
Positive Female Peer			0.010*** (3.22)	0.003 (1.44)
Positive Male Peer			0.007** (2.24)	0.003 (1.57)
Negative Female Peer			-0.016* (-1.80)	-0.004 (-0.48)
Negative Male Peer			-0.017*** (-2.92)	-0.003 (-0.90)
Intended Entrepreneur	0.008 (0.73)	0.022** (2.31)	0.014 (1.19)	0.025** (2.62)
Year FE	Yes	Yes	Yes	Yes
Nationality FE	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes
GMAT FE	Yes	Yes	Yes	Yes
Undergrad Major FE	Yes	Yes	Yes	Yes
N	539	1563	539	1563
R-squared	.083	.037	.084	.037

Table 11: Do Peers in Other Intended Majors Affect Firm Creation?

This table presents the cohort peer effects due to other intended majors on firm creation. *Treatment (Finance)* measures the number of peers in her first year MBA cohort who intend to major in finance; similarly for marketing, management, operations, and strategy. *Intended Entrepreneur* is a dummy variable equal to one if a student declares in her MBA application an intent to major in entrepreneurship. We use * to denote significance at the 10% level, ** to denote significance at the 5% level, and *** to denote significance at the 1% level. We cluster standard errors at the cohort level.

	Firm Creation				
	(i)	(ii)	(iii)	(iv)	(v)
Treatment (Finance)	-0.000 (-0.38)				
Treatment (Marketing)		0.001 (0.65)			
Treatment (Management)			-0.000 (-0.12)		
Treatment (Operations)				-0.001 (-0.50)	
Treatment (Strategy)					0.001 (1.19)
Intended Entrepreneur	0.015* (1.99)	0.015* (1.97)	0.015* (1.99)	0.015* (1.99)	0.015* (1.99)
Year FE	Yes	Yes	Yes	Yes	Yes
Gender FE	Yes	Yes	Yes	Yes	Yes
Nationality FE	Yes	Yes	Yes	Yes	Yes
Race FE	Yes	Yes	Yes	Yes	Yes
GMAT FE	Yes	Yes	Yes	Yes	Yes
Undergrad Major FE	Yes	Yes	Yes	Yes	Yes
N					
R-squared	2102	2102	2102	2102	2102
r2	.033	.033	.033	.033	.033

Figure 1: Firm Creation by MBA Graduation Year

This figure plots the rate of firm creation by MBA Graduation year.

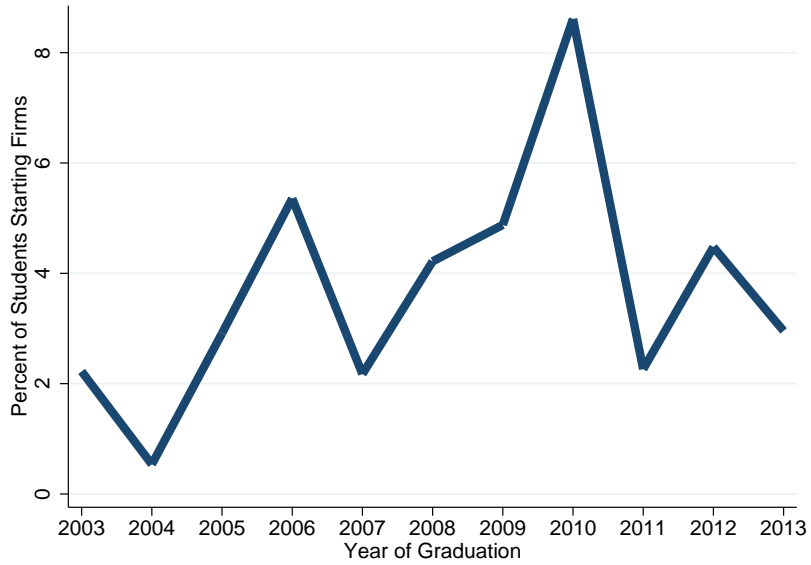


Figure 2: Cumulative Firm Creation By Intention to Major in Entrepreneurship

This figure plots the rate of firm creation for students intending and not intending to major in entrepreneurship.

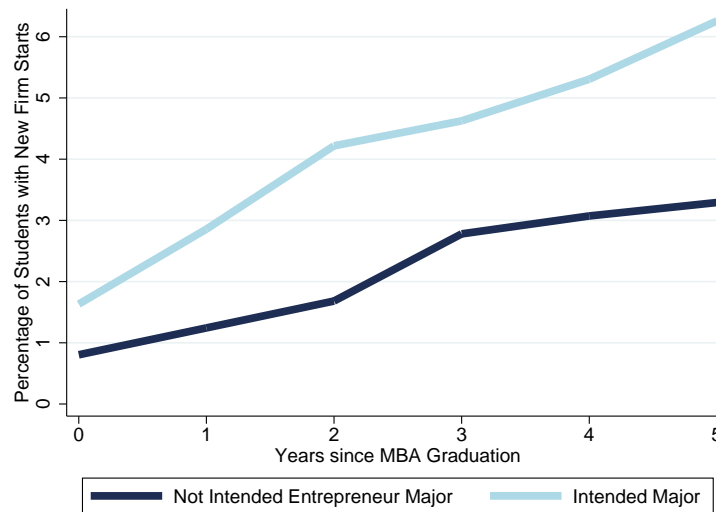


Figure 3: Cumulative Firm Creation By Major in Entrepreneurship at Graduation

This figure plots the rate of firm creation for students graduating with a major in entrepreneurship and graduating without a major in entrepreneurship.

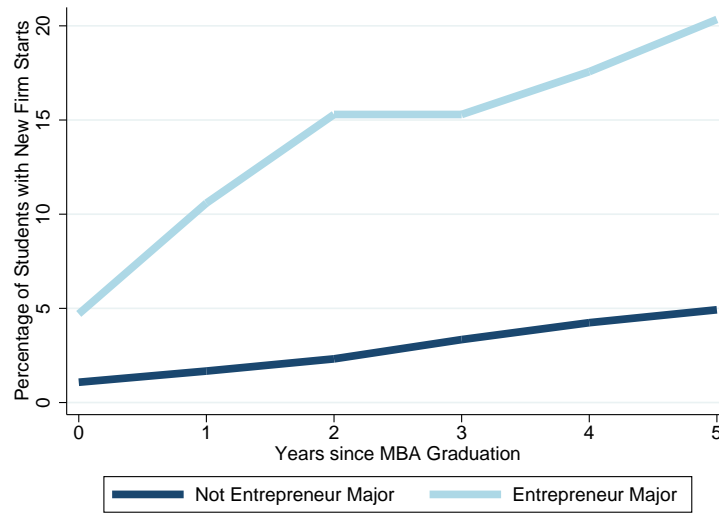


Figure 4: Cumulative Firm Creation By Start-Up Experience at Graduation

This figure plots the rate of firm creation for students entering a start-up at graduation and entering other employment at graduation.

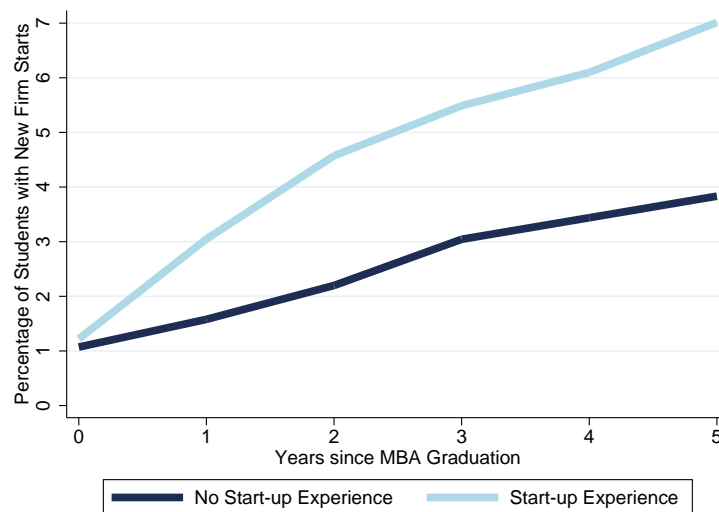


Figure 5: Age of New Firms

This figure plots the percent of firms within the sample that survive zero to five years after creation.

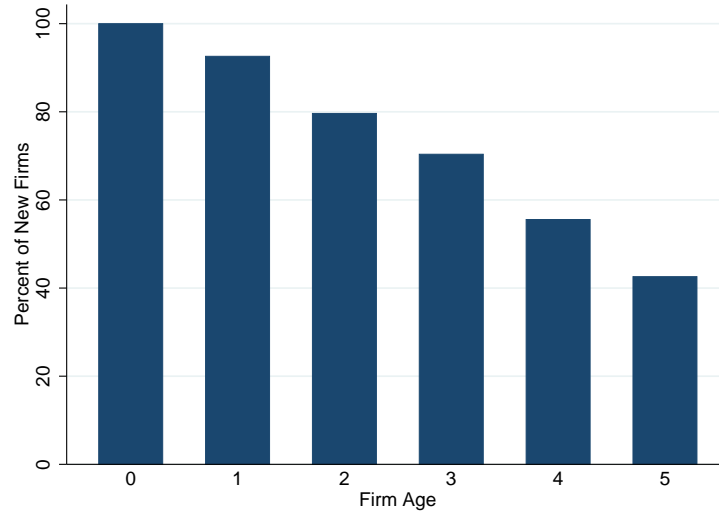


Figure 6: Employment of New Firms

This figure plots the percent of firms within the sample that employ zero to ten employees (not including founder).

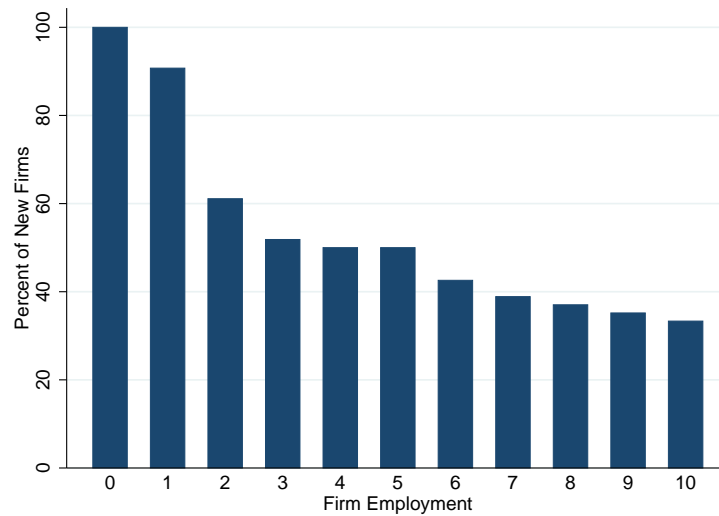


Figure 7: Overconfidence of Intended Entrepreneurs

This figure plots survey responses of current MBA students. Students are asked the likelihood they start a firm that employs ten or more workers within the first year following MBA graduation. We distinguish between students intending to major in entrepreneurship according to the MBA application and all other students.

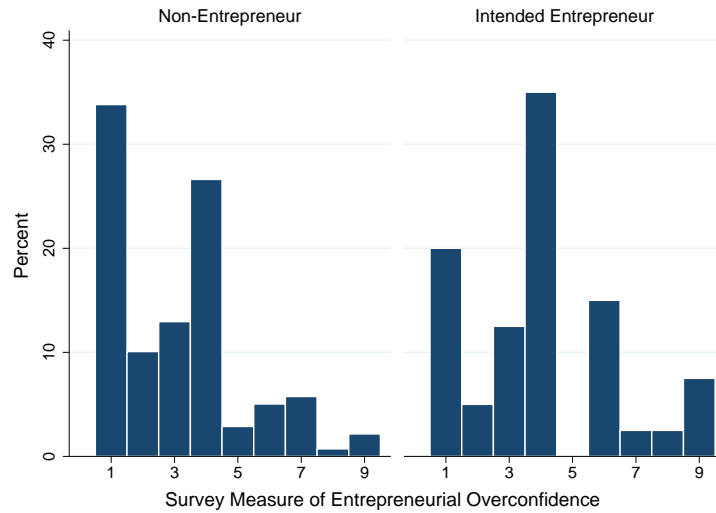


Figure 8: Likelihood of Entrepreneurship from Survey

This figure plots survey responses of treated students. Students with a positive team member are asked whether the team member increased/decreased the likelihood of firm creation.

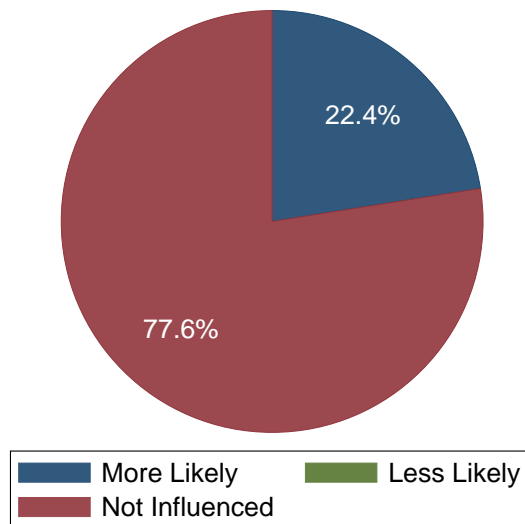


Figure 9: Behavioral Traits vs. Learning from Survey

This figure plots survey responses of treated students. Students reporting a positive effect from a team member are asked whether the effect is driven by a change in views towards entrepreneurship or learning about entrepreneurship.

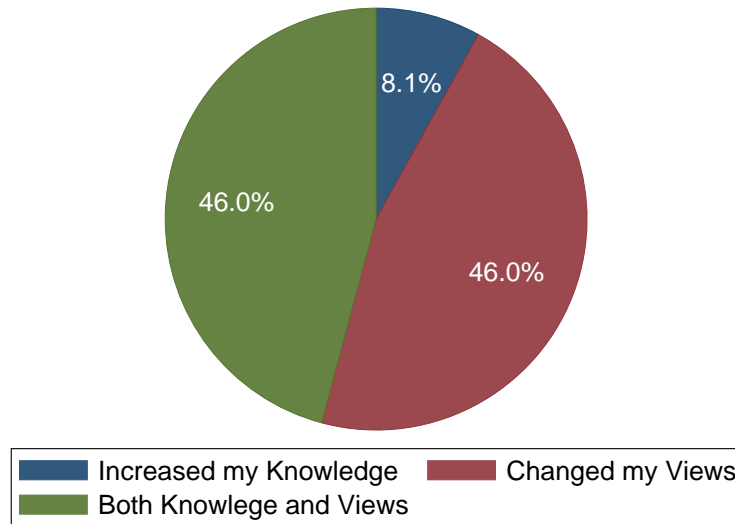


Figure 10: Behavioral Channels from Survey

This figure plots survey responses of treated students. Students reporting a change in views towards entrepreneurship are asked how their views changed: (i) willingness to take risk in starting a business, (ii) increased expectations of the rewards of starting a business, (iii) confidence in entrepreneurial ability, (iv) greater appreciation for non-monetary benefits, or (v) other.

