

Expectations and Follow-Through: The Roles of Confidence and Non-Cognitive Skills for Self-Employment

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Abstract

We examine the predictors of both long-term expectations of self-employment and future self-employment activities and earnings among the same individuals, with a particular focus on gender differences and the roles of non-cognitive skills. Using longitudinal data from the GMAT Registrant Survey, which includes prospective graduate management students, our analysis involves wide-ranging and novel sets of variables, including work-life balance and job preferences, self-efficacy, confidence, and other non-cognitive skills or characteristics. We find notable differences in the drivers of self-employment and self-employment expectations between men and women, and also large differences in the set of variables that relate to self-employment intentions versus future self-employment outcomes. While preferences for work-life balance matter more for men's expectations, preferences about non-monetary characteristics of the job, such as job security and interesting work, matter more for women. In contrast, regarding actual self-employment, only non-cognitive skills play a substantial role for women, while men are driven mostly by preferences over work-life balance. Confidence in one's quantitative skills influences self-employment decisions, especially for women, and it also affects success in both the self-employed and the traditionally employed sectors, as reflected in earnings.

Keywords: Self-Employment; Entrepreneurship; Gender differentials; Expectations.

JEL Classification: L26, J23, J16, M13.

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1 Introduction

According to recent articles in BBC News and NPR there is considerable competition to buy up entrepreneurs among venture capitalists, with firms using data-driven approaches in order to identify potentially successful business founders, even among those with no entrepreneurial aspirations (Rose, 2014; Neely, 2014). In fact, the economic literature has been studying the determinants of entrepreneurship for some time (Evans and Leighton, 1989; Evans and Jovanovic, 1989; Blanchflower and Oswald, 1998). Numerous studies show that the probability of being self-employed is affected by a large variety of characteristics.

Recent literature shows that personality and behavioral characteristics (or non-cognitive skills) are an important determinant of labor market outcomes (Heckman, Stixrud and Urzua, 2006; Bowles, Gintis and Osborne, 2001). One of our goals is assessing the role of business-related non-cognitive skills in self-employment outcomes. Given that labor market returns to non-cognitive skills and entrepreneurial outcomes also differ by gender (Groves, 2005; Fortin, 2008), we study gender differences as well.¹

We analyze both expectations to be self-employed and actual self-employment activity for the same group of individuals. In doing so, we can compare the predictors of both intentions and follow-through. We find that job-related preferences (and not abilities of any type) are the most important predictors of intentions, while non-cognitive skills matter more for follow-through for women. Some intervening events such as getting an MBA reduce the likelihood of becoming self-employed, while others like getting married or having an additional child have no effect. Finally, we look at the determinants of earnings for the self-employed compared to paid workers and find that both types of occupations reward non-cognitive skills equally for both men and women.

Numerous studies show that the probability of becoming self-employed is affected by a large variety of traditional characteristics, such as gender, race, family background, age, education, and liquidity constraints.² Women, African-Americans and poor or liquidity-constrained individuals

¹See Jennings and Brush (2013) for a survey on the marketing literature about gender differences in entrepreneurship.

²Blanchflower and Oswald (1998) was the first to study determinants of self-employment. Other papers have focused on specific aspects: gender (Burke et al., 2002; Georgellis and Wall, 2005; Gurley-Calvez et al., 2009; Verheul et al., 2012), race (Fairlie, 1999, 2004), family background (Fairlie 1999, 2005; Blanchflower and Oswald, 1998, Hou and Rosen, 2000), liquidity constraints (Blanchflower, 2004; Blanchflower and Oswald, 1998; Evans and Jovanovic, 1989; Holz-Eakin et al., 1994), education and age (Blanchflower, 2004; Burke et al., 2002; Fairlie, 1999; Verheul et al., 2012).

are less likely to enter self-employment, while older, more educated individuals and those with a self-employed parent are more likely to become self-employed. Job-related preferences are also an important determinant: more interesting work and more autonomy (Benz and Frey, 2008), and the desire to be one's own boss (Burke, Fitzroy and Nolan, 2001; Hamilton, 2000) are some of the reasons why people prefer to be self-employed. Perceptual variables, such as knowing an entrepreneur, perception of opportunity, and fear of failure, also affect self-employment and have the same effect on both men and women (Arenius and Minniti, 2005).

Behavior and personality characteristics also affect the probability of entering self-employment. Risk-aversion decreases the likelihood of becoming self-employed (Caliendo, Fossen, and Kritikos, 2009, 2010; Cressy, 1999; Kihlstrom and Laffont, 1979), while three of the "big five" personality traits (openness to experience, extraversion and emotional stability) increase the probability of entering self-employment (Brandstatter, 1997; Caliendo, Fossen and Kritikos, 2014). Experimental evidence shows that overconfidence drives people into self-employment (Camerer and Lovallo, 1999; Holzl and Rusticchini, 2005), and is supported by empirical evidence (Koellinger, Minniti and Schade, 2013), although overconfidence can lead firms to perform poorly (Audia, Locke and Smith, 2000). Weitzl, Urbig, Desai, Sanders, and Acs (2010) and Urbig, Weitzel, Rosenkranz, and van Witteloostuijn (2012) study the connection between entrepreneurial talent and other-regarding preferences.

More recently, there is increased interest in the roles of specific general traits such as self-confidence and locus of control on labor market outcomes in general (Fortin, 2008), and on self-employment in particular (Levine and Rubinstein, 2016). Individuals with higher self-confidence and those who believe that they control their own outcomes (as opposed to luck or chance) perform better than their counterparts. These two personality characteristics are closely related to self-efficacy, which is an individual's perception of how likely she is to succeed at performing a certain task (Bandura, 1977). Self-efficacy is found to be more specific than locus of control or self-esteem (Bandura, 1982; Chen, Greene and Crick, 1998), and generally refers to one specific activity, though it can also be extended to interrelated tasks (Bandura 1982).

Levine and Rubinstein (2017) study the determinants of self-employment for individuals who choose to incorporate their businesses and those who don't. They find that high-ability educated white men, people with high self-esteem and internal locus of control and those who engaged in

more illicit activities as youths are more likely to enter incorporated self-employment. They also look at earnings by self-employment type, and find that the incorporated self-employed work more hours and make more money per hour than paid workers, while the unincorporated self-employed also work more hours, but make less money per hour than paid employees. Since very few women who are self-employed incorporate their businesses, their earnings analysis restricts attention to men only.

Studies in psychology and management suggest that entrepreneurial intentions are the best predictor for actual entrepreneurial behavior (Ajzen, 1977; Ajzen and Fishbein, 1975; Bird, 1988; Krueger and Brazeal, 1994; Krueger, Reilly, and Carsrud 2000; Kolvereid and Isaksen, 2006). Numerous studies have found that self-efficacy increases entrepreneurial intentions (Boyd and Vozikis, 1994; Wilso, Kickul and Marlino, 2007; Zhao, Zeibert and Hill, 2005) and outcomes (Arenius and Minniti, 2005; Baum and Locke, 2004; Koellinger et al., 2007). However, although self-efficacy tends to be lower for females than for males (Chen et al., 1998; Minniti, Arenius and Langowitz, 2005), increasing self-efficacy has a higher effect on entrepreneurial intentions for females (Kickul, Marlino and Barbosa, 2008).

Even if an individual has an intention to become an entrepreneur, follow-through may be affected by intervening events such as obtaining additional education, having children or becoming unemployed (Bertrand, Goldin and Katz, 2010). Various studies find that married women have a greater demand for flexibility and are therefore more likely to become self-employed (Adachi and Hisada, 2017; Lombard, 2001; Patrick, Stephens and Weinstein, 2016; Wellington, 2006). While married women are “pushed” into self-employment by increased household burdens, unmarried women are attracted by higher earnings for self-employment, ability, and self-confidence. If the latter face more opportunities in the salaried labor market, then they may be less likely to start their own business, especially if they do not have a spouse’s income as a fallback option.

Finally, there is mixed evidence about the effects of entrepreneurial education. Participation in entrepreneurial training may increase the probability of starting a firm, but not survival (Elert, Andersson and Wennberg, 2014), decrease entrepreneurial intentions (Von Graeventiz, Harhoff and Weber, 2010) or increase entrepreneurial self-efficacy (Chowdhury and Endres, 2005; Wilson et al., 2007, 2009; Zhao et al., 2005). However, Oosterbeek, Van Praag and Ijsselstein (2010) find that the effect on students’ self-assessed entrepreneurial skills is insignificant and the effect on the intention

to become an entrepreneur is even negative for both males and females, although more negative for women.

Our study uses data from the GMAT Registrant Survey, a longitudinal survey of registrants for the Graduate Management Admission Test (GMAT), sponsored by the Graduate Management Admissions Council (GMAC), that was conducted in four waves between 1990 and 1998. Focusing on prospective graduate management students, the survey contains a considerable amount of information on individuals' employment status, job characteristics and earnings, work experience, family background, and educational attainment. While individuals obtain MBAs for a variety of reasons, entrepreneurial intentions may be an important driver. According to another survey conducted by GMAC in 2013, of all the prospective students considering entrepreneurship as a post-MBA career goal, 60 percent were motivated to get the degree in order to develop the skills to manage their own business.³ In fact, this increasing trend has led business schools to increase entrepreneurial content in their curricula (Baron, 2015).

The GMAT Registrant Survey offers several advantages not typically available to researchers studying self-employment, which allow us to make the following contributions. First, as the sample includes only those who have demonstrated at least some degree of interest in obtaining an MBA or related degree, it represents a relatively homogeneous group of men and women in terms of commitment to their careers, interest in business, and prior accumulated human capital.⁴ Thus, the data may allow us to better understand the differences in expectations and decisions regarding self-employment among relatively comparable individuals, while lessening the role of potentially confounding factors that would be magnified in a more diverse dataset. Second, the survey data include several unique variables that may be related to self-employment outcomes, including indicators of several behavioral and personality characteristics (non-cognitive skills), as well as measures of self-confidence in one's cognitive (quantitative and verbal) skills. Additionally, the survey data are linked to GMAT registration and testing results, giving us measures of individuals' actual quantitative and verbal abilities. Third, individuals were initially surveyed about their expectations of future self-employment. Given the longitudinal nature of the survey, the data allow us, for the same group of individuals, to investigate both determinants of expectations or desire of future self-

³Source: GMAC mba.com Prospective Student Survey, 2013.

⁴Hardies, Breesch, and Branson (2013) find that, as a result of self-selection and other mechanisms, gender differences that are present in general populations may not persist in professional sub-populations.

employment, as well as determinants of realized future self-employment outcomes. Related to this, we can consider the roles of intervening events, such as marriage and children or MBA attainment and associated debt, in explaining possible differences between expectations and outcomes. Finally, we look at earnings in order to investigate the predictors of success among our overall sample and identify differences between self-employed and non-self-employed individuals.

2 Data and Empirical Methodology

In this section we provide a detailed description of our data. Our empirical analysis can be divided into three parts. For all three parts, we consider nine different categories of independent variables. We begin by investigating the relationship between self-employment expectations and these variables. We then turn our attention to actual, future self-employment outcomes and, in addition to these variables, we include variables that reflect intervening events. Finally, we analyze the determinants of earnings, focusing on the roles of self-employment and non-cognitive skills. For the first two analyses we conduct probit estimation and for the last one we use OLS.

2.1 Data Overview

The primary source of data used in our analysis is the GMAT Registrant Survey, a national survey of a random sample of individuals who registered to take the Graduate Management Admission Test (GMAT), a requirement for application to the majority of MBA and other business programs in the United States. The first wave of the longitudinal survey was collected in 1990. Three follow-up surveys were mailed to the same individuals from 1991 to 1998, whether or not they ultimately took the GMAT and regardless of their MBA enrollment or completion. 5,885 individuals responded to the initial survey, declining to 3,771 by the fourth and final wave in 1998. Because we control for GMAT scores, we restrict our analysis to those who took the test. After dropping individuals with missing values for any of our control variables, our sample includes 1,764 females and 2,445 males from the first survey wave.

Our analysis utilizes data from the first, third, and fourth survey waves.⁵ Since our goal is to predict both self-employment expectations and also future self-employment, we focus primarily on

⁵We omit the second wave of survey data due to fact that the survey takes place only one year after the initial survey, and because of the nature of our self-employment expectations variable, described below in section 2.3.

variables that are derived from the first survey wave. This not only helps to identify long-term predictors of self-employment, but lessens the degree to which subjective survey responses may themselves be influenced by labor market outcomes. The third and fourth surveys are then used to obtain self-employment and earnings outcomes for the same group of individuals.

2.2 Empirical Methods

We begin by estimating the roles that different variables play in determining an individual's expectation of self-employment five years after the first survey wave. As expected self-employment is a binary variable, we use probit estimation. Probit regressions are then also carried out in the second part of our analysis that involves predicting actual self-employment in waves III and IV, 5 to 8 years after the first wave. By comparing the results of these two exercises we can identify possible differences in determinants of expectations and actual self-employment for the same group of individuals. Finally, we provide some evidence of success in self-employment by estimating log earnings regressions for both self-employed and traditionally employed individuals. Because of the large degree of gender heterogeneity in either preferences towards self-employment or actual self-employment, we separate all regressions by gender.

2.3 Dependent Variables

The GMAT Registrant Survey contains a large amount of information on individuals' employment status, job characteristics and earnings, work experience, family background, and educational attainment. The survey also asks about self-employment and expectations of self-employment. In particular, in wave I individuals were asked whether or not they expected to be self-employed five years later. This binary variable constitutes the dependent variable in the first part of our analysis.⁶ About 6.7% of our initial sample reports expecting to be self-employed five years later, with men reporting a significantly higher likelihood.

The second part of our analysis uses information on actual self-employment from waves III and IV, occurring approximately 5 and 8 years, respectively, after the first survey wave. We limit observations to those that report currently working at least 20 hours in a typical week. Self-

⁶This measure of self-employment intentions is the same as in Krueger et al. (2000), Zhao et al. (2005) and Urbig et al. (2012).

employment is a binary variable that is equal to one if the individual reported being self-employed and working at least 20 hours per week at the time that wave was conducted. We are thus not considering part-time self-employment that involves an insubstantial number of hours, but we do not rule out the possibility of individuals also currently holding employment elsewhere. Based on this definition of self-employment, 9.5 percent of the male sample and 7.2 percent of the female sample were currently self-employed in either wave III or wave IV (or both), with about 6.2 percent of the sample being self-employed in a given survey wave.

For our third dependent variable, we use reported earnings from individuals' current, primary jobs in waves III and IV, whether the individual was employed or self-employed. We specify earnings as the logarithm of total annual earnings (pre-tax and including all bonuses except one-time starting bonuses), restricting the sample to only those working at least 20 hours per week.⁷

2.4 Independent Variables

In each of our estimations we include a large number of covariates, each derived from wave I of the GMAT Registrant Survey. For self-employment expectations and outcomes, we consider the roles of several classes of variables that are often used in the self-employment literature, as well as less traditional variables reflecting a variety of non-cognitive skills and preferences. Among the traditional variables, we include as controls: (1) Demographic characteristics; (2) Family background variables; (3) Professional background; (4) Academic background. Our focus is primarily on the roles of more novel variables, which include those that represent: (5) Confidence indicators; (6) Self-efficacy; (7) Other non-cognitive skills and characteristics; (8) Preferences over work-life balance; and (9) Job preferences. Additionally, for self-employment outcomes and earnings, we define variables for intervening events, including variables that reflect MBA attainment.

For demographic characteristics, we include the respondent's age at the time of the wave I survey, indicator variables for Asian, black, and Hispanic, and indicator variables for whether or not the individual was married and whether or not they had any children under 18 living at home at least half of the time. Family background variables include the number of years of education

⁷Earnings could be reported in the survey in a variety of ways: hourly, weekly, bi-weekly, monthly, or yearly). For the minority of the sample not reporting earnings in annual dollars, we used reported hours worked per week to calculate a measure of annual earnings, assuming 50 weeks worked per year. In practice, our results are not sensitive to either this assumption or using a measure of hourly earnings (as we control for hours worked per week in our regressions).

attained by the respondent’s father and mother. Professional background includes years of total work experience, whether the individual had no job at the time of wave I, whether they were in school full-time, whether they were self-employed on their current or most recent job, and two indicator variables representing whether they reported themselves as currently being a lower-level manager or a mid- to high-level manager. For academic background, from official testing records linked to the survey data we use actual GMAT scores on both the quantitative and verbal sections of the test. We also include undergraduate grade point average (out of 4.00), an indicator variable for whether or not the individual had obtained a graduate degree before wave I, and indicator variables for undergraduate selectivity. In particular, using Barron’s *Profiles of American Colleges*, we categorized universities as “least selective” (the omitted category), “moderately selective,” or “more selective” in admissions.⁸

To highlight the role of confidence in determining self-employment outcomes, we utilize a survey question from wave I (importantly, prior to taking the GMAT) that asks respondents to report how well they expect to perform on the GMAT. These score expectations, reported separately for the quantitative and verbal sections of the test, range from 1 to 5: “poor”, “below average”, “average”, “above average”, and “excellent” respectively. We compare these score expectations to their actual estimated scores on each section of the test, collapsing the individuals’ actual test scores into quintiles of the sample distribution in order to compare them to individuals’ subjective score expectations (also in five categories). We then define overconfidence as a binary variable, equal to one if the reported expectation is at least one category above the actual score quintile, or zero if the expectation is within or below the actual score quintile. Underconfidence is symmetrically defined as one if the reported expectation is at least one category below the realized test score quintile. Thus, a value of zero for both overconfidence and underconfidence reflects that the individual’s subjective expectation was close to their actual performance. Importantly, actual GMAT score variables (as well as academic background and performance) are also included in our regressions in order to isolate the role of subjective attitudes regarding one’s ability in these areas.

For non-cognitive skills or characteristics, we use a set of survey questions in wave I asking respondents to “indicate the extent to which you think you have each of these characteristics or

⁸The more numerous admissions selectivity categories included in Barron’s guide were collapsed into these three categories, where the omitted category (“least selective”) was also combined with those schools not included in the guide.

skills” that are potentially important as a manager or executive. Each response ranged from 1 (“not at all” having the characteristic or skill) to 4 (“very much” having the characteristic or skill). In addition to physical attractiveness and “knowing the right people”, the majority of the 16 variables can be categorized as skills (communication skills, ability to work with people from diverse backgrounds, ability to organize, ability to capitalize on change, ability to delegate tasks, ability to adapt theory to practical situations, understanding business in other cultures, ability to motivate others, good intuition, and being a team player), while a few reflect personality traits (initiative, assertiveness, high ethical standards and shrewdness). Prior research has used these variables in the context of estimating the gender earnings gap (Grove et al., 2011).

In addition to including each of these self-reported characteristics individually in our analysis, we use them, along with other variables, to construct a measure of business self-efficacy. As self-efficacy relates to one’s belief in her ability to be successful in a particular task, we created an index variable that takes into account individuals’ beliefs about what it takes to be successful in business. This index combines one’s self-assessed skills, weighted by their beliefs about the relative importance of those skills for success in business. For the same set of 16 skills or characteristics, respondents were also asked how important they felt that each was for becoming successful in business. Again, responses for belief of importance of each skill ranged from 1 (“not at all”) to 4 (“very”). These responses were multiplied by an adjusted measure of the self-assessed skills. Specifically, if an individual felt they “very much” possessed a particular skill or characteristic or skill, they were given a value of 1. If they felt they “somewhat” possessed the skill, they were assigned a value of 0.5. Similarly, “not very much” and “not at all” were assigned values of -0.5 and -1, respectively. The self-efficacy index is thus the sum of each of these adjusted self-assessed skill responses, each multiplied by their perceived importance and divided by the sum of the perceived importance responses. This construction allows for high self-assessed skill responses and high importance responses to have the most positive impact on one’s belief regarding their ability to be successful, while high importance but low self-assessed ability will have the largest negative impact on this belief.⁹

⁹Our measure of business related self-efficacy is more general than that of entrepreneurial self-efficacy used in the management literature, since we expect an overlap in skills required for each occupation. See McGee et al. (2009) for a summary of entrepreneurial self-efficacy measures. We also considered alternative constructions of a self-efficacy index, with our results changing only modestly across specifications.

Finally, work-life balance and job-related preferences vary across individuals and gender groups and will likely have a significant impact on the decision to be self-employed. To address this possibility, we include variables that represent how important respondents feel that particular job attributes are for their expected future position (5 years later). In particular, we create binary variables indicating whether individuals feel the following job characteristics were “very important”: “The work is interesting”; “I have enough authority to do my job”; “The job security is good”; “The pay is good”; “The problems I am expected to solve are hard enough”; “I am free from the conflicting demands that others make of me”; and “The hours are good.” To account for possible differences in broader preferences over family versus career, we include indicator variables reflecting whether individuals report that the following aspects of life are “very important”: family, career, and wealth.

In addition to the categories described, when analyzing predictors of future self-employment, we incorporate a few variables in some specifications that reflect relevant changes in one’s life between the wave I survey and the subsequent surveys from which actual employment observations are drawn. In particular, as the GMAT Registrant Survey was intended for those interested in graduate management education, we include a dummy variable for whether or not the individual completed an MBA, a dummy variable for other graduate degree attainment, and indicator variables for current marriage status and children (under 18 living in the home). As the quality of an MBA program has been previously observed to be a powerful predictor of earnings (Arcidiacono, et al. 2008) and job satisfaction (Grove and Hussey, 2014), we investigate whether higher ranked MBA programs have a differential effect on self-employment outcomes. Specifically, we include whether or not the program was ranked in the top 25 according to 1992 *U.S. News & World Report* rankings. Finally, the source of funding for one’s MBA may have an impact on one’s willingness to become self-employed. Specifically, debt may deter entry into self-employment. Also, those whose current employer is funding their MBA may be unable or unwilling to leave the job for a period of time. For individuals obtaining an MBA, we include indicator variables representing the primary (greater than 50 percent) source of funding their degrees.

Descriptive statistics of each of our wave I covariates are shown in Table 1, which reports means separately by gender, as well as p-values from two-sided t-tests of differences in means by gender. As can be seen, there are substantial differences across genders, confirming the need for separating

the analyses that follow by gender. Men are typically older and have almost a full year more work experience. Correspondingly, men are more likely to be married and have children, and are twice as likely (14 percent) to report being a mid- to upper-level manager than are women. In terms of academic background, while women have higher undergraduate GPAs, men's average GMAT scores are significantly higher than women's, especially on the quantitative portion of the exam. All of these differences are statistically significant.

Our less traditional variables also exhibit strong gender differences. Interestingly, while men tend to perform better on the GMAT, women in the sample exhibit higher degrees of verbal and quantitative overconfidence and lower degrees of verbal underconfidence. Also, while men report having higher degrees of particular non-cognitive skills/characteristics (shrewdness, ability to adapt theory to practice, and knowing the right people), women report higher values for most of these variables (initiative, ethical standards, communication, ability to work with diverse backgrounds, organization, attractiveness, assertiveness, intuition, and being a team player). However, no gender differences in self-efficacy are found, a result that contrasts with Langowitz, Minniti and Arenius (2005).

We similarly observe gendered preferences regarding work-life balance and job characteristics. While men and women both report equally high importance of family, women place higher importance on career than men, though men place higher importance on wealth.¹⁰ Women also place higher priority on all non-monetary aspects of their expected future job, desiring it to have good hours and to be, among other things, interesting, secure, and challenging.

3 Results

In this section, we report the results of our empirical exercise. First, we describe the determinants of self-employment expectations calculated with the information from wave I. Next, we compare these results to those corresponding to actual self-employment realization in waves III and IV, and analyze the effects of intervening events on self-employment outcomes. Finally, we analyze the predictors of earnings in general and across employment type. For robustness, since our variable categories often include several alternative measures, we use the Holm-Bonferroni method within

¹⁰Fortin (2008) finds that, among a broader sample of employed individuals, women are catching up to men in terms of importance placed on career, but not with respect to the importance of money.

each set to account for multiple hypotheses tests.

3.1 Self-Employment Expectations

Table 2 reports coefficient estimates from probit estimations on expected self-employment using variables from the wave I survey. Variables that reflect one’s employment situation and several job-related preferences are common predictors across gender. Not surprisingly, individuals who are or were recently self-employed are more likely to expect to be self-employed five years later. Also, individuals who didn’t have a job were more likely to expect future self-employment. A strong desire for job security decreases self-employment intentions, while a desire to be “free from the conflicting demands that others make of me” increases such intentions for both genders. We also find that women and men who view themselves as having higher organizational skills are less likely to have self-employment intentions.

We also find significant differences in coefficients, for both traditional and non-traditional variables. Traditional variables generally only matter for men. Specifically, the data show that while Asian, black, and Hispanic males are more likely than white males to aspire for entrepreneurship, ethnicity matters little for women. Surprisingly, general attitudes toward what is important in life matter more for men’s self-employment expectations rather than for women’s, such as highly valuing both family and wealth. Additionally, there are some job-related preferences that differ across gender. While male and female aspiring entrepreneurs are motivated by their perception of the work itself, women value interesting work and men prefer challenging work. They both also view other, more objective, features of the job as being important: women value authority, while men value schedule.

We also see gender differences in the roles of confidence, self-efficacy, and other non-cognitive skills. Men who were overconfident (in their verbal skills) are less likely to expect future self-employment, but not women. Women who identify as more attractive are more likely to expect to be self-employed in the future. An interesting finding is that people skills seem to dissuade people from entrepreneurial aspirations, perhaps because these skills are rewarded by employers. However, the ability to motivate others is relevant for females, while being a team player is significant for men. Given that our measure of business self-efficacy is quite general and may be relevant for both paid employment and self-employment, its predicted effect on entrepreneurial intentions is unclear.

We find that self-efficacy is weakly significant in predicting intentions for men, but not significant for women.

3.2 Realized Self-Employment

Table 3 reports the results of the probit regression on realized self-employment in waves III or IV. The first columns for each gender use the regressors from Table 2. Columns (2) and (5) then add self-employment expectations (the dependent variable in Table 2) as a control. This distinction allows us to investigate whether our non-cognitive skills and other variables continue to predict actual self-employment activity beyond their effects on shaping individuals' preferences or intentions for self-employment. Remarkably, the results in these two specifications are quite similar, and suggest that some differing factors affect self-employment versus self-employment expectations.

In fact, for women, there are no common predictors of both self-employment and self-employment expectations. Non-cognitive skills are the strongest predictors of eventual self-employment for this group. Not surprisingly, these non-cognitive factors generally appear to be those that may be important for entrepreneurship: assertiveness, ability to capitalize on change, ability to delegate, and intuition. Additionally, we find that women who considered themselves ethical were more likely to be self-employed in the future. Surprisingly, we find little predictive ability of demographic, family, academic, or professional background variables, which was also the case for entrepreneurial intentions. Finally, we find significant roles for confidence and self-efficacy for women. Specifically, quantitative underconfidence positively and business self-efficacy negatively influence future self-employment. Both of these variables may relate to beliefs about one's abilities to perform in the paid employment sector. Since our measure of self-efficacy is generally associated with business, a higher value indicates stronger beliefs about opportunities for success in all business-related sectors, which may imply a higher opportunity cost of self-employment. Analogously, underconfidence in quantitative skills may represent a lower opportunity cost of self-employment.

While there are no common predictors of realized self-employment versus self-employment expectations for women, there is some overlap for men. In particular, when we correct for multiple hypotheses using the Holm-Bonferroni method, the only significant predictor of self-employment for men is importance of career. This, in addition to other work-life preferences, also predicted self-

employment expectations. Using traditional p-values, other variables were significant for men. In addition to predicting self-employment intentions, initially being an upper-level manager, placing lower value on one's career, and reporting a lower ability to work with a team, all increase realized self-employment. Like Fairlie (1999), our data show that black males are significantly less likely to become self-employed. However, we also find that the same group is substantially more likely to express self-employment intentions. Background variables that influence men's self-employment include father's education, not working during the first survey wave, and attending a moderately selective undergraduate university. Additionally, personal connections and the ability to work with people from diverse backgrounds both positively influence traditional employment rather than self-employment. Actual quantitative GMAT scores negatively predict men's self-employment, which may be consistent with a higher opportunity cost associated with paid employment. Nonetheless, unlike women, confidence and self-efficacy do not seem to play a role in self-employment realizations for men.

To address whether some intervening life changes are causing differences between predictors of expectations versus actual self-employment, columns (3) and (6) of Table 3 include all previous variables but additionally include current marriage status and children, as well as MBA-related variables, that are current to waves III and IV. The impacts of these variables are quite gendered. Our results suggest that obtaining an MBA, especially from top programs, reduces the likelihood of women becoming self-employed. This is not found for men, however. We also find that women who concentrate their studies in entrepreneurship are more likely to be self-employed. More surprisingly, there is no significant effect of this variable for men. Finally, women who felt their MBA more greatly augmented the same non-cognitive skills that were also self-assessed in Wave I were more likely to be self-employed. Thus, obtaining an MBA appears to augment the effects of the baseline non-cognitive skill measures. Correcting for multiple hypotheses within this category of variables exacerbates the differences by gender, as no variables remain statistically significant for men, and all but Top-MBA program remain significant for women.

Although some literature reports evidence that higher student loan debt reduces the entrepreneurial start-up activity (Ambrose et al., 2015), we find no evidence to support this. In contrast, we find that, for both men and women, employer-based financing of an MBA negatively impacts self-employment, likely reflecting an obligation to remain with one's employer following

graduation.

Surprisingly, the roles of marriage and family are relatively minor, or at least not significant, for women in our sample. This was true for self-employment expectations, and remains true for actual self-employment. Both wave I and current marriage and children variables are insignificant for women. However, having children under 18 negatively influences the likelihood of men being self-employed. Additionally, we investigated the role of spousal income in self-employment. As labor supply decisions are often jointly determined, spousal income may positively affect the likelihood of self-employment, as it provides a fallback option for the household.¹¹ Wave 3 of the survey asks individuals to report spousal earnings. Though not shown in the table, we carried out regressions including these earnings interacted with marriage. For both men and women, the higher earnings of one's spouse, the more likely they were to be self-employed.

3.3 Earnings

In Table 4 we turn to results from log earnings regressions. The purpose of this analysis is two-fold: (i) to investigate whether self-employment for men and women leads to higher or lower earnings compared to regular employment, and (ii) to identify factors that may predict success (as reflected in higher earnings) in the employed versus self-employed sectors. These regressions included current job observations for those working at least 20 hours per week, and are derived from waves III and/or IV of the GMAT Registrant Survey. As typical in earnings regressions, we control for hours worked in a typical week, as well as several demographic, human capital, and experience variables.

In columns (1) and (3) we focus on the roles of earlier measures of confidence indicators, business self-efficacy, and other non-cognitive skills in determining future earnings, controlling for self-employment status. It is notable that while the point estimates on the self-employed variable are negative for women and positive for men (suggesting a 7 percentage point gender pay gap that is due to self-employment), these coefficients are not statistically significant. The coefficient on self-employed is considerably larger and significant for men (but not for women) if weekly hours are not controlled for. This result (not shown) suggests an even larger gender differential in terms of

¹¹Lombard (2001) finds that married women are more likely to enter self-employment when their husbands have health insurance.

returns to self-employment, with self-employed men earning 12.5 percent more than traditionally employed men, and self-employed women earning almost 5 percent less than other women in paid employment.

In terms of predictors of earnings, we generally observe fewer significant relationships for women than we do for men. There are some commonalities by gender. As expected, people with higher quantitative GMAT scores earn more. Additionally, there is a premium for initiative and physical attractiveness for both genders, though the coefficient estimate for attractiveness is almost twice as large for females than it is for men. We also find that self-efficacy is similarly unimportant for determining earnings for both men and women, controlling for the other factors.

Other variables are differentially rewarded or penalized by gender. While women observe a significant premium for “being a team player,” men observe a marginally significant (and smaller) penalty for the same non-cognitive trait. Also, women are penalized for the ability to delegate tasks, while men are penalized for organizational skills and ethics. We also observe several statistically significant factors for men that are not shared by women. For example, whereas quantitative GMAT scores predict higher earnings for both males and females, verbal scores also are associated with higher earnings for males. Additionally, men observe a premium for confidence in their quantitative skills and a penalty for underconfidence in their verbal skills. Finally, we find that men who reported higher degrees of personal connections (as they relate to business) in wave I earn significantly more in waves III and IV than other men, while women have no such benefit from personal connections.

In order to investigate whether predictors of earnings differ by employed versus self-employed sectors, we perform regressions that include interactions between the self-employed variable and all of our noncognitive, confidence, self-efficacy and test score variables.¹² Results from these regressions are reported in columns (2) for women and columns (4) for men, with (a) reporting the coefficients on the non-interacted variables and (b) reporting the coefficients on the interactions.

We are able to identify a few determinants of earnings that differ across self-employed versus employed sectors, and all of them are unique to one gender. Men who are self-employed tend to earn more if they are underconfident in their quantitative skills, while this relationship doesn't hold among employed men. Perhaps in the same vein, we observe that quantitatively overconfident

¹²Unfortunately, since our sample of self-employed individuals is too small, we were unable to perform separate regressions by self-employment and gender.

women suffer a large earnings penalty if they are self-employed, but not in regular employment. Again, these findings may reflect the possibility that opportunity cost of self-employment increases with confidence in quantitative skills. Men who report higher ethical standards are penalized in terms of earnings, a result that has been found by previous research (Hussey, 2011). Our results indicate that a significant ethics *premium* exists for women, but only those who are self-employed. We see similar opposing gender effects for the ability to capitalize on change, with self-employed women benefitting substantially and self-employed men being penalized heavily. Finally, self-employed women also are uniquely rewarded for the ability to adapt theory to practical situations, while self-employed men are penalized for shrewdness. However, it must be noted that no significant differences between predictors of earnings among the self-employed versus employed remain when Holm-Bonferroni adjustments are used.

4 Conclusion

We examine the predictors of both long-term expectations of self-employment and actual (future) self-employment among registrants for the GMAT exam, a group of individuals with exhibited interest in business-related fields, particularly focusing on gender differences and the roles of non-cognitive skills. Because of the longitudinal nature of the data, we are able to compare the predictors of self-employment to the predictors of self-employment ambition for the same individuals. The uniquely rich dataset allows us to include several novel variables in our model, including those representing over- and underconfidence, preferences towards several job related characteristics and life values, self-efficacy, and many dimensions of non-cognitive skills or characteristics deemed important for success in business. We are also able to investigate the roles of intervening life events, such as obtaining an MBA degree, changes in marriage status, or having children. Finally, we investigate the heterogeneous effects that our key variables have on success in self-employment and traditional employment, as reflected by earnings.

Several broad findings emerge from our analysis. First, preferences regarding job characteristics are key determinants of entrepreneurial intentions for both males and females. While preferences for work-life balance matter more for men, preferences about non-monetary characteristics of the job matter more for women. Perhaps surprisingly, women's preferences do not include a desire for

flexible hours or the importance of spending time with family. Second, these preference variables do not predict actual self-employment for women. For women, non-cognitive skills, such as intuition and ethics, are the only factors that are important drivers of self-employment outcomes. Among men, preferences regarding work-life balance, in particular importance of career, remain important predictors for self-employment outcomes.

Next, we find in our sample of business-oriented professionals, that intervening events like having kids or getting married do not have any significant effects on entrepreneurial decisions for women. This is consistent with the lower importance placed on flexible hours and family. These results suggest that women in our sample may be substantially different than other sub-groups of women who find self-employment attractive, similarly to Nekby et al. (2008) and Hardies et al. (2013)'s findings for other competitive environments. Interestingly, however, having kids deters men from self-employment. In contrast, the other type of intervening event we analyze, getting an MBA, generally negatively affects women's self-employment prospects. This outcome depends on whether or not these women perceived an increase in business-related non-cognitive skills, selectivity of the MBA program, and entrepreneurial concentration. For both genders, student-related debt does not seem to matter, but employer financing of the MBA deters post-graduation self-employment.

Finally, we contribute to a growing literature that has found significant effects of confidence and other non-cognitive skills on labor market outcomes. Specifically, we find a consistent role for different non-cognitive skills in self-employment expectations and realized self-employment. We also identify a role for confidence indicators in predicting future outcomes, particularly confidence in one's quantitative skills: while quantitative underconfidence positively impacts self-employment outcomes, quantitative overconfidence has a larger impact on earnings. Also, while quantitative skills have consistently been found to positively impact earnings, our results suggests an additional role for confidence in those skills in determining career outcomes.

A few caveats should be noted regarding our analysis. First, despite our inclusion of a rich set of covariates, one should be cautious about interpreting our results as causal effects. Establishing true, causal pathways through which these relationships operate is difficult using secondary data sources. Second, due to a relatively small sample size of self-employed individuals, our analysis was unable to focus on specific changes in self-employment status over time. Finally, while our unique focus on educated, young, business professionals is a strength, one should be cautious in making

broad generalizations of our results to all groups of prospective self-employed individuals.

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5 Declarations

5.1 Availability of data and material

The data used in this study are not generally publicly available, and as researchers we do not have permission to share the data with others. However, researchers interested in obtaining the data can contact the Graduate Management Admission Council via <https://www.gmac.com/service/contact-us.aspx>.

5.2 Competing interests

The authors declare that they have no competing interests.

5.3 Funding

No funding was used to carry out this study.

5.4 Authors' contributions

All authors had equal contributions in the writing and data analysis involved in this study. All authors read and approved the final manuscript.

5.5 Acknowledgements

Not applicable

Table 1: Summary Statistics

	Female	Male	T-test p-value
GMAT			
GMAT quant score	26.422	30.858	0.000
GMAT verbal score	27.220	28.541	0.000
Confidence			
Quant overconfidence	0.552	0.463	0.000
Quant underconfidence	0.135	0.157	0.052
Verbal overconfidence	0.483	0.425	0.000
Verbal underconfidence	0.219	0.253	0.011
Work-Life Balance			
Family	0.880	0.874	0.509
Career	0.692	0.621	0.000
Wealth	0.208	0.266	0.000
Job-Related Preferences			
Interesting work	0.898	0.845	0.000
Authority at work	0.778	0.718	0.000
Job security	0.581	0.476	0.000
Salary	0.679	0.635	0.003
Challenging work	0.300	0.275	0.075
No conflicts	0.226	0.192	0.007
Work hours	0.381	0.233	0.000
Non-Cognitive Skills			
Initiative	3.610	3.571	0.020
Ethics	3.765	3.626	0.000
Communication	3.412	3.322	0.000
Work with diversity	3.639	3.581	0.001
Shrewdness	2.646	2.800	0.000
Organization	3.597	3.417	0.000
Physical attractiveness	3.133	3.027	0.000
Assertiveness	3.210	3.171	0.052
Ability to capitalize on change	3.170	3.203	0.112
Ability to delegate tasks	3.247	3.259	0.572
Adapt theory to practical situations	3.133	3.211	0.000
Understand other cultures	2.601	2.653	0.057
Intuition	3.365	3.312	0.008
Motivate others	3.326	3.283	0.032
Team player	3.631	3.563	0.000
Connections	2.553	2.587	0.164
Self-efficacy	0.872	0.871	0.773
Controls			
Expect to be self-employed	0.051	0.079	0.000
Age	26.8	27.6	0.000
Asian	0.165	0.179	0.263
Black	0.184	0.093	0.000
Hispanic	0.155	0.158	0.782
Married	0.242	0.315	0.000
Kids at home	0.097	0.144	0.000
Mother's education	13.5	13.8	0.014
Father's education	13.3	13.1	0.127
Experience	4.2	5.0	0.000
Not working	0.3	0.3	0.400
In-school	0.214	0.197	0.185
Self-employed	0.023	0.039	0.003
Lower management	0.164	0.178	0.232
Upper management	0.075	0.139	0.000
Undergraduate GPA	3.076	2.987	0.000
Other prof degree program	0.039	0.065	0.000
Highly-ranked undergrad	0.182	0.209	0.036
Middle-ranked undergrad	0.245	0.258	0.352
Observations	1765	2446	

Notes: Means are presented for each variable separately for females and males along with the associated p-value from a t-test for a difference in means. The sample is restricted to only observations with non-missing values for all variables.

Table 2: Determinants of Expecting Self-Employment

	Female (1)		Male (2)	
GMAT				
GMAT quant score	-0.00160	(0.011)	-0.00486	(0.008)
GMAT verbal score	-0.00865	(0.012)	-0.0102	(0.008)
Confidence				
Quant overconfidence	0.0785	(0.133)	0.0275	(0.107)
Quant underconfidence	0.0441	(0.203)	0.0564	(0.125)
Verbal overconfidence	-0.0120	(0.147)	-0.192*	(0.112)
Verbal underconfidence	-0.163	(0.173)	-0.0312	(0.116)
Work-Life Balance				
Family	0.0257	(0.176)	0.417**‡	(0.142)
Career	-0.205*	(0.118)	-0.152*†	(0.088)
Wealth	0.174	(0.131)	0.296**‡	(0.093)
Job-Related Preferences				
Interesting work	0.509**†	(0.208)	-0.0213	(0.120)
Authority at work	0.275*	(0.150)	0.141	(0.104)
Job security	-0.413**‡	(0.116)	-0.334**‡	(0.090)
Salary	-0.0791	(0.126)	-0.00535	(0.094)
Challenging work	0.0415	(0.123)	0.157*	(0.094)
No conflicts	0.252**	(0.126)	0.320**‡	(0.103)
Work hours	-0.115	(0.127)	-0.226**	(0.113)
Non-Cognitive Skills				
Initiative	0.0979	(0.135)	0.0619	(0.095)
Ethics	-0.0571	(0.134)	-0.130	(0.085)
Communication	-0.0211	(0.112)	-0.0474	(0.085)
Work with diversity	-0.0951	(0.120)	-0.0225	(0.092)
Shrewdness	-0.116	(0.083)	0.00182	(0.071)
Organization	-0.244**	(0.107)	-0.190**	(0.085)
Physical attractiveness	0.347**‡	(0.100)	-0.0955	(0.076)
Assertiveness	-0.150	(0.111)	-0.111	(0.087)
Ability to capitalize on change	-0.146	(0.110)	-0.0629	(0.089)
Ability to delegate tasks	-0.0419	(0.109)	-0.0179	(0.084)
Adapt theory to practical situations	-0.236**	(0.111)	-0.0664	(0.077)
Understand other cultures	0.0516	(0.091)	0.00503	(0.066)
Intuition	-0.136	(0.111)	0.0146	(0.084)
Motivate others	-0.232**	(0.116)	-0.0302	(0.085)
Team player	-0.174	(0.115)	-0.401**‡	(0.079)
Connections	-0.0222	(0.084)	0.000621	(0.066)
Self-efficacy	0.0361	(0.023)	0.0269*	(0.016)
Controls				
Age	0.0594	(0.148)	-0.00234	(0.108)
Age ²	-0.00113	(0.002)	0.000855	(0.002)
Asian	0.0233	(0.172)	0.233*	(0.119)
Black	0.195	(0.153)	0.478**	(0.138)
Hispanic	-0.0672	(0.157)	0.379**	(0.110)
Married	-0.126	(0.146)	-0.0222	(0.120)
Kids at home	0.0660	(0.179)	-0.0225	(0.144)
Mother's education	0.0125	(0.021)	0.0137	(0.013)
Father's education	-0.00165	(0.021)	-0.0131	(0.014)
Undergraduate GPA	-0.0689	(0.135)	-0.0869	(0.107)
Highly-ranked undergrad	0.113	(0.142)	-0.0379	(0.114)
Middle-ranked undergrad	-0.237	(0.147)	0.00968	(0.098)
Other prof degree program	0.175	(0.258)	-0.0899	(0.175)
Experience	0.0516	(0.065)	-0.0241	(0.041)
Experience ²	-0.00142	(0.003)	-0.00252	(0.002)
Lower management	0.296**	(0.147)	0.154	(0.115)
Upper management	0.102	(0.204)	0.324**	(0.130)
Self-employed	0.702**	(0.245)	0.537**	(0.157)
Not working	0.312**	(0.140)	0.276**	(0.108)
In-school	-0.266	(0.169)	-0.194	(0.120)
Observations	1764		2445	

Notes: Coefficients from probit regressions separately by gender are presented above with robust standard errors in parenthesis. Regressions include observations from wave I of the GMAT Registrant Survey. In addition to the variables presented, coefficients for binary variables indicating missing variables for parents' education are suppressed. * $p < 0.10$, ** $p < 0.05$. In addition to indicators reflecting traditional p-values, we correct for multiple hypothesis testing using Holm-Bonferroni p-values within each family of non-control variables containing more than one variable, where † < 0.10 , ‡ < 0.05 .

Table 3: Determinants of Realized Self-Employment

	Female						Male					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
GMAT												
GMAT quant score	-0.00996	(0.010)	-0.0104	(0.010)	-0.00802	(0.010)	-0.0144*	(0.007)	-0.0145*	(0.007)	-0.0137*	(0.007)
GMAT verbal score	0.00778	(0.011)	0.00840	(0.011)	0.00650	(0.012)	-0.00748	(0.009)	-0.00873	(0.008)	-0.00748	(0.009)
Confidence												
Quant overconfidence	0.150	(0.140)	0.138	(0.141)	0.106	(0.149)	-0.0616	(0.104)	-0.0743	(0.105)	-0.0620	(0.107)
Quant underconfidence	0.361*	(0.164)	0.354*	(0.164)	0.421*†	(0.170)	0.126	(0.105)	0.126	(0.105)	0.188*	(0.108)
Verbal overconfidence	0.0739	(0.148)	0.0805	(0.150)	0.0910	(0.159)	0.0943	(0.104)	0.109	(0.105)	0.142	(0.110)
Verbal underconfidence	-0.102	(0.141)	-0.0848	(0.141)	-0.0840	(0.153)	0.142	(0.102)	0.159	(0.102)	0.166	(0.108)
Work-Life Balance												
Family	-0.215	(0.148)	-0.208	(0.147)	-0.207	(0.155)	0.0604	(0.121)	0.0640	(0.124)	0.101	(0.124)
Career	0.179	(0.125)	0.189	(0.127)	0.118	(0.127)	-0.199*‡	(0.078)	-0.191*‡	(0.079)	-0.238*‡	(0.080)
Wealth	0.00568	(0.135)	-0.0189	(0.139)	-0.0612	(0.148)	0.111	(0.094)	0.0965	(0.096)	0.108	(0.099)
Job-Related Preferences												
Interesting work	0.00533	(0.172)	-0.0116	(0.177)	-0.0103	(0.179)	0.182	(0.113)	0.232*	(0.118)	0.215*	(0.119)
Authority at work	0.141	(0.141)	0.138	(0.143)	0.145	(0.146)	-0.0784	(0.093)	-0.0825	(0.093)	-0.0959	(0.097)
Job security	0.00795	(0.111)	0.0137	(0.112)	-0.0121	(0.117)	-0.133	(0.085)	-0.106	(0.085)	-0.0883	(0.088)
Salary	-0.114	(0.112)	-0.101	(0.113)	-0.0505	(0.119)	-0.153*	(0.084)	-0.150*	(0.084)	-0.139	(0.087)
Challenging work	-0.0980	(0.117)	-0.105	(0.117)	-0.162	(0.122)	0.0396	(0.086)	0.0241	(0.087)	0.0522	(0.091)
No conflicts	0.0900	(0.130)	0.0997	(0.131)	0.0906	(0.136)	0.157	(0.103)	0.118	(0.102)	0.128	(0.107)
Work hours	-0.0204	(0.123)	-0.0115	(0.124)	0.0325	(0.127)	-0.105	(0.102)	-0.0916	(0.102)	-0.125	(0.105)
Non-Cognitive Skills												
Initiative	0.121	(0.124)	0.107	(0.123)	0.182	(0.128)	0.102	(0.090)	0.112	(0.091)	0.112	(0.093)
Ethics	0.440*‡	(0.150)	0.436*†	(0.150)	0.421*†	(0.154)	-0.0573	(0.082)	-0.0398	(0.083)	-0.0693	(0.084)
Communication	0.0124	(0.101)	0.0229	(0.103)	0.0430	(0.107)	-0.0358	(0.078)	-0.0257	(0.078)	-0.0606	(0.080)
Work with diversity	-0.00680	(0.113)	0.00409	(0.116)	0.00862	(0.127)	-0.159*	(0.078)	-0.158*	(0.078)	-0.146*	(0.080)
Shrewdness	-0.00617	(0.077)	-0.00455	(0.080)	-0.0165	(0.083)	0.00463	(0.063)	0.0140	(0.064)	0.0106	(0.066)
Organization	-0.0786	(0.092)	-0.0436	(0.091)	-0.0961	(0.093)	-0.102	(0.076)	-0.0867	(0.077)	-0.116	(0.080)
Physical attractiveness	-0.0784	(0.095)	-0.0982	(0.097)	-0.0328	(0.101)	-0.0196	(0.072)	-0.0160	(0.073)	-0.0263	(0.075)
Assertiveness	0.268*	(0.107)	0.279*	(0.108)	0.255*	(0.109)	0.00344	(0.073)	0.0185	(0.072)	0.00979	(0.075)
Ability to capitalize on change	0.226*	(0.107)	0.248*	(0.108)	0.276*	(0.111)	0.000858	(0.082)	-0.00989	(0.082)	-0.0255	(0.085)
Ability to delegate tasks	0.271*	(0.103)	0.270*	(0.105)	0.284*	(0.109)	-0.0558	(0.075)	-0.0575	(0.076)	-0.0763	(0.077)
Adapt theory to practical situations	-0.182*	(0.099)	-0.152	(0.098)	-0.107	(0.104)	0.00861	(0.072)	0.0113	(0.072)	0.0113	(0.076)
Understand other cultures	0.166*	(0.078)	0.172*	(0.079)	0.214*	(0.080)	0.0292	(0.060)	0.0334	(0.060)	0.0179	(0.062)
Intuition	0.326*‡	(0.101)	0.322*‡	(0.103)	0.336*‡	(0.110)	0.0815	(0.075)	0.0755	(0.075)	0.0798	(0.079)
Motivate others	0.164	(0.112)	0.187	(0.114)	0.190	(0.116)	-0.0869	(0.078)	-0.104	(0.079)	-0.0985	(0.082)
Team player	0.0853	(0.111)	0.0988	(0.112)	0.0669	(0.112)	-0.128*	(0.071)	-0.0993	(0.071)	-0.137*	(0.074)
Connections	-0.0248	(0.089)	-0.0433	(0.091)	-0.0398	(0.096)	-0.111*	(0.064)	-0.116*	(0.065)	-0.128*	(0.067)
Self-efficacy	-0.0341*	(0.020)	-0.0367*	(0.020)	-0.0418*	(0.020)	0.0205	(0.015)	0.0185	(0.016)	0.0254	(0.016)
Controls												
Expect to be self-employed			0.551*	(0.179)	0.585*	(0.180)			0.400*	(0.122)	0.339*	(0.127)
Age	0.103	(0.103)	0.0872	(0.100)	0.0177	(0.105)	0.0457	(0.106)	0.0265	(0.107)	0.0532	(0.115)
Age ²	-0.000563	(0.001)	-0.000367	(0.001)	0.000582	(0.002)	-0.000215	(0.002)	0.0000440	(0.002)	-0.000591	(0.002)
Asian	0.183	(0.150)	0.177	(0.149)	0.217	(0.151)	0.0810	(0.117)	0.0574	(0.118)	0.0110	(0.126)
Black	-0.269*	(0.158)	-0.308*	(0.162)	-0.270	(0.175)	-0.377*	(0.179)	-0.398*	(0.178)	-0.366*	(0.182)
Hispanic	-0.164	(0.151)	-0.159	(0.154)	-0.126	(0.160)	-0.00253	(0.111)	-0.0296	(0.114)	-0.0277	(0.116)
Married	-0.121	(0.112)	-0.126	(0.114)	-0.206	(0.137)	0.101	(0.097)	0.0948	(0.097)	0.143	(0.111)
Kids at home	0.0475	(0.152)	0.0560	(0.156)	-0.0891	(0.181)	-0.0788	(0.135)	-0.0752	(0.137)	-0.115	(0.148)
Mother's education	-0.00103	(0.016)	-0.00483	(0.016)	-0.0106	(0.016)	-0.0115	(0.013)	-0.0116	(0.014)	-0.00847	(0.014)
Father's education	-0.0131	(0.017)	-0.0107	(0.018)	-0.0108	(0.019)	0.0298*	(0.015)	0.0310*	(0.015)	0.0289*	(0.016)
Undergraduate GPA	-0.0284	(0.130)	-0.0101	(0.132)	0.0635	(0.137)	0.0848	(0.099)	0.0968	(0.099)	0.0767	(0.103)
Highly-ranked undergrad	-0.0174	(0.153)	-0.0227	(0.156)	-0.0257	(0.163)	0.0803	(0.105)	0.0869	(0.106)	0.0704	(0.112)
Middle-ranked undergrad	-0.0502	(0.118)	-0.0441	(0.118)	-0.0550	(0.124)	0.236*	(0.085)	0.234*	(0.085)	0.240*	(0.087)
Other prof degree program	0.183	(0.251)	0.197	(0.255)	0.227	(0.259)	-0.0292	(0.159)	-0.0163	(0.159)	-0.242	(0.196)
Experience	-0.0568	(0.050)	-0.0487	(0.048)	-0.00603	(0.050)	-0.0578	(0.036)	-0.0494	(0.037)	-0.0463	(0.038)
Experience ²	-0.000206	(0.002)	-0.000595	(0.002)	-0.00199	(0.002)	0.00164	(0.002)	0.00138	(0.002)	0.00206	(0.002)
Lower management	0.0801	(0.134)	0.0435	(0.137)	-0.0390	(0.140)	0.0220	(0.112)	0.0305	(0.112)	0.0257	(0.114)
Upper management	0.155	(0.185)	0.179	(0.185)	0.127	(0.193)	0.276*	(0.113)	0.263*	(0.114)	0.276*	(0.120)
Self-employed	0.726*	(0.271)	0.633*	(0.287)	0.453	(0.285)	1.198*	(0.128)	1.130*	(0.130)	1.164*	(0.133)
Not working	0.131	(0.134)	0.112	(0.133)	0.0663	(0.139)	0.344*	(0.101)	0.337*	(0.103)	0.308*	(0.105)
In-school	-0.0844	(0.150)	-0.0764	(0.152)	-0.0672	(0.154)	0.0831	(0.106)	0.0788	(0.107)	0.0733	(0.108)
Waves 3 & 4:												
Received MBA					-0.382*†	(0.167)					-0.0482	(0.109)
Top-25 MBA program					-0.680*	(0.326)					0.0353	(0.199)
MBA financed via loans					0.325	(0.236)					-0.149	(0.170)
MBA financed via employer					-0.495*	(0.268)					-0.269*	(0.163)
Entrepreneurial-focused MBA					2.233*‡	(0.523)					0.566	(0.466)
Gained skills during MBA					0.367*†	(0.154)					-0.00405	(0.079)
Married					0.0445	(0.123)					0.0264	(0.092)
Kids at home					0.0704	(0.141)					-0.180*	(0.106)
Observations	2282		2277		2192		3171		3156		3010	

Notes: Coefficients from probit regressions separately by gender are presented above with robust standard errors in parenthesis. Regressions include observations from waves III and IV of the GMAT Registrant Survey. In addition to the variables presented, coefficients for binary variables indicating missing variables for parents' education are suppressed as well as an indicator for the wave of response. Variables associated with the receipt of an MBA are interacted with whether the respondent received an MBA. * p<0.10, ** p<0.05. In addition to indicators reflecting traditional p-values, we correct for multiple hypothesis testing using Holm-Bonferroni p-values within each family of non-control variables containing more than one variable, where † < 0.10, ‡ < 0.05.

Table 4: Earnings

	Female			Male		
	(1)	(2a)	(2b) × Self-Employment	(3)	(4a)	(4b) × Self-Employment
GMAT						
GMAT quant score	0.012**‡ (0.00)	0.012**‡ (0.00)	-0.010 (0.02)	0.009**‡ (0.00)	0.008**‡ (0.00)	0.023* (0.01)
GMAT verbal score	-0.001 (0.00)	-0.001 (0.00)	-0.018 (0.02)	0.005**‡ (0.00)	0.004*† (0.00)	0.003 (0.01)
Confidence						
Quant overconfidence	0.009 (0.03)	0.019 (0.03)	-0.522* (0.29)	0.062**† (0.03)	0.042 (0.03)	0.282 (0.17)
Quant underconfidence	0.018 (0.03)	0.018 (0.03)	0.050 (0.28)	0.003 (0.03)	-0.019 (0.03)	0.335* (0.19)
Verbal overconfidence	-0.034 (0.03)	-0.036 (0.03)	0.112 (0.30)	-0.021 (0.03)	-0.016 (0.03)	-0.203 (0.24)
Verbal underconfidence	0.021 (0.03)	0.017 (0.03)	0.256 (0.33)	-0.065**† (0.03)	-0.052** (0.02)	-0.202 (0.17)
Non-Cognitive Skills						
Initiative	0.065** (0.03)	0.050 (0.03)	0.318 (0.20)	0.060**† (0.02)	0.060**† (0.02)	-0.069 (0.16)
Ethics	-0.043 (0.03)	-0.054 (0.03)	0.489** (0.23)	-0.041** (0.02)	-0.037** (0.02)	-0.056 (0.13)
Communication	-0.009 (0.02)	-0.010 (0.02)	0.045 (0.19)	-0.009 (0.02)	0.003 (0.02)	-0.227 (0.16)
Work with diversity	-0.029 (0.03)	-0.029 (0.03)	-0.012 (0.20)	0.028 (0.02)	0.034* (0.02)	-0.112 (0.15)
Shrewdness	-0.009 (0.02)	-0.011 (0.02)	0.169 (0.17)	-0.013 (0.01)	0.001 (0.01)	-0.175* (0.10)
Organization	-0.042 (0.03)	-0.045 (0.03)	0.158 (0.24)	-0.044** (0.02)	-0.046** (0.02)	-0.077 (0.13)
Physical attractiveness	0.067**† (0.02)	0.066**† (0.02)	-0.045 (0.17)	0.036* (0.02)	0.030* (0.02)	0.072 (0.14)
Assertiveness	0.040 (0.03)	0.037 (0.03)	0.051 (0.23)	0.031 (0.02)	0.027 (0.02)	0.009 (0.12)
Ability to capitalize on change	-0.001 (0.02)	-0.007 (0.02)	0.357* (0.21)	-0.037* (0.02)	-0.023 (0.02)	-0.329** (0.14)
Ability to delegate tasks	-0.038* (0.02)	-0.035 (0.02)	-0.292 (0.20)	-0.029 (0.02)	-0.033* (0.02)	0.105 (0.14)
Adapt theory to practical situations	0.018 (0.02)	0.002 (0.02)	0.333** (0.15)	-0.002 (0.02)	0.001 (0.02)	-0.156 (0.13)
Understand other cultures	0.003 (0.02)	-0.004 (0.02)	0.049 (0.13)	-0.030** (0.01)	-0.026* (0.01)	-0.045 (0.10)
Intuition	-0.042 (0.03)	-0.043* (0.03)	-0.190 (0.24)	-0.024 (0.02)	-0.022 (0.02)	-0.034 (0.14)
Motivate others	0.009 (0.03)	0.005 (0.03)	0.142 (0.18)	0.021 (0.02)	0.030 (0.02)	-0.139 (0.14)
Team player	0.057** (0.03)	0.048* (0.03)	0.266 (0.17)	-0.033* (0.02)	-0.025 (0.02)	-0.102 (0.14)
Connections	0.005 (0.02)	-0.000 (0.02)	0.126 (0.19)	0.042**† (0.02)	0.042**† (0.01)	-0.065 (0.10)
Self-efficacy	0.001 (0.01)	0.003 (0.01)	-0.041 (0.04)	0.003 (0.00)	0.001 (0.00)	0.036 (0.03)
Self-employed	-0.042 (0.10)	-4.212 (4.59)		0.034 (0.06)	2.925 (2.61)	
R-Square	0.348		0.364	0.411		0.428
Observations	2071		2071	2954		2954

Notes: Coefficients from regressions are presented above with standard errors clustered at the individual level in parenthesis. Regressions include observations from waves III and IV of the GMAT Registrant Survey. The dependent variable in each regression is the log of annual earnings separately by gender. In addition to the variables presented, coefficients for binary variables indicating missing variables for parents' education are suppressed as well as an indicator for the wave of response, age, age-squared, experience, experience-squared, indicators for race, marriage, kids at home, undergraduate GPA, weekly hours worked, indicators for high- and middle-ranked undergraduate institutions attended, whether an MBA or other professional degree program was received, and whether the MBA was received at a top-25 program. * $p < 0.10$, ** $p < 0.05$. In addition to indicators reflecting traditional p-values, we correct for multiple hypothesis testing using Holm-Bonferroni p-values within each family of non-control variables containing more than one variable, where † < 0.10 , ‡ < 0.05 .