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# Personal Characteristics and Intention for Entrepreneurship

Murat Yalcintas, Oykü Iyigun, and Gokhan Karabulut[1]

**Abstract**

This study analyzes the relationship between entrepreneurship intention and personal characteristics and skills by using the surveys we conducted in Turkey on 1465 senior university students. We use a modified version of the Entrepreneurial Orientation (EO) scale and the Political Skills Inventory to measure some personal characteristics and skills. We also use the nine sub-dimensions of these two scales. Probit model and wavelet coherence analysis results show that proactivity, entrepreneurship, and networking sub-dimensions of the scales are related to entrepreneurship intention. We also find that gender, the number of siblings, the grade point average (GPA) of the students, their family's education level, the parent' ownership of an enterprise, and the number of non-governmental organizations (NGO) that they are a member of are also related to entrepreneurship intention. Results may be useful to understand and enhance entrepreneurship potential.

**Keywords:** Entrepreneurship, Self-employment entry, Occupational choice ·
**JEL:** C90; D63

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## 1. Introduction

Over the recent decades, there has been considerable interest in entrepreneurship determinants because entrepreneurial activity is the main reason of the development in a free market economy (Schumpeter, 1911), and many researchers tried to understand why individuals become self-employed. Individuals start their own businesses for different reasons and become different types of business owners. Some people start a business out of necessity (necessity entrepreneurship), some to exploit a business opportunity (opportunity entrepreneurship), and some for life-style reasons (Reynolds, Camp, Bygrave, Autio, & Hay, 2002). It is common to label the first group as "self-employed" and the second group as "entrepreneur." However, since it is rather difficult to distinguish them from one another in observational data, empirical research usually uses these terms interchangeably. In this paper, for reasons of clarity, we also used these two terms as substitutes and classified the factors which affect entrepreneurship under distinct headings. Even so, the factors influencing necessity entrepreneurship are far more difficult to determine, and due to lack of alternative employment opportunities and economic needs, necessity entrepreneurs mostly launch their business independently of some theoretical determinants such as age, gender, and level of education (Bergmann & Sternberg, 2007).

The paper is organized as follows: Section 2 discusses relevant literature on the determinants of entrepreneurship. Section 3 presents methodology and data, and section 4 provides the empirical findings and robustness checks. Section 5 presents discussions, and section 6 concludes the paper.

## 2. Determinants of Entrepreneurship

*Personality and personal traits*

Until the late 1980s, research examining the role of personality in entrepreneurship gave inconsistent and contradictory results and led researchers to conclude that there was no generic relationship between personality and entrepreneurship (e.g., Chell, 1985; Gartner, 1988). However, recent developments in personality theories and psychosomatic meta-analysis techniques have nurtured more meaningful conclusions.

Zhao & Seibert (2006) performed a meta-analysis comparing the personality traits of entrepreneurs and managers as a comparison group. The authors analyzed personality variables, according to the five-factor model of personality, and found that entrepreneurs scored higher on Conscientiousness and Openness to Experience and scored lower on Agreeableness and Neuroticism. No difference was found for Extraversion. Their findings prove that personality is an important determinant of entrepreneurship. Similarly, López-Núñez et al. (2020) found that both real entrepreneurs and university students with high entrepreneurship intentions have lover neuroticism scores. Still, benevolence (i.e., honesty and humility) has emerged as the sixth important personality trait next to Big-Five (Hilbig & Zettler, 2009), and evidence claimed that benevolent behavior was negatively associated with entrepreneurial talent (Weitzel, Urbig, Desai, Sanders, & Acs, 2010). Following that study, further research showed that selfishness also deserves attention as one of the entrepreneurship characteristics, and people with entrepreneurial talent invest more in destructive opportunities (Urbig, Weitzel, Rosenkranz, & van Witteloostuijn, 2012). Rauch A. & Frese M. (2007) found that entrepreneurial behavior is related to generalized self-efficacy, need for achievement, proactive personality innovativeness, need for autonomy, and stress tolerance.

Brandstatter (1997) compared business owners and people interested in setting up a private business to a control group of a representative sample of the Austrian population and found that the entrepreneurial group scored higher on risk-taking, extraversion, social recognition, and readiness for change. He also claimed that independence and emotional stability were significant factors of entrepreneurship. Another personality characteristic closely related to self-employment is trust. As agency theory states, entrepreneurs delegate tasks and establish social networks to run their businesses, both of which require an element of trust. Thus, being able to trust others is an important prerequisite for entrepreneurship. Empirical evidence shows that a higher level of trust significantly increases the likelihood of entry into self-employment (Caliendo, Fossen, & Kritikos, 2012). There was also a similar conclusion in a special report of The Economist. The report claimed that entrepreneurs were highly tolerant to risk, eager to delegate tasks to trustworthy people, and needed social networks to succeed (The Economist, 2009).

Since self-employment means becoming your own boss, the need for autonomy emerges as another main driver of entrepreneurship (Feldman & Bolino, 2000). Other personality traits correlated with entrepreneurship are optimism (Keith & Baron, 2009), need for control (Brockhaus, 1982), locus of control (Bonnett & Furnham, 1991), and risk preferences (Caliendo, Fossen, & Kritikos, 2009). Individuals' personalities affect both the entry to and the exit from self-employment decisions. Those with a high external locus of control and agreeableness have a higher probability of exiting from self-employment. The relationship between the exit decision and risk tolerance is U-shaped (Caliendo, Fossen, & Kritikos, 2014).

*Risk preference*

Since financial gains in entrepreneurship are naturally riskier than in paid employment, risk-taking is long believed to be one of the key characteristics of entrepreneurs (Knight, 1921). There are several empirical results suggesting that risk aversion discourages people from entrepreneurship (Cramer, Hartog, Jonker, & Van Praag, 2002; Ekelund, Johansson, Jarvelin, & Lichtermann, 2005; Skriabikova, Dohmen, & Kriechel, 2014). An important supporter of this view is Kent (1985), who asserted that entrepreneurs possessed two unique characteristics, which were risk-taking and achievement motivation. In a variant research paper, Fairlie R. W. (2002) used past drug dealing as a proxy for risk propensity, entrepreneurial ability, and preference for autonomy and concluded that these entrepreneurial characteristics are important determinants of self-employment. Similarly, using an entrepreneurial model, Kihistrom & Laffont (1979) showed that more risk-averse individuals become employees while the less risk-averse ones become entrepreneurs. This claim is especially true for developed economies. As per capita income grows, people tend to become less inclined to entrepreneurship because, in a more developed economy, high-income professional employment opportunities are abundant as a safer alternative (Iyigün & Owen, 1998).

Nevertheless, there are also studies claiming that entrepreneurs are not inevitably exceptional risk-takers (Tucker III, 1988). Given that in business situations, entrepreneurs are inclined to perceive strengths and opportunities while others seek weaknesses and threats, Palich & Bagby (1995) suggested that entrepreneurs are not risk-takers but people who view opportunities differently and pursue them consequently. Consistent with this argument, there are results providing evidence that while choosing a new venture, entrepreneurs are not influenced only by the risk inherent to the

anticipated outcome of the venture but also by their perception of the risk as well as by their propensities to take a risk (Forlani & Mullins, 2000). Akay & Karabulut (2020) also show that personality types are related to positional behavior, which may be connected to risky behavior.

The notion that entrepreneurs differ in their risk propensity implies that they may be biased in their ventures, jeopardizing chances for success; more risk propensity meaning more bias. This view is supported by data proving that firms started up by more risk-tolerant entrepreneurs perform worse than less risk-tolerant entrepreneurs' ventures (Hvide & Panos, 2014). An analysis carried out by Caliendo, Fossen, & Kritikos (2010) revealed an inverse U-shaped relationship between risk attitude and business performance. While there is a positive correlation between risk attitude and business creation, individuals with especially low or high-risk attitudes perform worse in managing a business than individuals with medium-level risk attitudes. Similarly, Willebrands, Lammers, & Hartog (2012) found that an entrepreneur's risk propensity has a significant negative effect on revenue but only so when risk perception is not included and that the effect of risk perception on revenue is positive. The authors concluded that recognizing and dealing with risk cautiously enhances business performance. Data also suggest that males and females calculate risk differently; females tend to be more risk-sensitive than males (Childers, 2011).

The self-employed can not always be viewed as a homogenous group (Schoar, 2010). There are people who want to be self-employed (opportunity entrepreneurs) and people who have to be self-employed for survival (necessity entrepreneurs). The results of different surveys confirmed that people who became self-employed by choice are more risk-tolerant than people who enter self-employment by necessity, and the most risk-intolerant tend to enter salaried employment (Block, Sandner, & Spiegel, 2015; Ahunov & Yusupov, 2017). Färnstrand et al. (2017) also show that entrepreneurs choose risky projects in order to reduce costs.

*Gender*

Although in recent decades, female self-employment, or women-owned businesses, has risen substantially in the world, the probability of women getting involved in entrepreneurship is much less compared to that of men, as shown by numerous studies globally (Minniti & Nardone, 2007). There are claims of a direct gender effect: women have, ceteris paribus, a lower probability of becoming self-employed than men

(Caliendo & Kritikos, 2012; Molino et al., 2018). Prior research attributed the gender discrepancies in entrepreneurship to differences in management styles (Candida, 1992), human and social capital (Greene, 2000), and risk tolerance (Jianakoplos & Bernasek, 1998). There are other findings suggesting that these discrepancies may be explained by both a relative lack of willingness and the existence of gender-specific obstacles. (Verheul, Thurik, Grilo, &Van der Zwan, 2012).

Although multiple studies report the negative effect of motherhood on work (Klerman & Leibowitz, 1999; Waldfogel, 1997), some studies claim that small children's presence multiplies the likelihood of female self-employment (Carr, 1996). Noseleit (2014) showed that as the number of children in a household increases, women are more likely to become self-employed. These findings may indicate that women may combine better their careers with family-related tasks when they are self-employed (Taniguchi, 2002). Budig (2006) also found out that women enter non-professional and non-managerial self-employment to balance work and family demands. The reason may be that self-employed people are somehow more flexible in managing their work schedule and that the boundary between time spent at the workplace and time spent with the family is less rigidly demarcated in self-employment. Thus, for women desiring to balance family life and career, self-employment seems to be more appealing than salaried work. Nevertheless, this argument is challenged by the work of König & Cesinger (2015) where they contended that self-employed people tend to have more family-work conflict, and the number of children in the household significantly increases time-based conflict especially for women, which reflects their higher responsibility for childcare.

Gender discrimination appears to be another reason which induces women to be self-employed, albeit with a higher risk of failure. Rosti & Chelli (2005) argued that entrepreneurial talent remaining equal between men and women as a group, less talented women also set up their own business in reaction to employer's discrimination. However, once they are self-employed, they are more susceptible to failure than men because their lower entrepreneurial ability level increases their risk of default. Furthermore, there are also studies proving that discrimination exists even on the familial level. In a study limited to small businesses, Goffee & Scase (1985) ascertained that compared to male entrepreneurs, women entrepreneurs are less supported and even disadvantaged by their families.

Gender disparity is likewise documented in income inequality. Several studies indicate a relatively large earnings gap between male and female entrepreneurs to the females' disadvantage (Hundley, 2000). Similarly, the research conducted in urban China revealed that self-employed women were concentrated in the financially least rewarding areas (Zhang, 2013). Furthermore, Hundley (2000) proved that that self-employed women's earnings declined with marriage, family size, and hours of housework; whereas self-employed men's earnings increased with marriage and family size, the reason being married women are inclined to self-employment to balance work and family commitments, and men to attain higher income. Budig (2006) disagrees with this reasoning, and she claims that family factors have little weight in explaining women's entrepreneurship and women, similar to men, are mainly interested in career development.

*Education and age*

Like on gender, some data on education support disadvantage theories in the formation of entrepreneurial ambitions. A study carried out in the United States found that academic success reduces the aspiration for self-employment at an early age and that not having a bachelor's degree was one of the most important variables predicting self-employment aspirations along with being male and having at least one self-employed parent (Thomas K. M., 2009). Contrariwise, an earlier study of self-employment determinants was carried out by Rees & Shah (1986) using large-scale U.K. data where authors had argued that education increases the incentive to entrepreneurship because more educated people were better informed and that they were more capable of assessing entrepreneurial opportunities. Similarly, for industries requiring high-level skills, education positively predicts entrepreneurial activity (Lofstrom & Bates, 2007). Additionally, Lofstrom (2013) claims that self-employment is not an economically good option for low-skilled individuals since his research revealed that the earnings of most low-skilled employees are higher than self-employed people with similar low skill levels. All the above literature supports the findings of Svaleryd (2015): individuals with higher human capital are more likely to be pulled into opportunity entrepreneurship to exploit business opportunities while individuals with lower human capital are more prone to be pushed into necessity entrepreneurship to avoid unemployment, this pattern being especially significant for women. Similarly, data on workers displaced due to

plant closures in Sweden show that layoff increases the probability of self-employment, and individuals with a lower position on the labor market tend to transit to self-employment to a larger extent (Von Greiff, 2009).

When it comes to business success, although there are contradicting results (Fairlie, 2005; Fairlie & Robb, 2010), overall research suggests that educational attainment is an important factor in running a successful business venture. Since basic entrepreneurial skills can be taught, human capital becomes an element which is closely linked to success in business. Empirical evidence shows that owner education consistently explains firm longevity, and highly educated entrepreneurs are most likely to create successful firms (Bates, 1990). The meta-analyses by Van der Sluis, Van Praag, & Vijverberg (2008) likewise confirmed that although the relationship between education and the entrepreneurial incentive is insignificant, the relationship between education and entrepreneurial performance is unambiguously positive. Since entrepreneurs tend to engage in activities where their human capital may generate higher returns and where employees are somewhat constrained in an organizational structure formed by others, entrepreneurs benefit more from formal education than employees (Van Praag, van Witteloostuijn, & van der Sluis, 2013). Furthermore, Falter (2007) delivered evidence that education is the major factor causing income inequality among self-employed individuals. Zhou et al. (2020) also found creativity and education interaction variable is positively related to entrepreneurship identity.

There are contrasting influences of age on entrepreneurial propensity, leading to a reversed u-shaped relationship between the two variables. On the one hand, the available amount of capital, expertise, self-confidence increase with time which augments the probability of entrepreneurship with age. On the other hand, family and professional embeddedness build up, and the planning horizon shortens with age, which discourages entrepreneurial activity (Bates, 1995). According to Friederike & Von Rosenbladt (1998), entrepreneurial propensity increases initially with age, reaches its peak between 35 – 40, and then drops off. Liang et al. (2018) found that a decrease in median age leads to an increase in new business formation. Despite the common belief that young entrepreneurs are more likely to start the most successful new firms, Azoulay et al. (2020) found no evidence to support this belief.

*Family*

Previous literature has referred to family as the primary social organization shaping entrepreneurial decisions (Sanders & Victor, 1996). Having a self-employed family member in the household is one of the most influential determinants of entrepreneurship. Data analyzed by Ozcan (2011) proves that marriage is an important antecedent of entrepreneurship for men and women, where cohabitation is a less supportive context. Thus, marriage's positive effect goes beyond spillover effects between spouses since, in theory resembling impacts should also be observed among cohabitant partners.
Findings suggest that having an entrepreneur husband causes higher self-employment rates for married women due to the fact that female self-employment also reflects the tendency for women to join family businesses established by husbands (Lin, Yates, & Picot, 1998) and/or the company owned by a husband may enable intra-family flows of human or financial capital (Caputo & Dolinsky, 1998). Another reason can be that women who are probably to become ultimately self-employed are likely to marry a similarly inclined person (Bruce, 1999).

Not only spouses but also the offspring of the self-employed display a greater affinity to become an entrepreneur. According to Hout & Rosen (2000), the main family factor that influences entrepreneurship is the father's self-employment status. An explanation for this correlation is that, as previous research suggests, successful entrepreneurs are more able to transfer financial wealth to their offspring or to ease their access to funds (e.g., Evans & Boyan, 1989; Blanchflower & Oswald, 1990). Dunn & Holtz-Eakin (2000) proposes an alternative explanation: parents transmit to their offspring valuable human capital such as work experience, reputation, networks, or other intangible business assets. Another explanation for the phenomenon is genetic inheritance. Nicolaou & Shane (2010) postulates that the existence of an "entrepreneurial gene" explains intergenerational correlation in entrepreneurship. Other findings suggest that departing from social learning theory (Bandura, 1986), parental role models will affect offspring attitude towards becoming entrepreneurs themselves (Carr & Sequeira, 2007). Thus, family-specific capital, the transmission of human skills within the family, genetic inheritance, and parental role models increase the probability that offspring become entrepreneurs. Nevertheless, Wyrwich (2015) claims that parental role modeling dominates the influence of all other factors in intergenerational transmission. He demonstrated that parents influence their children by transmitting their value

orientation, and as a result, entrepreneurs differ in their merits depending on the environment in which their parents were self-employed. However, gender seems to play an important role in the transfer of the business to the offspring. Men are more likely to inherit a business from their parents compared to women (Robinson & Garnier, 1985).

On the other hand, offspring's personality, specifically openness, is an important variable moderating the effect of role models. Data from Germany demonstrates that parental role models' effect becomes weaker as a person is more open (Chlosta, Patzelt, Klein, & Dormann, 2012). Even so, there are findings proving that the impact of personality on entrepreneurial behavior differs across cultures (Mueller, 2004). Results from a Swedish survey show that self-employment of both Swedish natives and immigrants is positively influenced by having a self-employed father, whereas having a self-employed grandfather only has a positive effect on immigrants. (Andersson & Hammarstedt, 2010). These results imply the presence of an intergenerational link in entrepreneurship across three generations for immigrants and two generations for natives. The rationale of this implication may be that the transmission of human skills between generations is more influential among immigrants than natives.

*Job satisfaction*

Research has determined various career needs which motivate individuals to enter self-employment. Although there exist various motivators to pursue self-employment such as job satisfaction, life satisfaction, psychological well-being, degree of skill utilization, intent to remain self-employed (Feldman & Bolino, 2000), autonomy and independence appear to be the most common motivator (Feldman & Bolino, 1996; Wilson, Marlino, & Kickull, 2004). Greater autonomy also leads to higher job satisfaction. Results suggest that greater autonomy of self-employed individuals and more interesting work explain between 50 and 80 percent of the job satisfaction differential between self-employed and employed individuals (Benz & Frey, 2008). Autonomy and the chance of pursuing interesting activities are important elements of a broader human motivator which is the need for self-determination (Deci & Richard, 2000). Accordingly, van Gelderen & Jansen (2006) conducted an exploratory research on types of autonomy motives and concluded that entrepreneurs pursue different autonomy motives such as freedom of decision, dislike for unpleasant rules or difficult bosses, the opportunity to work in accordance with one's goals, and being in charge, all in line with self-

determination theory. Furthermore, numerous studies have proved that job autonomy is positively related to job and life satisfaction and negatively related to stress (Kinicki, McKee-Ryan, Schriesheim, & Carson, 2002). The research of Prottas (2008) supports this opinion but also posits that although self-employed reports more job autonomy than employees, the relationship between job autonomy and job satisfaction, life satisfaction, and stress is not stronger among the self-employed than among employees. In other words, there is no evidence that self-employed people benefit more from job autonomy than do employees.

*Income*

Another classification of career motives by Carter, Gartner, Shaver, & Gatewood (2003) comprises innovation (accomplishing something new), self-realization, independence, role (following family tradition or emulating role models), financial success, and recognition. The authors claim that albeit it is assumed that entrepreneurs want more self-actualization, more financial success, and more independence than others, previous studies did not offer any test of this assumption and that, according to their data, entrepreneurs were similar to non-entrepreneurs in those three aspects. Contrary to earlier research (Wright & Perrone, 1977) and the common view that self-employment generates higher income than paid-employment, many new businesses fail shortly after inception (Baldwin & Gorecki, 1998), and except for the highest 25% of entrepreneurial incomes, paid-employment generates more income than self-employment (Hamilton, 2000). Those results suggest that from an economic aspect, entrepreneurs are overconfident in risk-taking and making a decision error. However, Croson & Minniti (2012) argue that entrepreneurs are willing to trade income for autonomy, and by using a model founded on utility maximization by a rational individual, they demonstrate that lower income immediately after entering self-employment is actually inferred by rational decision making.

The common belief that people become entrepreneurs because of financial success is also challenged by Benz (2006), who, after gathering evidence from a broad range of authors, claims that entrepreneurship is not particularly attractive in monetary terms and people choose to become entrepreneur due to non-monetary satisfaction motives such as the greater possibility to use their skills and higher autonomy. Other studies analyzed financial motives for self-employment from a different perspective and found that there is a u-shaped relationship where the transition from wage-employment to self-

employment is highest in the tails of income and educational distribution. One possible explanation of this pattern is that employees in the bottom distribution start their own business out of necessity and employees at the higher end out of opportunity (Astebro, Chen, & Thompson, 2011; Andersson Joona & Wadensjo, 2013).

Another variable that affects transition to self-employment is employer size, and there is an inverse correlation between firm size and the tendency of employees to become self-employed (Sorensen, 2007). Following this line of work, Elfenbein, Hamilton, & Zenger (2010) uncovered further evidence proving that scientists and engineers in small firms are more probable to enter self-employment than their large firm counterparts and labeled this phenomenon the small firm effect.

## 3. Data and Methodology

To analyze the relationship between intention to become an entrepreneur and personal characteristics, we conducted a survey in Turkey. The survey took place in 35 different public and private universities. The participants are senior university students from faculties of engineering and economics. 1645 participants answered the survey. After cleaning the data, we used 1465 surveys in our analysis.

The dependent variable of our analyses is the intention to be self-employed.[2] Baseline variables are Scale 1 and Scale 2. Scale 1[3] is a modified version of Covin and Slevin's (1989) entrepreneurial Orientation (EO) scale. Modifications are made by Taatila and Down (2012) to make the EO scale more suitable for students. The modified version of the questionnaire focuses on potential and eliminates questions about achievements. Sub-dimensions of scale 1 are entrepreneurship, innovation, pro-activeness, risk-taking, and networking. (Taatila and Down, 2012). Scale 2[4] is the Political Skills Inventory developed by Ferris et al. (2005). Sub-dimensions of scale 2 are social astuteness, interpersonal influence, networking ability, and sincerity. Despite this scale being developed for measuring political skills, considering the sub-dimensions, we decided to

[2] Measured with a binary choice question: "Are you planning to create your own business in the near future?"
[3] 24 questions- Six-point Likert type scale, 13 questions that measure negative quality are reversed
[4] 40 questions- Seven-point Likert type scale

use it in our analysis in order to understand the relationship between political skills and entrepreneurship potential.[5]

The sub-dimensions of the scales are also analyzed in different models. We use several control variables[6] for robustness checks. First of all, we checked gender since several studies indicate gender can be a determinant in the decision to become an entrepreneur (König and Cesinger 2015, Noseleit, 2014). We ask participants whether they take the entrepreneurship classes or not. Taking an entrepreneurship class can be a sign of an intention to become an entrepreneur in the future, so this variable might appear as creating a self-selection problem. However, some participants can change their plans, especially after taking this class. Thus, checking this variable seemed interesting for us. The number of siblings is another control variable since many studies show the number of siblings can affect several entrepreneurship decisions (Dunn and Holtz-Eakin, 2000). Another factor that can affect an individual's decision to become an entrepreneur is the parent's business ownership status (Wyrwich, 2015). Studying in a public or private university can also be an important factor affecting the decision to be an entrepreneur (Thomas, 2009). We apply a dummy variable which takes a value of 1 for a private university, 0 for otherwise, Parents' education levels (Budig, 2006), participation in cultural events, and being a member of NGOs are other variables that we check.

$$\text{Entrepreneurship Intention} = \gamma_0 + \gamma_1 \,\text{Scale}_i + \gamma_1 \,X_i + \varepsilon_i \qquad (1)$$

$\boldsymbol{X}_i$ denotes the vector of controls and $\varepsilon_i$ is the error term for the individual i. Entrepreneurship Intention (probent) variable is scales, and controls are described above. Since the dependent variable is binary, we apply a probit model. Another method that we use is wavelet coherence analysis. Wavelet coherence analysis is used to analyze the frequency and time axes by employing the rescaled series (Crowley, 2007). This method is good for examining the wavelengths with their frequencies and time scale. The wavelet method uses some projections like Fourier transformations to transform series into continuous signals.

[5] Scale 1 and Scale 2 have been checked and shown to be valid and reliable (Cronbach's Alpha:0.79 and 0.82).
[6] 24 questions

Wavelet transformation equation (Kang et al., 2019) is

$$W_x(\tau, s) = \int_{-\infty}^{+\infty} x(t)\, \Psi^*_{\tau,s}(t)dt = \frac{1}{\sqrt{s}} \int_{-\infty}^{+\infty} x(t)\, \Psi^* \left(\frac{t-\tau}{s}\right) dt.$$

Where $\tau$ is time, s is the scale parameter, $\Psi^*_{\tau,s}(t)dt$ is the mother wavelet factor. Mother wavelet factor's integral should be 0,

Fourier transformation equation (Torrence and Compo, 1998) is

$$x(t) = \frac{1}{C_\varphi} \iint_{-\infty}^{+\infty} \varphi_{\tau,s}(t)\, W_x(\tau, s) \frac{d\tau ds}{d^2}$$

## 4. Empirical results

The results of the probit models for the baseline equations are reported in Table 1. Equations 1 and 2 give the results of the probit models with scale 1 and scale 2. Both scales have positive relationships with the Probent.

**Table 1. Probit Model Results- Baseline**

| **Regressors** | **(I)** | **(II)** |
|---|---|---|
| constant | 1.529*** | 1.372*** |
| | (0.230) | (0.213) |
| Scale1 | 0.110*** | – |
| | (0.018) | |
| Scale2 | – | 0.109*** |
| | | (0.018) |
| *Observation* | 1357 | 1357 |
| *Pseudo R-squared* | 0.0205 | 0.0187 |

Note: Standard errors in parentheses. * Statistical significance at 10% level. ** Statistical significance at 5% level. *** Statistical significance at 1% level.

The relationship between sub-dimensions and entrepreneurship intentions are supplied in Table 2 and 3. The relationship between the five sub-dimensions of scale 1 and entrepreneurship intentions can be seen in equation I (Table 2). Without robustness checks, all sub-dimensions have a positive relationship with the dependent variable. The

coefficients of entrepreneurship and pro-activeness variables are significant at 1%, but pro-activeness coefficients are much larger in absolute terms than the entrepreneurship coefficient. The coefficients of the innovation and networking variables are significant at 10%. The relationship between the four sub-dimensions of scale 2 and entrepreneurship intentions can be seen in table 3, equation III. There are four sub-dimensions which are social astuteness, interpersonal effectiveness, networking skills, and sincerity. The social astuteness and networking skills are significant at 5% and 1%, respectively, but the coefficient of networking skills is much larger in absolute terms than the social astuteness coefficient. Coefficients of two subscales, interpersonal effectiveness and sincerity, are not statistically significant at conventional levels.

**Table 2. Probit Model Results- Sub-scales for Scale 1**

| **Regressors** | **(I)** | **(II)** |
|---|---|---|
| constant | -2.140*** | -0.724 |
| | (0.340) | (0.608) |
| Entrepreneurship | 0.075*** | 0.067** |
| | (0.023) | (0.027) |
| Innovation | -0.086* | 0.006 |
| | (0.050) | (0.059) |
| Pro-activeness | 0.253*** | 0.316*** |
| | (0.076) | (0.090) |
| Risk taking | 0.196** | 0.078 |
| | (0.077) | (0.091) |
| Networking | 0.116* | 0.046 |
| | (0.170) | (0.084) |
| Gender | – | 0.387*** |
| | | (0.084) |
| Public-Private University | – | -0.122 |
| | | (0.102) |
| Siblings | – | 0.168*** |
| | | (0.048) |
| GPA | – | -0.159** |
| | | (0.066) |
| Entrepreneurship Course | – | -0.123 |
| | | (0.084) |
| Family Education | – | -0.068** |
| | | (0.030) |
| Mother Business Owner | – | 0.142** |
| | | (0.059) |
| Father Business Owner | – | 0.173*** |
| | | (0.061) |
| Cultural Events Participation | – | 0.064 |
| | | (0.039) |
| Membership NGOs | – | -0.217*** |
| | | (0.065) |
| *Observation* | 1357 | 1043 |
| *Pseudo R-squared* | 0.0252 | 0.0783 |

Note: Standard errors in parentheses. * Statistical significance at 10% level. ** Statistical significance at 5% level. *** Statistical significance at 1% level.

We use equations II and IV in Table 2 and 3 as a check of the robustness of the baseline findings. When we check the controls in equation II, significances of the coefficients for three baseline sub-dimensions, which are innovation, risk-taking, and networking, change and become insignificant. Pro-activeness and entrepreneurship variables still have significant coefficients. Gender, number of siblings, business ownership of mother, and business ownership of father are positively; GPA, family education, membership of the NGOs are negatively related to the dependent variable among the controls. Cultural events participation, taking an entrepreneurship course, and public-private university controls are not related to the Probent.

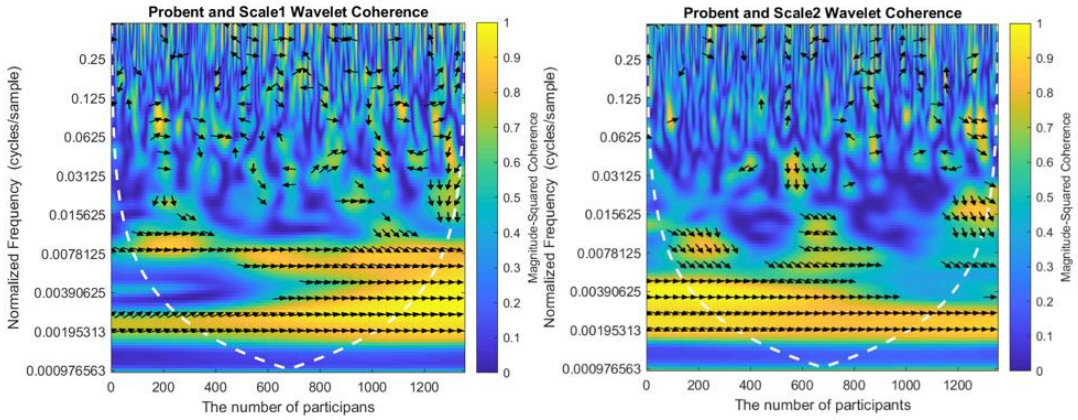
**Table 3. Probit Model Results- Sub-scales for Scale 2**

| **Regressors** | **(III)** | **(IV)** |
|---|---|---|
| Constant | -1.317*** | -0.239 |
| | (0.228) | (0.528) |
| Social Resourcefulness | 0.129** | 0.050 |
| | (0.055) | (0.064) |
| Interpersonal Effectiveness | 0.024 | 0.043 |
| | (0.059) | (0.070) |
| Networking Skill | 0.215*** | 0.210*** |
| | (0.046) | (0.055) |
| Sincerity | 0.005 | 0.038 |
| | (0.038) | (0.45) |
| Gender | – | 0.365*** |
| | | (0.084) |
| Public-Private University | – | -0.074 |
| | | (0.102) |
| Siblings | – | 0.178*** |
| | | (0.048) |
| GPA | – | -0.181*** |
| | | (0.066) |
| Entrepreneurship Course | – | -0.122 |
| | | (0.084) |
| Family Education | – | -0.073** |
| | | (0.030) |
| Mother Business Owner | – | 0.137** |
| | | (0.059) |
| Father Business Owner | – | 0.186*** |
| | | (0.061) |
| Cultural Event Participation | – | 0.060 |
| | | (0.039) |
| Membership NGOs | – | -0.208*** |
| | | (0.064) |
| *Observation* | 1357 | 1043 |
| *Pseudo R-squared* | 0.0227 | 0.0777 |

Note: Standard errors in parentheses. * Statistical significance at 10% level. ** Statistical significance at 5% level.*** Statistical significance at 1% level.

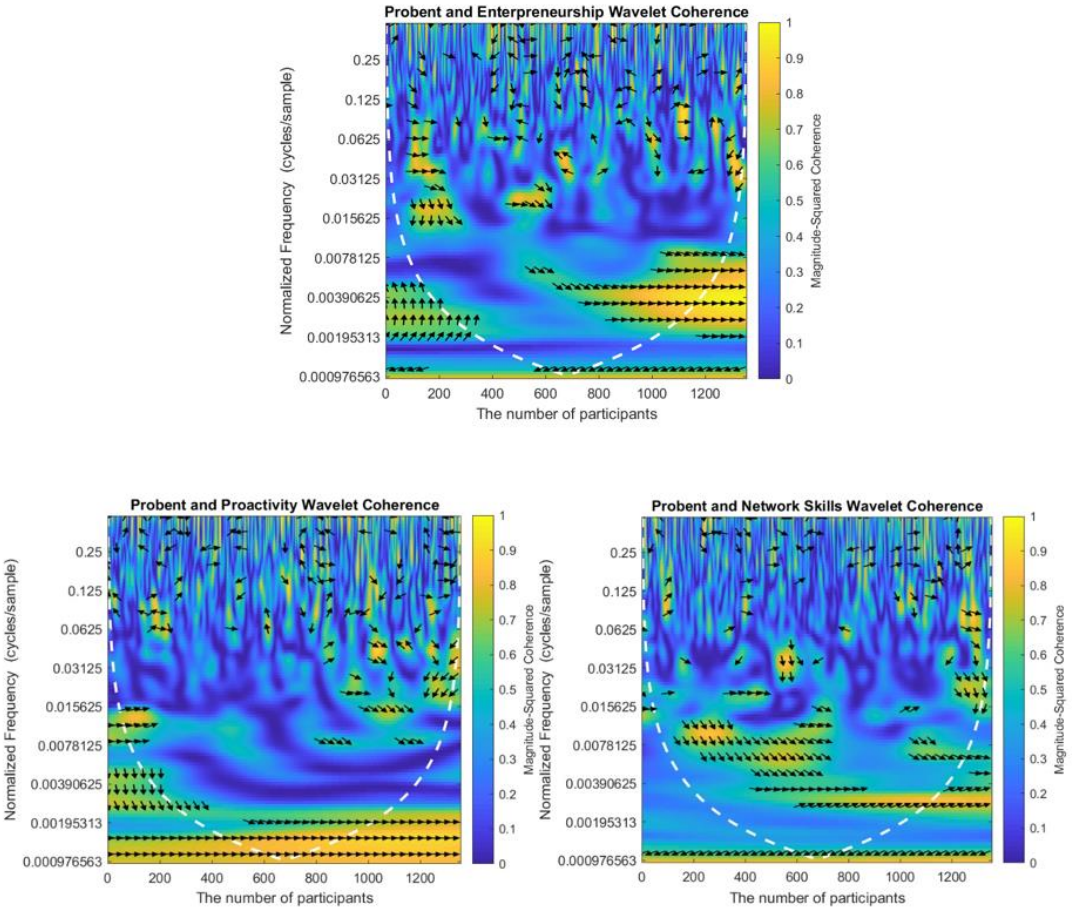
When we check the controls in equation IV, the significance of the coefficient for social astuteness changes and becomes insignificant. Proactivity and entrepreneurship still have significant coefficients. Gender, number of siblings, business ownership of mother, and business ownership of father are positively; GPA, family education, and being a member of NGOs are negatively related to the dependent variable. Cultural events participation, taking an entrepreneurship course, and public-private university controls are not related to the dependent variable.

**Graph 1. Scale 1-2 Wavelet Coherence Analysis**




In the graphical expression of Wavelet coherence analysis, arrows indicate phase differences. The vertical direction of the arrows shows the sign of the correlation. The horizontal direction of the arrows shows the causality (Aguiar-Conraria et al., 2008). Colors show the strength of the correlation, where blue-cold is low and vice versa (Barunik and Vacha, 2009). Therefore, by observing the co-movements of the scale 1-2 and Probent, the positive relationship of these variables can be seen. Causal direction from scales to Probent can be observed in this graph (Graph1). We also apply wavelet coherence analysis subscales, and, at this level, the causal relationship cannot be observed (Graph 2). This does not mean that there is no causal relationship for subscales since there is a causal relationship at scale level but detecting this causality at a subscale level is not possible.

**Graph 2. Sub-scales- Wavelet Coherence Analysis**




## 5. Discussion

Entrepreneurship entails the discovery and exploitation of business opportunities. In this study, we analyzed the personal characteristics and skills which lead individuals to the aspiration of such discoveries and exploitations. Determinants of entrepreneurship have already been widely discussed in entrepreneurship studies. Previous research proved that factors such as personality, risk preference, gender, education, age, family, job satisfaction, and income affect an individual's decision to exploit business opportunities. Our findings neatly corroborate most of these results. We found that student's gender, number of siblings, grade point average (GPA), family's education level, parent's ownership of an enterprise, and the number of non-governmental organizations (NGO) they are members of are related to their entrepreneurship intention. Furthermore, our

analysis suggests that intention to become an entrepreneur is also associated with one's perception of entrepreneurship as a career, level of proactivity, and networking skills.

Our results provide strong evidence that male students have higher entrepreneurial intentions than their female counterparts. This finding is globally consistent with numerous researches. Although studies report different reasons for gender discrepancies in entrepreneurship, the practical implication of this finding suggests that policymakers should engage more actively in removing gender-specific obstacles to entrepreneurship, especially in cultures where gender discrimination still prevails.

We believe that findings, especially on parent's ownership of an enterprise, number of siblings, and academic success reflect Turkey's conditions, an emerging economy. Previous literature refers to family as the primary social organization shaping entrepreneurial decisions (Sanders & Victor, 1996), and having a self-employed family member in the household is one of the most influential determinants of entrepreneurship. Furthermore, Thomas (2009) claims that academic success reduces the aspiration for self-employment, and among others, Rees & Shah (1986) also argue that education increases the incentive to entrepreneurship because more educated people are better informed and that they are more capable at assessing entrepreneurial opportunities. In Turkey, 99% of all the companies are SME's and 95% of them are family-owned (Yalçıntaş, 2015). The usual practice in family-owned companies is to recruit family members, usually in managerial positions, as soon as they complete their education. Not surprisingly, according to our results, intention for entrepreneurship among Turkish senior university students is positively related to parent's ownership of an enterprise as well as the number of siblings and negatively related to academic success. We may conclude that having a parent or a sibling working in a family business encourages students to be self-employed, and the feeling of recruitment security diminishes the desire for academic success.

The survey results also show that intention for entrepreneurship is negatively related to the number of non-governmental organizations (NGO) a student is a member of. Volunteering in a non-profit organization characterizes an altruistic personality which is defined by empathy and inner values (Blank, 2012). The negative relation between entrepreneurship and altruism is also supported by prior research, which proved that that benevolent behavior was negatively associated with entrepreneurial talent (Weitzel, Urbig, Desai, Sanders, & Acs, 2010) and that selfishness was one of the entrepreneurship characteristics (Urbig, Weitzel, Rosenkranz, & van Witteloostuijn,

2012). Selfish and inconsiderate entrepreneurs usually construct business models where social problems are largely ignored. Hence, for a better society, business education should include topics such as corporate social responsibility or social entrepreneurship in order to produce entrepreneurs with a visionary mission (İyigün, 2015). Business students should be encouraged to become change agents of social and economic progress and bring about positive change in the economy as well as the society through their pro-active and innovative activities.

The findings also suggest that enhancing the networking skills and proactive behavior of students will improve their intention for entrepreneurship. Moreover, the data indicate that connecting entrepreneurship with high status and prestige will similarly affect entrepreneurial intentions positively. Thus, educational and informational measures aimed at refining networking and proactive skills of the students as well as their perception of entrepreneurship may nourish the emergence of a more distinctly entrepreneurial breed of students.

This paper complements the existing body of knowledge with empirical evidence from the perspective of an emerging economy where 99% of the enterprises are SME's and family owned. Our findings shed light on some general and country-specific factors on the intention for entrepreneurship and provide a good basis for introducing curriculum and policy discussions aimed at extending the entrepreneurial activity.

## 6. Conclusion

Entrepreneurship is not only an important factor that affects economic growth but also has further importance in developing countries since it is a kind of remedy for high levels of unemployment rate problem. Considering these benefits, many countries give incentives to induce entrepreneurship. Therefore, a better understanding of the dynamics of the decision to be an entrepreneur would be useful to policymakers. In this study, we aim to analyze the relationship between entrepreneurship intention and personal characteristics and skills. For this aim, we conducted a survey in Turkey that took place in 35 different public and private universities on senior university students from faculties of engineering and economics to analyze the relationship between intention to become an entrepreneur and personal characteristics. 1645 students participated in the survey.

The intention to be self-employed is the dependent variable of our analyses. Baseline variables are Scale 1 and Scale 2. Scale 1 is a modified version of Covin and Slevin's (1989) entrepreneurial Orientation (EO) scale. Modifications are made by Taatila and Down (2012) to make the EO scale more suitable for students. Sub-dimensions of scale 1 are entrepreneurship, innovation, pro-activeness, risk-taking, and networking. (Taatila and Down, 2012). Scale 2 is the Political Skills Inventory developed by Ferris et al. (2005). Sub-dimensions of scale 2 are social astuteness, interpersonal influence, networking ability, and sincerity. We used this scale to analyze the relationship between political skills and entrepreneurship potential even though it was initially developed for measuring political skills because of its sub-dimensions.

Probit model and wavelet coherence analysis results show that there is a relationship between entrepreneurship intention and proactivity, entrepreneurship, and networking sub-dimensions of the scales. We also find gender; the number of siblings, grade point average (GPA) of the students, their family's education level, Parent's ownership of an enterprise, and the number of non-governmental organizations (NGO) they are a member of are also related to entrepreneurship intention. These results might be instrumental in understanding and enhancing entrepreneurship potential.

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# Appendix
## Descriptive Summary Statistics

| Cultural event participation | Mean | Standard Deviation | Minimum | Maximum | Obs |
|---|---|---|---|---|---|
| Entrepreneurship | 0.366 | 1.508 | -5 | 4 | 1418 |
| Innovation | 3.265 | 0.713 | 1.2 | 8.8 | 1418 |
| Proactive | 2.994 | 0.494 | 1.33 | 4.83 | 1418 |
| Risk taking | 2.971 | 0.516 | 1.16 | 11.83 | 1418 |
| Networking | 2.947 | 0.495 | 1.4 | 5 | 1418 |
| Social resourcefulness | 3.880 | 0.746 | 1 | 8 | 1418 |
| Interpersonal effectiveness | 3.873 | 0.759 | 1 | 8 | 1418 |
| Networking skill | 3.426 | 0.855 | 1 | 10 | 1418 |
| Sincerity | 4.146 | 0.978 | 1 | 21.66 | 1418 |
| Gender | 0.551 | 0.097 | 0 | 1 | 1397 |
| Foundation-state university | 0.237 | 0.042 | 1 | 2 | 1403 |
| Siblings | 2.389 | 0.893 | 0 | 4 | 1388 |
| GPA | 58.664 | 5.94 | 53 | 65 | 1145 |
| Entrepreneurship Course | 0.632 | 0.082 | 0 | 1 | 1386 |
| Family Education | 4.120 | 1.506 | 0 | 9 | 1392 |
| Mother business owner | 0.318 | 0.036 | 0 | 1 | 1385 |
| Father business owner | 0.580 | 0.063 | 0 | 1 | 1385 |
| Cultural event participation | 3.089 | 1.052 | 0 | 5 | 1378 |
| Membership NGOs and Association | 1.475 | 0.673 | 0 | 3 | 1418 |