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The Determinants of the Growth Expectations of Turkish Entrepreneurs in the Way up the Entrepreneurial Ladder Using Ordinal Logistic Model (OLM)

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ABSTRACT

Given the increasing importance of entrepreneurship in job creation, innovation and economic growth, we try to inquire into the question of why some of the entrepreneurs and not the others expect a rapid development of their ventures. This study uses the Ordinal Logistic Model (OLM) to analyze the determinants of the growth expectations of Turkish nascent, baby and established entrepreneurs, expressed in terms of new jobs to be created within their firms. The OLM procedure allows to compute a probability distribution of growth expectations in four categories given the demographic, perceptual characteristics of these entrepreneurs, and the distinctive traits of their businesses. The data from the Global Entrepreneurship Monitor (GEM) for the years 2006-2008 for Turkey were employed. The growth expectations of Turkish business owners are found to decrease as they mature in the entrepreneurial course. Overall, while both demographic and perceptual characteristics seem to affect firm growth expectations of nascent Turkish entrepreneurs, only demographic variables appear to influence similar expectations of baby Turkish business owners. For established Turkish entrepreneurs, firm's size is predominantly important.

JEL Classification: M13; M51.

Key Words: Entrepreneurial growth expectations; Nascent, baby and established entrepreneurs; Ordinal logistic model.

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1. INTRODUCTION

Interest in the determinants of entrepreneurship has grown over the last decade. There are three consequences of national entrepreneurial activity for a country (Reynolds et al., 2004): (1) the scope of effort devoted to entrepreneurial initiatives which mobilize resources for change and growth, (2) the impact on job creation provided by new firms which increase national economic well-being, and (3) the relationship between entrepreneurial activity and national economic growth. The promotion of entrepreneurship is not only necessary for a healthy economy but also critical for sustaining prosperity, creation of new jobs and thereby in reducing the rate of unemployment. With regard to job creation it is not new firms that are intrinsically the key, but the relatively small number of fast-growing ones which create a big share of jobs in new firms (Autio, 2005). High-growth firms contribute more to the economic

growth than do small and new firms in general (Friar and Meyer, 2003; Pages et al., 2003; Wong et al., 2005). Therefore, high-growth firms are prominent on the agenda of policy-makers (Smallbone et al., 2002; European Commission 2003).

Although the high-growth aspiration entrepreneurial activity is responsible for the bulk of expected new jobs by early-stage entrepreneurs, it represents only a small proportion of all venturing activity. In other words, a small part of new entrepreneurs have high expectations, but the economic potential in this area is notably important, since a major portion of total jobs expected to be generated by all entrepreneurs is due to high-growth expectation start-up entrepreneurs. In the world, high income countries appear to exhibit higher entrepreneurial growth ambition compared to those of middle and low income countries according to the Global Entrepreneurship Monitor (GEM) data (Autio, 2005). However, in an earlier work of ours we found Turkey to be a notable exception to this overall pattern where about 30 percent of all early-stage entrepreneurs expected a rapid growth using GEM data for 2006-2008 (Karadeniz and Ozcam, 2009). Therefore, the high growth expectations of a typical early-stage Turkish entrepreneur were found to be higher than those of an average entrepreneur participating in GEM surveys in 42 countries. This result ranked Turkey in the 4th place among these countries in the year of 2008.

Bager and Schøtt (2004) already suggested that nascent entrepreneurs might often have much higher expectations for growth than baby and established entrepreneurs. In the current paper, high expectations of established Turkish entrepreneurs are investigated in addition to those of nascent and baby Turkish entrepreneurs. We find that the growth expectations of Turkish venturers decrease as they climb up the entrepreneurial ladder (nascent 35%, baby 15% and established 13%). Consequently, this study focuses on the important drivers of high growth expectations of Turkish business owners in different stages of their entrepreneurship career (nascent, baby and established) from the perspective of their ambitions in new job generation. It is important to note that the expectations of start-up entrepreneurs represent their initial ambition related to the sizes of their firms rather than their realized job creation. While not all expectations come true, growth aspiration has been shown to forecast eventual growth quite well (Autio ,2005).

In this paper, the data from the Adult Population Survey (APS) of the Global Entrepreneurship Monitor (GEM) project for Turkey for the years 2006-2008 were merged into one set of data to be able to determine the factors of the growth ambition of Turkish entrepreneurs using the Ordinal Logistic Model (OLM). To the best of our knowledge, the OLM has not been used so far in estimating GEM data. However, Zwan, Thurik and Grilo (2007) used this model to analyze the determinants of entrepreneurial activity based on the Flash Eurobarometer Survey data. The paper is organized as follows. In section 2, the theoretical literature on the factors which affect the presence of ambitious entrepreneurs who expect growths of their firms is examined and our hypotheses are developed. Section 3 presents the data and defines the variables used in this study. In Section 4, modeling ordered data and the theoretical estimation by Ordinal Logit Model (OLM) is explained. While Section 5 presents the interpretations of the empirical findings including scenarios designed for some specific categories of entrepreneurs, Section 6 concludes the paper.

2. BACKGROUND AND HYPOTHESES

It is known that ventures are not started by chance, and that the venturing activity is created as a form of planned behavior (Ajzen, 1991). Ajzen's Theory of Planned Behavior postulates

three conceptually independent determinants to intention. The first is the attitude toward the behavior (growth); it refers to the degree to which a person has a favorable or unfavorable evaluation or appraisal of the growth. The second predictor is a social factor termed subjective norm; it refers to the degree to which others consider growth to be important. The third one is the perceived behavioral control which refers to whether the individual believes (s)he is able to achieve firm growth. Together they determine an individual's intention to pursue firm growth. However, many new ventures do not realize substantial growth, because the entrepreneurs do not intend their ventures to achieve substantial growth (Kolvereid, 1992). Therefore, uncovering why some entrepreneurs have greater propensity for growth aspiration and intend to be a large venture, will provide valuable insight into why some intend to grow large while others do not.

Our aim is to find out the determinants of growth ambition of entrepreneurs which contribute to actual firm growth. To identify the determinants that might influence the growth expectations of entrepreneurs in Turkey, we used the model established by Verheul and van Mil (2008) and Terjesen & Szerb (2008). These two studies have used GEM data to examine growth expectations of entrepreneurs. Verheul and van Mil investigated the determinants of the growth ambition and growth expectations among Dutch early-stage entrepreneurs. Terjesen & Szerb examined entrepreneurs, firms and national environmental factors associated with the growth expectations in 35 countries. The present study investigates three factors: entrepreneur's demographic characteristics, perceptual variables and attributes at firm level (See Figure-1).

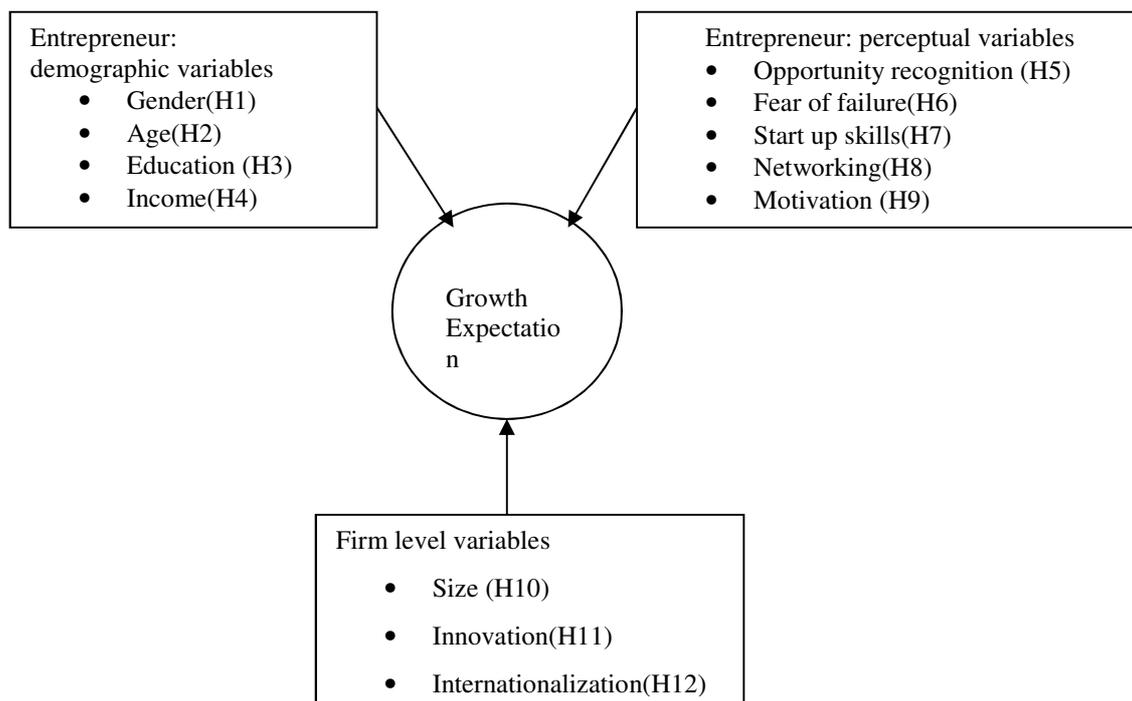


FIGURE -1: Determinants of growth expectations of entrepreneurs

Figure-2 below summarizes the entrepreneurial process, where an individual entrepreneur goes through different phases, from the very early phase when its business is in gestation to the established phase and possible discontinuation of business (Reynolds et al., 2005). Total early-stage entrepreneurial activity (TEA) considers as entrepreneurs those people who are either involved in setting up a business and trying to survive in a market, or those who have

already owned a business for up to 3.5 years. On the other hand, a person is an established business owner if s(he) has been in a business for quite a number of years (more than 3.5 years). Therefore, GEM provides a framework with which a wide variety of entrepreneurial characteristics can be analyzed.

The present study is based on this life cycle of the entrepreneurial process and examines the factors associated with growth expectations at three distinct firm stages : early stage entrepreneurs who are actively involved in either starting (*nascent*) or managing a business they will wholly or partly own, which is less than three and a half years old (*baby*); and entrepreneurs who own and manage a business that has paid wages or salaries for more than 42 months (*established*). Specifically our study tries to determine the factors of the growth expectations of nascent, baby and established entrepreneurs such as individual entrepreneurs' demographic and perceptual characteristics and firm level attributes.

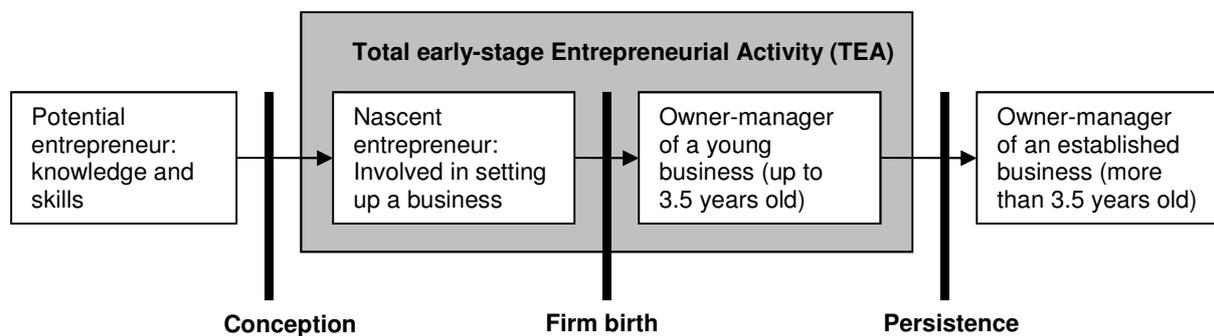


FIGURE -2: The entrepreneurial process and GEM's operational definitions

Demographic variables

Gender

Many authors analyzed the influence of gender in determining the growth of the firm and indicated that gender affected business performance. Cooper et al.(1994) point out that female-owned businesses tend to be smaller and are less likely to grow compared to male-owned businesses. Moreover, females are more likely to have lower intended firm revenues than males (Cassar, 2006). Likewise, Autio (2005,2007) finds that male nascent, baby and established entrepreneurs have higher growth expectations than women entrepreneurs. Furthermore, female entrepreneurs have less ambition to grow their firms than men regardless of the phase of entrepreneurial activity (Bager and Schøtt, 2004) and being female has the most important negative effect on business growth (Terjesen and Szerb, 2008). However, Verheul and van Mil (2008) finds gender differences to disappear after including control variables. Kolvereid (1992) show that there are no gender differences with respect to growth ambition; it may be due to the gender equality in Norway. Generally, being male is expected to have a positive effect on firm growth. Thus, we suggest;

Hypothesis 1: Male entrepreneurs are more likely to have greater growth expectations than female entrepreneurs.

Age

The results are mixed with regard to the age of the entrepreneur. For example, Cressy (1996) claimed a positive relationship between age of the entrepreneur and growth of the firm. On the other hand, some other studies found that the age of the entrepreneur might have a negative effect on the growth ambition of entrepreneurs about the firm or expected firm's size (Bager and Schøtt, 2004; Autio, 2005; Terjesen and Szerb, 2008). Bager and Schøtt (2004) showed that young baby and established entrepreneurs had higher growth expectations than older ones except for nascent entrepreneurs. Terjesen and Szerb, (2008) showed that younger age was positively related to firm growth expectations for baby and established entrepreneurs. They indicated that older entrepreneurs were less innovative, more interested in their status quo and were more risk averse. A study by Burns (2001) showed that middle aged entrepreneurs are more likely to grow their businesses compared to other age groups. Verheul and van Mil (2008) found that age was important only in the start-up stage and not in the later stage. Wiklund et al. (2003), and Cassar (2006) found no evidence of relationship between the age and the growth ambition.

Despite these mixed results, we will expect younger entrepreneurs to be more likely to have higher growth expectations than older entrepreneurs. Thus we suggest;

Hypothesis 2: Younger entrepreneurs are more likely to have greater growth expectations than older entrepreneurs.

Education

Generally, education seems to provide the knowledge base and to improve analytical and problem-solving skills (Aidis et al.,2004), and especially, entrepreneurship education can increase awareness, confidence and enthusiasm (van Gelderen et al.,2008). The education level of the entrepreneur has a positive influence on both firm survival and growth (Cooper et al, 1994). Brüderl and Preisendörfer (2000) explicitly indicated that firms owned by the entrepreneurs with more educational background were more likely to experience fast growth. Furthermore, Shane (2003) claimed that better educated people were expected to found firms with higher growth expectancies. The studies by Kolvereid (1992), Autio (2005, 2007), Terjesen and Szerb (2008) showed that there was a positive effect of education level of the entrepreneurs on the ambition of growth and expectation of growth. Terjesen and Szerb, (2008) found that the level of education had a positive effect on nascent entrepreneurs, while Autio, (2005) found that this effect held for both nascent and young business owners. Terjesen and Szerb (2008) found that the level of education is significant and has a positive effect on growth oriented nascent entrepreneurs, while it is insignificant for baby and established entrepreneurs. Although Cassar (2006) claimed that higher levels of human capital led to higher opportunity costs which drove up the desired and expected firm size, he could not find evidence to support his claim. Therefore, we expect a positive relationship between an entrepreneur's education level and his/her expectations for firm growth. Thus, we suggest;

Hypothesis 3: Highly educated entrepreneurs are more likely to have greater growth expectations than those entrepreneurs with lower level of education.

Household Income

Individuals with greater wealth will intend to achieve something that is large enough to make a difference to their wealth (Bhide, 2000). Also, greater wealth provides greater financial resources which allow entrepreneurs to undertake larger size venturing before using outside sources of funding. Therefore, securing funding may be important in achieving the growth objectives. Cassar (2006) found that the opportunity cost of being a nascent entrepreneur measured by the household income had a positive influence on growth ambition. Terjesen and Szerb (2008) claimed that individuals with higher incomes may finance their businesses better and access necessary resources for business growth. They found that higher household income was significant only in the case of established firms' growth expectations. Autio (2007) pointed out that high expectation entrepreneurial activity is overrepresented in high income groups (43% of nascent high-expectation entrepreneurs, 58% of baby high-expectation entrepreneurs and 63% of high-growth established entrepreneurs). Individuals from high income families may be interested in more gainful opportunities than individuals from low income families. Autio (2005) claimed that individuals with higher income may better finance their businesses and access necessary resources for business growth. Therefore, we expect a positive relationship between an entrepreneur's household income and his/her expectations of firm growth. Thus, we suggest that;

Hypothesis 4: Entrepreneurs with higher household incomes are more likely to have greater growth expectations than entrepreneurs with lower household incomes.

Perceptual variables

Opportunity recognition

Opportunity recognition represents the most distinctive and fundamental entrepreneurial behaviour according to many scholars (Eckhardt and Shane, 2003; Shane and Venkataraman, 2000). These claims confirm the entrepreneurship definition of Kirzner (1979) which defines entrepreneurs as individuals who are more likely than others to be alert to identification and to exploitation of profit opportunities.

The recognition of business opportunities will affect an entrepreneur's expectation to grow the firm. Autio (2005) finds that high-expectation early-stage entrepreneurs are significantly more likely to perceive good business opportunities than are low-expectation entrepreneurs. Terjesen and Szerb (2008) find that the ability to see good opportunities is positively and significantly related to business growth regardless of the phase of entrepreneurial activity. However, Bager and Schøtt (2004) find a positive effect only for nascent entrepreneurs. Verheul and van Mil, (2008) found that opportunity perception did not play a role for nascent and young business owner. Overall, we expect that entrepreneurs who perceive good opportunities in the environment to be more likely to have higher expectation of firm growth. Thus, we suggest that;

H5: Entrepreneurs who perceive business opportunities are more likely to have greater growth expectations than those who do not perceive business opportunities.

Fear of failure

Fear of failure affects the growth expectation of entrepreneurs. “Because growing the firm is associated with high risk, it may be expected that relatively risk averse entrepreneurs are less likely to have the ambition to develop the firm to its full potential” (Verheul and van Mil, 2008). However, they find that fear of failure has a weak effect only for nascent entrepreneurs. On the other hand, according to Autio (2005), high-expectation nascent entrepreneurs are less likely to be constrained by the fear of failure. Bager and Schøtt (2004) found that nascent entrepreneurs who expect expansion are more likely to take a risk than baby business and established firms’ entrepreneurs. Cassar (2007) finds that individuals who are risk averse are more likely to have an ambition to grow the firm. Thus, we suggest that;

H6: Entrepreneurs who fear failure of their business are less likely to have greater growth expectation than entrepreneurs who do not fear failure of their business.

Entrepreneurial skills and knowledge

Entrepreneurs who believe in their entrepreneurial skills and knowledge are more likely to have a growth ambition, because they are more likely to feel confident with their skills and knowledge that they need to prove themselves by growing the businesses (Verheul and van Mil, 2008). However, they do not find entrepreneurial skills to have a significant effect on growth ambition of nascent and baby business owners. However, the relationship between entrepreneurial self-efficacy and growth ambition is found to be positive (Bager and Schøtt, 2004; Autio, 2005; Terjesen and Szerb, 2007). According to Autio (2005), Bager and Schøtt (2004) high-expectation nascent entrepreneurs and young business owners have more confidence in their entrepreneurial skills than low-expectation entrepreneurs. Terjesen and Szerb (2008) find evidence for such a relationship for young and established business owners. Thus, we suggest that;

H7: Entrepreneurs who believe in their entrepreneurial skills and knowledge are more likely to have greater growth expectation than entrepreneurs with low confidence in this area.

Knowing other entrepreneur (Networking)

Formal and informal networks (Aldrich and Martinez, 2001) and importance of role models (Wagner and Sternberg, 2004; Walstad and Kourilsky, 1998) are significant factors for entrepreneurial decisions. Networks are rich sources to get information about the opportunities they will pursue (Light and Robenstein, 1995). Social networks provide information about opportunities. Therefore, personal context is strongly linked to business growth of nascent entrepreneurs (Terjesen and Szerb, 2008). Thus, we suggest that;

H8: Entrepreneurs who are personally acquainted with entrepreneurs are more likely to have greater growth expectation than entrepreneurs with less embedded in entrepreneurial society.

Motivation

A number of studies relate motives to aspirations. Individuals may have pull motives such as autonomy (i.e independence and freedom), income and wealth, challenge, and

recognition and status to be entrepreneurs. Pull motives are also referred to as opportunity motives. However, individuals may also be pushed into entrepreneurship (Thurik, et al., 2008). Push motives (also referred to as necessity motives) are present for example when (a threat of) unemployment forces people into self-employment.

Kolvereid (1992) found that the achievement motive was positively related to growth ambition. Davidsson (1989) explained that expectations of financial reward and of increased independence and concern for employee well-being were positively related to ambition to grow. Wiklund, Davidsson, and Delmar (2003) also showed that concern for employee well-being was the strongest predictor for growth ambition in Sweden. Generally, people starting up a business with the necessity motive have lower aspiration levels than opportunity motivated entrepreneurs (Reynolds et al., 2002). Those people are more likely to have a limited access to human capital, financial capital, technology, and other resources (Hessels et al., 2008). Therefore, their potential for generating job growth is likely to be constrained. Verheul and van Mil (2008) found that nascent entrepreneurs and baby business owners started their business by opportunity rather than necessity motive. According to Autio (2005) high-expectation nascent and baby entrepreneurs are more often found to be motivated by a business opportunity than low-expectation entrepreneurs. The study by Terjesen and Szerb (2008) found that opportunity motivated young and established entrepreneurs were more likely to focus on growth than necessity motivated entrepreneurs. Therefore, we expect that opportunity motive is a determinant of entrepreneurial aspirations. Thus, we suggest that;

H 9: Opportunity motivated entrepreneurs are more likely to have greater growth expectation than necessity driven entrepreneurs.

Firm level variables

Firm size

Firm size, in terms of the number of employees, is taken into account only for the young business owners since it is not available for nascent entrepreneurs. With regard to firm size on growth ambition, the results are again mixed. Davidsson (1989) , Wiklund et al. (2003) argued that owners of small firms were more likely to pursue growth than owners of large firms. However, Terjesen and Szerb (2008) found evidence for a positive effect of firm size on growth ambition for baby and established firms. Verheul and van Mil (2008) also indicated that the young business owners with growth ambition have larger firms. We expect that the greater the firm size, the greater the firm growth expectations. Thus, we suggest that;

H10: The greater the size of the firm, the greater the firm growth expectations.

Innovation

According to Schumpeter, an entrepreneur is an innovator and (s)he is a key figure in driving economic development. Innovation is assumed to enhance the competitive advantage of the firm and create a sound ground for expansion. Terjesen and Szerb (2008) found that innovation was positively related to growth ambition no matter what the stage of entrepreneurial activity was. Verheul and van Mil (2008) also showed that the innovation was important for explaining expected growth by nascent entrepreneurs. Brüderl and Preisendörfer (2000) claimed that fast-growing firms were more likely to have introduced new products.

This is also supported by the study conducted from Wynarczyk et al. (1993). Thus, we suggest that;

H11: The more innovative the firm, the greater the firm growth expectations.

Exporting

Empirical evidence indicates that the firms that are involved in exporting activities are more likely to be growing. International markets may speed up the growth process because they offer new business opportunities (Verheul and van Mil, 2008). Studies by Terjesen and Szerb (2008) showed that export orientation was significant for the nascent and established businesses but insignificant for baby businesses. Verheul and van Mil (2008) found evidence that export activity was significantly related to growth ambitions of nascent and young business owners. We suggest that;

H12: The more export-oriented the firm, the greater the firm growth expectations.

3. DATA AND DEFINITION OF VARIABLES

The data used in this paper were collected by means of the national adult population survey (APS) from the Global Entrepreneurship Monitor (GEM) project (Reynolds et al., 2005) conducted in Turkey covering years 2006-2008. The combined dataset consisting of over 6,000 interviews with a representative sample of adults (18-64 years old) was hoped to increase the reliability of the empirical results. In total, there were 161 nascent, 235 baby and 518 established entrepreneurs. Random Sampling Method was used and CATI (Computer Assisted Telephone Interview) was conducted by the vendor company¹.

Dependent variables :

The growth expectation is the dependent variable, and we expect the determinants of business growth ambition to differ among nascent, baby and established businesses. GEM's data on growth expectations of entrepreneurs in each stage in terms of number of jobs to be created within the next five years have four categories: (1) no new jobs except that of the founder; (2) 1-5 more jobs (3) 6-19 more jobs (4) 20 or more jobs.

- 1- Growth expectations of *nascent* entrepreneurs: Nascent entrepreneurs are those who are currently active in trying to start a business, have not yet paid any salaries or wages, or have paid for less than three months.
- 2- Growth expectations of *baby* entrepreneurs: Baby entrepreneurs are those who are currently active in running a business that has paid salaries or wages for more than three months, but less than 3.5 years.
- 3- Growth expectations of *established* entrepreneurs: Established business owners are individuals who have set up businesses that they have continued to own and manage and which have paid wages or salaries for more than 42 months.

¹ The vendor company, Akademetre is a member of the European Society of Opinion, Marketing Researchers (ESOMAR), and the Turkish Association of Marketing, and Opinion Researchers. It has an honour agreement with Association of Researchers and possesses ISO 9000-2001 quality certification.

Independent variables:

- 1- Gender (GENDER): Respondents were asked to provide their gender: (1=male, 2=female).
- 2- Age (AGE): Respondents were asked to provide their age : (between 18 and 64).
- 3- Education (EDUCATION): Respondents were asked to provide the highest degree they had earned :(1=up to Second degree, 2=Second degree, 3=Post Second, 4=Graduate).
- 4- Household income (INCOME): Respondents were asked to provide information about their levels of household income: (1=Lower 33 %, 2= Middle 33 %, 3= Upper 33 %).
- 5- Opportunity perception (OPPORTUNITY): Respondents were asked if they believed that, in the 6 months following the survey, good business opportunities would exist in the area where they lived : (0=NO, 1=YES).
- 6- Fear of failure (FEAR of FAILURE): Respondents were asked whether the fear of failure would prevent them from starting a business: (0=NO, 1=YES).
- 7- Self confidence (SKILLS): Respondents were asked whether they believed to have the knowledge, skills, and experience required to start a business: (0=NO, 1=YES).
- 8- Knowing entrepreneurs (NETWORKING): Respondents were asked whether they knew someone personally who had started a business in the 24 months preceding the survey: (0=NO, 1=YES).
- 9- Motivation (MOTIVATION): Respondents were asked what drove them to become an entrepreneur: (1=purely opportunity motive, 2=partially opportunity motive 3=necessity motive)
- 10- Size of the firm (SIZE): Respondents were asked how many people were employed in their businesses: (1= no new jobs except that of the founder, 2= 1-5 more jobs, 3= 6-19 more jobs, and 4= 20 or more jobs).

To measure innovativeness, entrepreneurs were asked how they evaluated the newness of their products or services, the competition they faced, and the novelty of their technology :

- 11- Customer oriented innovation (INNOVATION): Respondents were asked about the newness of their products and services they offered to customers :(1= to all customers, 2= to some customers, 3= to none of the customers).
- 12- Intensity of expected competition (INNOVATION): Respondents were asked about the degree of competition they faced: (1= Many business competitors, 2= Few business competitors, 3= No business competitors).
- 13- Newness of technology (INNOVATION): Respondents were asked about how new were the technologies or procedures they used: (1= Very latest technology, 2= New technology (1 to 5 years), 3= Old technology)
- 14- Degree of exporting (INTERNATIONALIZATION): Respondents were asked what percentage of the expected sales were exported to foreign customers : (1=76-100%, 2= 75-26%, 3= 1-25 %, and 4= None).

4. MODELING AND ESTIMATION OF ORDERED DATA BY ORDINAL LOGISTIC MODEL (OLM)

4.1 Modeling ordered data

Frequently, the data obtained from surveys like GEM are *ordered* with more than two classes, where the respondents are asked to identify themselves with a particular category of a multiple (polychotomous rather than dichotomous) outcome which is not nominal but ordinal. For example in our case, the expected number of jobs to be created by Turkish entrepreneurs within the next five years may be expressed in terms of four categories : *no jobs except that of the founder, 1-5 jobs, 6-19 jobs and 20 or more jobs*. This paper uses the Ordinal Logistic Model (OLM) which takes into account the rank ordering of the outcome in terms of cumulative logits while preserving the proportional odds (PO) assumption. McCullagh (1980) called this the Proportional Odds Model (POM), where the major conjecture is that the relation between the pairs of groups of the dependent variable is identical, and hence the term PO assumption, or parallel lines assumption. This amounts to asserting that the effect of each independent variable is the same for all relative cumulative probabilities.¹ The ordinal approach allows to compute the estimates of growth expectations of entrepreneurs, especially when the goal is to calculate the accumulated probabilities in view of changes in the explanatory variables, even though elasticity estimation is not viable (Fucks and Salazar, 2008).

As an alternative, the Multinomial Logistic Model (MLM) would ignore the ordinal nature of the dependent variable and consequently the estimated odds ratios might not interpret the results properly (Hosmer and Lemeshow, 2000). Moreover, the traditional OLS approach has some drawbacks in this case due to the discrete nature and narrow range of the dependent variable. To the best of our knowledge, OLM has not been used so far in estimating GEM data, except Karadeniz and Ozcam (2009). However, Zwan, Thurik and Grilo (2006) used OLM to interpret the results of the Flash Eurobarometer Survey on Entrepreneurship.

4.2 Estimation of ordinal logistic model (OLM)

In cases where the dependent variable is *ordinal*, POM is the most broadly used model for OLM. If the logistic distribution (rather than a normal distribution) is used for estimating the probabilities, it is based on the notion of logits of the *cumulative* probabilities (logit (C_{ij})), where the cumulative probability C_{ij} indicates, in our case that the i th entrepreneur possessing some given characteristics will have growth expectations of jobs falling in the j th class or lower, where J is the total number of classes.²

$$C_{ij} = \Pr(\text{EXPECTATIONS} \leq j) = \sum_{k=1}^j \Pr(\text{EXPECTATIONS} = k) \quad j=1,2,\dots,J-1 \quad (1)$$

Then, the cumulative logit for the entrepreneur i and for class j :

$$\text{logit} (C_{ij}) = \ln (C_{ij} / (1 - C_{ij})) \quad j=1,2,\dots,J-1 \quad (2)$$

A model for cumulative logit j looks like a binary logistic regression model in which categories $j+1$ form a second category. Assuming a linear relationship of the logit with respect to the m independent variables :

$$\text{logit} (C_{ij}) = \alpha_j - (\beta_1 x_{i1} + \beta_2 x_{i2} + \dots + \beta_m x_{im}) \quad j=1,2,\dots,J-1 \quad (3)$$

Note that the intercepts, α_j 's differ for each level of cumulative logit. However, the β 's are constant for all $J-1$ categories according to PO assumption, reflecting the fact that the effect of x is the same for all $J-1$ cumulative logits. When this model fits well, only a single parameter, β is demanded to be estimated rather than $J-1$ parameters to show the impact of any x . The β 's exhibit the effect of x on the log odds ratio of expectations of entrepreneurs in category j or higher, due to the presence of the negative sign in equation (3). Hence, β 's show how a unit increase in one of the characteristics of the entrepreneur, *ceteris paribus*, will change the logit in the high end of the scale of the dependent variable, i.e. growing expectations of entrepreneur.³ The common effect β for each j suggests that the cumulative probability curves, C_{ij} have the same shape except for a shift factor. The size of $|\beta|$ determines how quickly these curves climb or fall (Agresti, 2007).

5. ECONOMETRIC ESTIMATION RESULTS BY ORDINAL LOGISTIC MODEL (OLM)

5.1 Estimation of coefficients and model selection

In Tables 1-3 below, the dependent variables are the growth expectations of three types of entrepreneurs : *nascent, baby and established* entrepreneurs, in terms of the number of jobs expected to be created within the next five years in four categories : *no new jobs except that of the founder* ($y = 1$), *1-5 jobs* ($y = 2$), *6-19 jobs* ($y = 3$) and *20 or more jobs* ($y = 4$). To be able to determine the important variables which explain these growth expectations of three categories of entrepreneurs, three *ordinal logistic regressions* (OLM) were run :

Table-1: Determinants of *Nascent* entrepreneurs' growth expectations,

Table-2: Determinants of *Baby* entrepreneurs' growth expectations,

Table-3: Determinants of *Established* entrepreneurs' growth expectations.

In Table-1 below, the second column shows the first estimation results when all 13 independent variables (IV's), given in first column are included in the regression for *nascent* entrepreneurs (note that the Size IV is irrelevant for nascents). Among these 13 variables, only Education, Income, Skills, Motivation and Internationalization IV's were found to be significant in explaining the growth expectations of nascent entrepreneurs. The likelihood ratio statistic (not reported) testing the redundancy of the 8 non-significant variables indicated that they were indeed not further helpful in the explanatory power of the remaining 5 IV's. The third column displays the refined values of the coefficients when a second regression was run only on these remaining 5 IV's. The likelihood ratio test statistic (40.845) which is distributed as chi-square χ_5^2 with 5 degrees of freedom, given in the lower part of Table-1, compared the restricted and unrestricted log likelihoods of the second regression on the remaining variables, and rejected the null hypothesis that the slopes of all 5 remaining regressors were zero at less than 1%.

The last column gives the Odds Ratios (OR). For Education IV, the OR value of 2.35 indicates that nascent entrepreneurs with a higher level of education are about 2.35 times

more likely to expect to create more jobs compared to those with a lower level of education. Likewise, the Income IV produces an OR value of 2.13. The Skills IV seems to be quite important since those nascent entrepreneurs believing to have abilities in undertaking such business ventures are about 5.12 times more likely to create more jobs than those who do not believe to possess skills in carrying out their business initiations. The Motivation IV indicates that those entrepreneurs who have started their businesses due to necessity are only 0.61 times as likely to hire more employees compared to those who have started their firms because of seeing an opportunity. Finally, Internationalization IV shows that starting entrepreneurs who expect to export *less* are half as likely to expect to grow their firms with comparison to those who expect to export more.

TABLE -1
MODEL 1 : *Dependent variable* : Growth expectations of Nascent entrepreneurs,

	Coefficient (Std. error)	Coefficient (Std. error)	Odds Ratio
<u>Independent Variables (IV's)</u>			
Gender	-0.736 (0.559)	-	
Age	0.023 (0.024)	-	
Education	0.858 (0.277)***	0.856 (0.216)***	2.35
Income	0.733 (0.308)**	0.754 (0.251)***	2.13
Opportunity	0.606 (0.478)	-	
Fear of Failure	-0.171 (0.579)	-	
Skills	1.230 (0.740)*	1.634 (0.603)***	5.12
Networking	-0.242 (0.547)	-	
Motivation	-0.605 (0.271)**	-0.491 (0.221)***	0.61
Size	-	-	
New Customer	0.193 (0.317)	-	
Competition	0.029 (0.356)	-	
Technology	0.146 (0.347)	-	
Internationalization	-0.937 (0.302)***	-0.686 (0.232)***	0.50
<u>Threshold values</u>	$\lambda_1 = -1.719$, $\lambda_2 = 1.412$, $\lambda_3 = 2.855$		
<u>Akaike information criterion</u>	2.220		
<u>Schwarz information criterion</u>	2.423		
<u>Likelihood Ratio test statistic</u>	40.845*** (χ^2_5 with 5 df)		
<u>Likelihood Ratio Index(LRI)</u>	0.160		

(***), (**) and (*) indicate the statistical significance of coefficients at 1%, 5% and 10% levels respectively. The coefficient estimates are followed by standard deviations given in parentheses.

In Table-2 below, the second column shows again the first estimation results when all 14 independent variables (IV's) given in first column are included in the regression for *baby* entrepreneurs. Among these 14 variables, only Gender, Education, Size, Technology and Internationalization IV's were found to be significant in explaining the growth expectations of baby entrepreneurs. The third column displays the refined values of the coefficients when a second regression was run only on these remaining 5 IV's. The likelihood ratio test statistic

(148.497) which is distributed as chi-square χ_5^2 with 5 degrees of freedom, given in the lower part of Table-1, compared the restricted and unrestricted log likelihoods of the second regression on the remaining variables, and rejected the null hypothesis that the slopes of all 5 remaining regressors were zero at less than 1%.

In the last column, the OR value of 0.31 for Gender IV, indicates that female baby entrepreneurs are about as one third as likely to expect to create more jobs compared to their male counterparts. For Education IV, baby entrepreneurs with a higher level of education are about 1.67 more likely to expect to create more jobs compared to those starting-up venturers with a lower level of education. The Size IV seems to be very important showing that those baby entrepreneurs having already had a business with more employees are about 8.58 times more likely to create more employment than those who have not used as much labor. Lastly, Technology IV indicates that those baby entrepreneurs who use a *lower* technology are 1.93 times as likely to hire more employees compared to those who do take advantage of technological progress. (Note that the impact of exporting dissipated in the second regression).

TABLE -2
MODEL 2 : *Dependent variable* : Growth expectations of Baby entrepreneurs,

	Coefficient (Std. error)	Coefficient (Std. error)	Odds Ratio
<hr style="border-top: 1px dashed black;"/>			
<u>Independent Variables (IV's)</u>			
Gender	-0.789 (0.533)*	-1.164 (0.355)***	0.31
Age	0.004 (0.022)	-	
Education	0.625 (0.217)***	0.480 (0.157)***	1.67
Income	0.304 (0.301)	-	
Opportunity	0.264 (0.404)	-	
Fear of Failure	0.302 (0.505)	-	
Skills	0.085 (0.639)	-	
Networking	0.411 (0.463)	-	
Motivation	-0.189 (0.223)	-	
Size	1.858 (0.296)***	2.175 (0.241)***	8.58
New Customer	-0.238 (0.273)	-	
Competition	0.169 (0.396)	-	
Technology	0.918 (0.405)**	0.727 (0.286)***	1.93
Internationalization	0.577 (0.225)***	0.225 (0.166)	-
<hr style="border-top: 1px dashed black;"/>			
<u>Threshold values</u>	$\lambda_1 = 4.615$, $\lambda_2 = 6.967$, $\lambda_3 = 8.977$		
<u>Akaike information criterion</u>	2.017		
<u>Schwarz information criterion</u>	2.159		
<u>Likelihood Ratio test statistic</u>	148.497*** (χ_5^2 with 5 df)		
<u>Likelihood Ratio Index(LRI)</u>	0.30		

(***), (**) and (*) indicate the statistical significance of coefficients at 1%, 5% and 10% levels respectively. The coefficient estimates are followed by standard deviations given in parentheses.

In Table-3 below, the third column shows the second estimation results for *established* entrepreneurs with the remaining 5 significant IV's from the initial list of 14 IV's : Education, Income, Skills, Size and Technology. The likelihood ratio test statistic (297.591) shows that these 5 variables are not all unimportant together. In the last column, established entrepreneurs with a *lower* level of education are about 1.27 (=1/0.79) times more likely to expect to create more jobs compared to those established entrepreneurs with a higher level of education. Moreover, such entrepreneurs with a higher level of family income are 1.4 times more likely to create more jobs whereas those who possess skills are 2.35 times more likely to generate employment, compared again to their respective counterparts. Size IV is again very important, and displays that those entrepreneurs having already had an established business with more employees are about 10.6 times more likely to create more employment than those who have not used as much employment. Finally, Technology IV indicates that those established entrepreneurs who use a higher technology are 2.5 (=1/0.40) times as likely to hire more employees compared to those who do not take advantage of the technological progress.

TABLE -3

MODEL 3 : *Dependent variable* : Growth expectations of Established entrepreneurs,

	Coefficient (Std. error)	Coefficient (Std. error)	Odds Ratio
<hr/>			
<u>Independent Variables (IV's)</u>			
Gender	-0.385 (0.355)	-	
Age	0.002 (0.012)	-	
Education	-0.290 (0.142)**	-0.237 (0.121)*	0.79
Income	0.308 (0.197)*	0.341 (0.168)**	1.40
Opportunity	0.235 (0.268)	-	
Fear of Failure	-0.145 (0.319)	-	
Skills	0.764 (0.347)**	0.855 (0.273)***	2.35
Networking	0.124 (0.293)	-	
Motivation	-0.138 (0.116)	-	
Size	2.166 (0.204)***	2.361 (0.180)***	10.60
New Customer	-0.064 (0.160)	-	
Competition	0.352 (0.286)	-	
Technology	-0.963 (0.335)***	-0.913 (0.291)***	0.40
Internationalization	-0.223 (0.197)	-	

Threshold values $\lambda_1 = 1.455$, $\lambda_2 = 3.764$, $\lambda_3 = 6.083$

Akaike information criterion 1.821

Schwarz information criterion 1.908

Likelihood Ratio test statistic 297.591*** (χ^2_5 with 5 df)

Likelihood Ratio Index(LRI) 0.32

(***), (**) and (*) indicate the statistical significance of coefficients at 1%, 5% and 10% levels respectively. The coefficient estimates are followed by standard deviations given in parentheses.

Overall, both Akaike and Schwarz information criteria and Likelihood Ratio test statistics indicated that the regression for established entrepreneurs fitted better than that for baby entrepreneurs, and the latter was in turn better than that for nascent entrepreneurs. The Likelihood Ratio indices (LRI) support this finding.

Of the demographic characteristics, Gender IV matters only for baby entrepreneurs, and males expect higher growth of employment. Therefore, we find a support for Hypothesis 1 for baby entrepreneurs only. Education IV is important for all three types of entrepreneurs. The Odds Ratios (OR) indicate that education is most important for nascent entrepreneurs (2.35) and less so for baby entrepreneurs (1.67). However, established entrepreneurs believe to grow their businesses more when they possess *less* of education with an OR of 0.79. Hence, we find a partial support for Hypothesis 3 for Turkish entrepreneurs, since the growth expectations of established business owners decrease with higher levels of education. Income IV seems to be important only for nascent and established entrepreneurs. However, it does not seem to be as important for established ones, since those kinds of experienced entrepreneurs expect to grow their businesses via other factors like their firms' already acquired current size, and new technology. Therefore, Hypothesis 4 is supported only for nascent and established entrepreneurs.

With respect to perceptual attributes of entrepreneurs, Skills IV affects the growth expectations of nascent and established entrepreneurs, and again less the latter similar to Income IV. The nascent entrepreneurs seem to depend on their personal abilities/perceptions, whereas the established ones appear to count on the size of their firms. For that reason, we accept Hypothesis 7, again only for nascent and established entrepreneurs. Motivation IV is significant solely for nascent entrepreneurs. Hence, we accept Hypothesis 9 only for burgeoning business owners. On the other hand, opportunity recognition, fear of failure and networking variables are not found to play a role in explaining Turkish entrepreneurs' growth expectations. Therefore, we reject Hypotheses 5, 6 and 8.

Of the firm's characteristics, Size IV is relevant only in the case of baby and established entrepreneurs. However, established entrepreneurs depend heavily on their current sizes, as mentioned above, than do those in the way to get organized to acquire a more solid position in the marketplace. Consequently Hypothesis 10 is supported both for baby and established entrepreneurs. While products and services newness to customers and degree of competition components of Innovation IV are not found to be important, baby entrepreneurs' growth expectations seem to be negatively related to technology, whereas established business owners acknowledge the contributions of the new technology. Nevertheless both of them actually use quite old technology. As a result, Hypothesis 11 is maintained only for baby and established entrepreneurs and with respect to the newness of technology. Only nascent entrepreneurs have growth expectations originating from opportunities in foreign markets. Thus, Hypothesis 12 is kept just for nascent entrepreneurs.

In the next subsection, the probability distribution of growth expectations of Nascent, Baby and Established entrepreneurs are examined when the relevant IV's are allowed to change.

5.2 Impacts of the independent variables on the probability distribution of growth expectations of entrepreneurs

We have so far tried to determine the important independent variables (IV's) in explaining the growth expectations of Nascent, Baby and Established entrepreneurs in terms of new

jobs that they anticipate to create and the interpretations of the odds ratios (OR) of these IV's for these business owners. In this subsection, first the growth expectations of entrepreneurs are reported according to the actual count data provided by the sample in Table-4 below. Moreover, the effects of increasing the categorical values of the IV's on the whole estimated probability distribution of the expectations of these entrepreneurs are illustrated in Tables 5-7. Information about a computer code using E-Views which calculates these probabilities are given in Appendix A.

TABLE -4
Probabilities of growth expectations of entrepreneurs (count data) :

	Prob (y = 1)	Prob (y = 2)	Prob (y = 3)	Prob (y = 4)
NASCENT Entrepreneurs	0.08	0.29	0.28	0.35
BABY Entrepreneurs	0.23	0.36	0.26	0.15
ESTABLISHED Entrepreneurs	0.40	0.30	0.17	0.13

Table-4 above shows that the entrepreneurs' job growth expectations are the highest among nascent, with 35% of them expecting to create 20 or more jobs ($y = 4$) using the actual sample count data. These expectations are found to *decrease* as the business owners climb up the entrepreneurship ladder in Turkey. The same kinds of expectations ($y = 4$) are only 15% and 13% for baby and established entrepreneurs, respectively. The same ordering is also valid when the entrepreneurs' growth expectations to create 6-19 more jobs ($y = 3$) is considered. The probabilities of such expectations for nascent and babies are close to each other ; 28% and 26% respectively. However, the probability for the established ones is only 17%.

In Table-5 below, as the Education level of the nascent entrepreneurs increases, their growth expectations to create 20 or more new jobs ($y = 4$) increase from 10% up to about 59% when all remaining 4 variables are held constant at their sample means. (Note that the probabilities in each row add up to 1). The probability of expecting 6-19 new jobs ($y = 3$) increases from 22% to about 27% when nascent entrepreneurs become more and more educated. However, this increase is not monotonic ; it first increases up to Post second degree (34%) and then falls. The Income IV seems to produce similar effects, so that the growth expectations to create 20 or more new jobs ($y = 4$) increases from 17% up to 48% as household incomes of nascent entrepreneurs increase from low to high. Those entrepreneurs who do not have skills expect to create 20 or more jobs with only about 9% probability, whereas those with skills have similar aspirations with 34.5% probability. As far as the Motivation IV is concerned, the purely opportunity based nascent entrepreneurs expect high growth ($y = 4$) with about 39% probability, whereas their necessity based counterparts' similar expectations are only 19.5%. Finally, the nascent entrepreneurs with high export expectations have also high firm growth expectations with 67% of probability. These expectations decrease down to about 21% as export opportunities are not planned to be exploited. The probability of creating 6 and more jobs ($y \geq 3$) decreases from about 90% down to 52.5%, as export expectations of nascent business owners diminish.

TABLE -5
Estimated probabilities of growth expectations of *NASCENT* entrepreneurs with respect to Education, Income, Skills, Motivation and Internationalization

	Prob (y = 1)	Prob (y = 2)	Prob (y = 3)	Prob (y = 4)
<u>EDUCATION</u>				
Up to second degree=1	0.084	0.594	0.221	0.101
Second degree=2	0.038	0.435	0.319	0.208
Post second=3	0.016	0.260	0.341	0.383
Graduate=4	0.007	0.132	0.267	0.593
<u>INCOME</u>				
Low=1	0.048	0.489	0.294	0.169
Medium=2	0.023	0.330	0.345	0.302
High=3	0.011	0.194	0.317	0.479
<u>SKILLS</u>				
NO=0	0.091	0.606	0.210	0.093
YES=1	0.019	0.291	0.345	0.345
<u>MOTIVATION</u>				
Purely Opport. motive=1	0.016	0.251	0.340	0.393
Partially Opport. motive=2	0.025	0.348	0.343	0.284
Necessity motive=3	0.041	0.452	0.312	0.195
<u>INTERNATIONALIZATION</u>				
76-100%=1	0.005	0.099	0.225	0.671
26-75%=2	0.010	0.177	0.306	0.507
1-25%=3	0.020	0.294	0.346	0.341
none=4	0.038	0.437	0.318	0.207

In Table-6 below, male baby entrepreneurs' growth expectations to create 20 or more new jobs ($y = 4$) are 13.7%, whereas female baby entrepreneurs expect such job growth with only 4.7% probability, when all remaining 3 variables are held constant at their sample means. The education IV seems to affect baby entrepreneurs less than it does the nascents *ceteris paribus*. Baby entrepreneurs' high firm growth expectations increase from 6.3% up to only 20.5%. Size IV is an important determinant for baby entrepreneurs. Those entrepreneurs not having achieved the necessary firm size expect to create 20 or more jobs with only 1.2% probability, whereas the ones who have already expanded their businesses by employing over 20 employees have high expectations with about 88% probability. The probability of creating 6 and more jobs ($y \geq 3$) increases from about 8% up to 98%, as the current size of business owners becomes larger. The high Odds Ratio (OR) of 8.58 for Size IV in Table-2 above confirms this result. Technology variable has an *adverse* effect on baby entrepreneurs' high growth expectations. It increases them from 3.5% up to 12.6% implying that the baby entrepreneurs using older technology expect to grow more .

TABLE -6
Estimated probabilities of growth expectations of *BABY* entrepreneurs with respect to Gender, Education, Size and High Technology

	Prob (y = 1)	Prob (y = 2)	Prob (y = 3)	Prob (y = 4)
<u>GENDER</u>				
Male=1	0.074	0.388	0.402	0.137
Female=2	0.205	0.435	0.219	0.047
<u>EDUCATION</u>				
Up to second degree=1	0.158	0.511	0.267	0.063
Second degree=2	0.107	0.456	0.341	0.095
Post second=3	0.071	0.381	0.407	0.142
Graduate=4	0.047	0.298	0.450	0.205
<u>SIZE</u>				
No jobs except owner=1	0.510	0.408	0.070	0.012
1-5 jobs=2	0.109	0.459	0.339	0.094
6-19 jobs=3	0.014	0.119	0.397	0.470
20 or more jobs=4	0.002	0.016	0.099	0.883
<u>TECHNOLOGY</u>				
Very latest=1	0.259	0.531	0.175	0.035
New (1-5 years)=2	0.149	0.504	0.279	0.067
Old=3	0.081	0.405	0.388	0.126

In Table-7 below, as the Education level of the established entrepreneurs increases, their growth expectations to create 20 or more new jobs ($y = 4$) *decrease* from 4% down to about 2% when all remaining 4 variables are held constant at their sample means. Consequently, it seems that education IV is most important for nascent entrepreneurs, and less so for baby entrepreneurs, and least important for the established ones. The sample averages of actual education levels of the entrepreneurs at these three stages indicate also the same ordering; the nascent business owners are most educated and the established ones are least educated. Even though a higher level of household income increases the job growth expectations, it produces marginal effects as well for the established entrepreneurs (an increase from 2.3% up to only 4.5%. Similarly, those entrepreneurs who do not have skills expect to create 20 or more jobs with only 1.7% probability, whereas those with skills have similar aspirations with 4% probability. The Size IV seems to be the most important factor for established entrepreneurs, as indicated also with an OR value of 10.6 in Table-3 above. As the size of their ventures grow in terms of the number of employees, high growth expectations ($y = 4$) increases from about 1% up to 83%. The probability of creating 6 and more jobs ($y \geq 3$) increases from about 4% up to 98%, as the current size of established business owners becomes larger. Finally, the established entrepreneurs using a very latest technology expect to hire 20 or more employees with 15% probability, whereas those who use an old technology have similar beliefs with only 3% probability.

TABLE -7
Estimated probabilities of growth expectations of *ESTABLISHED* entrepreneurs with respect to Education, Income, Skills, Size and High Technology

	Prob (y = 1)	Prob (y = 2)	Prob (y = 3)	Prob (y = 4)
<u>EDUCATION</u>				
Up to second degree=1	0.190	0.512	0.258	0.040
Second degree=2	0.229	0.520	0.219	0.032
Post second=3	0.273	0.518	0.184	0.025
Graduate=4	0.323	0.505	0.152	0.020
<u>INCOME</u>				
Low=1	0.291	0.514	0.172	0.023
Medium=2	0.226	0.520	0.221	0.032
High=3	0.172	0.504	0.279	0.045
<u>SKILLS</u>				
NO=0	0.357	0.491	0.134	0.017
YES=1	0.191	0.513	0.256	0.040
<u>SIZE</u>				
No jobs except owner=1	0.706	0.254	0.036	0.004
1-5 jobs=2	0.184	0.510	0.264	0.041
6-19 jobs=3	0.021	0.156	0.509	0.314
20 or more jobs=4	0.002	0.018	0.151	0.829
<u>TECHNOLOGY</u>				
Very latest=1	0.052	0.302	0.494	0.152
New (1-5 years)=2	0.120	0.458	0.355	0.067
Old=3	0.253	0.520	0.199	0.028

5.3 Some scenarios to explain high growth expectations of Turkish entrepreneurs

Tables 1-3 above showed the Odds Ratios (OR) of the entrepreneurs with respect to their own IV's. Additionally, Table-4 displayed that Turkish entrepreneurs' job growth expectations *decreased* as they climbed up the entrepreneurial ladder : nascent (35%), baby (15%) and established (13%). Now, we can examine some scenarios where some sub-groups or population cells of Turkish entrepreneurs at different stages of their entrepreneurship activities can be compared to each other.

In Tables 8 and 9 below, our first two scenarios examine the Turkish entrepreneurs (nascent, baby and established) with respect to their demographic attributes that were found statistically significant in Section 5-1 above. In Table-8, these demographic characteristics were set at disadvantaged levels for these entrepreneurs ; *nascent* : education (second degree), income (low), *baby* : education (second degree), gender (female), *established* : education (second degree), income (low). Their growth expectations to create 20 or more new jobs ($y = 4$) *decrease* from 11% down to about 2% when we move from nascent business owners

toward the established ones. We see that the high-growth expectations of the entrepreneurs preserve the same ordering as the actual count data given in Table-4 above. In Table-9, these demographic characteristics are set at their most advantageous levels (education (graduate), gender (male) and income (high)). Then, we observe the expectations of nascent entrepreneurs in the highest category ($y = 4$) to increase dramatically from 11% up to about 76%. Whereas, there is a modest increase for baby entrepreneurs from 4.2% up to 26%, the expectations of established entrepreneurs remain virtually unchanged. Thus, we conclude that the demographic characteristics are most important for the nascent entrepreneurs, and least important for the established ones. This result reiterates our findings in Tables 1-2 and 3 above in terms of Odds Ratios (OR).

TABLE -8 : Scenario 1 , Demographic variables
Estimated probabilities of job growth expectations of entrepreneurs
NASCENT : Education (second degree) and Income (low)
BABY : Education (second degree) and Gender (female)
ESTABLISHED : Education (second degree) and Income (low)

	Prob($y = 1$)	Prob($y = 2$)	Prob($y = 3$)	Prob($y = 4$)
NASCENT Entrepreneurs	0.077	0.579	0.234	0.110
BABY Entrepreneurs	0.223	0.532	0.202	0.042
ESTABLISHED Entrepreneurs	0.292	0.514	0.171	0.023

TABLE -9 : Scenario 2 , Demographic variables
Estimated probabilities of job growth expectations of entrepreneurs
NASCENT : Education (graduate) and Income (high)
BABY : Education (graduate) and Gender (male)
ESTABLISHED : Education (graduate) and Income (high)

	Prob($y = 1$)	Prob($y = 2$)	Prob($y = 3$)	Prob($y = 4$)
NASCENT Entrepreneurs	0.003	0.067	0.173	0.756
BABY Entrepreneurs	0.035	0.245	0.461	0.259
ESTABLISHED Entrepreneurs	0.251	0.520	0.201	0.028

In Tables 10 and 11 below, this time our second set of scenarios studies the same kind of entrepreneurs with respect to their perceptual attributes. In Table-10, these perceptual characteristics were set for these entrepreneurs as follows ; *nascent* : no skills and necessity-motivated, *baby* : calculated at sample averages since no characteristics of this type were found significant for baby entrepreneurs, *established* : no skills and necessity-motivated. The growth expectations to create 20 or more new jobs ($y = 4$) are 5.5% for nascent business owners whereas they are only 1.7% for the established entrepreneurs. In Table-11, the same perceptual characteristics are set at their highest levels (skilled and opportunity-motivated) for these two types of entrepreneurs. In that case, we observe the expectations of nascent

entrepreneurs in the highest category ($y = 4$) to increase substantially from 5.5% up to about 44%, while those of the established ones increase from 1.7% up to only 4%. The probability of creating 6 and more jobs ($y \geq 3$) increases from 19.7% up to 77% for the nascent business owners, whereas that of the established ones increases from 15.4% up to only 29.6%. Again, perceptual characteristics seem to be much more important for the nascent entrepreneurs than they are for the baby and established business owners.

TABLE -10 : Scenario 3, Perceptual variables
Estimated probabilities of job growth expectations of entrepreneurs
NASCENT : Skills (No) and Motivation (Necessity)
BABY :
ESTABLISHED : Skills (No)

	Prob($y = 1$)	Prob($y = 2$)	Prob($y = 3$)	Prob($y = 4$)
NASCENT Entrepreneurs	0.151	0.652	0.142	0.055
BABY Entrepreneurs	0.097	0.439	0.359	0.105
ESTABLISHED Entrepreneurs	0.357	0.491	0.134	0.017

TABLE -11 : Scenario 4 , Perceptual variables
Estimated probabilities of job growth expectations of entrepreneurs
NASCENT : Skills (Yes) and Motivation (Opportunity)
BABY :
ESTABLISHED : Skills (Yes)

	Prob($y = 1$)	Prob($y = 2$)	Prob($y = 3$)	Prob($y = 4$)
NASCENT Entrepreneurs	0.013	0.217	0.329	0.441
BABY Entrepreneurs	0.097	0.439	0.359	0.105
ESTABLISHED Entrepreneurs	0.191	0.513	0.256	0.040

Finally, in Tables 12 and 13 below, our last two scenarios examine the entrepreneurs with respect to their firm level characteristics. In Table-12, these variables were placed at most disadvantaged levels for these entrepreneurs ; *nascent* :no internationalization, *baby* : size (1-5 jobs), old technology, *established* : size (1-5 jobs), old technology. Their growth expectations to create 20 or more new jobs ($y = 4$) *decrease* from 20.7% down to about 11% and 3.6% steadily when we move from nascent business owners toward the baby and established ones. Once more, the growth expectations of the entrepreneurs decrease as they climb up the entrepreneurial ladder. In Table-13, these demographic characteristics are set at their advantageous levels (*nascent* : 26-75% internationalization, *baby* : size (20 or more jobs), very latest technology, *established* : size (20 or more jobs), very latest technology). Then, we observe the expectations of nascent entrepreneurs in the highest category ($y = 4$) to increase from 20.7% up to only 50.7%. In the meantime, the same kind of expectations

increase from about 11% up to 70% for baby entrepreneurs and from 3.6% up to 96.4% for the established entrepreneurs. As noted in the previous Sections, this last result that the firm level characteristics are more important to the established entrepreneurs than they are to the baby business owners is due to both the Size IV affecting the former more, and the latter preferring the older technology better.

TABLE -12 : Scenario 5 , Firm level variables
Estimated probabilities of job growth expectations of entrepreneurs
NASCENT : Internationalization (None)
BABY : Size (1-5 jobs) and Technology (old)
ESTABLISHED : Size (1-5 jobs) and Technology (old)

	Prob(y = 1)	Prob(y = 2)	Prob(y = 3)	Prob(y = 4)
NASCENT Entrepreneurs	0.038	0.437	0.318	0.207
BABY Entrepreneurs	0.091	0.427	0.370	0.112
ESTABLISHED Entrepreneurs	0.205	0.517	0.241	0.036

TABLE -13 : Scenario 6 , Firm level variables
Estimated probabilities of job growth expectations of entrepreneurs
NASCENT : Internationalization (26-75%)
BABY : Size (20 or more jobs) and Technology (very latest)
ESTABLISHED : Size (20 or more jobs) and Technology (very latest)

	Prob(y = 1)	Prob(y = 2)	Prob(y = 3)	Prob(y = 4)
NASCENT Entrepreneurs	0.010	0.177	0.306	0.507
BABY Entrepreneurs	0.005	0.050	0.246	0.699
ESTABLISHED Entrepreneurs	0.000	0.003	0.033	0.964

Overall, the high-growth expectations of Turkish nascent entrepreneurs (35%) are found to be mostly related to their demographic and perceptual characteristics and less so to their potentials to exporting their goods abroad. On the other hand, the baby and established business owners who have relatively smaller high-growth expectations (15% and 13% respectively) are generally affected by the present firm size and technology variables. However, the last two variables seem to influence the established business owners more than the baby ones, with the baby entrepreneurs being adverse to newer technology.

6. CONCLUSION

Given the increasing importance of entrepreneurship in job creation, innovation and economic growth, this paper investigates the determinants of the growth expectations among Turkish nascent, baby and established entrepreneurs in terms of the number of jobs they

anticipate to create within the following five years, using the data from the Global Entrepreneurship Monitor (GEM) for the years 2006-2008 for Turkey. We find that entrepreneurs differ in their growth expectations in the way up the entrepreneurial ladder. Nascent entrepreneurs expect their firms to develop larger (35%) than do the baby (15%) and established entrepreneurs (13%). Hence, the growth expectations of Turkish business owners are found to *decrease* as they mature in the entrepreneurial course.

Our study uses the Ordinal Logistic Model (OLM) to analyze the determinants of the growth expectations of Turkish entrepreneurs. The OLM procedure allows to compute a probability distribution of growth expectations expressed in four categories given the socio-demographic, perceptual and firm level characteristics of these business owners.

Of the demographic characteristics, gender is important only for baby entrepreneurs. Male baby entrepreneurs compared to their female counterparts expect their firms to grow faster. Entrepreneurs who have higher education are more likely to have greater growth expectations in terms of new jobs to be created by their firms within the following five years in the case of nascent and baby entrepreneurs. Nevertheless, established entrepreneurs who have higher education are more likely to have *lower* growth expectations. Household income is a positive predictor of nascent entrepreneurs' growth expectations, but less important in the case of the growth expectations of established entrepreneurs.

Of entrepreneurial perceptual variables, whereas both motivation or starting a business because of seeing an opportunity to exploit and possessing necessary skills are directly associated with the growth expectations of nascent entrepreneurs, only skills are positively related to established entrepreneurs' anticipations of growth. Skills seem to affect the growth expectations of nascent entrepreneurs much more than they do those of established ones. Perceptual variables do not appear to affect the baby entrepreneurs' growth expectations.

Among firm level variables, firm's size is the most important positive influential factor in baby and established firms capturing most of the total variations in growth expectations. Technology innovation positively influences expected employment growth in the case of baby and established entrepreneurs. Even though established entrepreneurs expect to grow more by using newer technology, baby business owners seem to be averse to novel technology. Finally, expectations to be internationalized are directly related to growth ambition of only nascent entrepreneurs.

Overall, while both demographic and perceptual characteristics seem to affect firm growth expectations of nascent Turkish entrepreneurs, only demographic variables appear to influence similar expectations of baby Turkish business owners. For Turkish established entrepreneurs, firm's size is mainly important.

REFERENCES

- Agresti, A. (2007), *An Introduction to Categorical Data Analysis*, 2nd edn. New York: John Wiley & Sons.
- Aidis, R. and Mickiewicz, T. (2004), "Which Entrepreneurs Expect to Expand their Businesses? Evidence from Survey Data in Lithuania", William Davidson Institute Working Paper, No. 723.

Ajzen, I. (1991), "The Theory of Planned Behaviour", *Organizational Behaviour and Human Decision Processes* 50(2), 179–211.

Aldrich, H. E. and Martinez, M. A. (2001), "Many are Called, but Few are Chosen: an Evolutionary Perspective for the Study of Entrepreneurship", *Entrepreneurship Theory and Practice* 25, 41-56.

Arenious, P. and Minniti, M. (2005), "Perceptual Variables and Nascent Entrepreneurship", *Small Business Economics* 24, 233-247.

Autio, E. (2005), "Global Entrepreneurship Monitor, 2005 Report on High-Expectation Entrepreneurship", London Business School/Mazars/Babson.

Autio, E. (2007), "Global Report on High-Growth Entrepreneurship", London Business School/Mazars/Babson.

Bager, T. and Schøtt, T. (2004), Growth Expectations by Entrepreneurs in Nascent Firms, Baby Businesses and Mature Firms: Analysis of the Global Entrepreneurship Monitor Surveys in Denmark 2000-2003, GEM Research Conference, Berlin.

Becker, W. E. and Kennedy, P. E. (1992), "A Graphical Exposition of the Ordered Probit", *Econometric Theory* 8, 127-131.

Bhide A. V. (2000), *The Origin and Evolution of New Businesses*, Oxford University Press, New York.

Brüderl, J. and Preisendörfer, P. (2000), "Fast Growing Businesses. Empirical Evidence from a German Study", *International Journal of Sociology* 30(1), 45–70.

Burns, P.(2001), *Entrepreneurship and Small Business*. London: Palgrave Macmillan.

Cassar, G. (2007), "Money, Money, Money? A Longitudinal Investigation of Entrepreneur Career Reasons, Growth Preferences and Achieved Growth", *Entrepreneurship and Regional Development* 19, 89-107.

Cassar, G. (2006), "Entrepreneur Opportunity Costs and Intended Venture Growth", *Journal of Business Venturing* 21, 610-632.

Cooper, A., Gimeno-Gascon J. and Woo, C. (1994), "Initial Human and Financial Capital as Predictors of New Venture Performance", *Journal of Business Venturing* 9(5), 371- 395.

Cressy, R. (1996), "Pre-entrepreneurial Income, Cash-flow Growth and Survival of Start-up Businesses: Model and Tests on UK Data", *Small Business Economics* 8(1), 49–58.

Davidsson, P. (1989), "Entrepreneurship—and After? A Study of Growth Willingness in Small Firms" *Journal of Business Venturing* 4(3), 211–226.

Eckhardt, J. and Shane, S. (2003), The Individual-opportunity Nexus. in: Z. J. Acs & D. B. Audretsch (eds.), *Handbook of Entrepreneurship Research*. Dordrecht: Kluwer.

European Commission (2003). Green Paper Entrepreneurship in Europe. Retrieved 20 November 2007, from http://europa.eu.int/comm/enterprise/entrepreneurship/green_paper/.

Friar, J. and Meyer, M. (2003), "Entrepreneurship and Start-ups in the Boston Region: Factors Differentiating High-growth Ventures from Micro-ventures", *Small Business Economics* 21, 145–152.

Fucks, M. and Salazar, E. (2008), "Applying Models for Ordinal Logistic Regression to the Analysis of Household Electricity Consumption Classes in Rio de Janeiro, Brazil", *Energy Economics* 30, 1672-92.

Greene, W. H. (2003), *Econometric Analysis*, 5th edn. New Jersey : Prentice Hall, Englewood Cliffs.

Harris, M.N. and Zhao, X. (2007), "A Zero-inflated Ordered Probit Model, with an Application to Modeling Tobacco Consumption", *Journal of Econometrics* 141, 1073-1099.

Hessels, J , van Gelderen, M and Thurik, R (2008), "Entrepreneurial Aspirations, Motivations, and their Drivers", *Small Business Economics* 31, 323–339.

Hosmer, D.W. and Lemeshow, S. (2000), *Applied Logistic Regression*, 2nd edn. New York: John Wiley & Sons.

Jung, T. Y. (1993), "Ordered Logit for Residential Electricity Demand in Korea", *Energy Economics* 15 (3), 205-209.

Karadeniz, E.E. and Ozcam, A. (2010), " The Determinants of the Growth Expectations of the Early-Stage Entrepreneurs (TEA) Using the Ordinal Logistic Model (OLM): The Case of Turkey", *Journal of Economic and Business Review*, 13(1).

Kennedy, P. (1998), *A Guide to Econometrics* , 4th edn. Massachusetts : Blackwell Publishers Inc.

Kirzner, I. M. (1979), *Perception, Opportunity and Profit: Studies in the Theory of Entrepreneurship*. University of Chicago Press. Chicago.

Kolvereid, L. (1992), "Growth Aspirations among Norwegian Entrepreneurs", *Journal of Business Venturing* 7(3), 209–222.

Light, I. and Robenstein, C. (1995), *Race, Ethnicity, and Entrepreneurship in Urban America*, Aldine De Gruyter, New York, N. Y.

McCullagh, P. (1980), "Regression Models for Ordinal Data (with discussion)", *Journal of the Royal Statistical Society Series B* 42 (2), 109-142.

McKelvey, R.D. and Zavoina, W. (1975), "A Statistical Model for the Analysis of Ordinal Level Dependent Variables", *Journal of Mathematical Sociology* 4, 103-120.

Pages, E. R., Freedman, D., and Von Bargen, P. (2003), *Entrepreneurship as a State and Local Economic Development Strategy*. In Hart, D. (Ed.), *Entrepreneurship Policy* (pp. 240–259). Cambridge: Cambridge University Press.

Reynolds, P. D., Bygrave, W. D., Autio, E., Cox, L., & Hay, M. (2002), "Global Entrepreneurship Monitor: 2002 Executive Report", Kansas City, MO: Kauffman Center for Entrepreneurial Leadership.

Reynolds, P. D., Bygrave, W. D., Autio, E., and others (2004), "Global Entrepreneurship Monitor: 2003 Executive Report", Kansas City, MO: Kauffman Center for Entrepreneurial Leadership.

Reynolds, P., Bosma, N., Autio, E., Hunt, S., Bono, N.D., Servais, I., Lopez-Garcia, P. and Chin, N. (2005), "Global Entrepreneurship Monitor: data collection design and implementation 1998–2003", *Small Business Economics*, 24, 205–231.

Shane, S., Ventakaraman, S. (2000), "The Promise of Entrepreneurship as a Field of Research", *Academy of Management Review* 25 (1), 217-226.

Smallbone, D., Baldock, R., & Burgess, S. (2002), "Targeted Support for High-growth Start-ups: Some Policy Issues", *Environment and Planning C* 20(2), 195–209.

Terjesen, S. and Szerb, L. (2008), "Dice Thrown from the Beginning? An Empirical Investigation of Determinants of Firm Level Growth Expectations", *Estudio de Economía* 35(2), 153-178.

Thurik, A. R., Carree, M. A., van Stel A. J., and Audretsch, D. B. (2008), "Does Self-employment Reduce Unemployment? ", *Journal of Business Venturing* 23(6), 673- 686.

Tominc, P. and Rebernik, M. (2007), "Growth Aspirations and Cultural Support for Entrepreneurship: a Comparison of Post-Socialist Countries", *Small Business Economics* 28, 239-255.

Van Gelderen, M., Brand, M., Van Praag, M., Bodewes, W., Poutsma, E., and Van Gils, A. (2008), "Explaining entrepreneurial intentions by means of the theory of planned behaviour", *Career Development International* , 13 (6), 538 – 559.

Verheul I. and van Mil, L. (2008), What Determines the Growth Ambition of Dutch Early-stage Entrepreneurs?, *Scientific Analysis of Entrepreneurship and SMEs*, H200811, Zoetermeer.

Wagner, J. and Sternberg, R. (2004), 'Start-up activities, individual characteristics, and the regional milieu: Lessons for entrepreneurship support policies from German micro data', *Annals of Regional Science*, 38(2), 19-240.

Walstad, W. and Kourilsky, M. L. (1998), "Entrepreneurial Attitudes and Knowledge of Black Youth", *Entrepreneurship Theory and Practice* 23(2), 5–18.

Wiklund, J., Davidsson, P., & Delmar, F. (2003), "What do They Think and Feel about Growth? An Expectancy-value Approach to Small Business Managers' Attitudes toward Growth", *Entrepreneurship Theory and Practice* 27(3), 247–270.

Wiklund, J. and Shepherd, D. (2003), "Aspiring for and Achieving Growth: The Moderating Role of Resources and Opportunities", *Journal of Management Studie*, 40 (8), 1919-1941.

Wong, B., Ho Y., & Autio, E. (2005), "Entrepreneurship, Innovation and Economic Growth: Evidence from GEM Data", *Small Business Economics* 24(3), 335–350.

Wynarczyk, P., Watson, R., Storey, D.J., Short, H. and Keasey, K. (1993), *The Managerial Labour Market in Small and Medium Sized Enterprises*, Routledge, London.

Zwan, P., Thurik R., & Grilo I., (2007), The Entrepreneurial Ladder and its Determinants, Tinbergen Institute Discussion Paper, TI 2006-103/3.

TECHNICAL NOTES

¹ Ordinal Logistic Model (OLM) has some versions like Proportional Odds (POM), Partial Proportional Odds (PPOM) and Generalized Unconstrained Proportional Odds (GOLOGIT) models perspectives. The non-proportional odds versions (PPOM and GOLOGIT) which consider the possibility of unequal coefficients imply that the cumulative probability curves for different categories of the dependent variable increase or fall at different rates. However, then these curves cross at certain independent variable values, leading to violate the basic underlying probabilistic fact that the cumulative probabilities have the proper order (Agresti 2007). Therefore, this paper favors the POM as an OLM which is a constrained version of GOLOGIT.

² The logistic function is given as $f(\theta) = \exp(\theta)/(1 + \exp(\theta))$. It varies from zero to one while θ varies from $-\infty$ to $+\infty$, and looks similar to the cumulative normal distribution. However, it does not require the numerical calculation of an integral, and therefore much simpler compared to the normal distribution. In the latter case, the model would be Ordinal Probit Model (OPM).

³ This model is sometimes written as :

$$\text{logit} (C_{ij}) = \alpha_j + (\beta_1 x_{i1} + \beta_2 x_{i2} + \dots + \beta_m x_{im})$$

so that a positive value of β corresponds to the dependent variable being more likely to fall at the low end of the scale (i.e. increasing expectations of entrepreneurs below class j , in our case) as the independent variable increases, ceteris paribus. Note that the computer program SAS is designed to give parameter estimates according to the version given in this note, whereas Eviews estimates the parameters according to the formulation in the text.

APPENDIX: COMPUTER CODE WHICH CALCULATES THE PROBABILITY DISTRIBUTION OF THE DEPENDENT VARIABLES

An E-Views computer code which calculates the probability distribution of the dependent variable with respect to the dichotomous and polychotomous independent variables, and some scenarios can be made available from the authors. Other statistical software such as STATA and SAS can also be helpful in this respect.

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