

An Analysis of Academic Performance: Could Family Income and Medium of Instruction Be Determinants?

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Akademik Performansın Bir Analizi: Aile Geliri ve Eğitim Dili Belirleyici Olabilir mi?

Abstract

Analyses of the determinants of college grades have a long history and an extensive literature. However, there are not enough studies in this area for developing countries. In this paper, we tried to investigate the factors that could affect the Cumulative Grade points Average (CGPA) of first-year management students at Atılım University, particularly the family income and the medium language of instruction. We gave surveys to first year students and asked questions regarding educational attainment of the family, income, gender, age, university entrance score, high school average grade and the department of the student (whether they are in Management in English department or Management in Turkish department). Using data regarding the information obtained from the surveys, we have estimated our linearly formed model. According to the results, while family income has a negative effect on CGPA, university entrance score positively affects the CGPA. On the other hand, education language is not found as a determinant of academic performance.

Keywords : Academic Performance, Family Income, Developing Country, Medium of Instruction, Tobit Regression.

JEL Classification Codes : C34, I21, I23.

Özet

Öğrencilerin üniversitedeki akademik performansları üzerine oldukça eskiye dayanan yoğun bir literatür bulunmaktadır. Ancak gelişmekte olan ülkelere baktığımızda bu alanda yapılmış yeterli sayıda çalışma bulunmamaktadır. Bu çalışmada Atılım Üniversitesindeki işletme bölümü öğrencilerinin CGPA'lerini belirleyen faktörler, özellikle de ailenin gelir düzeyi ve eğitim dili incelenmiştir. Birinci sınıftaki öğrencilere anketler uygulanarak, öğrencilerin ailelerinin eğitim durumu ve gelir düzeyi, cinsiyetleri, yaşları, üniversite giriş puanları, lise mezuniyet notları ve bölümleri (Türkçe İşletme mi yoksa İngilizce İşletme mi) hakkında bilgi edinilmiştir. Anketlerden elde edilen verilerle oluşturulan model tahmin edilmiş ve şu sonuçlara ulaşılmıştır: Ailenin gelir düzeyinin akademik performans üzerinde negatif bir etkisi varken, üniversite giriş puanı başarıyı olumlu yönde etkilemektedir. Öte yandan, eğitim dilinin akademik performans üzerinde bir etkisi olmadığı sonucuna ulaşılmıştır.

Anahtar Sözcükler : Akademik Performans, Gelir Düzeyi, Gelişmekte Olan Ülke, Eğitim Dili, Tobit Tahmini.

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Beyan

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1. Introduction

Academic performance and its determinants are major issues whose significance have been understood by the educators several years ago and there has emerged a descending interest on the issue in today's world since the universities want to improve their student quality together with their standards.

Being informed about the determinants of academic performance helps the universities to examine themselves with their minuses and pluses; by doing so, they could find further ways to enhance their capabilities. On the other hand, this also provides the students with valuable guidance in directing their academic studies and determining their career destination. This two sided benefit paved way to considerable amount of research on this issue in the literature.

When the literature is looked over, we see that the researches have shown how some specific factors influence the success. For example, in 1917, Lincoln has found that rather than the university entrance exam score, the success in the high school emerges as a stronger determinant. Similar to Lincoln, Astin (1971) has reached the conclusion that emphasizes the high school CGPA (Cumulative Grade Point Average) and its positive contribution over the university grade average. Martin (1989), on the other hand, stressed the mathematical knowledge and experience while sharing the common ground with Astin and Lincoln for their similar results. In a study, which had been done by Ethridge and Hudson (1996), the significance of both the university entrance score and high school average grade have been underlined.

If more up-to-date studies are considered, a study done by Koh and Koh (1999) suggests that being male and at a younger age, having previous work experience, having better academic aptitude besides better mathematical background makes students become more successful. Caido and Madeira (2002) look at both demographic (age, sex, professional status, place of residence) and academic determinants (entrance score, accounting score, math score) that affect academic performance. As being different from other studies, the paper also focuses on the question whether the effects of these determinants differ according to the location of the university. Drennan and Rohde (2002) suggested that having English as the first or second language does not play a role when the students are at first year and at the introductory level. Dolado and Morales (2008) found out that specialization track at high school plays a significant role in first year academic performance which is measured as the grade in accounting courses. Those who had a technical based education during high school become more successful than the ones who were educated in social sciences. Some of the recent studies focused on the relationship between the socio-economic status of the family and the academic success of the student and found a positive relation between those (Janes, 2002; Barry, 2006 and Caro, 2009).

Chohan and Khan (2010) found that the parents' contribution to their children's education has a consistent and positive effect on academic achievement. Some of the studies regarding Turkey are as follows: Güler and Emeç (2006) found that the female students, those who are pleased with their lives, the ones with lower monthly and whose parents live together have better academic performance. Güncer and Köse (1993) stated the importance of family background on the academic achievement of the student. In a recent study Tomul and Savaşçı (2012) found the result that, socioeconomic variables of students explain 39.2% of SBS points of student.

The aim of this study is to analyze the factors that determine the academic performance of Turkish and English Management students within Atilim University. Specifically, the effect of family income and medium of instruction will be focused on as major determinants. The literature in this area has shown that there is not a considerable amount of researches regarding the determinants of academic performance at colleges in developing countries, thus in Turkey. Therefore, this study will make a contribution to the related literature and will enlighten the way for the following studies and researchers.

Another peculiarity of our study is its concentration on the determining feature of the language. To the best of our knowledge, the number of the studies that investigate the impact of the language on academic success is limited. The existing studies have been done in English spoken countries and they analyze the effect of language by comparing the performances of the native and foreign students (Schneeweis, 2006; Konan et al, 2012). However, the difference in performances could stem from the cultural discrepancies rather than the language. At this point, our study could contribute to the literature since we can observe the pure effect of language on academic performance by conducting a survey at Atilim University. In Turkey, we have universities whose medium of instruction is English since English language is accepted as a common tool all over the world in order to make scientific studies and reach universality. In this respect, the medium of instruction at Atilim University is English; whereas, there is the Turkish Management Department as well which has similar program to the English Management Department. Having two Management departments with two different languages gives us the chance of analyzing the role of the language. The results of this paper may not only contribute to the limited literature regarding the developing countries but also give a small answer for up-to-date discussions that questions what education language must be in our higher education system.

Our study is based on the surveys that ask questions regarding the students' age, gender, graduated high school, high school average grade, university entrance score, education level of the parents, monthly income of the family, department (Turkish or English Management Department), and the CGPA. The output of the survey is analyzed by employing econometric techniques; that is, CGPA is regressed on dependent variables

obtained from the surveys. By doing so, we decompose the effects that determine the GCPA. The question that asks the department, whether Turkish or English Management, makes us recognize the effect of the medium of instruction on success because the course program of each department is the same with one major difference that is the education language. The selection of first year students as a basis of our research is due to the following reasons: First of all, the students of the two departments take the same courses only during the first year. Also, first year college education is a critical period in one's life. If it is overcome without serious damages, the following years become less challenging.

The paper is organized as follows: The data and the model are presented in the next session. In Section 3, estimation results are given. Finally, the last section concludes the paper.

2. Method

2.1. Data and Model

Before presenting our model, it could be useful to give brief information about the structure of Turkish higher education system and Atilim University. Until the year 1984, higher education in Turkey was being conducted only through public universities. However, after 1984, foundation universities came onto the stage. By the year 2012, there are 103 public and 65 foundation universities in Turkey. The medium of instruction could be Turkish, English or the combination of both in public and foundation universities as depending on the education policy of the university. Atilim University is a foundation university whose medium of instruction is English and there are five faculties within the university one of which is Management faculty. The Management faculty uses English as the medium of instruction; however, the department of Economic and department of Management have a peculiar structure: Each of these departments is divided into two as English and Turkish. To exemplify, there are two Management departments; one gives Management education in Turkish and the other in English. They apply the same programs but only the medium of instruction is different.

In order to analyze the determinants of academic performance of the first year students at Atilim University's Management departments, we have applied surveys to 72 first year students in 2007-2008 academic year and 84 students in 2008-2009 academic year. In other words, when we pooled both years we obtain 156 participants. The survey covers the questions regarding the students' age, sex, graduated high school, high school average grade, university entrance score, educational attainment of the parents, monthly income of the family, department (Management in English or Turkish), and the first term's CGPA. From those questions, the questions about high school average grade and family

income haven't been answered by all students: 10 students didn't answer for the income, and 13 students didn't answer the question about high school average grade.

The reliability of the answers except educational attainment of the parents, monthly income, and high school average grade has been confirmed as a result of cooperation with the Student Affairs. As following this process, we have formed the data matrix by using the output of the surveys.

The pooled survey consists of 54 students from Management in English and 102 students from Turkish Management departments. The 60% of the participants are males, and the 40% of them are females. The distribution of the females according to the departments is as follows: 41 females are registered at the Department of Management in Turkish Management and 21 are at the Department of Management in English Management. On the other hand, while there are 64 males are in the Department of Turkish Management, 30 males are registered in the Department of English Management.

We specify CGPA which is an indicator of academic success as a function of educational attainment level of the mother ($moed_i$), educational attainment level of the father ($faed_i$), monthly family income (inc_i), department of the student (dep_i), sex (sex_i), age (age_i), high school average grade ($haveg_i$) and university entrance score (ues_i). The linearly formed econometric model is as follows:

$$cgpa_i = \beta_0 + \beta_1 moed_i + \beta_2 faed_i + \beta_3 inc_i + \beta_4 dep_i + \beta_5 sex_i + \beta_6 age_i + \beta_7 haveg_i + \beta_8 ues_i + u_i \quad (1)$$

2.2. Measurement of Variables

The dependent variable of our model is CGPA which is one of the most frequently employed indicator of academic performance in the studies investigating the determinants of academic success (Graunke and Woosley 2005; Trudeau and Shephard 2008). While the minimum value that it can take is 0, the maximum is 4. The CGPA that has been used within this study belongs to the first terms of both academic years.

The first independent variable is "educational attainment of the mother". We asked the students to write down the last graduated education institution of the mother and then we grouped the results by the help of numbers from 1 to 7. If the level is below primary school, it takes the value of 1, if it is primary school it takes 2; 3 stands for secondary school, 4 has been used for high school, 5 for college, 6 for MA, and 7 represents the Ph.D. This variable has been employed within our model due to the

expectation regarding the positive contribution of the mother's high attainment level on the student. The link is formed in this way: the higher attainment level of the mother causes a better performance at university since the student will be guided in a more qualified way. The same procedure is applied to the educational attainment level of the father variable, and it is included in the model due to the same reasons.

The monthly family income is another variable in our model. We have obtained the data of this variable from the survey and we did not have any chance to confirm it since this kind of personal information wasn't included within the system of the Student Affairs. Income variable could be evaluated as two dimensional. The first one makes us think that a high income causes a better performance at school since it will open several facilities for further improvement (Janes, 2002; Barry, 2006). On the other hand, it is very likely for the students with lower family income to be more motivated due to having concerns for the future. Therefore, we may also expect a negative relation between income and CGPA.

Department is the variable that we used to capture the effect of the education language on academic performance. As mentioned above, Atilim University has two management departments: one in English and the other in Turkish. The first year programs of the two departments are the same except the English courses¹. Hence, when we include this variable to our model, we would be able to identify the effect of education language on CGPA. We used a dummy variable which takes zero if the department is Management in English and 1 for the department in Turkish Management to represent the effect of language.

One of the mostly used variables in analyzing the determinants of academic performance is the sex of the student (Koh and Koh 1999; Dolado and Morales 2008). In our model, we employ a dummy variable to represent sex and while 0 stands for males, 1 indicates females. Although some studies found that females are more successful, we do not have any former expectations.

Another variable in our model is age. We asked the students to write down their date of births, and we calculated their ages in the year the survey conducted. We didn't have a positive or negative expectation about this variable. We think that when the students grow in terms of age, they could mature and be more conscious; however, there are older students representing a group who could hardly achieved the university entrance exam after a few tries due to their unsuccessful educational background.

¹ *In spite of the difference in the nature of the English courses, the distribution of grades for both English courses is very similar, so this will not affect the results of our study.*

High school average grade and university entrance score are perceived as important indicators since they are the proof of academic success and educational background. Thus, we expect both variables to have positive signs. All the variables in our model, their definitions, and expected signs are summarized in Table: 1.

3. Results

Table: 2 presents descriptive statistics related to these variables. As mentioned above academic performance is measured by CGPAs of the students. According to the Table: 2, CGPA of the students in the sample ranges between 0.19 and 4 with an average of 1.85. In Atilim University, the number of scholarship students is low compared to the regular ones, and they are more successful as it is the case in all universities². The reason of the low mean could be attributed to this fact.

When we look at the high school average grade points (they could be minimum 0 and maximum 5), it could be seen that it has an average of 3.55 with a minimum of 1.64 and a maximum of 5. Thus, we can assert that compared to their academic performance at university, the students in the sample were more successful at high school.

² *As a noteworthy fact, there are two students with the maximum CGPA (4) in the sample and they are scholarship students.*

Table: 1
The Descriptions of the Variables and the Expected Signs

<i>Variable</i>	<i>Description</i>	<i>Expected Sign</i>
$Cgpa_i$	CGPA (Dependent Variable) The first term CGPA of the students	
$moed_i$	Educational Attainment of the Mother 1 below primary school, 2 primary school, 3 secondary school, 4 high school, 5 university, 6 master degree, 7 Ph.D.	Positive
$faed_i$	Educational Attainment of the Father 1 below primary school, 2 primary school, 3 secondary school, 4 high school, 5 university, 6 master degree, 7 Ph.D.	Positive
inc_i	Monthly Family Income The income earned by the family members during the month.	-
dep_i	Department of the Students 0 for English Management, 1 for Turkish Management.	-
sex_i	Sex 0 for males, 1 for females.	-
age_i	Age Age of the students at survey date.	-
$haveg_i$	High School Average Grade The graduation score of the students from high school.	Positive
ues_i	University Entrance Score The score that the students get from the university entrance exam.	Positive

Table: 2
Descriptive Statistics

Variable	N	Mean	Std. Dev.	Min	Max
cgpa	156	1,86	0,85	0,19	4
moed	156	3,86	1,05	2	6
faed	156	4,43	0,80	2	6
inc	156	5641,27	3883,08	500	20000
age	156	19,18	1,56	17	23
haveg	156	3,55	0,72	1,64	5
ues	156	267,89	16,47	238,84	305,49

Table: 2 presents that the mean educational attainment of fathers is higher than mothers' which could be counted as normal for a country having a patriarchal social structure³. The mean educational attainment of mothers is high school which has a frequency of 43%. The mothers in the sample with a university degree compose the 28%

³ See for example King and Hill (1993) and World Bank (2011).

within the survey. On the other hand, considering the fathers' education, the 55.5 percent of the sample has a university degree, while the high school graduates are 30.5 percent.

The data regarding the monthly family income may not be reliable as the students were not very enthusiastic about writing the income of their families. A mean of 5641 YTL could be thought as high for a family income in Turkey; however, when Atılım University is considered, the amount seems a bit low, because it is expected that the families with high income should be dominant in a private university. Moreover, the ratio of the students with scholarship was around 15% in 2008.

In Turkey, the average age for entering university is nearly 18. According to the Table., this age for our sample is 19.18 which show that Atılım University is generally preferred by those who have tried the university entrance exam more than once.

In our country, public universities are the primary preference of the students because they have quite low tuitions compared to private universities and also students do not have the risk of losing their scholarship at public universities. Therefore, the student profile of our university cannot be counted as high. The low mean of university entrance score of our sample could be an indicator of this fact. The correlations of the variables are given in Table: 3.

Table: 3
Correlation Matrix

Variables	Haveg	moed	Faed	Inc	dep	Sex	Age	ues
haveg	1							
moed	0.1021	1						
faed	0.1293	0.3653	1					
Inc	-0.1030	0.2246	0.0485	1				
dep	-0.0828	0.1303	0.0301	0,1882	1			
Sex	0.5463	0.0120	-0.0236	-0,3398	-0.0145	1		
Age	0.2139	-0.0846	-0.1297	-0,2488	-0.2931	0.2178	1	
Ues	0.4113	0.1303	0.0922	-0,338	-0.4539	0.4051	0.3051	1

The variables that are used to explain the CGPA are expected to be correlated with each other. However, according to Table: 3, there is no significant multicollinearity problem in our model. Still, it is worth to mention some correlations between the variables. For example, university entrance score and high school average grade seem related since they both represent the academic background and the university entrance score is calculated by the addition of high school average grade to the university exam score.

Since the couples more or less come from the similar social background, a correlation is observed between educational attainments of fathers and mothers. In Turkey the students are placed to the departments according to their university entrance exam scores and the minimum point required to be placed in English Management Department is higher than that of Turkish Management. We define the departments through dummy variable and we use 0 to represent English and 1 to Turkish Management Department. Therefore, a negative and noteworthy correlation is observed between *ues* and *dep* variables. According to Table: 3, girls are more successful in high school and university entrance exam.

The empirical results are based on the data obtained from the surveys conducted to the first year English Management and Turkish Management Department students. The sample consists of 156 students; however, due to lack of data, some of them were excluded from analysis⁴.

Since CGPA is bounded by zero and four, estimating (1) by ordinary least squares (OLS) may produce biased coefficient estimates. In order to correct this problem we employed Tobit regression techniques and used zero as a lower bound and four as the upper bound. Estimation results are presented in Table: 4 in which we also reported OLS results as benchmark⁵.

The first thing to mention regarding the Table: is that both estimations give similar results. Although for both estimations, the model is overall significant with an F statistic equal to 4.74, according to the Table: 4, only two variables are found statistically significant: income and university entrance score. University entrance score is found to have a positive effect on CGPA. The students who have taken higher score from the university entrance exam have higher CGPA at the end of the first semester. This situation could stem from a stronger educational background, larger capacity and proper study skills. In other words, the more talented and better educated students proceed with their success in the university.

⁴ *The estimations are carried out with 135 observations.*

⁵ *Since we applied survey to first year students in two different academic years, we have included a time dummy variable for 2008-2009 academic years in order to control for time related effects.*

Table: 4
Determinants of CGPA

Variable	OLS	Tobit
<i>Moed</i>	0.154 (0.106)	0.156 (0.098)
<i>Faed</i>	-0.060 (0.144)	-0.057 (0.133)
<i>Inc</i>	-0.0001 ^a (0.00002)	-0.0001 ^a (0.00002)
<i>Dep</i>	0.196 (0.332)	0.232 (0.321)
<i>Sex</i>	-0.147 (0.236)	-0.156 (0.222)
<i>Age</i>	0.011 (0.077)	0.021 (0.076)
<i>Haveg</i>	0.207 (0.167)	0.217 (0.155)
<i>Ues</i>	0.015 ^b (0.007)	0.016 ^b (0.007)
<i>D09</i>	0.213 (0.202)	0.256 (0.201)
<i>Constant</i>	-2.945 (2.435)	-3.274 (2.508)
<i>F</i>	4.74 ^a	5.19 ^a

Notes: *a* denotes significance at 1% and *b* denotes significance at 5%. Robust standard errors are in parentheses. *moed*: Educational attainment of the mother, *faed*: Educational attainment of the father, *Inc*: Monthly family income, *dep*: Department of the student, *sex*: Sex of the student, *age*: Age of the student, *haveg*: High school average grade, *ues*: University entrance. *D09*: Time dummy for 2008-2009 academic year. In tobit estimation 0 is used as a lower bound and 4 as the upper bound. Sample: 135 observations for both estimations.

Different from Janes, (2002) Barry (2006) and Caro (2009), income is found to have a negative relationship with CGPA. The students with higher family income have a lower CGPA. This negative relationship could indicate the higher motivation of students with lower family income. The students coming from poorer families have concerns for the future more than those coming from rich families.

The rest of the variables are found statistically insignificant. As a possible reason we have checked the correlations for multicollinearity problem; however, we did not face serious correlations as could be seen from Table: 3. Still, we have estimated our model by dropping the variables that could be correlated but this has not affected our results. In other words, our estimations are robust. One of the most interesting results

among our findings is not to see any relationship between educational attainment of the parents and academic performance of the students⁶. To analyze this result deeply, we have also created a variable by adding the father's and mother's educational attainments. However, this new variable was also found insignificant.

The insignificant result of the variable regarding the department of the students which is used to investigate the effect of medium of instruction could be interpreted as, learning the lesson in a second language does not affect the success of the students.

4. Conclusion

The paper examines the factors that affect the academic performance of first year Turkish and English Management students within Atilim University. For this purpose, a survey in which we ask questions regarding the students' age, sex, graduated high school, high school average grade, university entrance score, educational attainment of the parents, monthly income of the family, department (Management in English or Turkish), and CGPA is conducted to 156 students. The information obtained from survey is used to form an econometric model.

According to the results the students with lower family income have better academic performance. Unstable economic conditions of Turkey increase the concerns about the future of the young population. This concern is more densely felt among the low income families. Hence, the students who come from these families feel the necessity of studying harder to stand their own feet. This may lead them to have relatively higher CGPAs.

The educational background, capacity and proper studying skills could affect the academic performance in university. The university entrance score that we have found as significant indicates that previously had academic knowledge and skills are important and academic performance at first year of the university is the advanced step of a long process that started at early ages. In this respect, long-term guidance of the learners gains importance.

⁶ *Although, education attainment of mother variable is found to be insignificant at 10%, it is significant at 12% with a positive sign. This tells us as the attainment level of the mother gets higher, the academic performance of the students becomes better and this could be related with mother's guiding the student more efficiently due to her higher education.*

To be able to follow the academic literature, some universities in Turkey employ the English language as the medium of instruction. However, opponents of this idea claim that educating the university students in a second language could be an obstacle since students might have difficulty in understanding the subjects. In our study, we have found evidence refuting the opponents' view for the medium of the instruction. The insignificant coefficient of department variable reveals the fact that medium of instruction does not affect the success of the students for our sample.

This study only covers the students in Atilim University. For a better understanding of academic performance in Turkey, this kind of researches could be carried out in different universities (both public and private). According to the results of the study, in order to increase the academic success, we have to adopt education policies that aim to increase the capacities and the skills of the children at early ages. Moreover, while deciding the medium of instruction in universities, the view of "education in a second language could be an obstacle since students might have difficulty in understanding" seems not to be an important argument, at least for Atilim University.

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