

How to predict university performance: a case study of a prestigious Turkish university

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Turkey's education system is based on a centralized selection system, starting from secondary education level. For post-secondary studies, students are sorted according to their scores in a competitive national exam. By statute, Galatasaray University, a French speaking institution founded in 1992 by Turkey and France, enrolls half of its students from the very best candidates while the other half comes from French speaking high schools (relatively top-ranked). These students must be classified amongst the first 25,000 in the national competition to be admitted as well as passing a competitive exam in French, although their national ranking remains lower than the first group. The first batch has to learn French at university before starting undergraduate studies, whereas French speaking students are entitled to enter the first year directly. Within the public university system, where admission is strictly based on national exam scores, Galatasaray University's differentiated admission scheme can be tested through the respective performance of these two groups of students.

Using specific data, we estimate the impact of high school background (public versus private, types of high school) and national exam score on the university performance of students admitted between 1994 and 2011. Although we lack information on family background, the public-private distinction can capture some of the income effect missing in our data. Gender is also taken into consideration to assess the respective performance of females and males. We also use additional controls for selection into graduation (time to complete) and departments. Regional variation is controlled through high school location. If we assume a correlation between initial academic level and final grades, we can measure the trade-off in terms of total academic output linked to the recruitment of French-speaking students through a less-demanding specific competition versus the highly selective process of the national competition. Finally, we evaluate the validity of Turkey's national exam in sorting students by ability.

Keywords: higher education; student performance; standardized tests; evaluation; Turkey

JEL Classification: I23;C21

1. INTRODUCTION

University admission has been an issue in many countries, with numerous evaluations of different facets of this process being carried out within both the economic and education literature. Most studies focus on predicting the student success based on the validity of measurements and admission procedures concerning standardized test scores or academic performance, and high school background. One of the main issues deals with the trade-off between various test scores and socio-biographical characteristics in the admission system.

This paper reports on the evaluation of a specific admission process used in Galatasaray University (GSU), a high-ranked French speaking public university in Turkey.¹¹¹ Turkey's public education system is based on a centralized selection system starting from secondary education level, through which higher ranked students are placed in elite high schools (Anatolian high schools or science high schools) according to their scores while lower ranked students attend regular or private high schools. In order to pursue post-secondary studies in two or four-year colleges, students are sorted according their scores on the competitive national university entrance exam. Public universities, with some exceptions, are among the most preferred universities while private universities' admission policies require less demanding test scores. By its specific legal statute, GSU admits half of its students from amongst the very best candidates taking the national exam while the other half are admitted from a pool of French speaking relatively highly ranked high school students. These French speaking students take a specific competitive exam in French and must also rank amongst the first 25,000 in the national competition. Usually, these students have a lower rank in the national exam than the students who did not graduate from a French speaking high school. In order to enter their undergraduate courses, the first batch of students also has to complete a comprehensive French preparation course whereas French speaking students are entitled to enter the first year directly.

In this article, we will use university data to assess the validity of GSU's dual admission process in predicting the college graduate point averages (CGPAs). If we assume a correlation between initial academic level and final grades, we can measure the trade-off in terms of final academic output in relation to the recruitment of French speaking students through a less demanding specific competition versus the highly selective process of the national competition. Taken as a specific case, we evaluate the validity of a central exam to sort students according to their abilities. In the following sections, we first review the specific literature on cases where admission rules do not rely solely on standardized test scores and where the mixed character of admission process is likely to suffer from selection bias. We briefly present the data and the

¹¹¹ Galatasaray University is a French speaking public university in Turkey, a heritage of the former relationship between Turkey and France, tracing back to the sixteenth century and the spread of French schools. Later on, at the end of the nineteenth century, the Ottoman sultan asked the French government to found a French speaking public high school in order to train senior officials of the Ottoman Empire. This school survived after the Turkish Republic was established in 1923 to train part of Turkey's 20th century intellectual and economic elite. At the end of this century, former graduates lobbied to set up a French speaking university, through a bilateral agreement between France and Turkey, with Galatasaray University opening in 1992. Around 5,000 graduates have been trained by GSU since then.

estimation strategy in the second section. Our results confirm the validity of central exam scores for predicting CGPAs. In the final section, we conclude with a short discussion of our findings.

2. LITERATURE REVIEW

Turkey implemented a centralized university entrance exam in 1974, designed to select students according to their aptitude for higher education. The test aims to assess both reasoning skills and knowledge of the high school curriculum. In this fashion, it can be classified as a combination of the USA's SAT and ACT exams. The current priority of higher education policy is to put more weight on reasoning skills rather than measuring, like ACT, mastery of the high school curriculum. We should note that besides exam scores, high school academic performance (Cumulative Grade Point Average) is added to balance the over-reliance on centralized exam scores. Although there is considerable change regarding the coefficient-factor precision, for students aiming for top public universities (like GSU), high school grades make a very marginal contribution to their overall score.

As outlined above, GSU's admission process has a dual character. In this respect, it fits into the category of selective admission system where both standardized test scores and selective submission according to high school background may be involved. In GSU's case, while both admission routes involve test scores, the pool of students and the test contents differ. Robinson and Monks (2005) discusses the effectiveness of the University of California's optional SAT score admission policy in terms of final CGPAs. In the USA, several states have preferred to switch to different admission processes because standardized tests such as SAT or ACT are considered inadequate for predicting future college academic achievement. In such cases, students are admitted based on optional SAT score reporting, and applicants can choose not to declare SAT scores, instead declaring their high school performance and class ranking. Robinson and Monks (2005) argues that the optional SAT policy is partially successful for widening the student pool but, in terms of CGPAs, SAT remains an accurate predictor of success. Nevertheless, admission systems that rely on standardized tests suffer from selection bias (Clark et al, 2009). For example, Cohn et al. (2004) found that SAT scores are still a good predictor of CGPAs at the University of South Carolina while scholarship programs can correct for non-selectivity and increase student performance. Rothstein (2004) found that student background characteristics can largely explain variance in SAT scores. Similarly, for the Turkish case, Caner and Okten (2013) suggest that parental background (education and family income) leads to a selection bias among students admitted to public universities. They conclude that public subsidizing of higher education is equity impeding due to the selection bias.

3. DATA AND ESTIMATION STRATEGY

The central exam system in Turkey has a national character and based on rankings of students at the national level. Students rank (order) their most preferred faculties and submit their preferences. The central exam score finally determines which faculty they will be admitted

depending on their preferences and the quota specific to the faculty. To be ranked higher among successful students for a university in the previous year sends a signal for the formation of individual choices of students. Each year, the highest and lowest scores of admitted students are made public for each faculty to assist prospective students revise their list of options.

We use data provided by GSU for graduating students for three periods: 1996-1999, 2001-2003 and 2007. In order to assess the dual admission process, we standardize all the central exam scores¹¹² using the annual reports of the Measuring, Selection and Placement Center (MSPC). The raw GSU data contains some missing data or misreporting specific to certain years. Due to these limitations, our sample covers specific years and faculties (seven out of twelve, namely management, economics, law, communication, international relations, computing and industrial engineering). The predictor model we use estimates the following equation:

$$\ln(\text{grade})_i = \beta_0 + \beta_1 G_i + \beta_2 C_i + \beta_3 E_i + \beta_4 X_i + \mu_i \quad (1)$$

Where C is the central exam score for the specific field of study and¹¹³ E is a dummy variable for student admission type. It takes the value of 1 for students admitted through their central exam score and 0 if admission is through GSU's internal exam. Gender (G) is included to test the respective performance of females and males. X is the set of controls used in regression including regions fixed effects. Our dependent variable is log CGPA (using the 4-point GPA scale) adapted by GSU.¹¹⁴ We also control factors that might affect CGPA depending on which year students began their undergraduate studies or which faculty they are attended due to specific grading practices.

The initial discrepancy in academic level between the two groups is shown in Table 1 which also presents the summary statistics for our sample. The standardized central exam score is 0.93 for the group admitted by the central exam against 0.75 for the other. Since the group admitted through the central exam faces a longer preparatory period due to their lack of French (1.74 against 0.58 years), their total completion time is longer (5.98 against 4.98 years). However, as already mentioned, their time to complete their actual undergraduate studies is shorter (4.24 against 4.40 years). The final CGPAs of the two groups are not significantly different, which is noteworthy considered the initial differences in academic level. Due to internal regulations regarding the distribution of students between faculties, the distribution of both groups is more or less the same. Considering gender, females are slightly more common in the group that entered through the internal exam (59% versus 53%). Regarding high school background, 43% of the group admitted through the internal exam are former students of Galatasaray High School while 58% come from Istanbul's private French speaking high schools. Half of students admitted through the central exam come from Anatolian high

¹¹² The central exam has been modified over time. In particular, modification of the coefficient factors for high school grades and specific high school contribution to overall score requires standardization across years. Each individual score is divided by the maximum score at the national level for a specific field.

¹¹³ Students choose their specific field of university study while enrolled in high school. The high school curriculum includes common courses but also specializes according the field of study. These fields fall under broad categories like verbal and quantitative or a mix of both. To give an idea, a high school student must follow the quantitative track in order to choose engineering or medicine at university whereas a law faculty candidate should answer both quantitative and verbal questions in the central exam.

¹¹⁴ For our sample, selection into graduation is not a serious problem as the drop-out ratio is very low.

schools, which are the elite public high schools. Of this group, only 30% come from Istanbul, evidence of the high ranking of Galatasaray university.

Table 1: Summary Statistics by Admission Type

Variables	Internal Exam		Central Exam	
	Mean	St. Dev.	Mean	St. Dev.
Ln (GPA)	4.24	0.15	4.27	0.16
Female	0.59	0.49	0.53	0.50
Central Exam Score	0.75	0.18	0.93	0.06
Undergraduate Years	4.40	0.87	4.24	0.66
Preparation Years	0.58	0.51	1.74	0.57
<i>High School Background</i>				
Anatolian	0.00	0.00	0.50	0.50
French	0.58	0.49	0.05	0.23
Galatasaray	0.42	0.49	0.01	0.12
Private	0.00	0.00	0.17	0.38
Regular	0.00	0.00	0.19	0.39
Science	0.00	0.00	0.07	0.26
<i>Faculties</i>				
Communication	0.16	0.36	0.14	0.34
Computer Engineering	0.13	0.34	0.12	0.32
Economics	0.14	0.34	0.14	0.34
Industrial Engineering	0.15	0.35	0.13	0.34
International Relations	0.11	0.32	0.17	0.38
Law	0.16	0.37	0.16	0.37
Management	0.15	0.36	0.14	0.35
<i>Regions (NUTS1)</i>				
Aegean	0.06	0.24	0.21	0.40
Central Anatolia	0.00	0.00	0.03	0.18
East Black Sea	0.00	0.00	0.02	0.12
East Marmara	0.00	0.00	0.10	0.30
Mediterranean	0.00	0.00	0.15	0.35
Middle East Anatolia	0.00	0.00	0.02	0.15
Northeast Anatolia	0.00	0.00	0.00	0.05
Southeast Anatolia	0.00	0.00	0.01	0.09
West Anatolia	0.04	0.21	0.06	0.25
West Black Sea	0.00	0.00	0.03	0.18
West Marmara	0.00	0.00	0.07	0.25
Istanbul	0.90	0.31	0.30	0.46
No. Obs	610		666	

Due to missing and inaccurate information on central exam scores, data include students who are enrolled in years 1996,1997, 1998, 2001, 2002,2003 and 2007. Students who are enrolled in second grade through Transfer Exam are not included due to missing information on Central exam.

The distributions of the central exam scores and the GPAs of both groups of students are also interesting as the central exam scores clearly distinguish between them (Figure 1 and 2). The scores of students entering through the national competitive exam are normally distributed with a very small spread around a high average. In contrast, the distribution of the French speaking students is bi-modal with lower average central exam scores. Regarding the distribution of GPA, it is striking how the distributions of both groups converge. However, the performance of the group that entered through the central exam remains higher while the distribution of the other group remains bi-modal. That is, higher education at GSU tends to bring the two distributions together, although the initial differences partly remain. The following models will try to reconcile these distributions with regressions.

Figure 1: Distribution of Cumulative Grade Point Averages (Kernel Density)

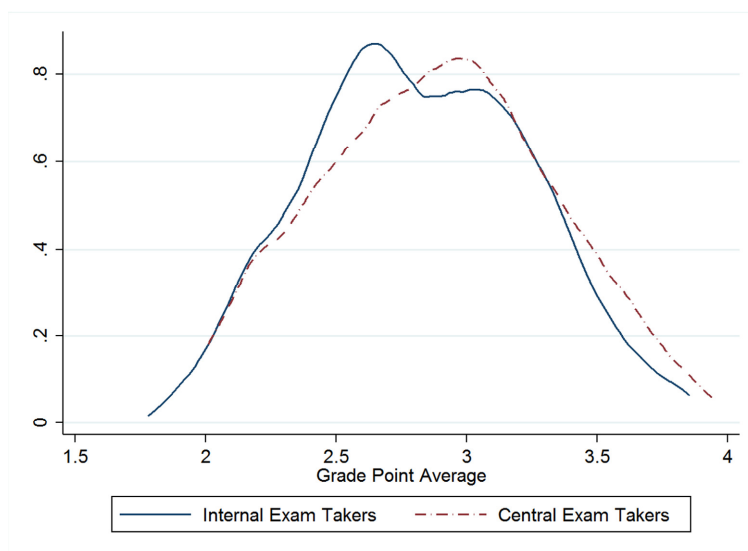


Figure 2: Distribution of Central Exam Scores (Kernel Density)

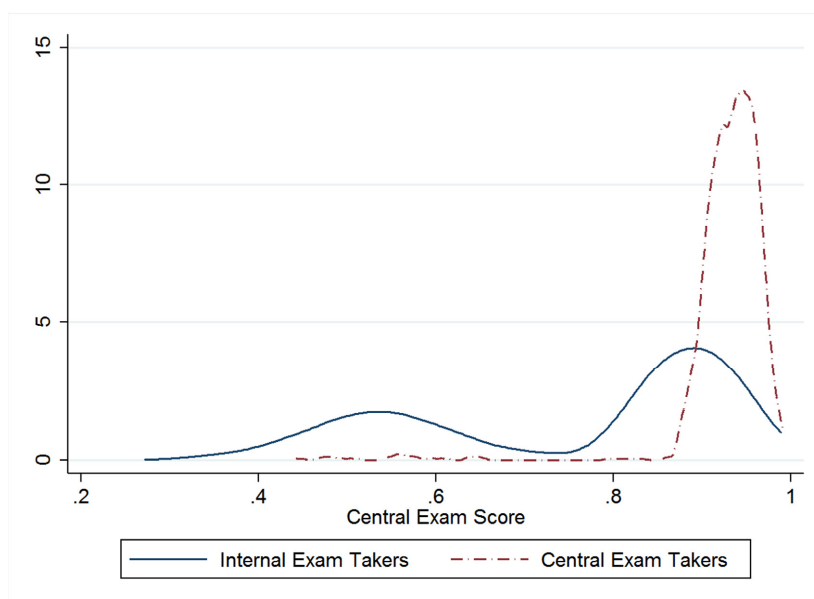


Table 2 presents our basic results with eleven different specifications. In each specification, we control for faculty and year (class) effects. We lack information on family income or high school grades. Omitted variable bias, such as family income, ethnicity or parental education, is a concern for our model. However, the use of these background variables should work through selection process before admission. Apart from the high school dummies, we do not have enough information to the measure selection bias emerging from GSU's specific admission procedure.

In all specifications, females perform better than males, which is a common finding in the literature (see Dayioğlu and Türüt-Aşık (2007) for Turkish data). The central exam score is a valid predictor of students' academic performance. Dayioğlu and Türüt-Aşık (2007) reports a similar result for Middle East Technical University (METU) regarding the CGPA scores both in terms of high school background and central exam scores.

High school background dummies, which are initially significant for some high schools, lose their significance once we control for student central exam scores. However, the admission channel significantly predicts student university performance. The use of both high school dummies and central exam scores to some extent undermines the regression results due to multicollinearity. Comparing model 5 and 6 with full model 10 and 11 reveals that both standard errors doubles and coefficient of *high school* dummies change signs. That is controlling for entrance exam score, we can definitely argue that students from French schools (Galatasaray high school and French schools) perform better at GSU. Concerning the students from French schools (Galatasaray high school and French schools), it seems that excluding central exam score in the regression (model 5 and 6), there is a positive impact may be due to linguistic advantage or high school quality, which helps them adapt to the university environment. It is interesting to note that the positive and significant impact of French school background becomes insignificant when gender dummy is introduced in the regression (model 5 versus 6). It seems that the gender effect wipes out the significance of French school background. This result must be related to the higher proportion of girls in these schools (see table 1), once girls perform better than boys

Students who prolong their undergraduate studies have lower grades, and this effect remains robust across specifications. However, the length of time spent in preparatory class (mostly to study French) does not significantly affect CGPAs when school background is controlled. In METU, however, an English medium university, Dayioğlu and Türüt-Aşık (2007) reports that time spent in the English preparation school is associated with lower GPA scores. In terms of faculty fixed effects, the law faculty has a less strict grading practice than the other faculties, perhaps due to its high ranking for both exam types.¹¹⁵ Quantitative faculties like computing and industrial engineering have significantly lower grade practices, probably due to different assessment policies, although entrance exam scores are also lower for these faculties.

¹¹⁵ GSU's law faculty only admits students from the top 100 scores in the field from among 500,000 entrants.

Table 2: College Performance and Central Exam Score

Dep. var. Ln (Grade)	m1	m2	m3	m4	m5	m6	m7	m8	m9	m10	m11
Female	0.064***	0.063***	0.061***	0.064***		0.063***	0.053***	0.051***	0.052***	0.052***	0.049***
	(0.008)	(0.008)	(0.008)	(0.008)		(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Central Exam Score	0.072**		0.203***	0.139***				0.131***	0.054	0.093**	0.098**
	(0.030)		(0.031)	(0.034)				(0.046)	(0.044)	(0.047)	(0.047)
Admission Type (Central=1)							0.054***		0.044***	0.074***	0.075***
							(0.014)		(0.016)	(0.020)	(0.021)
Undergraduate Years							-0.069***	-0.068***	-0.069***	-0.068***	-0.068***
							(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Preparation Years							-0.025**	-0.005	-0.025**	-0.013	-0.006
							(0.010)	(0.012)	(0.010)	(0.012)	(0.012)
<i>High School Background</i>											
Anatolian					0.044***	0.034**		0.003		-0.050**	-0.033
					(0.014)	(0.013)		(0.021)		(0.025)	(0.025)
French					0.034***	0.017		0.007		0.003	0.006
					(0.011)	(0.011)		(0.010)		(0.010)	(0.011)
Private					0.049***	0.045***		0.006		-0.047*	-0.036
					(0.018)	(0.017)		(0.023)		(0.027)	(0.027)
Regular					0.023	0.015		-0.014		-0.065**	-0.056**
					(0.016)	(0.015)		(0.023)		(0.027)	(0.027)
Science					0.037	0.032		0.002		-0.053*	-0.033
					(0.023)	(0.022)		(0.026)		(0.030)	(0.031)
<i>Faculties</i>											
Computer Engineering	-0.122***	-0.126***	-0.124***	-0.132***	-0.163***	-0.138***	-0.128***	-0.104***	-0.125***	-0.114***	-0.107***
	(0.015)	(0.015)	(0.015)	(0.016)	(0.016)	(0.016)	(0.017)	(0.018)	(0.017)	(0.018)	(0.018)
Economics	-0.028*	-0.029**	-0.025*	-0.031**	-0.048***	-0.035**	-0.027**	-0.028**	-0.027*	-0.027*	-0.026*
	(0.015)	(0.015)	(0.014)	(0.015)	(0.015)	(0.015)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Industrial Engineering	-0.071***	-0.073***	-0.091***	-0.083***	-0.102***	-0.087***	-0.109***	-0.085***	-0.107***	-0.095***	-0.087***
	(0.014)	(0.014)	(0.014)	(0.015)	(0.016)	(0.016)	(0.017)	(0.018)	(0.017)	(0.018)	(0.018)
International Relations	-0.027**	-0.027**	-0.029**	-0.036***	-0.039***	-0.036***	-0.040***	-0.036***	-0.039***	-0.041***	-0.042***
	(0.012)	(0.013)	(0.012)	(0.012)	(0.013)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Law	0.084***	0.084***	0.078***	0.079***	0.073***	0.080***	0.070***	0.068***	0.069***	0.067***	0.065***
	(0.011)	(0.012)	(0.011)	(0.012)	(0.012)	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Management	0.020*	0.020	0.021*	0.018	0.008	0.017	0.020*	0.019*	0.020*	0.020*	0.024**
	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
<i>Regions</i>											
Central Anatolia											0.024
											(0.022)
East Black Sea											-0.011
											(0.054)
East Marmara											-0.005
											(0.018)
Mediterranean											-0.036**
											(0.015)

Dep. var. Ln (Grade)	m1	m2	m3	m4	m5	m6	m7	m8	m9	m10	m11
Middle East Anatolia											0.004
											(0.029)
Northeast Anatolia											-0.190***
											(0.030)
Southeast Anatolia											-0.117***
											(0.032)
West Anatolia											0.011
											(0.019)
West Black Sea											-0.067***
											(0.024)
West Marmara											-0.035*
											(0.018)
Istanbul											0.017
											(0.011)
Constant	4.212***	4.264***	4.270***	4.263***	4.351***	4.321***	4.662***	4.573***	4.633***	4.601***	4.575***
	(0.027)	(0.014)	(0.053)	(0.035)	(0.035)	(0.034)	(0.043)	(0.049)	(0.047)	(0.049)	(0.051)
<i>Controls for Batch Fixed Effects</i>											
Registration Year	+	+	-	-	-	-	-	-	-	-	-
Graduation Year	-	-	+	-	-	-	-	-	-	-	-
Undergraduate Year	-	-	-	+	+	+	+	+	+	+	+
Number of observations	1,276	1,276	1,276	1,276	1,276	1,276	1,276	1,276	1,276	1,276	1,276
Adjusted R2	0.239	0.236	0.291	0.272	0.230	0.266	0.383	0.379	0.383	0.385	0.395

Omitted categories are Galatasaray for school type, Aegean for regions and Communication for faculties. Students who are enrolled in second grade through Undergraduate Transfer Exam are not included due to missing information on Central Exam. Regional dummies do not indicate residential information but the city where students graduated from high school.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parentheses.

The fact that faculty fixed effects hardly vary across different specifications reflects strict faculty preferences. Adding regional information regarding high school background slightly improves the model, which suggests that regional effects may capture social adaptation problems due to the new university environment since students who attended high school in northeastern and southeastern provinces perform worse than those from Istanbul. Comparing high and low income district background, Cyrenne and Chan (2012) (For Winnipeg University, Canada) argues that academic performance may be affected by previous social environment. Thus, a similar mechanism may apply to our results as well.

Since students' initial academic level, the proportion of students admitted through the internal exam and the assessment process itself can differ between faculties, the results may change once the model is estimated for each faculty (Table 3). More specifically, if some faculties are more demanding than others then the more CGPAs will reflect the aptitude gap or the gap between admission types. We test four specifications, each of them for three faculties or groups of faculties: computing and industrial engineering; law; and social science departments including communication, economics, international relations and management. The first specification confirms the importance of the central exam score for law studies and social

science departments. The best students at entry remain the best performers for selective undergraduate studies such as law as well as social sciences to a lesser extent.

In the second specification, students with Galatasaray high school background perform poorly relative to all other students with various backgrounds. In law faculty, the high school effect is differentiated, French school students perform poorly while students with Anatolian and private school background have higher achievement.

Table 3: College Performance by Faculty

Dep. var. Ln (Grade)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Female	0.066*** (0.017)	0.025 (0.016)	0.074*** (0.011)	0.062*** (0.017)	0.031* (0.017)	0.069*** (0.011)	0.066*** (0.017)	0.029* (0.017)	0.075*** (0.011)	0.051*** (0.015)	0.017 (0.017)	0.054*** (0.011)
Central Exam Score	0.106 (0.065)	0.353*** (0.075)	0.092** (0.047)							0.121 (0.091)	0.223 (0.141)	0.054 (0.068)
Admission Type (Central=1)							0.007 (0.021)	0.066*** (0.020)	0.041*** (0.013)	0.039 (0.061)	0.023 (0.040)	0.096*** (0.026)
Undergraduate Years										-0.067*** (0.009)	-0.083*** (0.014)	-0.068*** (0.009)
Preparation Years										0.022	0.006	-0.006
<i>High School Background</i>												
Anatolian				0.020 (0.028)	0.043* (0.025)	0.043** (0.019)				-0.021 (0.068)	-0.002 (0.047)	-0.052 (0.033)
French				0.022 (0.023)	-0.051** (0.022)	0.036** (0.016)				0.015 (0.021)	-0.029 (0.021)	0.014 (0.016)
Private				0.077* (0.045)	0.070** (0.032)	0.040* (0.022)				-0.000 (0.075)	0.013 (0.048)	-0.062* (0.036)
Regular				-0.050 (0.032)	0.001	0.042** (0.020)				-0.116* (0.070)	-0.010	-0.047 (0.035)
Science				-0.017 (0.031)		0.073** (0.033)				-0.076 (0.071)		0.001 (0.073)
Constant	4.157*** (0.041)	4.172*** (0.061)	4.202*** (0.134)	4.190*** (0.034)	4.425*** (0.034)	4.237*** (0.143)	4.204*** (0.031)	4.388*** (0.032)	4.262*** (0.134)	4.437*** (0.074)	4.581*** (0.120)	4.499*** (0.146)
<i>Controls</i>												
Batch (Undergraduate)	+	+	+	+	+	+	+	+	+	+	+	+
Faculty	+	+	+	+	+	+	+	+	+	+	+	+
Regions	-	-	-	-	-	-	-	-	-	+	+	+
Number of observations	339	204	733	339	204	733	339	204	733	339	204	733
Adjusted R2	0.191	0.126	0.116	0.203	0.110	0.117	0.186	0.094	0.122	0.362	0.186	0.269

(1) Computer and Industrial engineering, (2) Law, (3) Communication, Economics, International Relations and Management
 Omitted categories are Galatasaray for school type, Aegean for regions. For Engineering faculties, reference is computer engineering. For Social Sciences, it is communication faculty. Students who are enrolled in second grade through Undergraduate Transfer Exam are not included due to missing information on Central Exam. Regional dummies do not indicate residential information but the city where students graduated from high school.
 *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

The fourth specification presents a complete representation of the data. The effects of central exam scores and high school backgrounds are weakened while the time spent to graduate (Table 4) reduces the final grade. Females perform better in engineering and social sciences. Those who spend more time to graduate, whatever the reason (lower academic level, weaker motivation) gets lower undergraduate grades. In social sciences, students that entered through the national exam have higher GPAs. Students from regular high schools perform less well in engineering, whereas students from private high schools perform less well in social sciences. It is worth noting that the full model cannot isolate the effect of central exam scores when high school background is introduced.

The reduced effect of the central exam score once years to graduate are taken into consideration can be explained by the correlation between the two variables. That is, those who enter with a better score perform better at university and spend less time to graduate.

Table 4 compares the years to graduate across all faculties for the whole period between 1999 and 2014 to illustrate the role of initial academic level. Students admitted through the central exam complete their undergraduate studies faster than the other group, which indicates the higher initial academic level of the first group. This difference is particularly significant for three faculties (political science, economics and French literature).

Table 4: University Graduation Performance

Department	Years spent at the university until graduation		
	Central Exam	Internal Exam	Difference
Management	4.26	4.41	0.15*
Economics	4.31	4.55	0.24**
Communication	4.3	4.37	0.07
Computer Eng.	5.12	5.25	0.14
Industrial Eng.	4.45	4.43	0.02
Philosophy	4.29	4.57	0.28*
French Lit.	4	4.12	0.12**
Law	4.17	4.25	0.08
Math	4.43	5	0.57
Political Sci.	4.34	4.66	0.33***
Sociology	4.25	4.41	0.16
Int. Relations	4.28	4.36	0.08

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

4. CONCLUSION

In this study, we assessed the validity of Turkey's national exam score as an academic performance predictor using the dual Galatasaray University's admission process as a case. Based on a restricted model without high school grades and family background, our results largely confirmed earlier findings that emphasize the importance of standardized test scores in predicting college success. Regression results confirm the existing literature that female

students have higher academic achievement than male students. The effect of high school background in predicting college success is limited and inconclusive for the reason that model specifications cannot isolate selection into elite high schools. Specific to our case, GSU's selective admission system performs poorly in terms of predicting college success. It can be discussed that the students from non-French school background can rapidly catch up the language requirements through the preparation program.

Despite the lower average score of these students in the national exam, the raw final CGPAs did not show significant difference between the two groups. However national exam scores were associated with higher CGPAs and this effect remained positive if we control for a set of variables. We cannot conclude that there is a clear trade-off in terms of final academic output due to the recruitment of French-speaking students through a less demanding specific competition versus the elite selection process of Turkey's national competitive exam.

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