

# EXPLAINING ACADEMIC PERFORMANCE OF FIRST-YEAR UNDERGRADUATE STUDENTS IN ECONOMICS

By

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## **Abstract**

This paper examines the impact of a set of academic performance predictors on first-year undergraduate students of Economics. The academic performance predictors are grouped into pre-university school characteristics, prior academic achievement, entrance requirements, university and social factors. Stepwise regression technique was employed in the analysis. The results show that performance in O'level Economics and University and Tertiary Matriculation Examination (UTME) consistently have significant positive influence on students' academic performance. Attendance of tutorial in the university has important influence students' performance. It is evident that male academic performance is on the average, lower than female performance. However, there is weak evidence that time students spend on social media negatively affect their academic performance. This paper therefore, recommends that admission authority should put more emphasis on O'level grade in Economics and UTME score when considering candidates to study economics; and that tutorial should be well organized by the Department rather than arbitrarily as being organized currently.

**JEL Classification:** A21, A22, I21, I23

## **1. Introduction**

The role of education in driving growth and development of an economy has been emphasized in neoclassical growth literature. This argument is situated within the context of human capital theory that healthy and educated labour force will be more productive than unhealthy and uneducated labour force, and also that the ability of labour force to adopt and utilize modern technology depend largely on level of education. Now, since the university is one of the cardinal institutions that produces educated labour force, understanding what determines quality of university graduate becomes extremely important.

Though there is voluminous literature on the predictors of academic performance of university students, the effects of these predictors vary from one context to another; and also across cultural setting. It is therefore imperative to carry out case by case investigation of the influence of these predictors on students' academic performance periodically. Thus, this paper uniquely examines the influence of a set of predictors cutting across pre-university school characteristics, prior academic achievement, university and social predictors. However, the paper focuses on academic performance of first year students of Economics in an university in Nigeria. This is because, as argued by Jamelske (2009) university first year experience has significant impact on students' final academic performance and their eventual success in the labour market. Thus, understanding what determines the academic performance of first year students cannot be overemphasized.

The rest of the paper is arranged in six sections. Following this introduction is section two, which presents literature review. The model specification and the data as well as the estimation technique are discussed in section three. Preliminary data analysis and the empirical results are presented in sections four and five, while section six concludes the paper.

## **2. Literature Review**

Numerous factors have been identified as predictors of university undergraduate students' academic performance. Studies such as Julian & Morell (1999); Epple, Figlio & Romano (2004); Smith & Naylor (2005); Horowitz & Specter (2005); Mora & Escardibul (2008); Wolniak & Engberg (2010) identify the quality and characteristics of secondary/high school to have significant influence on university students' academic performance. Mohammad and Almahmeed (1988); Anderson, Benjamin and Fuss (1994); Dunlap, Henleg & Fraser (1998); Salahdeen &

Murtala (2005); Garton, Kitchel & Ball (2005); Gbore (2013), and Kilishi (2014) among others, identify university admission criteria as important determinant of undergraduate academic performance. These latter scholars base their argument on the fact that admission criteria help admission authorities to select the most qualified candidates for different programmes in the university. Therefore, admission criteria according to these scholars, have direct bearing on quality of students and, by extension, academic performance.

Robert, Sarmistha and Peter (2002); Dayioglu and Turut-Asik (2007) and Uwaifo (2012) examine the impact of students' characteristics and their family background on academic performance. These studies find that cognitive ability of student, gender, peer group influence, and socio-economic status of parents are imperative in explaining academic performance.

Some other studies emphasize the effect of learning environment such as competency level of teachers, classroom condition, teaching method, laboratory/library, residency of student and the use of social media. Of all the environment predictors, the effect of social media has received tremendous attention. For instance, Roblyer et al (2010), Junco, Heiberger and Loken (2011), Alrahmi, Othman and Musa (2014), Alrahmi, Othman, Yusof and Musa (2015), Ainin, Naqshbandi, Moghavvemi and Jaafar (2015), Alrahmi and Zeki (2017) show that if social media is used for academic, co-curricular discussions, and collaborative learning, it influences academic performance positively. On the other hand, Nalwa & Anand, 2003; Englander, Terregrossa & Wang, 2010; Kirschner & Karpinski, 2010; Junco, 2012; Nsizwana, Ige & Tshabalala, 2017 show that if students use social media for purposes other than academics, academic performance would decrease by time spent on the social media. On the other hand, Young (2006), Kolek and Saunders (2008) did not find any significant relationship between use of social media and academic performance. Alwagait, Shahzad and Alim (2015) differ slightly from Young (2006), Kolek and Saunders (2008) that though no linear relationship between use of social media and academic performance, but there is indirect effect through poor time management.

Specifically, a number of studies on academic performance have directed on understanding the academic performance of undergraduate economics students. Most of these studies focus on performance in individual courses while few focus on aggregate performance. Anderson, Benjamin and Fuss (1994), Ballard and Johnson (2004), Lagerlöf and Seltzer (2009), Arnold and Straten (2012) for instance show that performance in mathematics at secondary school level is an important

predictor of success in the study of economics at university. Similarly, Denny (2014) shows that performance at secondary school and prior knowledge of economics and mathematics are important predictors of success in introductory economic courses for both economics major and non-economics major.

The influence of gender in students' performance in the study of economics at university level has also been investigated by a number of studies, (e.g. Krohn and O'Connor, 2005; and Kherfi 2008). These studies find that gender is a significant predictor of students' performance in economics, that men do outperform their female counterparts, though, Krohn and O'Connor (2005) argue that the effect of gender on academic performance diminish with exposure of both over the course the semester. However, the study by Swope and Schmitt (2006) did not find gender to be a significant predictor of performance in economics courses. He instead put his argument that male minority students were lower than their counterparts.

In an extended education production function, Krohn and O'Connor (2005) examine the impact of students' effort in terms of time allocation on academic performance of economics students over a semester. Their findings show that study time has small significant negative effect on performance and that class attendance is not related to examination scores. Similarly, in the context of a Middle Eastern but within an American education setting, Kherfi (2008) examines factors that have potentials of influencing students' performance in principles of microeconomics courses. He finds class characteristics such as class size, time, duration, and intensity to be statistically insignificant. His result also show that basic mathematical skills and good command of English increased the probability of performance.

### 3. Methodology

The model in this study is specified as:

$$CGPA_i = \beta_0 + \beta_1 PreUniP_i + \beta_2 EntrP_i + \beta_3 UniP_i + \beta_4 OtherP_i + \varepsilon_i$$

Where CGPA measures students' academic performance; *PreUniP* is a set of pre – university predictors which include the characteristics of pre-university schools; *EntrP* is entrance requirement predictors; *UniP* is a vector of university predictors; *OtherP* is a set of other predictors which include demographic and social media variables. Details of indicators for each

category of predictors are presented in Table 1 below. In addition,  $\varepsilon$  is random error term and  $i$  is individual student.

The aggregate performance of students over one academic session measure as Cumulative Grade Point Average (CGPA) is used as the dependent variable. The decision on whether a student continues with the programme or is withdrawn depends on aggregate performance.

Hierarchical forward and backward selection procedures stepwise regression technique is used to gauge the model. All the predictors are initially assumed to be equally relevant, hence the simultaneous selection process was adopted. The selection was done at 10% and 20% significant levels, since the variables are many.

The data is collected from the 2014 cohort of first-year Economics students in University of Ilorin. Students' academic performance records, which include Cumulative Grade Point Average (CGPA), UTME and Post UTME scores as well as performance in SSCE Economics, English and Mathematics were sourced from students' files. Structured questionnaire was used to obtain information from the students on the other predictors.

Table 1: Definition and Measurement of Variables

Variable	Definition
<b>Dependent Variable</b> CGPA	Cumulative Grade Point Average calculated over an academic session
<b>Pre-university School Characteristics</b> Public School Private School Day School Boarding School Single School Mixed School	= 1 if secondary school attended is public = 1 if secondary school attended is private =1 if secondary school attended is day = 1 if secondary school attended is boarding = 1 if secondary school attended is single sex = 1 if secondary school attended is mixed sex
<b>Entrance Requirement</b> Economics Mathematics English UTME Post-UTME Science Major Arts Major Commerce Major WAEC NECO One Sitting	Grades in Economics in SSCE Grades in Mathematics in SSCE Grades in English in SSCE UTME Scores Post – UTME Scores =1 if student was Science major at secondary school =1 if student was Arts major at secondary school =1 if student was Commerce major at secondary school =1 if SSCE was organized by WAEC =1 if SSCE was organized by NECO =1 if student made the required number of credits in one sitting
<b>University Factors</b> Library Use Campus Residence	Average number of hours student spent in the library per day =1 if student resides in the University hostel

Computer Ownership	=1 if student owns a computer
Number of Roommates	Number of roommates in hostel
Number of Textbooks	Number of textbook owned by student
Reading Table	=1 if there is a reading table in student's hostel
Attendance of Tutorial	=1 if student attends tutorial
Departmental Association	=1 if student actively participates in departmental students association
Religious Association	=1 if student is an active member of a religious association
<b>Other Factors</b>	
Age	Age in years
Gender	=1 if male and zero if otherwise
Father's Education	Highest academic qualification of student's father
Social Media Platforms	Number of social media platforms used by student
Time on Social Media	Average number of hours spent on social media per day

Source: compiled by author

#### 4. Preliminary Data Analysis

The distribution of students' gender, age, and number of sittings in O'level examination as well as type of examination is presented in Table 2. Of the 199 students in the sample, 35.68% are female while 64.32% are male; 51.26% of the total students are above 18 years and 48.74% are below 18 years respectively. The distribution of number of sittings in O'level examination shows that 90.11% had single sitting while 9.8% had two sittings. This is a strong indication that the quality of students sampled is high.

At the point of compiling this data, seventeen (17) students' SSCE results could not be accounted for. However, one hundred and twenty-seven (127), representing 63.82% of the students, has the West African Senior School Certificate Examination (WAEC), while seventy-two (72), representing 36.18%, has National Examination Council of Nigeria (NECO).

Table 3 presents average students' academic ability both at entry and first year in the University. At entry into a university, the capability of a student is mainly measured by his/her performance in UTME and post-UTME test, while the student's academic performance at the university is commonly measured by Cumulative Grade Point Average (CGPA). The average UTME score is 225 with standard deviation of 17.29. This indicates that a lot of students in the sample performed well at UTME examination. Similarly, the average post-UTME score is 68.74 with standard deviation of 6.4. The spread in the post-UTME is not too wide like the UTME scores. The average academic performance at first year is 3.37 CGPA on 5 points scale. The standard deviation is 0.849. This shows that the performance of the students in the sample is close to the mean.

The distribution of academic performance is presented in Table 4. Out of the total sample, 14 of the students (7.03%) has first class grade, while 78 (39.1%) has a second-class upper grade; 85 (42.71%), a second-class lower grade, 14 (7.03%), a third-class grade and 8 (4.02%) are withdrawn from the university. The distribution of academic performance by gender is presented in Table 5a, while Table 5b presents t test result. Of the 14 students that has first class grade, 71% are male while 29% are female; 51% and 49% of the 78 students in second class upper are male and female respectively; 72% of the students in second class lower are male while 38% are female; 71% male and 29% female are in third class grade. Finally, 75% of those withdrawn from the university are male, while 35% are female respectively. The t test results in Table 5b show that the differences between male and female academic performance is statistically significant. However, contrary to findings in many previous studies, female average performance is higher than male average performance.

Table 2: Characteristics of Students and SSCE

		<b>Frequency</b>	<b>percentage</b>
<b>Age</b>	Above 18	102	51.26%
	Below 18	97	48.74%
	Total	199	100%
<b>Gender</b>	Female	71	35.68%
	Male	128	64.32%
	Total	199	100%
<b>No. of sittings</b>	Two sittings	18	9.8%
	One sitting	164	90.11%
	Total	182	100%
<b>Type of examination</b>	WASSCE	127	63.82%
	Others	72	36.18%
	Total	199	100%

Source: computed by author

Table 3: Summary of Students' Performance

<b>Variable</b>	<b>Observation</b>	<b>Mean</b>	<b>Std.Dev</b>	<b>Minimum</b>	<b>Maximum</b>
UTME	197	225.3046	17.29453	200	280
Post-UTME	197	68.74112	6.404637	60	86
CGPA	199	3.373467	.8495795	.97	4.9

Source: computed by author

Table 4: First Year Academic Performance of Students

<b>CGPA</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
Above 4.5 (First class)	14	7.03%
3.5- 4.49 (Second class upper)	78	39.1%
2.4-3.49 (Second class lower)	85	42.71%
1.5 - 2.39 (Third class)	14	7.03%
1.00 -1.49 (Withdrawn)	8	4.02%
Total	199	100%

Source: computed by author

Table 5a: First Year Academic Performance of Students by Gender

<b>Gender</b>	<b>First class</b>	<b>Second class upper</b>	<b>Second class lower</b>	<b>Third class</b>	<b>Withdrawn</b>	<b>Total</b>
Female	4	38	23	4	2	71
Male	10	40	62	10	6	128
Total	14	78	85	14	8	199

Source: computed by author

Table 5b: Two Sample t test

<b>Group</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Err.</b>	<b>Std. Dev.</b>	<b>95% Conf. Interval</b>	
Female	71	3.5883	0.0920	0.7751	3.4048	3.7718
Male	128	3.2543	0.0768	0.8683	3.1024	3.4062
Combined	199	3.3735	0.0602	0.8496	3.2547	3.4922
Difference		0.3340	0.1238		0.0900	0.5782
t stat= 2.6987		Pr(t)= 0.0076				

Source: computed by author

## 5. The Empirical Results

The forward and backward stepwise regression results are presented in Tables 6 to 10. The results consist of variables that survived the elimination model selection procedure. Both the forward and backward selection yielded the same results, therefore, there is no need to discuss the results separately. Table 6 presents results of pre-university school characteristics while entrance requirement, university, and other predictors are presented in Tables 7, 8 and 9 respectively. Table 10 presents all the four set of predictors examined in this study.

The results in Table 6 show that only two secondary school characteristics have significant influence on first year performance. These characteristics are ownership of and type of school. Students who attended public secondary schools significantly performed better than those who attended private schools. Similarly, those who attended mixed gender schools performed better than those who attended single sex schools. Whether the school is day or boarding was not significant.

Among entrance requirement predictors only four survived the elimination process. Achievement in pre-university performance in economics and UTME have significant positive impact on first year performance. On average the CGPA of students with WAEC result is 0.277 point higher. This finding raised important questions concerning the quality and standard of SSCE organized by NECO relative to that organized by WAEC. Equally, the academic performance of students who majored in Arts subjects is significantly higher by about 0.56 point. However, Post-UTME score, achievement in English and Mathematics are not statistically significant. The insignificance of post-UTME scores raised questions about the methodology of the post-UTME test where in most cases, candidates are subjected to the same test irrespective of the programme applied for. The finding on mathematics is different from a number of studies that find pre-university performance in Mathematics to have had significant influence on university students' performance in Economics. Probably because most of the previous studies investigated students' performance in specific courses while this study focuses on aggregate performance. Also, there is no evidence that academic performance of students who were science or commercial major at secondary school is significantly different from other students.

Out of the university predictors included in the model, only two survived the selection process. The two significant variables are attendance to tutorial and membership of religious association. On the average, academic performance of students who attend tutorial is higher by 0.42 point and those who participate in religious association by 0.36. Tutorials are organized among the students where more intelligent students in a class or a higher class will be the tutor. Hence, getting a tutor with required ability and willingness at any given time is random. It is therefore expected that the frequency and quality of tutorial will vary from one academic session to the other. This scenario can be changed if the Department takes over the organization of tutorials, making use of post-

graduate students as teaching assistants. Hence, tutorials will become more consistent with higher quality, and expected students' academic performance will improve.

First-year students' academic performance is not significantly affected by membership of social media platforms. Similarly, the time spent on social media is not statistically significant. The age of student does not also significantly influence beginners' academic performance. The only two variables (gender and parent academic qualification) that came out significant have negative sign. The results show that male students' academic performance is significantly lower than their female counterparts by about 0.37 point. Father's and mother's educational qualification has negative effect on academic performance of first-year students. These two findings are contrary to conventional knowledge in the literature.

When all the four set of factors were controlled for in the model, Economics, UTME score, tutorial, religious association are positive and significant. This is consistent with results presented in Tables 6 to 9. In addition, age and participation in departmental association turned out to have positive significant influence on academic performance. On the other hand, the coefficients of father's education and male are negative and significant. Moreover, time spent on social media, being a commercial major and attending a public school have significant negative signs. All the remaining variables such as number of sittings senior secondary school examination, attendance to a day or boarding school, mixed or single school, Post-UTME, pre-university achievement in English and Mathematics, being science or arts major, place of residency, number of roommates, text books, ownership of a computer lap top, reading table, frequenting the library, and membership of more than two social media platforms are not statistically significant.

Table 6: Pre-university Factors

VARIABLES	Forward Selection (0.1)	Forward Selection (0.2)	Backward Selection (0.1)	Backward Selection (0.2)
Mixed School	0.884*** (0.151)	0.884*** (0.151)	0.884*** (0.151)	0.884*** (0.151)
Public School	0.331*** (0.115)	0.331*** (0.115)	0.331*** (0.115)	0.331*** (0.115)
Constant	2.315*** (0.197)	2.315*** (0.197)	2.315*** (0.197)	2.315*** (0.197)
Observations	182	182	182	182
R-squared	0.195	0.195	0.195	0.195

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 7: Entrance Requirements

VARIABLES	Forward Selection (0.1)	Forward Selection (0.2)	Backward Selection (0.1)	Backward Selection (0.2)
Arts	0.562*** (0.121)	0.562*** (0.121)	0.562*** (0.121)	0.562*** (0.121)
WAEC	0.277* (0.146)	0.277* (0.146)	0.277* (0.146)	0.277* (0.146)
SSCE Economics	0.156*** (0.0392)	0.156*** (0.0392)	0.156*** (0.0392)	0.156*** (0.0392)
UTME Score	0.0104*** (0.00306)	0.0104*** (0.00306)	0.0104*** (0.00306)	0.0104*** (0.00306)
Constant	0.164 (0.678)	0.164 (0.678)	0.164 (0.678)	0.164 (0.678)
Observations	194	194	194	194
R-squared	0.251	0.251	0.251	0.251

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 8: University Factors

VARIABLES	Forward Selection (0.1)	Forward Selection (0.2)	Backward Selection (0.1)	Backward Selection (0.2)
Religious Association	0.362*** (0.134)	0.362*** (0.134)	0.362*** (0.134)	0.362*** (0.134)
Tutorial	0.299* (0.175)	0.299* (0.175)	0.299* (0.175)	0.299* (0.175)
Constant	3.110*** (0.169)	3.110*** (0.169)	3.110*** (0.169)	3.110*** (0.169)
Observations	119	119	119	119
R-squared	0.093	0.093	0.093	0.093

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 9: Social Media Platform and other Factors

VARIABLES	Forward Selection (0.1)	Forward Selection (0.2)	Backward Selection (0.1)	Backward Selection (0.2)
Male	-0.367*** (0.111)	-0.367*** (0.111)	-0.367*** (0.111)	-0.367*** (0.111)
Father's Education	-0.115*** (0.0350)	-0.115*** (0.0350)	-0.115*** (0.0350)	-0.115*** (0.0350)
Constant	4.161*** (0.158)	4.161*** (0.158)	4.161*** (0.158)	4.161*** (0.158)
Observations	174	174	174	174
R-squared	0.111	0.111	0.111	0.111

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 10: All Factors

VARIABLES	Forward (0.1) Model 1	Forward (0.2) Model 2	Backward (0.1) Model 3	Backward (0.2) Model 4
SSCE Economics	0.182*** (0.0454)	0.193*** (0.0450)	0.182*** (0.0454)	0.185*** (0.0454)
UTME Score	0.0108*** (0.00350)	0.0108*** (0.00347)	0.0108*** (0.00350)	0.0107*** (0.00347)
Tutorial	0.423** (0.170)	0.345** (0.170)	0.423** (0.170)	0.315* (0.170)
Male	-0.351*** (0.125)	-0.376*** (0.122)	-0.351*** (0.125)	-0.358*** (0.121)
Age	0.0669** (0.0274)	0.0513* (0.0279)	0.0669** (0.0274)	0.0497* (0.0279)
Father's Education		-0.0748* (0.0409)		-0.0886** (0.0422)
Dept. Association		0.237* (0.134)		0.261* (0.135)
Time on Social Media		-0.0952 (0.0632)		-0.117* (0.0646)
Public School				-0.209* (0.124)
Constant	-0.788 (0.918)	-0.296 (0.958)	-0.788 (0.918)	0.253 (0.962)
Observations	102	102	102	102
R-squared	0.334	0.411	0.334	0.412

Standard errors in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

## 6. Concluding Remarks

The relative influence of thirty-one predictors on first-year university students' academic performance in economics were examined in this paper using simultaneous selection stepwise regression technique. The Sample was taken from the Department of Economics of University of Ilorin, Nigeria. The empirical results show that only three variables were consistently significant. These are pre-university achievement in economics, UTME scores and attendance to tutorials. The paper concludes that: pre-university academic performance in Economics, UTME scores and attendance to tutorial are the most important predictors of first-year university students' academic performance in Economics. Also, there is weak negative effect of time spent in social media on first-year academic performance.

The paper thus, recommended that admission authorities should emphasize on performance in SSCE Economics and UTME scores in selecting candidates to study economics in the University of Ilorin. Stakeholders in the education sector should strategize on improving the quality of examination bodies that organize SSCE certificate examination. Regulations on private secondary schools should also be strengthened to advance the quality of students in such schools. All these would improve the quality of students who enter the University, and raise their academic performance in the University and their eventual success in the labour market.

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