EXPLAINING ACADEMIC PERFORMANCE OF FIRST–YEAR UNDERGRADUATE STUDENTS IN ECONOMICS

Abdulhakeem A. Kilishi*

Department of Economics, University of Ilorin, Ilorin, Nigeria

*Corresponding author's email: meetkilishi@yahoo.com/kilishi-a@unilorin.edu.ng

Abstract

This paper examines the impact of five different 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 is employed in the analysis. The results show that performances in O'level Economics, University and Tertiary Matriculation Examination (UTME) consistently have significant positive influence on students' academic performance. Attendance of tutorial in the university has important influence on 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 spent on social media negatively affects 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.

Keywords: First-year undergraduate, Academic Performance, Pre-university academic factors, Entrance requirement, university factors

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. The ability of labour force to adopt and utilize modern technology depends largely on level of education. 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. Therefore, it is 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 a 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 strength of this paper is investigating the joint impact of about five broad set of factors. These factors are pre-university school characteristics, pre-university academic achievement, entrance requirement, university environment, and social factors which jointly consist of thirty-one variables. This is unlike previous studies that focused on just one or two set of factors at a time. The advantages of bringing the five set of factors together are: to minimize the omission variable bias problem; and to allow researcher explore the concept of ceteris paribus in regression analysis. Hence, the actual impact of each set of factors in presence of others is better understood.

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 and Morell (1999); Epple, Figlio and Romano (2004); Smith and Naylor (2005); Horowitz and Specter (2005); Mora and Escardibul (2008); Wolniak and Engberg (2010) identify the quality and characteristics of secondary/high school to have significant influence on university students' academic performance. Anderson, Benjamin and Fuss (1994); Dunlap, Henleg and Fraser (1998); Salahdeen and Murtala (2005); Garton, Kitchel and 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, and 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 efforts to 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, ε 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
Dependent Variable	
CGPA	Cumulative Grade Point Average calculated over an academic session
Pre-university School Characteristics	
Public School	
Private School	= 1 if secondary school attended is public
Day School	= 1 if secondary school attended is private
Boarding School	= 1 if secondary school attended is day
Single School	= 1 if secondary school attended is boarding
Mixed School	= 1 if secondary school attended is single sex
	= 1 if secondary school attended is mixed sex
Entrance Requirement	
Economics	Grades in Economics in SSCE
Mathematics	Grades in Mathematics in SSCE
English	Grades in English in SSCE
UTME	UTME Scores
Post-UTME	Post – UTME Scores
Science Major	=1 if student was Science major at secondary school
Arts Major	=1 if student was Arts major at secondary school
Commerce Major	=1 if student was Commerce major at secondary school
WAEC	=1 if SSCE was organized by WAEC
NECO	=1 if SSCE was organized by NECO
One Sitting	=1 if student made the required number of credits in one sitting
University Factors	
Library Use	Average number of hours student spent in the library per day
Campus Residence	=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
Other Factors	
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 an average student 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

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

Source: computed by author

Table 3: Summary of Students' Performance

Variable	Observation	Mean	Std.Dev	Minimum	Maximum
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

CGPA	Frequency	Percentage
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

Gender	First class	Second class upper	Second class lower	Third class	Withdrawn	Total
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

Group	Obs	Mean	Std. Err.	Std. Dev.	95% Conf. Interval	
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. The finding that academic performance of students who attended private schools is significantly lower than those who attended public schools counters rational thinking. Generally, private schools in the country are expensive which makes such schools exclusive right of rich people. Expectedly, the quality of education in these schools should be higher relative to public schools, but evidence in this paper did not show that. It is therefore pertinent to closely look at the management and the operations of these schools. In most private secondary schools in Nigeria, the condition of service and remuneration is very poor so much so that it is difficult to attract and retain quality teachers in these schools.

Among the 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. These findings are expected. On the average, 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 might be explain by the methodology of the post-UTME test where candidates are subjected to the same test irrespective of the programme applied for. That is, the test questions are not often programme specific. The finding on mathematics is different from a number of previous 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***	0.884***	0.884***	0.884***
	(0.151)	(0.151)	(0.151)	(0.151)
Public School	0.331***	0.331***	0.331***	0.331***
	(0.115)	(0.115)	(0.115)	(0.115)
Constant	2.315***	2.315***	2.315***	2.315***
	(0.197)	(0.197)	(0.197)	(0.197)
Observations	182	182	182	182
R-squared	0.195	0.195	0.195	0.195

Source: computed by author, 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***	0.562***	0.562***	0.562***
	(0.121)	(0.121)	(0.121)	(0.121)
WAEC	0.277*	0.277*	0.277*	0.277*
	(0.146)	(0.146)	(0.146)	(0.146)

SSCE Economics	0.156***	0.156***	0.156***	0.156***
	(0.0392)	(0.0392)	(0.0392)	(0.0392)
UTME Score	0.0104***	0.0104***	0.0104***	0.0104***
	(0.00306)	(0.00306)	(0.00306)	(0.00306)
Constant	0.164	0.164	0.164	0.164
	(0.678)	(0.678)	(0.678)	(0.678)
Observations	194	194	194	194
R-squared	0.251	0.251	0.251	0.251

Source: computed by author, 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***	0.362***	0.362***	0.362***
	(0.134)	(0.134)	(0.134)	(0.134)
Tutorial	0.299*	0.299*	0.299*	0.299*
	(0.175)	(0.175)	(0.175)	(0.175)
Constant	3.110***	3.110***	3.110***	3.110***
	(0.169)	(0.169)	(0.169)	(0.169)
Observations	119	119	119	119
R-squared	0.093	0.093	0.093	0.093

Source: computed by author, 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***	-0.367***	-0.367***	-0.367***
	(0.111)	(0.111)	(0.111)	(0.111)
Father's Education	-0.115***	-0.115***	-0.115***	-0.115***
	(0.0350)	(0.0350)	(0.0350)	(0.0350)
Constant	4.161***	4.161***	4.161***	4.161***
	(0.158)	(0.158)	(0.158)	(0.158)
Observations	174	174	174	174
R-squared	0.111	0.111	0.111	0.111

Source: computed by author, 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***	0.193***	0.182***	0.185***
	(0.0454)	(0.0450)	(0.0454)	(0.0454)
UTME Score	0.0108***	0.0108***	0.0108***	0.0107***
	(0.00350)	(0.00347)	(0.00350)	(0.00347)
Tutorial	0.423**	0.345**	0.423**	0.315*
	(0.170)	(0.170)	(0.170)	(0.170)
Male	-0.351***	-0.376***	-0.351***	-0.358***
	(0.125)	(0.122)	(0.125)	(0.121)
Age	0.0669**	0.0513*	0.0669**	0.0497*
	(0.0274)	(0.0279)	(0.0274)	(0.0279)
Father's Education		-0.0748*		-0.0886**
		(0.0409)		(0.0422)
Dept. Association		0.237*		0.261*
		(0.134)		(0.135)

Time on Social Media		-0.0952		-0.117*
		(0.0632)		(0.0646)
Public School				-0.209*
				(0.124)
Constant	-0.788	-0.296	-0.788	0.253
	(0.918)	(0.958)	(0.918)	(0.962)
Observations	102	102	102	102
R-squared	0.334	0.411	0.334	0.412

Source: computed by author, 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.

Thus, this paper recommends 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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