Varazdin Development and Entrepreneurship Agency
in cooperation with
Azerbaijan State University of Economics (UNEC)
University North
Faculty of Management University of Warsaw
Faculty of Law, Economics and Social Sciences Sale - Mohammed V University in Rabat

Economic and Social Development

37th International Scientific Conference on Economic and Social Development –
"Socio Economic Problems of Sustainable Development"

Book of Proceedings

Editors:
Muslim Ibrahimov, Ana Aleksic, Darko Dukic

UNEC
Azerbaijan State University of Economics

Faculté des sciences juridiques économiques et sociales salé

ISSN 1849-6903

9 771849 690004 >

Baku, 14-15 February 2019

UNDERSTANDING THE HUMAN CAPITAL DEVELOPMENT: DIVERSIFICATION OF MULTINATIONAL ENTERPRISES 1127
Piroska Hoffmann, Zoltan Baracskai

THE IMPLEMENTATION OF PARTIAL LEAST SQUARE MODELLING (PLS) FOR MARKETING RESEARCH IN ARAB COUNTRIES: INTRODUCTION TO BEGINNER USERS - EVIDENCE FROM ISLAMIC BANKS OF PALESTINE 1134
Feras M. I. Alnaser, Mazuri Abd Ghani, Samar Rahi

PREDICTIVE MODELS AND SCENARIOS OF ECONOMIC DEVELOPMENT OF THE REGION 1142
Gushhani Rauf Nasir, Titova Irina Nikolaevna, Glotova Anastasia Sergeevna, Aleksandr Troshin

SUSTAINABLE DEVELOPMENT ASPECTS OF INFORMATION SOCIETY 1149
Rasul Balayev, Masume Aliyeva, Sevda Badalova, Sevda Hajizada, Saadat Abdullayeva

DESIGNING SURVEY RESEARCH: RECOMMENDATION FOR QUESTIONNAIRE DEVELOPMENT, CALCULATING SAMPLE SIZE AND SELECTING RESEARCH PARADIGMS 1157
Samar Rahi, Feras M. I. Alnaser, Mazuri Abd Ghani

THE ASSESMENT OF IMPACT OF COMPETITIVENESS TO ECONOMIC DEVELOPMENT 1170
Adalat Jalal Muradov, Yadulla Hamdulla Hasanli, Nazim Ozbey Hajiyev

EXAMINING THE ROLE OF CREDIT VOLUME ON ECONOMIC GROWTH: THE CASE OF AZERBAIJAN 1178
Nurkhodzha Akbulaev, Aysel Huseynova

PUBLIC-PRIVATE PARTNERSHIP: OPPORTUNITIES AND PROSPECTS OF BANKING FINANCING 1185
Atik Kerimov, Azer Babayev

IMPORTANCE OF ACADEMIC STAFF ATTITUDE TOWARDS THE RANKINGS OF HIGHER EDUCATION INSTITUTIONS 1193
Evija Rusite, Biruta Sloka

ECONOMETRIC ASSESSMENT OF THE DEPENDENCE OF REVENUES ON VALUE ADDED TAX ON INCOME TAX AND PROFIT TAX REVENUES IN REPUBLIC OF AZERBAIJAN AND IN RUSSIAN FEDERATION 1201
Aynur Sabir Suleymanova, Gunay Fazil Rahimli

ASSESSMENT OF THE INTEGRATION RELATIONSHIPS BETWEEN SCIENCE AND EDUCATION AT THE DOCTORAL 1210
Adalat Jalal Muradov, Yadulla Hamdulla Hasanli, Nazim Ozbey Hajiyev, Sardar Ahmadiyya Shabanov

WHAT AGRICULTURAL PRODUCTS CAN INCREASE THE COUNTRY'S EXPORT POTENTIAL 1219
Sevar Mammadova

ASSESSMENT OF THE INTEGRATION RELATIONSHIPS BETWEEN SCIENCE AND EDUCATION AT THE DOCTORAL

Adalat Jalal Muradov
Professor, Rector of the Azerbaijan State University of Economics (UNEC),
6 Istiglaliyyat Str., Baku, AZ1001, Azerbaijan
rector@unec.edu.az

Yadulla Hamdulla Hasanli
Professor, Director of the Scientific-Research Institute of Economic Studies,
Azerbaijan State University of Economics (UNEC),
6 Istiglaliyyat Str., Baku, AZ1001, Azerbaijan
yadulla.hasanli@unec.edu.az

Nazim Ozbey Hajiyev
Associate Professor, Department of "Economics and Business management"
Azerbaijan State University of Economics (UNEC),
6 Istiglaliyyat Str., Baku, AZ1001, Azerbaijan
Visiting Scholar, Davis Center for Russian and Eurasian Studies, Harvard University
n.hajiyev@unec.edu.az,

Sardar Ahmadiyya Shabanov
Associate Prof., Department of "Statistics and Econometrics",
Senior Scientific Researcher of the Scientific-Research Institute of Economic Studies,
Azerbaijan State University of Economics (UNEC),
6 Istiglaliyyat Str., Baku, AZ1001, Azerbaijan
sardar.shabanov@unec.edu.az

ABSTRACT

In this article the integration between science and education has been studied. The number of indexed scientific articles in Azerbaijan is accepted as a explained variable, which is pulled up from SCOPUS scientific bibliographic base and its dependence on the number of admitted PhD students has been assesed running the econometric model. In addition, the dependence of explained variable on the GDP value, education and science has been calculated by running the econometric models. As a result, the ratio of Doctor of Science to Doctor of Philosophy has been calculated.

Keywords: *science, education, integration, PhD, econometrics*

1. INTRODUCTION

It takes time to create and develop a university. The development stages of universities and their mission are categorized as following: a) educational universities (1.0); b) research universities (2.0); c) entrepreneur universities (3.0) (Kaprov, 2017, p.58). Educational universities were the first to be created and they were teaching the religion. In addition, Latin, Greek and other languages were taught at the universities. Bologna Univeristy was created in Italy in 1088, Paris University was created in France in 1150, Oxford University was created in England in 1167 and Istanbul University was created in Ottoman Empire in 1453. These universities are categorized under 1.0. The mission of these universities were education. The universities categorized on (2.0) add research to their core values in addition to teaching. These universities consider research key element to teaching that improves the quality of the education.

The universities categorized on (3.0) add the practical application of research results to the teaching and research elements of education. Therefore their mission statement have three key categories. To feed their mission these universities have created and developed scientific-research labs, business incubation centers and technology transfer centers. The creation of the (3.0) category universities have been established by the establishment of tech parks which first has been created at Stanford University in the United States. The reason for establishing the enterpreneur universities is to create innovation centers that supports research and education. Furthermore, the innovation centers help with the career replacement of students. As a result of establishing Stanford University tech park the Silicon Valley has been formulated as a physical space that companies produce tech products. It worth mentioning that the adoption of Bayh-Dole act in 1980 in the United States institutionalized the establishment of enterpreneur universities model in America (Karpov, 2017, p.58). After the adoption of the act. Before the adoption of the act the universities in the United States would register 250 patent, this number was 1,500 in 1982 and in 2010 there were 4,500 patent registered. The universities in the United States made $82 million revenues from the sales of licence during 1989-1990 period, while they made $1.5 billion just in 2009. The abovementioned facts demonstrate the improtance of Bayh-Dole act on the establishment of the third category universities. The trends on the educational field have positive impact to Azerbaijan too. Some universities in Azerbaijan, including Azerbaijan State University of Economics (UNEC) have been taking relevant steps to contribute to the development of education too (Muradov A.J. (2017), p.12). In order to increase the number of PhD students the universities and the Academy of Science of Azerbaijan Republic has developed the PhD programs. The Doctor of Philisophy program is about 3 years for full-time candidates, while being 4 to 5 years for part-time candidates. If it takes 5-6 years to defend the dissertation instead of 3-4 years that means, the publication of the dissertation delays for 1-2 years. We have got the results in accordance with these delays. It should be noted that it took 5 or 6 years for PhD candidates to continue their program. During this period the number PhD candidates who finished the program was less than 50%. Usually, this process continued for 6 years for fundamental sciences and technical sciences (3 years for doctoral studies and 3 years after graduating from doctorate) and 5 years in humanitarian and social sciences (respectively 3 years and 2 years) (Bednyy, 2006, p.34). If it took 5-6 years for PhD candidates to defend the dissertation. 59% of the 586 admitted PhD students on economy in 2002 finished their program by 2010 in the United States. While, 37% of them dropped out of the program and 4% were still continuing the program. The result of this study shows that the number of PhD candidates who defended their dissertation were increased by median value from 5.0 to 5.6 during 1996-2000 period (Stock, 2011, p.14). Science and education play key role on the development of the domestic economy in a given country. Therefore, there is a need to develop these fields and to increase the allocated funds for that. The share of science and education is high in developed countries. For instance, this indicator is 1.92% for OECD countries, while being 1.1% for Russia and 0.68% for Kazakhstan (Science &Engineering Indicators 2014. Tabl.4.4. p.4 etc.; Bulatov, 2017, p.266). In 2011the average share of GDP on the educational expenses was 6.1% in OECD countries, 5.1% in Japan, 7.6% in South Korea, 7.3% in Israel, 4.6% in Russia and 7.3% in Azerbaijan (OECD Education at a Glance, OECD Indicators 2014. Tabl.A1.2a, p.43 etc.; Bulatov, 2017, p.268). In addition, in 2014 the average share of higher education in GDP was 1.6% in OECD countries, 2.8% in Canada, 2.7% in the United States, 2.6% in South Korea, 1.9% in Finland, 1.3% in Germany, 1.4% in Russia. This indicator was 0.85% in Azerbaijan in 2017 (Explanation on the draft law of the Republic of Azerbaijan "On the 2017 State Budget of the Republic of Azerbaijan" (2017), p.20). The Azerbaijani economy has been developed 6.47 times during 1996-2017 period (see Table 1, column 10), which have had a positive impact over the general development of science and education.

One of the key indicators of development science and education in a specific country are the number of indexed scientific articles on the international databases. Another important factor is the average number of citations to an article. The number of international patents are the indicators of innovation. The number of admitted students to the Doctor of Philosophy and Doctor of Science programs and the expenses spent on education have an impact over the development of the science and education in Azerbaijan. There are different indicators that characterize the development of science and education: these include, the number of scientific articles on SCOPUS per 10,000 persons, the number of citations to those articles, the number of students in the higher education, the number of PhD students studying Doctor of Philosophy and Doctor of Science, etc. (https://www.scimagojr.com/countrysearch.php?country=az). Therefore, this study focuses on the number of indexed scientific articles on SCOPUS database for Azerbaijan, the number of admitted students to Doctor of Science and Doctor of Philosophy programs in Azerbaijan, the expenses spent on science and education and real GDP value and the econometric asessment of values among these variables. It should be noted that we could not find any scientific articles written on the relationship between the number of PhD students in a specific country and the indexed scientific articles on international databases. Therefore, this study is going to be the first articles in its nature in Azerbaijan.

2. THE DATA SET OF THE STUDY AND THE PROCESSING

There are some econometric models that have been run to assess the indexed scietific articles on international databases during 1996-2007. The number of students studying Doctor of Philosophy and Doctor of Science are accepted as explanatory variables, while the number of indexed scientific articles on SCOPUS are labeled as explained variables. In addition, the expenses on GDP, science and education are labeled as explanatory variables, while the number of indexed scientific articles on SCOPUS database is accepted as explained variables. We also included the number of Doctor of Science and Doctor of Philosophy candidates in order to demonstrate the potential of people who are in the science. The databases are the State Statistics Committee of Azerbaijan Republic and SCImagorjr.com scientific portal database. (see Table 1). The explanation for reductions on Table 1 is shown on the Appendices section. Table 1 shows that the number of admitted students to PhD programs have been declined dramatically, it is almost terminated. This was due to the adoption of the new bill on "Science".

Figure following on the next page

Table 1: DATA SET. [1996=100]

(1) Year	(2) FDq	(3) EDq	(4) SCOPUS_Doc	(5) ED	(6) FD	(7) UDMReal (million manat)	(8) ElmXercReal (million manat)	(9) TehsilXercReal (million manat)	(10) RealUDM Faizle [1996=100]
1996	386	19	244	717	3490	2532.66	4.80	102.8	100.00
1997	303	19	233	726	3457	2892.22	6.59	103.3	105.84
1998	253	23	204	700	3398	3179.35	5.82	107.5	116.35
1999	151	10	196	693	3374	3413.35	7.14	143.8	124.91
2000	367	9	190	678	3343	3802.13	12.83	146.5	139.14
2001	292	17	191	676	3328	4179.15	7.39	146.4	152.94
2002	303	18	298	643	3211	4623.06	8.69	145.8	169.18
2003	398	14	348	633	3209	5112.27	11.87	168.0	187.08
2004	470	14	442	656	3283	5629.24	13.20	194.1	206.00
2005	503	18	436	668	3328	7117.87	16.61	211.7	260.48
2006	550	17	380	705	3306	9573.63	16.34	244.7	350.35
2007	452	19	507	707	3242	11969.94	18.53	305.1	438.04
2008	455	22	592	746	3346	13267.83	21.68	342.0	485.54
2009	**51**	20	779	771	3302	15306.09	35.81	493.5	560.13
2010	**5**	**13**	809	838	3531	15734.23	35.36	446.9	575.80
2011	677	168	942	929	3703	16090.48	32.78	391.9	588.83
2012	814	219	1010	**1276**	**5312**	16436.15	36.11	436.3	601.48
2013	625	134	768	1352	5343	17538.62	37.98	433.4	641.83
2014	629	129	695	1539	6467	18023.76	39.29	474.6	659.58
2015	558	94	772	1519	6428	18231.00	41.31	538.1	667.17
2016	420	101	993	1476	6269	17652.19	37.79	512.8	645.99
2017	455	129	1095	1413	6180	17671.98	33.35	439.1	646.71

Source: (Education, Science and Culture in Azerbaijan.Statistical Yearbook, (2018, 2017, 2016, 2015),; https://www.stat.gov.az/source/education ; https://www.scimagojr.com/countrysearch.php?country=az the personal calculations of the authors.

It should be noted that, during that time the National Parlimant of Azerbaijan adopted a bill on "about the Science" (http://science.gov.az/uploads/PDF/Elm_haqqinda Azerbaycan Respublika-sinin_Qanunu.pdf) and the phrase of "Doctor of Philosophy" was adopted.

3. THE SPECIFICATION OF ECONOMETRIC MODELS AND THEIR REALIZATION

The number of indexed scientific articles on SCOPUS for Azerbaijan and the number of admitted students for Doctor of Philosophy program and other indicators that participating on the econometric modelling is studied by applying the unit root (Asteriou, 2016, pp.348-353). The revenues of the state budget, the expenses spent on science and eduation are the indicators that impact the integration of science and education in the higher education. Therefore, we will assess the impact of those indicators to the number of indexed scientific articles on SCOPUS database. Below is the spesification of the econometric model for the educational expenses and its impact on the number of indexed scientific articles on SCOPUS database (Hasanli, 2008, p.29).

$$LOG(SCOPUS_DOC) = C(1) + C(2)*LOG(TEHSILXERCREAL) + u \qquad (1)$$

The results of (1) regression equation is calculated on the Eviews software which is shown below:

Table 2: The main statistical characteristics of the econometric model for the number of articles on scopus to the real educational expenses in Azerbaijan during 2002-2017 period.

Dependent Variable: LOG(SCOPUS_DOC)				
Method: Least Squares				
Sample: 2002 2017				
Variable	Coefficient	Std. Error	t-Statistic	Prob
C	1.343755	0.615195	2.184274	0.0464
LOG(TEHSILXERCREAL)	0.877837	0.105586	8.313968	0.0000
R-squared	0.831573	Mean dependent var		6.445368
Adjusted R-squared	0.819543	S.D. dependent var		0.414362
F-statistic	69.12207	Durbin-Watson stat		1.011476
Prob(F-statistic)	0.000001			

The main statistical characteristics of the Model (1) on Table (2) shows that our model applied is adequate. Although the value of Durbin-Watson statistics is not satisfactory (the autoregression of the residues is partly available), but it is important for the analysis of the model. It should be noted that the availability of the autoregression of the residues makes the insignificant forecast of the econometric model. Below is the econometric modelling specification of the expenses on science to the number of indexed scientific articles on the SCOPUS database for Azerbaijan:

$$LOG(SCOPUS_DOC) = C(1) + C(2)*LOG(ELMXERCREAL) + u \qquad (2)$$

Here: LOG(ELMXERCREAL) – the natural logarifm of real expenses spend on science.
C(1)– fixed threshold, C(2)- elasticity coefficient.
(2) regression equation has been calcualted on the Eviews measurement tool and the results are below:

Table 3: The main statistical characterics of econometric modelling on the dependence between the number of scientific articles on scopus database and the real expenses in Azerbaijan

Dependent Variable: LOG(SCOPUS_DOC)				
Method: Least Squares				
Sample: 1996 2017				
Variable	Coefficient	Std. Error	t-Statistic	Prob
C	3.893831	0.201078	19.36177	0.0000
LOG(ELMXERCREAL)	0.786557	0.068200	11.53316	0.0000
R-squared	0.869293	Mean dependent var		6.144071
Adjusted R-squared	0.862757	S.D. dependent var		0.615620
F-statistic	133.0138	Durbin-Watson stat		1.066467
Prob(F-statistic)	0.000000			

The main statistical characteristics of the Model (2) on the Table 3 shows that the model we applied is adequate. Below is the impact of the GDP value to the indexed number of scientific artilces on SCOPUS.

$$LOG(SCOPUS_DOC) = C(1) + C(2)*LOG(UDMREAL) + u \qquad (3)$$

Here LOG(UDMREAL) – the natural logarifm of the real GDP value.
The regression (3) equation is calculated on the Eviews measurement tool (Table 4):

Table 4: The characteristics of the econometric modelling on the number of dependent articles on the scopus database to the real value of GDP

Dependent Variable: LOG(SCOPUS_DOC)				
Method: ARMA Maximum Likelihood (OPG - BHHH)				
Sample: 1996 2017				
Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob*
C	-1.447742	0.325467	-4.448203	0.0004
LOG(UDMREAL)	0.838829	0.035635	23.53948	0.0000
AR(1)	0.360016	0.161328	2.231580	0.0394
AR(3)	-0.639666	0.164801	-3.881451	0.0012
SIGMASQ	0.013851	0.006454	2.146302	0.0466
R-squared	0.961711	*Mean dependent var*		6.144074
Adjusted R-squared	0.952702	*S.D. dependent var*		0.612620
F-statistic	106.7479	*Durbin-Watson stat*		2.050845
Prob(F-statistic)	0.000000			
Inverted AR Roots	.56-.73i	.56+.73i	-.76	

It worth meantioning that in order to achieve the relevance of the econometric model (3) regression equation is added the AR (1) and AR (3) avtoregression factors from the 1st and 3rd compiles. In econometric modelling the stabilization of the residues is important. This is being applied by unit root test. Since there is no unit root ($\sqrt{0.56^2 + 0.73^2} = 0.92 < 1$), we can accept the residuals as stationary. So, the main statistical characterists of Model (3) show that the model applied is adequate.

What is the relationship between the number of Doctor of Science and Doctor of Philosophy students in Azerbaijan? Table 1 shows that the ratio between the variables is gets the value of 4-5 during the years. Is there an optimal ratio between the variables? We can accept the maximum number of indexed scientific articles on SCOPUS database as an optimum criteria. In order to calculate the optimum criteria the regressions equation gets specification (5) and its results is shown on Table 5 below:

$$ED = C(1) + C(2)*FD + C(3)*(FD)^2 \qquad (5)$$

Table 5: The calculation of optimal ratio between ED and FD

Dependent Variable: ED				
Method: Least Squares				
Date: 01/09/19 Time: 19:01				
Sample: 2006 2017				
Included observations: 12				
Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
C	-838.7940	283.0743	-2.963159	0.0159
FD	0.601611	0.126967	4.738338	0.0011
(FD)^2	-3.70E-05	1.32E-05	-2.803357	0.0206
R-squared	0.991024	*Mean dependent var*		1105.917
Adjusted R-squared	0.989029	*S.D. dependent var*		349.4935
S.E. of regression	36.60618	*Akaike info criterion*		10.28063
F-statistic	496.8396	*Durbin-Watson stat*		1.564682
Prob(F-statistic)	0.000000			

The (5) equation shows that as an explained variable ED is the parabola of FD. The ED gets the maximum value from the ratio of FD/ED=5.051537. This means, if the ratio between the number of people with Doctor of Science and the Doctor of Philosophy degree is 1:5, then this ratio would be maximum. In order to calculate the maximum number of scientific articles on SCOPUS, we should eccept it as an explained variable and formluate the econometric model.

We are going to label the indexed articles on SCOPUS as explained variables to calculate its maximum value and the number of PhD candidates as explanatory variables in order to run the model. The specification of econometric model is following:

*LOG(TOTAL_DOC_SCOPUS) = C(1)*LOG(EDQ) + C(2)*(LOG(EDQ))^2 (6)*

The results of Model (6) are on the Table 6.

Table 6: The calculation of optimal grade of doctor of science students and the maximum number of scientific articles on scopus for Azerbaijan

Dependent Variable: LOG(TOTAL_DOC_SCOPUS)				
Method: ARMA Maximum Likelihood (OPG - BHHH)				
Sample: 1996 2017				
Included observations: 22				
Convergence achieved after 9 iterations				
Coefficient covariance computed using outer product of gradients				
Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
LOG(EDQ)	*3.030821*	*0.097711*	*31.01831*	*0.0000*
(LOG(EDQ))^2	*-0.334764*	*0.023584*	*-14.19469*	*0.0000*
AR(12)	*-0.552315*	*0.241900*	*-2.283235*	*0.0348*
SIGMASQ	*0.127901*	*0.075740*	*1.688693*	*0.1085*
R-squared	*0.646450*	*Mean dependent var*		*6.144074*
Adjusted R-squared	*0.587525*	*S.D. dependent var*		*0.615620*
S.E. of regression	*0.395377*	*Akaike info criterion*		*1.343514*
Durbin-Watson stat	*1.204392*			
Inverted AR Roots	*.92+.25i*	*.92-.25i*	*.67-.67i*	*.67+.67i*
	.25-.92i	*.25+.92i*	*-.25-.92i*	*-.25+.92i*
	-.67-.67i	*-.67+.67i*	*-.92+.25i*	*-.92-.25i*

The caracteristics of Model (6) is satisfactory. The equation shows that EDQ=92,46244, which means, the maximum number of admitted Doctor of Science students is 92. In this case, the number of indexed scientific articles on SCOPUS is maximum, in other words it is: 3144,254.

4. THE RESULTS OF ECONOMETRIC MODELS

- The results of Model (1) show that 1% increase on real education expenses increases the number of articles from Azerbaijan on SCOPUS by 0,877% during 2002-2017 period.
- The results of Model (2) show that 1% increase of the expenses on science on current year increases the number of articles from Azerbaijan on SCOPUS by 0,786%.
- The results of Model (3) show that 1% increase of the real value of GDP increases the number of articles from Azerbaijan on SCOPUS by 0,838%.
- The results of Model (4) show that there ratio between the number of students of Doctor of Science against the students of Doctor of Philosophy should be 1:5 in order to acheive the maximum number of articles from Azerbaijan on SCOPUS database.
- The results of Model (5) show that the optimal level of ratio between the number of Doctor of Philosophy students who defended the dissertation and the number of Doctor of Science students who defended dissertation is 5,051537. This means, if the ratio between the people with Doctor of Science degree and people with Doctor of Philosophy degree is 1:5, then the number of articles from Azerbaijan on SCOPUS would be maximum.
- The results of Model (6) show that the number of articles from Azerbaijan would be maximum if the number of admitted Doctor of Science students would be 92. Table 1 shows that the number of admitted Doctor of Science students were 129 in 2017.

5. CONCLUSION

The result of the econometric modelling shows that there is a optimal ratio between the admitted students to Doctor of Philosophy and Doctor of Science and the number of students who defended their dissertation on Doctor of Science and Doctor of Philosophy, which impacts the maximum number of indexed scientific articles on SCOPUS database for Azerbaijan. Such as, the optimal ratio of Doctor of Philosophy students against the Doctor of Science students is 5:1. If the number of admitted Doctor of Science students would be 92, then the number of indexed articles would be maximum on SCOPUS. The real value of GDP, the expenses on education and science was assessed against the number of indexed articles on SCOPUS. Therefore, the ratio of the expenses on science and education to GDP and the increase on the GDP value positively impacts the number of PhD candidates in Azerbaijan. This results in the increased number of indexed scientific articles on SCOPUS database for Azerbaijan.

ACKNOWLEDGEMENT: *This work was supported by the Science Development Foundation under the President of the Republic of Azerbaijan - Grant № EIF-MQM-Elm-Tehsil-1-2016-1(26)-71/12/5.*

LITERATURE:

1. Asteriou D., Hall S.G. (2016). *Applied Econometrics*. Palgrave. N.Y. 518 p.
2. Bednyy B.I., Mironos A. A., Serov T.V. (2006). Productivity of research work of graduate students (scientometric assessment). In M.B. Sapunov (ed.) *The Vysshee Obrazovanie v Rossii (Higher Education in Russia)*, №7, p. 20-36
3. Bulatov A.S. et all. (2017). *World Economy and International Economic Relations* / ed.by prof. Bulatov A.S. M.: KNORUS. - 916 p.
4. Education, Science and Culture in Azerbaijan.Statistical Yearbook. (2018, 2017, 2016, 2015). State Statistical Committee of the Republic of Azerbaijan. Baku.
5. Eviews 9.0. Software Package.
6. Explanation on the draft law of the Republic of Azerbaijan "On the 2017 State Budget of the Republic of Azerbaijan" (2017). *I Envelope of the State Budget of the Republic of Azerbaijan*. Baku, 2016. 152 p.
7. Həsənli Y. (2008). *Ekonometrikaya giriş (e-publishing)*. Bakı. Retrieved 05.01.2019 from https://ebooks.azlibnet.az/book-Tn7cj4Yf.html
8. https://www.stat.gov.az/source/education/ [Retrieved *Date* 02.11.2018]
9. http://science.gov.az/uploads/PDF/Elm_haqqinda_Azerbaycan_Respublikasinin_Qanunu.pdf (Retrieved *Date* 03.01.2019)
10. Karpov A. (2017). Modern university as an economic growth driver: Models & missions. In A.Ya.Kotkovski (ed.). *Voprosy Ekonomiki*. No. 3. pp. 58—76. M.: Moscow State University of Press.
11. Muradov A.J. (2017). Enhance the role university education in economic development. In A.J.Muradov (ed.) *Azerbaijan State University of Economics Scientific Reviews*. Year 5. Vol.5., April-June 2017. Pp. 5-16. Baku: Azerbaijan Republic.
12. OECD (2014). Education at a Glance 2014: OECD Indicators. OECD Publishing. http://dx.doi.org/10.1787/eag-2014-en.
13. Science and Engineering Indicators (2014). Arlington VA: National Science Foundation (NSB 14-01).
14. SCImago, (n.d.). SJR — SCImago Journal & Country Rank [Portal]. Retrieved *Date 02.11.2018*, from https://www.scimagojr.com/countrysearch.php?country=az
15. Stock, W.A, Siegfried, J.J., and Finegan T.A. (2011). Completion Rates and Time-to-Degree in Economics PhD Programs. *AmericanEconomic Review*, 101,3 (2011): pp.176-187. doi:10.1257/aer.101.3.176.

APPENDIX

The definition of variables:

- FDq: PhD Admission in current year;
- EDq: DSc Admission in current year;
- SCOPUS_Doc: Total SCOPUS Document for contry in current year;
- ED: Number of DrS in country with diploma;
- FD: Number of PhD in country with diploma;
- ÜDMReal: Value of real GDP in Azerbaijan for the current year; 1996 is the base year;
- ElmXercReal: Scientific expenditures calculated by real prices for the current year;
- TehsilXercReal: educational expenditures calculated by real prices for the current year;
- RealUDMfaizle: GDP index of the current year againt the previous year excluding the inflation, 1996 year is the base year.