Economic Determinants of the Demand for Higher Education in Jordan: An Econometric Study (1990 – 2010)

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ABSTRACT

The main aim of this study is to investigate the economic determinants of the demand for higher education at public universities in Jordan during the period 1990-2010. A co-integration analysis with four explanatory variables is used. Unit root tests have been employed to test the integration order of variables. For the purpose of supporting the results, the dynamic relationships among the variables are explained through presenting the variance decomposition of the dependent variables. The empirical results of the study are found to be in accord with the results of the previous studies and support the main hypothesis of the study. Results show that the real disposable income, and real government support affect positively the demand for higher education in public universities, whereas the effect of the consumer price index as a proxy for education cost, and unemployment rate is found to be negative.

Keywords: Economic Determinants, Higher Education, Public Universities, Demand on Higher Education, Co-integration Analysis.

INTRODUCTION

The majority of countries worldwide have witnessed an important growth in higher education demand, especially in the Third World countries where the population explosion, and by consequent, the educational explosion were highly remarked.

Since the seventies of the last century, Jordan has experienced a steady growth in the demand for higher education. The fact that human capital acquired by education and training is more important than physical capital for development and growth of income in Jordan, can explain the infatuation for higher education in the country. The high rates of population growth, in addition to the factors mentioned above have engendered this educational explosion at all levels of education. Since 1960, the number of population has doubled five times to reach more than six million inhabitants currently. Thus, the numbers of students, educational institutions and enrollment rates have steadily increased.

Enrollment rates are actually 100% at primary level, 90% at secondary level. As for higher education- the subject of this study- enrollment rate has risen from only 9.3% in 1975/1976, to 21% in 1980/1981, to 26% in 1990/1991, and to 40% of the age group in 2010/2011. The number of students enrolled in this level was 243,000 in 2009/2010. This number constitutes about 4% of the total number of population.

Concerning the number of inhabitants per university, Jordan comes in the third position among Arab countries

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with one university for each 250,000 inhabitants in average.

But, in spite of this quantitative progress; higher education sector is still suffering from a number of obstacles and problems; such as the problems of financing, external efficiency represented by the weak correspondence between the qualifications of graduates, and the renewable needs of the labor market, and the lack of seats in the public universities expressed by the deficiency of supply versus increasing demand for seats in those universities. This last problem constitutes the principal motive that inspired this study about the economic determinants of the demand for higher education in Jordan over the period (1990 – 2010).

The importance of this study comes from the econometric analysis of the most important economic determinants assumed to affect the demand for enrollment in public universities in Jordan, in addition to considering the effect of income; the effect of unemployment rates, cost, and public subsidies to public universities. Moreover, the lack of econometrical studies dealing with this problem in Jordan and reaching adequate recommendations, may give an additional importance of this study.

The main objective of the study is to investigate the economic factors determining the demand for higher education in Jordan. Moreover, the following sub-objectives could be expected from this study: describing briefly the quantitative evolution of higher education in Jordan during the period of study, examining the problems of the deficiency of public universities seats versus the demand for these seats, and to reach conclusions and propositions that may be useful for the decision makers in this domain.

The study will be elaborated in six sections. After this introduction, a brief description of the evolution of higher education system will be displayed; the theoretical background and previous studies in this domain are presented in the third section. In the fourth section the methodology and data will be introduced; an analysis of the empirical and econometrical results will be examined in the fifth section, and in the sixth and last section; the concluding remarks and recommendations will be presented.

Higher Education System: An Overview

Higher education plays an important role in the process of development in Jordan. Even though financial resources are limited in this country, higher education is given a high priority by the state as of the role it plays in the process of economic, social and cultural development.

Higher education in Jordan has emerged with the establishment of "Dar-Almu'alemeen" in 1958 which is an institute with two years post secondary education aiming at educating and training qualified teachers to educate at the ministry of education schools. Following this step, a number of "teacher institutes" were created for the same purpose. These institutes have been developed for "Community Colleges" during the seventies of the last century.

As for universities, the establishment of the University of Jordan in 1962 was the commencement of public universities creation in the country. The establishment of private universities commenced in 1989 by the creation of Al-Ahliyya Amman University to be the first private one in the country.

At the time being, the number of public universities, which constitute the subject of this study is (10), and that of private universities (17), besides (51) public and private community colleges. Moreover, the number of students enrolled in the higher education has reached 243,000 student in 2010, including about 30,000 student from Arab and foreign countries.

The access to higher education is available to holders of "Tawjihi" "the General Secondary Education Certificate" who can then apply to all types of higher education institutions. The access to public universities

is partially competitive, the minimum score in Tawjihi required to apply for admission in these universities is 65/100 although 50/100 is the minimum score to pass. The passing students in Tawjihi with 65/100 score and above are allowed to apply for competitive admission in public universities. The number of applicants admits depends on the limited places available at these universities. Table (1) shows the number of applicants and that of students admits in the public universities for different years:

Table 1. The numbers of passing students in Tawjihi with 65/100 and above, of applicants for public universities and of admits in selected years

Year	Number of passing with 65/100 and above (1)	% of total passing (2)	Number of applicants (3)	Number of admits (4)	Column 4/Column 3 (%)
1990/91	23654	62%	16861	9115	54 %
1995/96	29096	71%	24349	9363	38 %
2000/01	30165	58%	27945	11591	41 %
2005/06	40109	75%	38880	33850	87 %
2006/07	39924	72%	39134	30212	77 %
2007/08	34692	68%	36509	30127	83 %
2008/09	42052	75%	40355	29860	74 %
2009/10	42398	84%	41439	32323	78 %

Source: Ministry Of Education (MOE) and Ministry of higher education (MOHE) in Jordan.

Table (1) shows that the passing in Tawjihi with score 65/100 and above constitute 58-84% of all passing students during the period of study. Most of those apply for admission in public universities, whereas the remainders apply to enroll, either at private universities or at foreign universities; so that to meet their intentions in studying the disciplines they wish which are not available for them at the national public universities.

The table shows also that, among the applicants to public universities, 41- 87% were admitted, most of them in disciplines that are not in concordance with their first preference.

Hence, the challenge facing the public universities in Jordan is their ability to increase their capacity of supplying much more additional seats and to fulfill the intentions of the admitted students in studying the specialties they prefer.

Theoretical background and Previous Studies

A) Theoretical background:

Since the emergence of the Economics of Education Science during the sixties of the last century; so many studies were conducted in economic literature aiming at examining and analyzing the factors affecting the growing demand for higher education. The works of Schultz (1961) and Becker (1964) laid theoretical foundation in this area, but it was Campbell and Siegel (1967) who first seriously attempted to measure the impact of tuition and disposable income on the demand for higher education. In their estimation, they used enrollment ratio against 'eligible' college population as

the dependent variable.

Another studies by Campbell and Siegel(1964) and the ensuing similar works by Hights (1970, 1975), Shim (1990), and Hsing and Chang (1996) have examined different relevant factors that influence this demand for higher education. More recently, Todaro and Smith (2011),have examined the determinants of the demand and supply of education places. They argue that the demand for education is determined by the expected income benefits and direct and indirect costs of schooling, while the supply of school places (at all levels) is determined by the political process, and is often unrelated to economic criteria. In addition the relationship between employment opportunities and educational demand was underlined by the authors.

Referring to the conclusions of these works, one can underline a number of basic factors that play into this domain, among them: socio-economic status of families, per-capita disposable income, unemployment rates and public subsidies to universities …….. etc.

The following previous studies in this area provide empirical results which are concord with these theoretical works.

B) Previous studies:

Literature review search revealed that there is an apparent lack of empirical studies about the economic determinants of the demand for higher education in Jordan and in the other Arab countries. This study is therefore mostly informed by studies and papers from elsewhere other than the Arab world.

In a study entitled: "The individual demand for higher education in the USA, Gregory (1975), argue that the evidence suggests that both, low tuition fees and students' grants do stimulate increase in enrollment.

Using individual data from a 1979 random sample of 3,300 Portuguese students in their final year of lower secondary education to analyze the determinant of their plans regarding further study; Psacharopoulos (1982), states that the results of his study indicate that, family income, school grades, and school type were found to exert a sizable influence on the decision to continue to upper-secondary education.

Shim (1990) in a study entitled, "a Simple demand for higher education", conducted for the period 1965-1986, suggests the following determinants of demand for higher education: real per capita personal income (INC), the cost (price) of college education, and state's rate of unemployment. The study indicates that, both the (INC) and unemployment rate, have positive signs, and the cost variable has a negative sign. The statistical results of this study explain more than 98% of the variation in college enrollment in Mississippi. Moreover, the results of the study confirm that both (INC) and the unemployment rate variables are significant and have their expected signs. The cost variable is also significant and has the expected sign.

A higher education demand function was formulated by Duchesne and Nouneman (1998) on Belgian time-series data from 1953 to 1992 in a study which it's results have shown that, both; income, and relative wage differences, influence enrollment decisions positively. The impact of indirect cost (Foregone earnings) is negative.

In the United states also, Yang (1998), in a study aimed at estimating the demand for higher education for the period 1965-1995, revealed that this demand may be specified as a function of the cost of education as own price variable and disposable income as a measure of both amounts and sources of funds to purchase enrollment. In brief, this study found that the two major determinants for higher education in the USA were the fees and the disposable income.

The main conclusions of a study conducted by Albert (2000), about the demand for higher education in Spain indicate that, the most important determinants of this demand are: family characteristics especially

mothers' education attainment, the labor market as a signal of both the opportunity cost of finding a job if not going to university, and the employment expectations for each educational level.

Low income and modest education of parents reduce the chance of children to attend a higher education institution. This is the result reached by a study conducted by Dinca (2002) on the higher education in South East European Countries. The author cites Germany as an example, where 80% of civil servants wanted their children to have a secondary school graduation certificate, so as to allow them to get admissions to higher education; while only 25% of workers wanted the same. Moreover, the author added that when taking income into account, the number of students originating in the first upper quarter of income scale was about 27% in the old Germany state and 36% in the new states.

Using a data-set published by the universities patterns of demand and supply for higher education courses in UK from 1996/1997 to 1999/2000 , a study conducted by Abbott and Leslie (2004) revealed that the major factor affecting the applications and enrollments in universities was the tuition fees.

The tuition fees and the real disposable income per capita among other less important variables influence significantly the demand for university education in Canada according to the results of a study of Muller and Rockerbie (2005). The authors utilized application data not enrollment data in their analysis which confirmed that male applicants tend to be more price sensitive than females, and tend to exhibit stronger income effects.

Canton and DeJong (2005), examined the role of economic factors in the university enrollment decision for the post-war period in the Netherlands. The econometric results of their study suggest that students were not responsive to tuition fees, but financial support (the sum of loans and grants), the college premium on future labor market earnings, and the alternative wage were important in the enrollment decision. The economic factors involved were; tuition fees, financial support/grants and loans, per capita income, returns to schooling, opportunity cost, and the unemployment rate.

A paper elaborated by Chow and shen (2005), investigated the demand for education in the three levels of education and aggregate demand for all education services in China concluded that: when these three levels are studied separately; income elasticity was 0.42 for primary, 0.81 for secondary, and 1.29 for higher education. The price elasticities of demand were respectively: 0.31, 0.22, and 0.29 with the price paid by the government as the price variable in the demand for higher education. These results confirm a higher elasticity of income and price of demand for higher education; the effect of income was positive, whereas the effect of price was negative at all levels of education.

Among the scarce studies about the demand for higher education in Arab countries, a study conducted by Alhawarin (2006) about Jordan in which the author paid a special attention devoted to the role of expected rate of return (ERRs) to higher education which influences positively students' post-secondary education decisions. The study confirms a strong role of education in determining students' starting earning expectations which influence positively the pursuit of higher education. Concerning the income, the study affirms that students from low-income classes and large families were found to be less likely to consider continuing into higher education. Other variables; such as parents' level of education, and students area of residence, were proved not to be significantly associated with demand.

Another study about higher education in Jordan conducted by, Kanaan**,** et al., (2009), emphasize that higher education enrollments are strongly correlated

with income; enrollments in higher education institutions (private and public) of students from the richest wealth quintile represent over three times those from the poorest wealth quintile. The authors add that the case is not different in public higher education institutions, where enrollments of the richest quintile represent more than twice those from the poorest income quintile.

In Greece, Saiti and Prokopiado (2008), in a study about the demand for higher education conducted by using data collected from 400 students enrolled in the final year of post-secondary education, found that family monthly income and employment opportunities affect positively the pursuit of higher education.

A model aiming at detecting the determinants of participations' rate in higher education empirically tested for (14) European countries through a five-year panel regression used in a study conducted by Agasisti (2009), has concluded that the most important determinants of participations rates in higher education are: expenditure on higher education as a percentage of GDP, Gini Coefficient, subsidies devoted to higher education, and per capita GDP.

Aiming at estimating the effect of tuition fees on demand for university education in Canada; a study of Neill (2009) concluded that a C$ 1,000 increase in university tuition fees was estimated to reduce the enrollment rate in Ontario, Canada's largest province, by between 2.5 and 5 percentage point.

In New Zealand, Maani (without dating), in a study entitled: "why are youth from poorer families less represented at universities? A longitudinal study", examined the determinants of higher education choices of young adults aged 16 to 18 years. The results support the hypothesis that students sort themselves into tertiary study or labor market choices is based on the expected returns of these choices. In the transition from school to higher education, work or unemployment, the students' academic performance is an important channel through which personal ability and economic factors exert their influence.

Finally, Todaro and Smith (2011) state two principal influences on the amount of education desired, which are: 1) The family's private benefits of education expressed by the prospects of more earnings. 2) The educational cost, both direct and indirect. The authors argue that the demand for education is a derived demand for high-wage employment opportunities in the modern sector.

Referring to the above studies, it can be deduced that income, employment opportunities, cost of educations, public support to universities, and educational background of families were the over-riding determinants that affect undergraduates choices to enroll in a higher education institutions. However, this study, focuses on the effect of namely; the economic determinants on the demand for public higher education in Jordan.

Methodology and Data

Several factors have been pointed out to explain the growing demand for public higher education: demographic factors related to high rates of population growth especially in developing countries; social and cultural factors that may be related to the social prestige, the educational level of parents, the infatuation of girls for enrollment in higher education for certain purposes including principally better opportunities of marriage and employment; and the economic factors or determinants that constitute the main subject of this study.

In an attempt to shed some light on these last determinants of the demand for enrollment at public universities in Jordan, a number of economic determinants assumed to influence this demand will be examined .These determinants for which all figures are taken from the publications of the Department of General Statistics (DOS), and of the General Bank of Jordan (CBJ) constitute the following explanatory variables:

1) Real Disposable Income (RYd):

This income has increased from JD 4535.98 million in 1990, to JD 15706.43 million in 2010 in real prices of 2006. The annual growth rate of this income is (6.2%) which is much higher than population growth rate (2.85%) for the same period.

2) Real Government Support (RGS) to public universities:

This support consists of government subsidies and grants which have varied from about JD 39.8 million in 1990, to JD 50 million in year 2000, and to JD 98.5 in 2003, but to fall again to only JD 22.8 million in 2010, all in 2006 prices.

3) Consumer Price Index for Education (CPIE):

This variable is used to express roughly the cost of all levels of public and private education incurred by families. This index was 48.8 in 1990 and has more than doubled in 2010 to reach 121.8 when taking the year 2006 as base year (100).

4) Unemployment Rate:

This rate has fluctuated over the period of study. The total unemployment rate (UT) for the two sexes was (8.9% for males, 17.7%for females), to rise to its maximum level in 2003 with 19.65% (16.6% for males, 36.6% for females).

The dependent variable which is the demand for enrollment in public universities is expressed by the annual number of the applicants for acceptance in the first university year.

The total number (DT) of these applicants has increased from 18053 in 1990 to 41439 in 2010 with an annual growth rate of 4.15% in average. This number for males (DM) has increased from 9613 in 1990 to 17031 in 2010 with an annual growth rate of 2.86%. For females, the number of applications has also increased from 8440 in 1990 to 24408 in 2010, with an annual growth rate of 5.315 in average. So, it is clear that this rate is nearly two times higher than the same rate of males.

The main sources of the data exploited in this study are: The Ministry of Education (MOE), the Ministry of Higher Education (MOHE), the Central Bank of Jordan (CBJ), and the Department of General Statistics (DOS) in Jordan.

The basic formula for the demand for higher education adopted by this study:

D = F (RGS, UT, RYd, CPIE).....(1)

Where:

D: Demand for higher education

RYd: Real Disposable Income

UT: Unemployment Rate

CPIE: Consumer Price Index for Education

RGS: Real Government Support to public universities

The econometric analysis adopted in this study is based on the following models:

1) $\text{Log (DT)} = a_0 + a_1 \log (\text{RGS}) + a_2 \log (\text{RYd}) + a_3 \log (\text{UT}) + a_4 \log (\text{CPIE}) + u_1$..... (2)

2) $\text{Log (DM)} = b_0 + b_1 \log (\text{RGS}) + b_2 \log (\text{RYd}) + b_3 \log (\text{UM}) + b_4 \log (\text{CPIE}) + u_2$..... (3)

3) $\text{Log (DF)} = c_0 + c_1 \log (\text{RGS}) + c_2 \log (\text{Ryd}) + c_3 \log (\text{UF}) + c_4 \log (\text{CPIE}) + u_3$ ..... (4)

Where:

DT, RYd, UT, RGS, and CPIE are as defined above.

UM: unemployment rate among males,.

UF: unemployment rate among females.

a_0, a_1, a_2, a_3, a_4, b_0, b_1, b_2, b_3, b_4, c_0, c_1, c_2, c_3, c_4 are parameters to be estimated.

u_1, u_2, u_3 are to measure the random error terms.

In order to test the hypothesis of the study, the study has employed the time series analysis in general; the co-integration analysis in particular, as follows:

Empirical Results

A) Integration order of variables:

The integration order of the variables determines the

appropriate approach of estimation. If all variables are integrated of the same order, it is possible for these variables to be co-integrated, and the Ordinary Least Squares (OLS) approach can be adopted. Otherwise, the results of this approach could be misleading and other approaches of estimation should be applied.(Gujarati 1995). For determining the order of integration of the variables, two tests were conducted:

1- Augmented Dickey Fuller Test(ADF) which examines the hypothesis **(p = 0) versus the hypothesis (**$\rho<0$) in the following formula:

$$\Delta Yt = \mu + pYt\text{-}1 + ai \sum \Delta Y\ t\text{-}i + \varepsilon t \quad \ldots\ldots\ldots\ldots\ldots\ldots(5)$$

In this test, the lagged difference terms are included where their number of lags is normally chosen empirically, i.e. enough terms could be included for obtaining serially independent error term in equation (5).

2- The Phillips-Perron Unit Root Test (PPU): This test is basically a test of the hypothesis $\rho=1$ in the equation:

$$\Delta X_t = \mu + \rho X_{t-1} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

The equation is estimated by the OLS method and then the t-statistic of the ρ coefficient is corrected for autocorrelation in εt.

B) Results of (ADF) and (PP) Tests

The results of the tests are displayed in (table2, Appendix1)

The results displayed in table (2) show that (ADF) indicate that the variable, log (DT) is integrated of order (1), i.e. 1(1) considering the calculated value (in absolute numbers) is higher than the critical value (in absolute numbers) at 5% Significant Level. Likewise, log (UT), log (RYd), and log (CPIE), are all 1(1), whereas, log (RGS), log (UM), and log (DF), are all 1(2) at 1% and 5% significance level. Finally, log (UF), and log (DM) are both 1(1) at 1% and 5% significance level.

As for the results of (PP) test displayed in table (2) above: log (DT), log (UT), log (RYd), log (UM), log (UF), log (DM), and log (DF), are all integrated of order (1), i.e. 1(1) since the calculated values (in absolute numbers) are higher than the critical values (in absolute numbers) at 1% and 5% significance level. By the same token, log (CPIE), and log (RGS), are both 1(2) at 1% and 5% significance level.

Given that the results of the two tests are not completely identical; the essential aim is that all the results support that all the variables are integrated of different orders, which allow the researcher to conclude that adopting the (OLS) method is not the appropriate method of analysis, therefore; other methods of estimation should be adopted. Thus, the co-integration method of analysis is adopted in this study.

C) The Co-integration Analysis:

The purpose of this study is to verify whether the five variables are co-integrated, i.e. if a linear combination of these variables is stationary. If this is the case; the regression on the levels of the variables would be significant and any important long-run information will not be missed. (Gujarati, 1995). The important and empirical test for co-integration used in this study is Johansen Co-integration Test. In this test the assumption is linear deterministic trend in the data.

The application of this test produced the results shown in tables: 3-A, 3-B, and 3-C (see appendix 1):

Tables (3-A), (3-B) and (3-C) above confirm the rejection of the null hypothesis of the no co-integrating at 5% (1%) significance level, and the likelihood ratio (L.R) test indicates 2 co-integrating equations at 5% significance level. Referring to these results, the researcher could use the variables in their levels; thus, any order of differencing will not be used. So; the resulting co-integrating equations from Johansen Co-integrating Tests are written as follows:

$$\text{Log(DT)} = 153.40 + 1.14\ \log(\text{RYd}) + 0.26\ \log(\text{RGS}) - 0.59\ \log(\text{UT}) - 0.66\ \log(\text{CPIE}) \quad (7)$$
(0.18) (0.04) (0.08) (0.25)

$$\text{Log(DM)} = 152.39 + 1.59\ \log(\text{RYd}) + 0.24\ \log(\text{RGS}) - 0.19\ \log(\text{UM}) - 1.54\ \log(\text{CPIE}) \quad (8)$$
(0.23) (0.06) (0.07) (0.31)

$$\text{Log(DF)} = 161.04 + 2.23\ \log(\text{RYd}) + 0.11\ \log(\text{RGS}) - 1.61\ \log(\text{UF}) - 2.63\ \log(\text{CPIE}) \quad (9)$$
(0.41) (0.06) (0.22) (0.68)

**** All numbers between brackets stand for standard errors.***

Equations (7), (8), and (9) provide the long-term equilibrium relationship among the variables and indicate the following results:

(1) A positive effect of both log (RYd) and log (RGS) on each of log (DT), log (DM), and log (DF) where the results are all significant.

These results are in accord with the studies of Dinca, Muller&Rockerbie, Canton&Dejong, Alhawarin, Kanaan, and most of the other studies cited in this study.

(2) A negative effect of both log (UT), and log (CPIE) on the (DT) and this result is also significant.

(3) A negative and significant effect of both log (UM), and log (CPIE) on (DM).

(4) Finally, the effect of both log (UF), and log (CPIE) on (DF) is negative and significant.

This negative effect of unemployment rate underlined in this study is not compatible with the positive effect of employment opportunities on the demand for higher education indicated in the studies of Saiti and Prokopiado (2008), Todaro and Smith (2011), and Canton and Dejong (2005). This positive effect means that students pursuit a tertiary level of education hoping improving their opportunities of getting jobs. This may signify also, a positive effect of unemployment rates on the demand for higher education as the study of Shim cited above, has concluded.

Also, the negative effect of the cost proxied by (CPIE), is identical to the results of the studies of Shim (1990), Yang (1998), Todaro and Smith (2011), Chow and Chen (2005), and Agasisti (2009).

So, all these results are compatible with the results of previous studies about this subject. except for the negative effect of unemployment rates; log(UT), log(UM), and log(UF) on the demand for higher education; log(DT), log(DM), and log(DF), which should be positive as expected.

The explanation of this negative effect may be that with high rates of unemployment, some students with secondary certificates, look pessimistically at their professional future, and prefer looking for jobs with their secondary education rather than enrolling in a costly higher education. This explanation becomes logic if we look at the statistics published by the Department of Statistics in Jordan, where ; for example the employment and unemployment survey indicates that 9.1% of unemployed persons aged 15+ years, are of secondary educational level; whereas this rate rises to 34.2% for the university level (Bachelor and above).

D) Variance Decomposition

To make the results more concrete, the researcher has tried to investigate the dynamic short-term relationship among the variables through decomposing the variances through decomposing the variances of log(DT), log(DM), and log(DF).

The results of decomposing these variances are shown in tables (4-A), (4 B), and (4- C) "see appendices".

Table (4-A) indicates that log(RYd) explains 1.52% of the variation of log(DT) after three time periods, and this percentage rises to 2.48% after seven time periods and to 3.74% after ten time periods. Innovation to

log(RGS) were responsible to explain 1.97% of the forecast error of log(DT) after three time periods, 14.12% after seven time periods, and 14% after ten time periods. Moreover, log (UT) explains 33.35% of the variation of log (DT) after three time periods, and this rate falls to 30.62% after seven time periods, and to 29.57% after ten time periods.

These results indicate that the greater effect on log (DT) is for log (UT) followed by log (RGS), then by log (CPIE) and finally, by log (RYd). Variance Decomposition of the variable log (DM) is reported in table (4- B) below:

The results shown in table (4-B) indicate that log (RYd) is responsible for explaining about 10.8% of the variation of log (DM) after three time periods, this rate rises to about 35.7% after seven time periods, and to a bit more than 55% after ten time periods.

The innovation to log(RGS) starts to explain about 12.7% of the forecast error of log(DM) after three time periods to stabilizes after that to about 12.6% after seven time periods and rises again to about 14.7% after ten time periods.

Innovations to log (UM) were found to explain about 2.4% of the forecast error of log (DM) after three time periods, this percentage reaches 4.3% after seven time periods and fall after that to 3.3% after ten time periods.

Finally, innovations to log (CPIE) explain only 0.63% of the variation of log (DM) after three time periods; this percentage rises to 1.5% after seven time periods and to 1.8% after ten time periods.

On the other hand table (4- C) shows that log(RYd) explains 3.9% of the variation of log(DF), this rate increases to 11.2% after seven time periods, and to 13.3% after ten time periods.

The innovations to log (RGS) explain about 15.9% of the forecast error of log(DF) after three time periods, this percentage stabilizes after that at 19.9% and 19.8% after seven, and ten time periods, consecutively.

The innovations to log(UF) starts to explain about 28% of the forecast error of log(DF), this rate falls to 21.6% after seven time periods, and to about 20.9% after ten time periods.

And finally, the innovations to log (CPIE) explain only about 1% of the variation of log (DF), this percentage increases to1.35% and to 2.64% after seven, and ten time periods, consecutively.

Concluding Remarks and Recommendations:

Referring to the empirical results shown in the tables above, we can underline the following remarks:

1) The Total Unemployment rate (UT) explains the bigger part of the variation of the total demand for the enrollment in public universities log (DT) in Jordan followed by the government subsidies log(RGS), then by the cost, proxied by the consumer price index for education Log(CPIE), and finally, the real disposable income log(RYd).

2) It seems that the real disposable income, log (RYd) explains the greater part of the variation of the males' demand, log (DM), for the enrollment in public universities in Jordan. Government subsidies, log (RGS), come in the second position, after that, comes unemployment rate among males, log (UM), and in the last position comes the cost represented by log (CPIE).

3) Concerning female demand (DF) for the enrollment in public universities in Jordan the results reveal that among the four explanatory variables used in this study, the unemployment rate among females log (UF) seems to explain the larger part of the variation of this demand, followed by the government subsidies, log (RGS), then by real disposable income, log (RYd), and lastly comes log (CPIE) which represents the cost of education as mentioned above.

With respect to the results of this study, we can formulate the following recommendations:

1) Reviewing the policies of admission at public higher education in such a way that leads to the abolition, or at least, limiting the exceptional admissions in order to satisfy the demand of the students obtaining higher scores than those admitted exceptionally.

2) Intensification the efforts of orientation of students at primary level towards the vocational education and training, in order to limiting the demand for enrollment at public universities.

3) Increasing the government subsidies to public universities in order to enable them to allocate more funds for expansion and creating additional supply of university seats.

Finally, we hope that this study attract specialized researchers to conduct further studies in this important domain aiming at investigating other factors affecting the demand on higher education, precisely; the social, cultural, and demographic factors.

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المحددات الاقتصادية للطلب على التعليم العالي في الأردن
دراسة قياسية (1990 – 2010)

ماجد فرحان بدر[1]

ملخـص

تهدف هذه الدراسة بشكل أساسي إلى استقصاء العوامل الاقتصادية المحددة للطلب على التعليم العالي في الأردن خلال الفترة (1990-2010). و لقد استخدم الباحث طريقة التكامل المشترك بأربعة متغيرات مستقلة. ولاختبار جذر الوحدة تم استخدام أسلوبين، هما: اختبار ديكي-فولر الموسع؛ واختبار فيليبس-بيرون؛ وذلك بهدف اختبار درجة تكاملية المتغيرات المستخدمة في الدراسة، كما تم استخدام طريقة جوهانسن للتكامل المشترك في التحليل. وبهدف دعم نتائج الدراسة تمت دراسة التفاعل الديناميكي بين المتغيرات باستخدام تحليل مكونات التباين للطلب الكلي (للذكور والإناث) معا، لطلب الطلبة الذكور، وكذلك لطلب الإناث؛ على التعليم العالي. وتشير نتائج الدراسة التي تطابقت مع نتائج الدراسات السابقة في العديد من الدول التي تدعم أيضا الفرضية الرئيسة للدراسة، الى أن أثر كل من المتغيرين المستقلين: الدخل الحقيقي المتاح، والدعم الحكومي للجامعات الرسمية كان ايجابيا؛ في حين كان أثر كل من المتغيرين المستقلين الآخرين: الكلفة الممثلة بالرقم القياسي لسعر المستهلك الخاص بالتعليم، ومعدلات البطالة سلبيا.

الكلمات الدالة: المحددات الاقتصادية، الطلب على التعليم العالي، الجامعات الحكومية، تحليل التكامل المشترك.

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