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EXPLAINING THE FACTORS EFFECT ON DEVELOPMENT BUDGET ALLOCATED TO EDUCATION SYSTEM IN IRAN

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ABSTRACT

The credits of capital assets acquisition (Development Credits) are supplied from General revenue resources and are spent for development and provision of educational facilities and the provision of laboratory equipment, workshop and to buy school furniture. In the present research, the Wagner's law was tested in the field of Explaining the factors effect on development budget allocated to Iran's public education system. According to this theory, government increases the spending on education, with increase of GDP and student population growth. In this article the mentioned theory was tested by Vector Auto – Regressive Process and VECM methods of Johansson–Juselius for the time period of 1971 to 2013. The results showed that in the short run, changes in the share of development credits had no relationship with Student numbers, government revenues fluctuating, plans, goals and educational activities and was also not affected by expansionary and contracting policies of government. Therefore the Wagner theory is not suitable for specifying the factors effect on allocation of development credits. In addition, the variables of development budget of Ministry of Education and the government's development credits, with a delayed period have had positive and negative effects on development credits of the education system, respectively. The results from variance decomposition also showed that most of the share in the changing of public development credits of the public education system belonged to variable itself (approximately 70 percent) and in next rank explained by education funds, Government spending, government development credits and government fiscal policies, respectively.

Keywords: *Development Budget of the Public Education System, Wagner Theory*

Contribution/ Originality

The paper's contribution is finding that the development budget of the public education system in Iran had no relation with student numbers, plans, goals and educational activities and was also not affected by government revenues fluctuating and contracting fiscal policies. The most shares in changes of size of development credits of Ministry of education were explained by itself.

INTRODUCTION

General budget of the government includes the current (running) and development credits. The capital assets acquisition credits (development) for creating or developing new capacities are provided from General revenue. Public funds are the financial sources related to ministries, government institutions, government companies and non-governmental institutions which can be consumed for public expenditure. Development credits of Ministry of education are governmental sources which are spent to develop and provision of educational facilities and equipment, laboratories, workshops and to furnish new schools. Ancillary costs for these activities, as the cost of mapping and the needed technical documents for building schools and also the cost of providing and preparing the land, walls and landscaping schools and paying shared costs and providing water, electricity and gas are Considered as a part of these credits. In the present study, it was tried to determine the factors affecting the development budget of Ministry of education.

Public education development credits variable was considered as the dependent variable and the variables of education funds and budget deficit, government oil revenues, government spending, government development budget, student population growth and fiscal contracting policy of government were considered as independent variables.

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According to the importance of development expenses for developing and improving the quality and quantity of education and its effect on reducing inequalities in educational opportunities, understanding government behavior in the allocation of development budget to the public education system is important. This research has investigated the government behavior about development budget determination in order to identify factors influencing the government's decision to allocate funds to development programs of public education.

Theoretical Framework

Adolf (1835-1917) states that in the industrialization process, the share of government spending increases (Alavi, 2001). Wagner's other explanation about the growth of governmental expenses is based on the type of commodity and services that government offers. A service like education has high income elasticity and the government spending on education is aimed at developing human capital and better distribution of income (Mehnatfar, 1999). Therefore it's expected that the relationship between government spending and the mentioned factors is positive. The Peacock and Wiseman (1961) theory (the ratchet theory of government growth) is based on this assumption that temporary crisis such as war, leads to the increase of government spending and after that stabilizes in a higher level (Mehnatfar, 1999). In this article the use of the Wagner theory was tested for explaining the effective factors on development credits of Ministry of education.

Literature Review

Ansari (2014) has concluded that non-personnel credits of the education system in Iran have been affected by the growth rate of the number of employees and size of credits for the previous year. Javadi (2011) states that the rate of the student population growth and size of previous year credits had been affected on the education system's credits. Ansari (2010) in an article stated that the competition of influential groups and government agencies for having more access to rent and the relative paucity of opportunities for rent seeking in the public education system are among the most important reasons for inadequate allocation of credits to the education system. Morekwa (2007), in a study investigated the effective factors on government funding structure of African countries for the years 1995-2004 and showed that with the increase of political stability, the public education expenses share of GDP increase. Chakrabarti and Jogleker (2006) have investigated the changes in patterns of governmental resource allocation to education in 15 main states of India. Results indicated that educational expenses in all levels reduced after economical post-liberalization period.

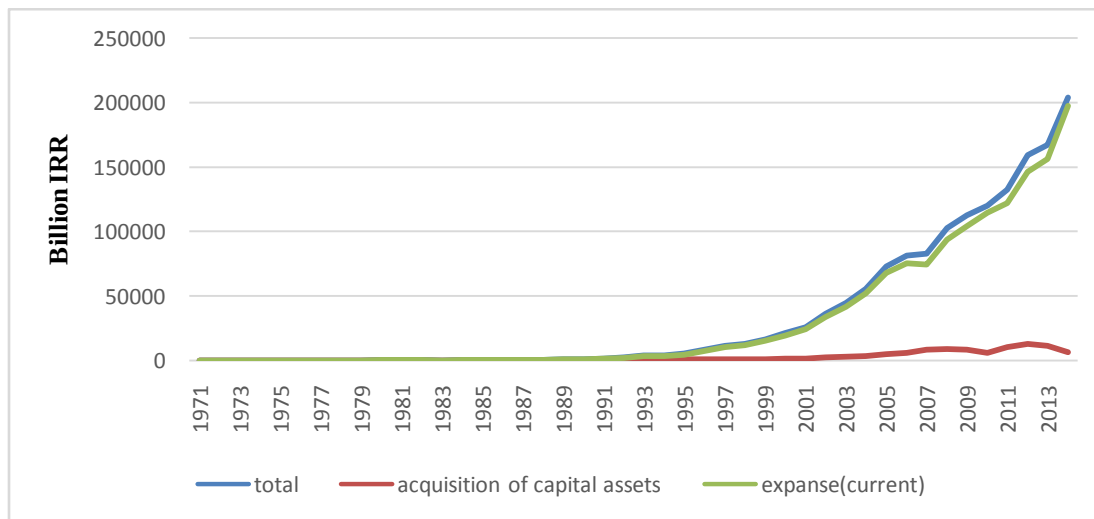
Also in states where the proportion of female students was more than male students, educational expenditures were lower. Douglasson (2004) has concluded that the government's income had significant positive effect on governmental education expenditures. She, Chih (2004), showed that per capita income variable has a positive and significant effect and population variables in the ratio of 5 to 17 years and 65 years above has a negative and significant effect on governmental per capita education expenditures. Strawczynski and Zeira (2003) showed that the population size has a positive and significant effect, Composition of student population has a negative effect and income or per capita GDP and governance period of Robin's government has a positive and significant effect on the increase of the share of public education spending. Verbena and Chowdhury (2002) showed that in the newly independent countries of the former soviet, government income and the number of students have a positive and population density in the area has a negative effect on government educational expenditures, in academic year (1999-2000). On the belief of Mehnatfar and Samimi (1999), the most important factors affecting the current government spending in the provinces of the country are: number of students in the provinces, urban population in each province, inflation ratio and province revenues from provincial and national incomes. Taghavi and SaniDanesh (1996) showed that oil income is considered as a main reason of fluctuations in the general budget and testing the government of Iran with the Wagner theory doesn't have a positive result. Dao (1995) investigated the determinant factors of governmental expenditures in 105 countries and showed that they were positive and significant for defense expenditures, education system, welfare and social security, housing and health, income elasticity of demand. Ram (1987) showed that the Wagner theory was rejected in 60 percent of the understudied countries by using time series and cross data of

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115 countries. Reviewing the above articles indicates Lack of support for theory in some articles and placing arbitrary variables are considered the most lack in them.

Evaluation of the Share of Development Credits from Ministry of Education

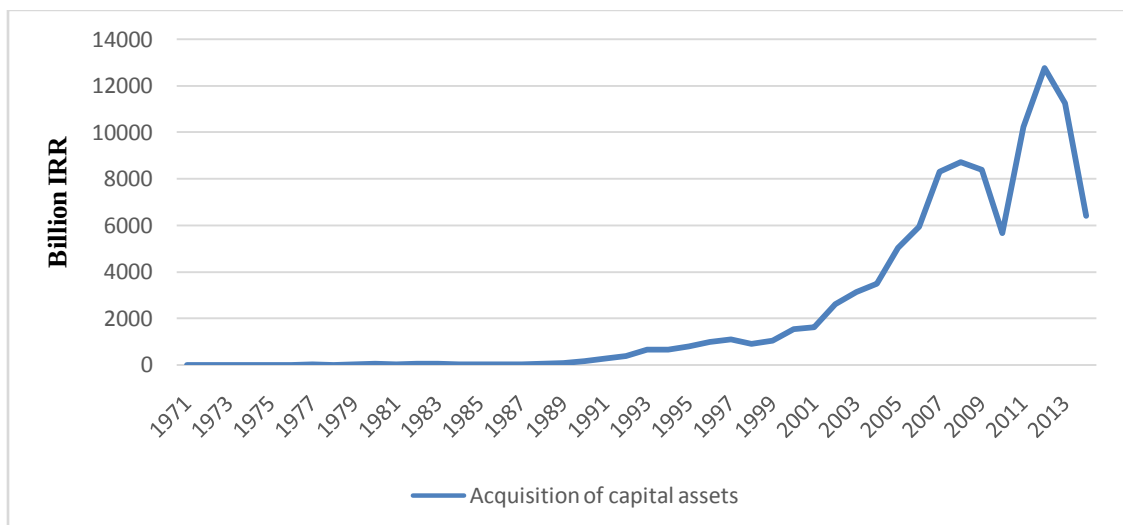
In this section some of the indices related to developmental government credits of the public education in Iran were reviewed.



Source: statistics and planning and budget office of the education system in 2014

Diagram 1: whole, current and developmental government credits of the public education system (1971-2013)

As it can be seen, the changing trend of the government credits for the education system is completely affected by current credits and development credits doesn't have a significant effect on the general changes of the entire governmental credits in the public education system.

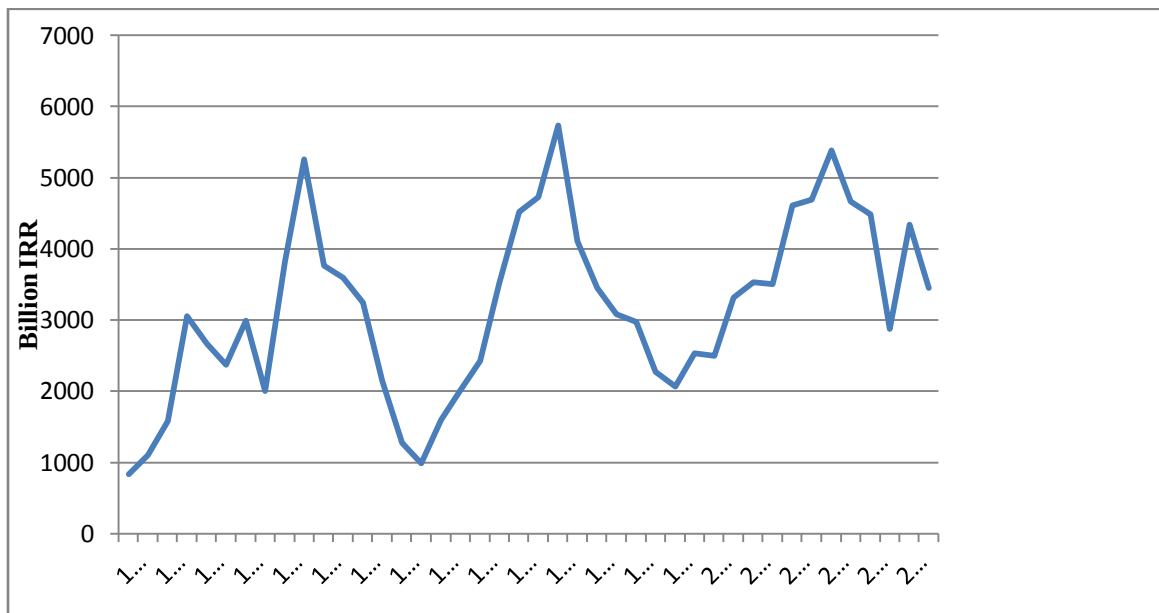


Source: statistics and planning and budget office of the education system in 2014

Diagram 2: The process of changes of development credits of ministry of education during (1971-2014) (current pricing)

Survey data on the approved development budget at current prices showed that during this time, the process increases but in the years 2010 and 2011 it significantly reduced.

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Source: statistics and planning and budget office of the education system 2014

Diagram 3: The process of developmental credits changes of the education system during (1971-2011) (constant prices)

Reviewing the information of diagram 3 shows that the development budget approved at constant prices in under studied period has faced with fluctuations. The highest level belongs to the year 1993 and the lowest to 1971 and 1986. In the past decade also the most drop assigned to the year 2010 that after increase in the years 2011 and 2012, faced with reduction in the year 2013.

MATERIALS AND METHODS

Method and Research Model

In this research, the method was causal comparative and of numerical indices extracted from documents. In this regard linear combination was used in combine with criterion critical variables of development credits of Ministry of education and the credits, budget deficit and personnel credits of Ministry of education, growth rate of student population, payments or government spending, gross domestic product, inflation ratio, growth rate of liquidity, government income and oil income, number of staffs and dummy variables during war times and government contracting fiscal policies as predictor variables.

Growth rate of students, war times and other variables are based on Wagner, Masgrio and the ratchet of government growth of Peacock and Wiseman theories.

Time series data related to the macroeconomic variables like government incomes and oil income, government expenditure, gross domestic production, inflation ratio and liquidity growth rate were from a set of economic and social time series data of the Central Statistics of Iran, Central bank of the Islamic republic of Iran and information related to budget and development credits and annual budget deficit of Ministry of Education and number of students were gathered from the office of statistics and planning and budget of Ministry of education. All the variables were placed in a time series frame covers under study period of 1971 to 2013.

In this article, advanced time series analyzing methods based on stationary test, co integration, and causality test were used for model making and estimating. the used model for analyzing short and long term relations of development credits of Ministry of education and factors affecting it, estimating parameters and predicting relations, is Vector error correction model (VECM) of Johansen-Juselius. The mentioned model was Vector Error Correction (VAR) with co integration characteristics between economic variables.

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RESULTS AND DISCUSSION

Findings

In this section the findings obtained from ordinary least squares model and vector regression with the results of the unit root tests and Johansen-Juselius have been provided and analyzed.

Model Variables

G CONS BUD: Government development credits

CONS BUD: Development credits of Ministry of education (approved)

REALBUD: Paid credits of Ministry of education (realized)

BUDDEF: budget deficit of Ministry of education

OILIN: Government oil income

INF: inflation ratio

EX: government expenditures

COST: Government consumption expenditures

GDP: Gross domestic product

LIQ: Liquidity growth rate

DPOP: Student population growth rate

DUMMY: Dummy variable for contracting fiscal policies of government (for the years that the rate of government Consumption expenditures was negative considered equal to 1 and for other years 0.)

W: dummy variable for war (for war times is included 1 and for other years 0)

In this path firstly, long-term linear relationship between all the mentioned variables (as independent variables) with the development credits of Ministry of education (as a dependent variable) was estimated by Ordinary least squares (OLS) and the results include:

Table 1: Estimated results of Ordinary least squares (OLS)

Variables	Coefficient	Possibility
Intercept	8045,32-	0.7905
G CONS BUD*	0.1093	0
BUDDEF*	-0.19.6	0
OILIN	0.001062	0.9911
EX*	-8886	0.0124
GDP	0.0091	0.7843
INF	23.568	0.7347
LIQ	-0.00079	0.9768
COST	-0.013041	0.6134
DPOP	-92.0569456	0.821
REALBUD	4.8766	0.8377
DUMMY*	-42487.91	0.0123
W	363.8956	0.8765

Source: Researcher's calculations with the use of Eviews software

*The Starred variables are significant at confidence level of 95 percent

The results of Table 1 showed that the coefficients of the government development budget, budget deficit of Ministry of education, government spending and the dummy variable for the government's fiscal policies variables were significant at the confidence level of 95 percent. Moreover, three variables of budget deficit of Ministry of education, government expenditures and contracting fiscal policy of the government variables had a negative and significant relationship and the Government development credits had a positive and significant relationship with the development credits of Ministry of education. Meanwhile, government oil income variables, gross domestic product, inflation ratio, liquidity growth ratio, government consumption costs and the rate of population growth of students and dummy variable of war years didn't have a significant relation. Following significant variables were placed in the vector regression model.

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Vector Auto Regression Model

The following is estimated a reduced form of vector regression model as follows:

$$Z_t = C_1 Z_{t-1} + U_t$$

Where, Z_t vector 5 x 1 is dependent variables in time t and C_1 is Coefficients Matrix for independent variables. All the variables in the simple above regression which were significant are placed in the years 1971 till 2013 and are endogenous.

Tests of Unit Root

To avoid the consequences of spurious regression and evaluate the possibility of achieving co integration vectors, it is necessary for the variables to be determined by the Stationary test and the degree of co integration. To evaluate the Stationary of the time series, the augmented Dickey-Fuller test was used. The used results of this test for the entire independent variables of vector regression model areas follow:

Table 2: The unit root test results for all variables

Name of variables	Test statistics values	Crisis values1%	Crisis values5%	Crisis values10%	Test result
CONS BUD Development credits	-3.79	-4.34	-3.68	-3.28	I(0) Is on a Stationary level
REALBUD Paid credits of Ministry of education	-7.35	-4.33	-3.59	-3.25	I(1) Is Stationary with a time difference measurement
BUDDEF Deficit of the public education system	-6.12	-4.31	-3.58	-3.24	I(1) Is Stationary with a time difference measurement
G CONS BUD Government development credits	-4.47	-4.31	-3.59	-3.24	I(0) Is on a Stationary level
EX Government expenditure	-7.54	-4.25	-3.52	-3.27	I(1) Is Stationary with a time difference measurement
DUMMY dummy variable for the years of contraction policies of the government	-4.21	-4.31	-3.59	-3.24	I(0) Is on a Stationary level
PASMAND Residuals	-4.36	-4.32	-3.59	-3.25	I(0) Is on a Stationary level

Source: The researcher's calculations with the use of Eviews software

According to the table information, all the variables except paid credits of the education system, budget deficit of the education system and government expenditures which were Stationary with a time difference measurement, the rest of the variables were on a Stationary level. Therefore combining these variables, co-integration was in first order and it was possible to estimate the vector regression model.

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Determine the Order of Vector Regression Model

Since the Johansson-Juselius method is based on a VAR model, it's necessary that a VAR model estimated and Order of the VAR model using model selection criteria meaning Shwartz-Bizin(SBC), Acaik(AIC) and HananQuiin(HQC) criteria, determined before estimating the auto-regressive process model.

Table 3: Different criteria to determine the order of the model

Pause	HQC	SBC	AIC
0	110,6421	110,8327	110,5525
1	107,7674	109,105	107,1398
2	107,3447	109,8224	106,1793
3	99,8518	103,4730	98,1484

Source: Author's calculations with the use of Eviews software

According to the table information, if each of the criteria is placed as a base, the order or optimal interval equals to 3.

Determining the Number of co-integration Vectors

Various methods existed in model to determine the co-integration vectors. In present study, Johansen's test was used and the results were provided in the co-integration table below:

Table 4: Determining the number of co-integration vectors used by Johansen's test

Number of co-integration vectors based on the null hypothesis	Characteristic root of eigenvalue	The test statistic result Trace	Critical value on the level of 5%	The maximum test statistic	Critical value on the level of 5%
None*	0.8348	139,591	95,754	57,625	42,077
At most 1*	0.6949	81,966	69,818	37,993	34,177
At most 2	0.5768	43,9729	47,856	27,52016	25,61233
At most 3	0.261094	16,4527	29,797	9,5531	20,932
At most 4	0.1917	6,8997	14,99472	6,8118	14,2646

Source: The researcher's calculations used by Eviews software

Table 5: The estimated results of vector error correction model

The dependent variable D CONS BUD)		
Independent variable	Estimation	T Statistics
C	-4481,599	-0.43
ECM(-1)*	-0.67	-5.06
D(CONS BUD (-1))*	-0.58	-1.69
D(REALBUD(-1))	0.042	0.88
D(BUDDEF(-1))	-0.024	-0.48
D(G CONS BUD (-1))*	6445,309	1.94
D(EX(-1))	4.47	0.83
D(DUMMY(-1))	-11040,74	-0.41

Source: The researcher's calculations used by Eviews software

*Starred variables on a significant level are 95 percent significant

The results of table 4 shows that the hypnosis of lack of co-integration vector and also the existence of one co-integration vector was rejected and the number of co-integration vectors in the level of 5% was obtained equal to 2 by doing both trace test and maximum eigenvalue which implies the existence of long-term relationship between the variables of the model.

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Estimating Vector Error Correction Model

Since the entire model variables were not on a stationary level but were co-integration, it was appropriate to use the vector error correction in order to estimate the model. The optimal lag length of variables with the use of Akaic, Shwartz-Bizin and Hanan-Quin statistics were equal to 3 lags. In addition, the numbers of co-integration vector models, with the use of Johansen's convergence test, were two vectors. Therefore vector error correction model was estimated and the results have been shown in the above table (table 5): Findings show that the dependent variable is endogenous and indicates the long period causal relation from independent variables to dependent variables. By reviewing the rest of the model variables, it can be understood that in the short run, the general development credits of Ministry of education and the development credits of the government variables affect on the dependent variable with delay and is significant on a 95 percent level. In the other words, development credits of the public education system as a dependent variable has a negative significant relation in a one year lag and shows that during the course on average, development credits after the year which experienced positive growth, has met with reduction. In addition the positive and significant relation of the development credits of Ministry of education variable with the development credits of the government variable means that reduce (increase) of the development credits is parallel to reduction (increase) of the development credits of the government. It should be emphasized that other variables don't have significant relations with the variable of development credits.

Short-term dynamics

Since the interpretation of the result of vector regression models about the obtained coefficients is difficult, for the inference of the related results and generally reviewing the short-term dynamics of the model the impulse response function and variance decomposition are used.

Table 6: The effect of shocks on each of the endogenous variables of the model on the size of development credits of the public education system

Period	Government expenditures	Development credits of the government	budget deficit	Paid credits of the public education system	Development credits of the public education system
1	0	0	0	0	1
2	24,8	-4569,44	0.055	-0.08	-0.25
3	4,03	-10347,01	-0.009	-0.02	-0.23
4	16,71	-7428,172	0.091	-0.15	0.46
5	4,86	-4238,369	0.01	-0.047	0.38
6	18,23	-6971,782	0.06	-0.102	0.19
7	8,38	-6746,181	0.017	-0.055	0.0007
8	13,86	-7716,560	0.056	-0.104	0.28
9	9,77	-5510,918	0.033	-0.074	0.25
10	13,99	-6982,511	0.043	-0.085	0.21
11	11,49	-6467,626	0.04	-0.08	0.15
12	11,76	-7052,166	0.04	-0.08	0.21
13	11,83	-6340,915	0.04	-0.08	0.22
14	11,46	-6676,596	0.04	-0.08	0.20
15	12,17	-6646,837	0.04	-0.08	0.19
16	11,47	-6695,541	0.04	-0.08	0.19
17	12,05	-6631,263	0.04	-0.08	0.21
18	11,6	-6589,405	0.04	-0.08	0.20
19	12,01	-6687,438	0.04	-0.08	0.20
20	11,68	-6623,284	0.04	-0.08	0.20

Source: The researcher's calculations used by Eviews software

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Impulse Response Function

The impulse response function indicates that if a shock in a size of one standard deviation happens in every one of the endogenous variables of the model, how would the effect of it on general development credits of the education system be.

Information on the first line indicates that when a shock as a standard deviation was given in the size of general development credits of the public education system, the effect of this shock on the size of general development credits of the public education system during 20 year period was in a way that the size of credits in the first year increases by 1 unit, in second and third year reduced, in the fourth year increased and after that has been reduced and till the end of the course has been stabilized on 0.20 level.

The Variance Decomposition

In this method, the prediction error variance is decomposed to elements that take each variable shocks and make it possible to estimate that what percentage of prediction errors is explained by changing the variable itself and what percentage of prediction error is explained by changing of other variables. The results of Variance decomposition of development credits of Ministry of education is shown in the table below:

Table 7: The results of Variance decomposition of the development credits of Ministry of education (percentage)

Period	DUMMY variable of the government policies	EX Government expenditures	G CONS BUD Government development credits	BUDDEF Budget deficits	REALBUD Paid credits	CONS BUD Development credits	S.E
1	0	0	0	0	0	100	54146.41
2	2.42	10.31	0.012	1.13	14.29	71.8	101295.7
3	6.07	9.81	3.03	2.04	14.3	64.73	106788.8
4	5.32	11.4	4.79	3.62	18.73	56.13	115378.5
5	5.03	11.03	5.21	3.51	20.55	54.66	118715
6	4.59	12.71	5.18	3.09	17.56	56.87	128460.4
7	4.98	12.97	5.79	3.14	17.74	55.37	131211.7
8	4.68	13.64	6.68	3.49	17.93	53.57	136407.8
9	4.54	13.85	6.99	3.46	18.48	52.64	139455.2
10	4.41	13.32	7.33	3.47	17.68	52.79	144271.7
11	4.41	14.73	7.65	3.56	17.60	52.13	147513.2
12	4.32	15	8.09	3.58	17.61	51.4	151272.5
13	4.22	15.32	8.36	3.59	17.64	50.87	154638.7
14	4.16	15.56	8.63	3.61	17.48	50.57	158123.7
15	4.11	15.86	8.86	3.69	17.35	50.20	161495.5
16	4.07	16.06	9.12	3.71	17.35	49.76	164695.7
17	4	16.29	9.33	3.73	17.28	49.42	167962.3
18	3.96	16.47	9.53	3.74	17.24	49.12	171055.1
19	3.92	16.67	9.71	3.75	17.15	48.86	174205.3
20	3.88	16.83	9.88	3.76	17.12	48.56	177190.7

Source: The researcher's calculations used by Eviews software

As it shown in the first row of the table, in the first period, the entire error variance of development credits size was explained by the variable itself. In the second period 71 percent of error variance Justified by the variable itself and 14 percent by paid credits of Ministry of education, 1.13 percent by budget deficit of the public education system and 0.01 percent by development credits of the government, 10.31 percent by government expenditures and 2.42 percent by dummy variable for government fiscal policies. In the last period it can be also observed that, approximately 48 percent of the size of changes in development credits of Ministry of education Justified by the variable itself, 17 percent by paid credits to Ministry of education, 3.76 percent by budget deficit of the education system, 9.88 percent by development credits of the government, 16.83 percent by government expenditure variable and finally 3.88 percent by dummy variable for fiscal policies of the government are explained. Therefore It can be concluded that in a 20 year period, the most share in changes of development credits of the public

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education system was explained by the variable itself and after that explained by paid credits of the education system, government expenditures, development credits of the government, government fiscal policies and finally budget deficit, respectively.

Conclusion

In the present article, it was attempted to evaluate the effective factors of development credits of Ministry of education from Wagner's point of view.

Findings indicated that the Wagner theory was rejected for lack of relationship between development credits of Ministry of education with the number of students. In the short run, the development credits variables of Ministry of education and government development credits with a delay had negative and positive effect on the dependent variable model (development credits of Ministry of education), respectively. In addition, the positive and significant relation of development credits with government development credits indicated the alignment of the changing process in the development credits of Ministry of education with government development credits.

It should be emphasized that the variables of total credits and budget deficit of Ministry of education, student population growth rate, dummy variable for contracting fiscal policies of the government and oil incomes of the government, didn't have significant relationship with the variable of development credits.

The results from variance decomposition also indicated that the most shares in changing of the general development credits of Ministry of education was explained by the variable itself (approximately 70 percent) in 20 years period and after that by paid credits of Ministry of education, government expenditures, government development credits, government fiscal policies and finally budget deficit, respectively.

In summary the development credits of Ministry of education are affected by the amount of government budget in previous year and government development credits. Therefore goals, approved programs and the performance of the education ministry don't effect on the development credits, even if they have been emphasized in official documents of development plans and the size of effectiveness of governmental allocated development credits is indistinctive from quality goals, strategies, policies and general guidelines of the education system.

In addition, development credits of Ministry of education are not depended on the general government revenues and government oil incomes and the government contracting fiscal policies for inhibiting the macroeconomic variables like inflation, unemployment and budget deficit also not effective on the allocation of these credits to the public education system. Therefore the subject of determination of development credits of the public education system should be considered as a phenomenon based decision making and be studied in the area of political economics. According to the Constitution, the government is responsible for public education financing and the main solution for dealing with these challenges, is differentiation between the area of decision of the government and state. Therefore in a condition that the constitution of the Islamic republic of Iran places the oil sources to the Islamic state (and not the government) hands, Distinction between the two concepts of government and state can open a new portal for the discussion about reform the share of the development budget in the public education system. Therefore it is recommended that the allocation of human resources development policies, from the government officials who are not periodical be approved and be delivered to the government and parliament for the annual credits.

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