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The Effects of Human Capital on Investment

Siamak Shokouhifard[1], Ali Salmanpour[*2], AmirAli Farhang[3]

1- Young Researchers and Elite Club, Ardabil Branch, Islamic Azad University, Ardabil, Iran
Email: S.Shokouhifard@iauardabil.ac.ir
2- Corresponding Author, Associate Professor, Department of Economics, Marand Branch, Islamic Azad University, Marand, Iran
Email: Ali_Salmanpour@marandiau.ac.ir
3- Department of Economics, Payame Noor University (PNU), P.O BOX, 19395- 4697 Tehran, Iran
Email: S_Farhang@pnu.ac.ir

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Abstract

Today, human capital, created through education, is growing at a higher rate than physical capital. In addition, the small and insignificant depreciation of human capital and its longer life than physical capital has caused human capital to grow more and more. Improving the quality of human capital through education boosts production and investment, especially private sector investment. On the other hand, investment is one of the macroeconomic variables that has been noticed by economists with different approaches in recent decades. Basically, the contribution of investment in the national net production in a period of time can show the economic status of a country. According to imprtance of subject this study examining the effect of social welfare costsand education costs of government on private sector investment over the period 1975- 2023 in Iran with using VAR model. Convergence vectors estimated with Johansen method. The empirical results show that social welfare costs of government has negative impact and education costs of government has positive impact on private sector investment.

Keywords: Human Capital, Government, Investment.

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Introduction

Private sector investment is one of the macroeconomic variables which has been the focus of attention of economists in recent decades with different approaches. Basically, the share of private sector investment in DDP in a period of time, can be an indicator of a country's economic status.

A study on developed countries reveals that the main reason of their economic development is investment. Through investment, resources are used better and more efficiently. Some studies suggest that private sector investment has a stronger and more efficient impact on economic development that governmental investment (Yousefi and Aziznezhad, 2000).

Due to lack of a sufficient investment market in developing countries, investment is usually divided into two types of private sector and governmental (Gorji, 1378). Government costs are those determined by the senate of a.country as the country's annual budget. Private sector investment is physical possessions which last more than one year (Mehrad, 2010).

In minor economy, analysis of investment mostly consists of an analysis of economic plans and their feasibility and through this process some factors are presented. While an analysis of investment in major economy, in fact is the inter-reliant effect of whole investment, governmental investment, private sector investment, and investment in other sectors of the economy with other verifiers of macroeconomic using mathematical models and econometrics methods (Gasgari and Associates, 2013).

Social Welfare

Conceptually in this discussion, it can be drawn into attention through two aspects:

A. General concept of social welfare: at this level, social welfare is sometimes referred to as social services, social rights, nation's rights, and constitutional rights of people, which are used to refer to all people of the society, despite their physical, mental, social, cultural or economic traits. This part of social welfare programs are usually introduced as the nation's rights in different constitutions.
B. Special concept of social welfare: social welfare in special description in related to special groups in the society. These special groups are people from the society, who because of their special physical, mental, personality, emotional, social-economic or cultural traits are in a situation different from the majority and so need s special program in social welfare plans and implementations. In this approach, social welfare means a set of regulations, plans and policies aimed at satisfying human's civil and spiritual needs in order to provide them with perquisites of development and perfection.

In another definition of social welfare it is mentioned that: "social welfare, and welfare in a society andthe amount of moral and material facilities the society is provided with, are determiners of the level of welfare of the people of that society (Mazidi, 2000).

Education

Today, education is one of the most important matters of human life. All societies, no matter what their beliefs and insights, and even with different objectives, accept education as one of the most important sectors of individual and social living of human in today's advanced world. Education is defined as a continuous action, which covers different aspects of life, and

is there to help develop human beings into perfection in both cultural and social matters (Dehghani and Associates, 2013).
Education costs is a set of governmental and family expenses during a working year, which is spent on the people of a society (Iran's statistics center). Education costs are divided into two groups: (1) individual expenses and (2) social expenses.
Individual expenses include costs which are paid straight from one's income for educational matters and are divided into two types of expenses: Evident and hidden costs. Evident costs are expenses paid by the student or his/her family for books, stationary, uniforms, commute etc. and it is sometimes referred to as private expenses. Hidden costs are those based on other opportunities which one misses because of their education.
Social expenses are those paid by the government of the society for each student, in every education grade which include continuous and construction costs. Continuous costs are those paid by the government for an educational year; and construction costs are those paid for facilities, construction of educational centers and machinery. These costs are newly demanded every two or three years.
This research tries to answer the following question: are social welfare and education costs influential on private sector investment? Therefore to be able to answer this question precisely, the following theories are assumed:
Social welfare costs have a positive effect on private section investment.
Education costs have a positive effect on private section investment.

Literature Review

Providing an appropriate level of livelihood, improving performance, decreasing wastes through enabling and improving the country's human investment, improving people's living situation and living standards, providing the necessary perquisites for forming economic development (investing on people and ensuring them for developmental maneuvers), are all economic musts of social welfare and of expenses of government regarding this field (Masoud Asl, 2010).
The class approach of social welfare was first arisen from tiring situations of production and poverty among laborers in Europe after the industrial revolution and it was designed to ensure continuous occupation of working force to accomplish the demands of employers and to prevent any strike by laborers. In this model, the aspects of social security were focused on covering the working force. In the developing approach or the neorealist approach, with reliance on foundations of social evolution, an effort has been made in order to implement appropriate solutions for those who have not been able to keep up with the society in the development process based on assigned regulations. Since in this approach, development is mostly considered based on its economic aspect, welfare measures are also focused on unofficial groups of people. In the modern approach which is based on human development, the people of a society are considered to be the main source of power and wealth. Therefore the focus of welfare measures is on developing and improving human skills and provoking human talents and promoting their qualifications (Madani, 2003). Improving the skills of human forces and social welfare measures for human investment leads to an increase in domestic production, which causes a growth in investments, especially private sector investment.

Making the effort to satisfy the needs and demands of a society regarding economic and social activities and human force training, or in other words; "specializing" is considered to be the main objective of education. Education plays an important role in economic growth and private section investment. Because from one point of view, it directly helps to recognize and unlockpotentials and talents, to increase skills and results in an escalation in the income of the individual. On the other side, education helps educated people to have better performance in production processes and as a result production of capital, Gross domestic product, and private sector investment are escalated.

Education is in some terms an investment for economic development. This point of view has drawn the attention of many specialists and is the source of special considerations about education from an economic aspect. Adam smith, one of the most validated classic economists suggests that; since gaining knowledge needs expenses and these expenses are investments and not waste, the receiver of this education, is considered a constant investment who will in turn increase the production force and the social income in production processes. Simon kuzentz believed that every time there is speak of "capital" it should cover both "physical capital" and "human capital". He did not consider DDP to be an appropriate yardstick for measuring the production capabilities and economic growth of countries, because in GDP, unlike investment in facilities, investment in human is not valued.

Theodore Schultz who is one of the most important contemporary economists and is considered to be "the father of human capital", believes that acquired abilities which lead to increased productivity, risen production capabilities and income, are in fact capital commodity and create stable production services and are a kind of investment. Since today working forces receive a variety of specialized trainings and since much human capital is illustrated in working force, Schultz believes that our working force today are in fact our real capitalists. He refers to working force as capitalists because the skills and abilities recognized in it are investments and are of great economic value (Emadzadeh, 1999).

The main reason why education is important is that nearly in all societies, educated people in equal circumstances have better incomes. Therefore expenses paid for educational matters are some kind of private investment by which one can ensure an increase in his/her future income. Today this kind of investment is highly beneficial and many people make such investments on self or their children.

In a research titled "the effect of government expenditures in crisis", . ruckner and Tuladhar demonstrated that government expenses have an alternative impact on private sector investment and private consumption and this alternative impact in 1980s and 1970s was 25% more than in 1990s.

In a research titled "the effect of government expenses on private sector", Forceriand and Ricardo (2009) used logical data to analyze 145 countries between years 1960 and 2007. The result of their research revealed that government expenses have negative effect on both consumption and private sector investment.

Soreiz (2006) showed that capital expenditure of a government in different forms, enters markets as demand for goods and services and if there are no structural constraints in production, it will lead to increase in production, income, and private sector investment.

Sun G has studies the influence of capital expenditure of Korea on private sector investment. Based on the results of this research, the effect of capital expenditure of a government on private sector investment is positive.

Mamatzakis (1996) studies the influence of capital expenditure of Greece on its private sector investment, using the VAR approach. He considers private sector investment to be under the influence of GPD, profits, government capital expenditure and consumption spending. Based on his findings government capital expenditure has a positive effect on private sector investment, while government consumption spending has a negative effect on the same matter.

Sundrajan and thankur (1980), Wang and Tanway (1982), studied the relationship between public investment and private sector investment in India, Korea, Greece, Malaysia, Mexico and Thailand using the flexible acceleration model of investment. They believe that algebraic substitution can occur through both government spending which leads to an increase in rates, and downturn of private sector investment, and through some resource allocation mechanisms. Also the supplementary effects of public investment are emphasized and there is only the financial aspect of substitution effect.

The innovation set in this research is that capital expenditure is divided into two sides: social welfare and education; and the influence of these expenditures on private sector investment are determined.

Methodology

Research Model Introduction

The theoretical framework of this model is based on what Wang (2005) has used in his research titled "The influence of capital expenditures on private sector investment" which has been modified in accordance with the economic structure of Iran and is as follows:

$$INV_t = a_0 + a_1 GDP_t + a_2 P_t + a_3 OIL_t + a_4 WEL_t + a_5 EDU_t + U_t \quad (1)$$

In the presented model the variables are considered to be:

INV: private sector investment based on fixed prices of 2004

GPD: non-oil GPD based on fixed prices of 2004

P: Inflation rate based on fixed prices of 2004

OIL: oil revenue based on fixed prices of 2004 (providing the necessary foreign exchange to the private sector

WEL: social welfare spending based on fixed prices of 2004

EDU: costs of education based on fixed prices of 2004

U: error rate

Time series of this research are extracted from the statistical time series of Central Bank of the Islamic Republic of Iran for the years 1975- 2023.

Results

Model Estimation and Analysis

Before setting for model estimation, variables must be taken examined for the last time. The most common way to examine a time series process, is Unit root test. This test is based on a generalized version of Unit root test of Dickey-Fuller. The results of this test are presented in Table 1.

Table 1. Generalized Dickey-Fuller test of Model Variables at Level and after Making a Difference

Variable	Base (At level)	Base (first order differential)	Critical value (5%)
INV	0.59	-5.95	-2.92
GDP	2.52	-3.25	-2.92
OIL	-2.12	-6.66	-2.92
P	2.50	4.34	-2.92
WEL	-0.66	-8.51	-2.92
EDU	-1.062	-7.87	-2.92

Source: The Authors' Calculations

The results of this test reveals that all variables are non-stationary. Therefore the nullhypnosis that the variables are non-static cannot be rejected. In other words the variables used are non-static. In this article, to eliminate non-static variables, first order differential has been used which is shown in Table 1. It can be said that all variables have become static and are accumulated from the first order, $I_{(1)}$. The first order differentiation can be estimated as a long-term model and be taken into analysis.

Determination of the Optimal Intervals and the VAR Model

One of the important issues in estimating the agglomeration relations, is to specify the variable intervals which must be entered into the model in order to be ensured that error terms have the classical assumptions. Yet, having appropriate intervals depends on the existence or non-existence of variables which affect the model behavior in short-term and if such variables exist, and they are eliminated from the model, their effect is set in error term of U_t.

In this test, we use the Schwarz's-Bayesian benchmark in order to determine the optimal intervals and its results are shown in Table 2. Based on the results shown in Table 2, the maximum value of Schwarz's-Bayesian is -2526.2, therefore one is considered the optimal interval.

Table 2. Determining Optimal Intervals

Rank	LL	AIC	SBC
0	-2624.5	-2630.5	-2635.8
1	-2446.7	-2488.7	-2526.2
2	-2407.4	-2485.4	-2555.0
3	-2367.5	-2481.5	-2583.2
4	-2316.5	-2466.5	-2600.3
5	-2182.3	-2368.3	-2534.2

Source: The Authors' Calculations

Estimation of Convergence Vectors using Johansson Method

The Unit root test taken from the variables above clearly shows that all of them are I (1). Therefore by determining the variable accumulation times, the first steps in using the Johansson method have been taken.

Now the accumulated vectors of variables are estimated using the Johansson method, based on which, the maximum eigenvalue test results and experimentation of the influence are shown in Table 3.

Based on the table results we can accept that there are two converge vectors (r=2), since the maximum eigenvalue test result, which is 20.80 is less than critical values of 95% and 90% which are in order 23.92 and 21.58.

Table 3. Determination of Converge Vectors Based on Examinations of Influence and Maximum Eigenvalue

Examination type	Critical value 90%	Critical value 95%	Statistical quantity	Number of vectors
Maximum eigenvalue	33.4400	36.2700	80.6627	R=0
	27.5700	29.9500	30.1894	R<=1
	21.5800	23.9200	20.8008	R<=2
	15.5700	17.6800	13.3220	R<=3
	9.2800	11.0300	5.6546	R<=4
	3.0400	4.1600	1.8092	R<=5
The influence	78.4700	83.1800	152.4387	R=0
	55.4200	59.3300	71.7760	R<=1
	36.6900	39.8100	41.5865	R<=2
	21.4600	24.0500	20.7858	R<=3
	10.2500	12.3600	7.4638	R<=4
	3.0400	4.1600	1.8092	R<=5

Source: The Authors' Calculations

Since the objective of this research is to study the influence of government social welfare spending and costs of education on private sector investment, the process of normalization on vectors has been done based on private sector investment. The normalized Co-integration vectors are presented in Table 4.

Table 4. Normalized Co-integration Vectors

Variable	INV	GDP	P	OIL	WEL	EDU
Normalized vector 1	-1	-0.36115	13309.2	-0.76126	17.2979	-9.1774
Normalized vector 2	-1	0.091377	-2204.2	0.18807	-0.74392	4.0144

Source: The Authors' Calculations

Since the normalized vector 2 is in compliance with theoretical foundations, it is selected and presented as:

$$INV=0.091377GDP-2204.2P+0.18807POIL-0.74392WEL+4.0114EDU \quad (2)$$

Based on this estimations, the following results can be concluded:
The relationship between private sector investment and GDP is positive and this is theoretically approvable; because promotion of economic status leads to an increase in private sector investment (the acceleration concept).
The relationship between private sector investment and inflation rate is negative. On one side, inflation and increase in the price of capital commodity increase the productive value of

investment and therefore capitalists are motivated to take part in production processes; one the other side, increase of prices and inflation cause an increase in nominal interest rate and as a result private sector investment decreases. The influence of inflation rate on private sector investment depends on the resultant of these effects and as shown, the influence of the inflation rate in this study was negative, so we can suggest that the nominal interest rate has been more than the productive value of investment.

It is shown in this research that the relationship between oil-based income and private sector investment is positive. As Iran is one of the petroleum exporting countries, the enormous sources of foreign exchange gained by this business are the main provider of the foreign exchange needs of the country. Through increasing the currency sources gained by petroleum exporting, the price of oil is lowered and this helps to have more over-sea purchases and imports into the country which eventually positively influences the private sector investment.

The relationship between government social welfare spending and private sector investment is negative. The main reason of this negative relationship between the social welfare spending and the private sector investment in Iran is, if the social welfare spending increases, then the welfare state and social security will be improved. At the same time these improvements take place, labor regulations and the terms of social security benefits will be modifier for the better, especially NHS and unemployment insurances. And this forces employers to pay larger amounts of money for employee welfare which leads to additional production cost; on the other hand, due to the support given to employees of the private sector, they may become rebellious against their employers and their working motivation will be lessened, all of which lead to lower motivation of investment and transfer of investments into mediatory.

It is shown that the relationship between education and private sector investment is positive. Education plays an important role in training a skilled working force in a society. As Adam smith suggests, training the people is a sort of investment, and this training, not only helps them to have higher incomes, it also helps the society benefit from their investment. The human capital generated through educated stands alongside the physical capital. In the present age, since IT has conquered the world, physical resources and the introduction of computer tools and applications, call for a trained, skillful working force. So the positive relationship between education and private sector investment is explainable.

Impulse Response Functions

Given the generalized impulse response functions, the results obtained from entering a positive shock of one standard deviation, based on the research model for social welfare spending suggest that the influence of this shock from the first period of t=0 until the fifth period had a descending flow and from the fifth period forward had an ascending flow. The influence of this positive shock of social welfare spending on private sector investment is descending for the first six periods, but is ascending for the rest.

Given the generalized impulse response functions, the results obtained from entering a positive shock of one standard deviation, based on the research model for costs of education suggest that the influence of this shock has been descending for all the periods. The influence of this positive shock of education on private sector investment had a descending flow for all the periods except for the fifth and the sixth periods.

Analysis of Variance

Using the analysis of variance, the percentage of impulse involvement of the mentioned variable for forecast error variance of variables is determined as long-term and short-term processes.

The results obtained from the analysis of variance suggest that in short-term, the fluctuations are explained by the private sector investment itself, but in medium-term and long-term, the share of other variables especially GDP in explaining the fluctuations are increased.

Conclusion

The objective of this article is to study the influence of capital expenditures divided as social welfare spending and costs of education during the years 1975- 2023 on private sector investment in Iran. The results obtained suggest that the influence of social welfare spending on private sector investment is negative, while the influence of costs of education on the same matter is positive. Other influential factors are GDP, inflation rate, and petroleum income (as the provider of necessary foreign exchange to the private sector). In this article it is concluded that GDP and petroleum income have positive effects on private sector investment, while inflation rate has a negative effect on private sector investment.

Today, human capital which his created through education, has a higher growth rate than physical capital. Also, slight depreciation of human capital in comparison with physical capital has led to higher growth rate in human capital. Improving the human capital through education and training can increase production and investment, especially private sector investment. So as one can realize, the results obtained from this research suggest that there is a positive relationship between private sector investment and costs of education.

The negative relationship between the social welfare spending and the private sector investment in Iran cannot suggest that these expenditures must be lowered in order to see an increase in the private sector investment. But it is exactly the opposite and the government must amplify such expenditures and at the same time, modify the factors that influential on private sector investment motivation. One of these factors is unemployment insurance which decreases the employee's enthusiasm of production. Therefore it is necessary that by modifying and amending the labor law, the government take a huge step toward amplifying the production enthusiasm of employees and the investment motivation of capitalists in production processes.

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