

The Survey of Human Capital Effect on Economic Growth in Oil Rich Countries

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Abstract

In recent years, there has been an increasing interest in studying the relation between human capital and economic growth. In this research we attempted to analyze the effect of human capital, oil reserves and health expenditure on economic growth during the period of 1980 to 2010 for five groups of oil-rich countries through the so-called Resource Curse hypothesis. The results indicate that human capital has a positive effect on economic growth of Middle East, European Eurasia, North America and Central America countries; however, it does not have any effect on that of African countries.

Key Words: Human capital, Economic growth, Oil Resource, Health, Education.

Introduction

Over the last few decades, many of the economists argued the relationship between human capital and economic growth. From the time Solow (1956-1957) have imported human capital as a new affecting variable in his growth model, the role of human capital accumulation on enhancing growth rate have been identified. Afterwards Schultz (1961) by introducing his human capital theory, emphasized that the quality improvement of labor force, which is achieved by investment on human capital, should be considered in investigating economic growth determinants. Investment on human capital could appear in form of education, learning by doing, health, nutrition, and etc. Schultz believes all of the society costs are not consumption expenditures but also they are a kind of investments with long term return.

Romer (1986) and Lucas (1988) introduced human capital as the leading cause of growth and poverty alleviation and next generation of researchers (such as Ravallion & Chen, 1997; Schultz, 1999; Sen, 1999; and Squire, 1993) expressed human freedom as a marginal objective of development.

The focus on the Millennium Development Goals (MDGs) led to the increased importance of improvement in key education and health indicators. The fundamental issue of these goals is the role of government policies in helping to promote human capital since education and health are considered as two essential aspects of human capital and main elements of the MDGs. In most countries, the governmental sector plays a dominant role in providing educational and health services which are necessary to enhance human capital (Baldacci, Clements, Gupta & Cui, 2008).

This paper investigates the effects of social expending (health), natural resources, and human development index on economic growth using a panel data set during the period of 1980 to 2010 for 5 groups of countries among Middle–Eastern, European-Eurasia, Africa, North America and Central America.

The paper is organized as follows: second section is literature review, section three presents the data and methods which are applied in the estimation and section four is about empirical results and finally section 5 concludes and explores the policy implications of research findings.

Review of Research

Economists became interested in non–economic determinants of growth rate (such as education and health) in the late 1960s. At the time some researchers noticed that economic growth is not merely dependent on economic and qualitative factors; however, it is influenced by more complex and intangible factors like human capital.

At first some researchers (Mankiw, Romer & Weli, 1992; Sala-i-martin, 1997; Levine & Renelt , 1992; Barro & Sala-i-martin, 1995; Barro, 1996a, 1996b) concentrated on the effect of education capital on growth rate. These studies confirmed that education or enrollment rate at schools significantly increase economic growth. On the other hand number of studies (Flug , Spilimbergo & Wachtenheim, 1998; Mingat & Tan, 1992, 1998; Noss, 1991) indicated poor linkage between the cost of public education and education indicators. Investigation of the developed countries (Jones & Olken, 2005; Krueger & Lindahl, 2001) presented weaker results on diminishing returns of education, and to resolve this heterogeneity, size range of countries introduced critical for explaining the determinants of growth rate. In Kruger & Lindahl viewpoint, if the education capital is used as a measure, these models would be effective on the empirical results. In order to estimate the effects of education capital on growth properly, Ranis & Ramirez (2000), Boozer, Ranis, Stewart & Suri (2003) intensified considering response effects between them (Baldacci, Clements, Gupta & Cui, 2008).

Coulombe, Tremblay & Marchand (2004) applied more refined measures for existing skills for 14 OECD countries, concluded 1% increase in average literacy level of these countries would raise per capita GDP 1.5 percentage points(Baldacci, et al., 2008).

According to the education-based demand, human capital has a positive effect on the economic growth of Spain. Although human capital has a low positive effect on labor productivity growth, the invention of new technologies facilitates growth (Prados de la Escosura , Roses, 2010).Investment in education is effective on economic growth of Sri Lanka; however it is relatively lower than other developing economies thus in order to improve the economy, it is necessary to make appropriate strategies to allocate resources on education (Ganegodage & Rambaldi, 2011).

The survey of education quality and quantity in economic development path indicates high quality education increases education returns and hence the incentives are important to human capital accumulation. Higher educational quality and accessibility increases per capita investment of education and educational quantity determines human capital composition and growth. Furthermore the effect of the quality and quantity of education on growth depends on the stage of development (Castello-Climent & Hidalgo-Cabrillanab , 2011).

At the micro level, living conditions improvement and health level rise boost economic growth and then at the macro level improved welfare and living conditions, would lead in further economic development of a country. Indeed, health is defined as an income that can be received if you have the ability to spend your time to work rather than in treatment in case of illness (Colantonio, Marianacci & Mattoscio, 2010).

Some studies (Filmer & Pritchett, 1997; Filmer, Hammer& Pritchett, 1998; Musgrove, 1996; Pritchett, 1996) found that the share of health expenditure to health status (such as mortality rates in infants and children) is very low. However next studies (Gupta, Verhoeven & Tiongson; 2003) found a positive relationship between public spending on health status and health care needs of the poor (Baldacci, Clements, Gupta & Cui, 2008).

In rich countries where the level of public health is higher, citizens' health conditions improve faster. In fact healthier people would work harder and longer than sick people. Also healthier children can attend school for longer periods and learn more, resulting in a greater chance of higher earnings when they enter

into the workforce (Colantonio, Marianacci & Mattoscio, 2010). Despite the fact studies has affirmed the positive effect of health on human capital accumulation and economic growth, the same research of OECD rich countries showed health capital formation does not have any positive effect on long-term economic growth in these area (Hartwig, 2009).

In recent years economic studies have examined the association between education and health. Grossman (1972) provided the first formal contribution to the objective study of the determinants of individual health status. He believed it is possible to observe a positive relationship between education and health. In particular, education has a positive impact on the likelihood of enjoying a healthy condition because it enhances the production of health technology which alters the production and distribution capability. Therefore, health affects income directly and indirectly: Mental capability enables individuals to work better and longer (direct effect); in a physical perspective, healthy labors are more productive (indirect effect). One of the most important problems when evaluating the link between health and income is the identification of an adequate measure for the variation in the level of output (Colantonio, Marianacci & Mattoscio, 2010).

According to microeconomic evidence, Strauss and Thomas (1998) believe health status explains variation in wages at least as much as education levels (Baldacci, Clements, Gupta & Cui, 2008). Fogel (1994) considered hygiene as an common indicator of individual welfare and he found that not only an increase in growth can lead to an increase in wage levels, but also health influences GDP indirectly through time preferences and education.

Bhargava et al. (2001) argued hygiene is more important in low-income countries than high income ones. Indeed, in low and middle income countries a 1% increase in survival rate in adulthood is positively associated with the increase of 0.05% in the rate of economic growth, while above a certain income the adult survival rate has a negligible effect and in some cases a negative growth rate (Colantonio, Marianacci & Mattoscio, 2010).

Thomas & Frankeberg (2002) and Thomas et al. (2003) stated specific health status significantly helps to get higher revenues, and general indicators of hygiene and nutrition status are appropriate predictors of economic successes. Further studies (Barro, 1996b; Bloom & Canning, 2003; Bloom, Canning & Sevilla, 2004; Gyimah-Brempong & Wilson, 2004) suggested health capital indicators positively influence total output. Some results based on cross-sectional analysis for developing countries (Baldacci, Guin-sui & de Mello, 2003; Gupta, Verhoeven & Tiongson, 2002) found that social spending is an important determinant of education and health outcomes. Education spending also has a more effect on social indicators than hygiene spending. These results have been corroborated by Anand & Martin, 1993; Psacharopoulos, 1994; Hojman, 1996; Bidani & Ravallion, 1997; Psacharopoulos & Patrinos, 2002 too.

Education and health spending both have positive effects on growth rate and with other policy interventions such as improved governance and taming inflation, similar results could be achieved (Baldacci, Clements, Gupta & Cui, 2008). In study of Sub-Saharan Africa countries, it was identified that skilled human resources are necessary to increase progress since more educated people are more likely to enjoy healthy life, and healthy people enjoy the learning process more than sick ones (Colantonio, Marianacci & Mattoscio, 2010). Study of Italian human capital accumulation also showed that two main aspects of human capital education and work experience are the fundamental determinants of earning and capital income (Giorgio Lovaglio, 2008).

The simultaneous analysis of the relationships between economic growth, human development and sustainability in three groups of oil rich countries (high, middle and low income ones) has emphasized that high institutional quality and investments on human capital accumulation are necessary for reaching sustainable development path. Also investment in accumulation of human capital can decrease the negative effect of natural curse (Costantini & Monni, 2007). In Ethiopia, fuel shortage, degradation of croplands, poor water quality and lack of public awareness are the major causes of being an undeveloped country. To overcome these problems proposed measures include investments in human capital, reforestation, social

capital (education and health) and extensive importation of infrastructure investments (Reynolds, Farley & Huberc, 2009). Study of the role of human development on economic development paths of Mediterranean countries indicated it is the most important factor of economic development in the southern countries of the Mediterranean Countries (Gürlük, 2009).

Furthermore, human development is not only considered as a basic core value of human welfare in developing countries, but also is a critical input into economic growth and the success in economical policy requires focus on human development since in addition to having a direct effect on growth, has the feedback effect on sustainable economic growth (Suri, Boozer & Ranis, 2010).

The Model

In this paper, we applied the model of Costantini & Monni (2007). This model shows the relation between economic growth and the quality of institutions based on so-called Resource Curse Hypothesis (RCH). The general formulation for the RCH is represented in equation (1-1) where distinguish globalization (GLOB) as a specific aspect, conditioning variable (COND) representing other macroeconomic aspects, human development dimensions (HD) and finally natural resources endowments (NR) and the quality of institutions (INST).

$$EG_{t-i} = B_0 + B_1 \ln GDP_i + B_2 GLOB_{t-i} + B_3 COND_{t-i} + B_4 HD_i + B_5 NR_i + B_6 INST_i + e_i \quad (1-1)$$

t and i correspond to the final and initial period respectively, and t-i is average value for the whole period. Initial GDP is included in all the empirical studies on this issue an economy will be a faster growth rate the more distant it is from its own steady state value of output.

These conditioning variables include trade openness, FDI flows, public investments in human capital accumulation, natural resources endowments, the quality of institutions and so on.

The globalization (GLOB) includes trade openness, FDI flows, and inflation rate as an index of macroeconomic stability on the international markets.

Conditioning variables (COND) include private investments as a percentage of GDP, while other macroeconomic conditioning controlling variables such as export price level or terms of trade are not included in the analysis due to the recurrent non-significant statistics in previous studies on the RCH (Costantini & Monni, 2007).

HD dimensions are represented as the initial level of life expectancy and secondary education as an index (a proxy) for the initial level of human capital. Natural resources (NR) concluded separately as point and diffuse resources that are estimated separately.

Also, the quality of institutions (INST) is considered as a specific conditioning variable because the variation across societies of the institutions is a relevant condition to growth and development paths such as the security of property rights, prevalence of corruption, structures of the financial sector or investments in infrastructures and social capital. In particular, the role of the institutions in enhancing the broader social capability has been highlighted as a major development engine.

Costantini and Monni (2007) used institutional quality provided by Kaufman et al. (2003). That six different characteristics describe this aspect: rule of law, political instability, government effectiveness, control of corruption, regulatory framework, and property rights and rule based governance. The measures related to institutional quality and human development (especially life expectancy) have been widely as same as another result of health index on economic growth. In particular the role of education as initial human capital endowment has the same role as the initial GDP level in countries with higher school enrolment ratios, but has lower growth rate.

Estimation

In this paper we attempt to compare the role of human capital on economic growth in five groups of oil-rich countries. We used four variables; GDP per capita (constant 2000\$), Human Development Index (Suri, Boozer & Ranis, 2010; Gürlük, 2008; Costantini & Monni, 2007), Oil reserves (Barro & Sala-i-Martin, 1995; Costantini & Monni, 2007) and Health expenditure (Colantonio, Marianacci & Mattoscio, 2010; Prados de la Escosura, Roses, 2010; Colantonio, E & Marianacci, R. Mattoscio, N., 2010; Hartwig, 2009; Baldacci & Clements, 2008; Bloom, Canning & Sevilla, 2004; Gyimah-Brempong & Wilson, 2004; Thomas et al., 2003; Bloom & Canning, 2003; Thomas & Frankeberg, 2002; Sachs, 2001; Grossman, 1972; Barro, 1996 b; Barro & Sala-i-Martin, 1995). Controlling variables are oil reserves and health expenditure. Health expenditure is a kind of public investment in human capital accumulation, HDI is used as a sign of human capital and GDP per capita (constant 2000\$) is applied as a sign of economic growth. The results of five estimations obtained from one-stage least square is presented in table 1:

Table 1: Estimation results for five group of countries

Dependent variable (1980_2010)	RCH _{Middle-East}	RCH _{Europe-Eurasia}	RCH _{Africa}	RCH _{North-America}	RCH _{Cent- America}
HDI	0.145609 [*] (6.518676)	0.058660 [*] (3.523745)	-0.081520 [*] (-6.059044)	0.792141 [*] (2.629101)	0.158480 [*] (4.579460)
OIL	-2.640877 [*] (-3.607007)	0.125175 [*] (23.33461)	0.085057 [*] (7.994114)	-2.279493 [*] (-2.241837)	- 0.077577 [*] (-11.06777)
PHE	0.061664 [*] (30.44211)	0.055058 [*] (18.36476)	0.020372 [*] (5.794994)	0.040687 [*] (0.0127)	0.049215 [*] (21.54405)
Number of observations	72	60	315	75	125
Number of estimated coefficient	9	10	11	3	7
Adjusted R-Squared	0.867236	0.839616	0.246446	0.314479	0.873142
Durbin-Watson Stat	2.066425	1.884693	2.023834	1.301689	2.132379

Statistics for t-student in Parenthesis
* P-values < 0.05

Source: finding of research

HDI has a positive effect on economic growth of Middle East, Eurasia, North America and Central America. This result is consistent with those of Suri, Boozer & Ranis, Stewart, 2010; Prados de la Escosura & Roses, 2009; Gürlük, 2008; Costantini & Monni, 2007; Giorgio Lovaglio, 2006; Bulte et al. (2005); Isham et al. (2003); Atkinson & Hamilton, 2003; Gylfason, 2001; Dante, 2001; Sala-i-Martin, (1997); Sachs & Warner, 1995; Lucas, 1988; Romer, 1986; Schultz, 1961).

Since human capital is one of the most important determinants of economic growth, the quality of human capital should be invested in context of education, improvement of living standards and society welfare. In fact, the output of this kind of investment will return in long term, in other words the output feedback of human capital in economic cycle takes a long term in order to use their skills and knowledge in the process of production. However HDI does not have any effect on economic growth of Africa. The reason could be referred to low investment budget for education in these countries for most of the people especially women. Moreover industry does not exist in true sense; therefore they do not have a good industrial production. Although, African countries have apparently achieved independence from colonization, they have been colonized yet. In the colonists' perspective less public investments (especially in education) is the best way to keep these country away from independence.

Despite the fact that African countries are endowed with natural resources (such as oil) and stone (such as diamond) they earn little money from selling these treasures Because they export these recourses in exchange for low amount of money. African governments have not been successful in providing basic levels of health care (controlling eradicated diseases like polio and malaria in the world) for their people. Moreover civil wars, anarchies, clannish wars and political conflicts can be other factors in the lack of public investment (education and health) as outlined in Africa.

The oil resource does not have an effect on economic growth in Middle East, North America and Central American countries. This result is in line with resource curse hypothesis and consistent with those of Costantini & Monni (2007), Stijns (2005), Bulte et al. (2005), Papyrakis & Gerlagh (2004), Atkinson & Hamilton (2003), Isham et al. (2003), Gylfason (2001), and Sachs & Warner (1995). Oil resource provides the most immediate source of foreign exchange and attracts foreign capital for extraction raw materials; however, this income would either spent in demanding for industrial products or leads in rentier activities which probably diminish economic growth in long term. On the other hand oil resource has led to increased economic growth in Eurasian and African countries. . Indeed the countries of European Eurasia conquered natural curse by investing on agriculture and industry segments, especially on human capital accumulation. These countries have succeeded in replacing natural resource by the production of tradable goods that are capable of being exporting. Furthermore African countries invested on infrastructures and improving primary living standards and could increase human development levels.

Health expenditure has a positive effect on economic growth in all five groups of countries which is consistent with those of Colantonio, Marianacci & Mattoscio (2010), Baldacci , Clements ,Gupta & Cui (2008) , Costantini & Monni (2007), Thomas et al. (2003), Thomas & Frankeberg (2002), Strauss & Thomas (1998), Gyimah- Brempong & Wilson (2004), Bloom, Canning & Sevilla (2004), Bloom & Canning (2003), Bhargava , Jamison, Lau & Murray (2001), sala-i-Martin (1997), Barro (1996b) and Grossman (1972). More investment on health issues would increase the number healthy people who enjoy the learning process which results in economic growth boosting.

Conclusion

Findings of research suggest that investment in human capital is beneficial in preventing resource curse. Comparing the results of the growth model in five group of countries including the Middle East, Eurasia, Africa, North America and Central America highlights in order to modify and control the negative effects of natural resources (underground resources including oil and gas) on economic growth, it is essential to increase investments in human capital and the quality of institutions. Hence rise in supportive initiatives in human capital accumulation (along with physical capital) is recommended, especially these investments should be carried out in the fields which have a more effective role in implementing technology in the production process. In other words, increased levels of functional expertise and skills of human resources as well as their involvement in sectors that they can exploit the acquired skills are among the most important factors in economic growth and development. Moreover investment on the level of society's health should increase since the performance of healthy

people in the community is more than patients' i.e. healthy individuals facilitate economic growth. On the other hand excessive speed increase extraction of natural resources in recent years indicates that the given resources will end shortly and in future extracting natural resources which are not economical today due to high costs of extracting, would be valuable. Consequently price of natural resources including oil and gas will rise dramatically and then it will also increase production costs so that resource-rich countries would use them as an economic weapon. Therefore, the governments should invest in the use of alternative fuels (such as nuclear energy, solar and wind) to guarantee their country and adjust these problems in long-term. Thus countries should reduce dependence on resource revenues. They can perform it by investment in other parts such as agriculture and industry. By investing in human resources it would be achieved since human capital provide new ideas and innovations in the field of energy and the use of new technologies (industrial and agricultural sector). Therefore to achieve sustainable economic growth and reduce reliance on oil revenues, serious attention must be paid to human capital, increased imports of higher quality goods with intention to achieve new Technologies.

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Appendix

Appendix A- Table A1 : Data sources and definitions

GDP	GDP per capita (constant 2000 \$), World Bank Index (WDI)
PHE	Health expenditure, public (% of total health expenditure), World Bank Index (WDI)
HDI	Human development index , standard UNDP methodology
OIL	Oil : proved reserves, Organization of Petroleum Exporting Countries (OPEC)

Appendix B -Table 2: Surveyed countries

Group	Countries	Period
Middle East	Iran, Islamic Rep.(IRN), Iraq(IRQ), Kuwait(KWT), Oman(OMN), Qatar (QAT), Saudi Arabia(SAU), Syrian Arab Republic(SYR), United Arab Emirates(ARE), Yemen, Rep.(YEM)	1980-2010
European Eurasia	Azerbaijan(AZE), Denmark (DNK), Italy(ITA), Kazakhstan(KAZ), Norway(NOR), Romania(ROM), Russian Federation(RUS), Turkmenistan(TKM), United Kingdom(GBR), Uzbekistan(UZB)	1980-2010
Africa	Algeria(DZA), Angola(AGO), Chad(TCD), Congo, Rep.(COG), Egypt, Arab Rep.(EGY), Equatorial Guinea(GNQ), Gabon(GAB), Libya(LBY), Nigeria(NGA), Sudan(SDN), Tunisia(TUN)	1980-2010
North America	United States(USA), Canada(CAN), Mexico(MEX)	1980-2010
Central America	Argentina(ARG), Brazil(BRA), Colombia(COL), Ecuador(ECU), Peru(PER), Trinidad and Tobago(TTo), Venezuela, RB(VEN)	1980-2010