Re-Examination of Human Capital

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Resumen

En este estudio intentamos avanzar hacia un concepto nuevo y más útil de "capital humano", teniendo en cuenta ciertos factores, hasta ahora en gran parte pasados por alto, los cuales podrian tener una importante relación con la calidad y la cantidad de contribución humana a la producción y al crecimiento económico. Creemos que este nuevo acercamiento, nos pepermitirá describir el capital humano con mucha más precisión de lo que se ha hecho hasta ahora. Comenzamos utilizando los años de educación media entre la población trabajadora como un indicador aproximado de capital humano considerando la calidad de educación recibida. Sin embargo, avanzamos en la modificación del concepto teniendo en cuenta la presencia de ciertos "factores de resistencia" que prevalecen en la sociedad, los cuales creemos pueden constituir un impedimento significativo para el desarrollo del capital humano en determinados aspectos. En efecto, la presencia de tales factores sugiere que el verdadero impacto del capital humano no puede ser suficientemente medido calculando los años de escolaridad y la calidad de la educación, aunque la combinación de los dos factores pueda mejorar la práctica tradicional. El artículo expresa el efecto y la calidad de la educación, y la presencia de factores de resistencia, además recomienda continuar la investigación en curso para dar luz sobre la manera como el elemento humano puede o no, contribuir al crecimiento económico en el mundo real.

Palabras clave: Capital Humano, crecimiento económico, educación, factores de resistencia, producción.

Abstract

In this study we attempt to advance toward a new and more useful concept of "human capital", by taking into account certain factors, hitherto largely overlooked, that would seem to have an important bearing on the quality and quantity of human contribution to economic growth and production. This new approach, we believe, will enable us to describe human capital with much more precision than has been the case until now. We begin by using the average years of education amongst the work age population as an approximate indicator of human capital but we qualify this by considering the quality of education received. However, we further modify the concept by taking into account the presence of certain "resistance factors" prevalent within society that, we believe, may comprise a significant impediment to human capital in certain settings. Indeed, the occurrence of such factors suggests that the real effect of human capital cannot be adequately measured by calculating years of schooling and quality of education alone, although the combination of the two may be an improvement on traditional practice. The article expresses the effect and quality of education, and the presence of resistance factors and points to the need for ongoing research to shed light on how the human element may or may not, contribute to economic growth in the real world.

Key words: Human Capital, production, resistance factors, economic growth, education.

I.   INTRODUCTION

In spite of the importance attributed to human capital in the economic growth of countries, it has been impossible to overlook the fact that there is no strong evidence that shows that investment in human capital necessarily results in economic growth. While the findings of Usawa (1965), Lucas (1988), Mankiw, Romer and Weil (1992) show that investment in human capital has a positive effect on growth, those of Caseli, Esquivel and Lefort (1996) [1] and Pritchett (1996) [2] show that improvements in educational quality in developing countries do not always have a positive impact on the rate of economic growth. Replies to the latter claims have held that the lack of impact has to do with the quality of education available in different countries and the quality factor seems to be gaining importance amongst economists (Dessus 2001). [3]

But one can also approach the problem by considering the effect of certain institutional, economic and social factors prevalent within different societies. This suggests that low quality education, in addition to certain negative institutional, economic and social factors may constitute a significant barrier to investments in human capital and their subsequent effect on economic growth.

Clearly, educational systems are apt to vary from one country to another. An individual graduating from one of the ten best universities in the world is likely to have a greater capacity for generating human capital over one graduating from a notably inferior one. And equally, a country sporting consistently high academic standards is likely to have an educational and economic advantage over one with lesser standards.

In the same way, a country with numerous institutional, economic and social problems may also be one that inhibits the free circulation of ideas that allow human capital to take effect, (Romer 2000) holds that when ideas circulate freely (perfect human capital mobility) these ideas can be translated into improved methods of production and thus greater human capital.
This article offers a theoretical explanation of why average years of schooling, the variable most commonly used by economists for measuring the effect of human capital on growth, should only be used when the quality of education is taken into account along with the characteristic institutional, economic and social relationship patters within the society in question.

We begin with a theoretical review of the concept of human capital, citing several authors and highlighting their contributions to the subject. This is followed by a consideration of how the quality of education as well as the presence of certain institutional, economic and social factors may influence the effect of human capital on economic growth and production in different countries. Then, with the help of data from Barrow and Lee (1994) and test scores in mathematics and science gathered in 1993 and combining this with the institutional indicators identified by Mauro (1997), we attempt to re-calculate the potential of human capital in some 33 countries. Finally, we make a simple calculation of how much human capital countries may lose due to the presence of these influences.

The corrections made by considering these indicators are simple and it is not our intention to apply complex mathematical interpretations to identify reliable indicators related to the quality of education and institutional value. The objective is more to direct attention to the subject and to issue a call for awareness to those who might assume that a country's growth and economic development depend exclusively on increasing the years of schooling amongst the population. We point out that it may be more important to concentrate on improving existing educational systems and creating a more suitable institutional, economic and social climate within the country so that those who manage to study can actually apply their knowledge, ideas and abilities without restriction.

We believe that as a result of this exercise we will be in a position to develop mathematical indicators related to the quality of education as well as the institutional / social climate that influence the functions of production in each country and that determine the elasticity of product with respect to human capital.

II.   THEORETICAL CONSIDERATIONS

Human capital is one of those factors that directly affect production, in that it determines the quality of work and that, in turn, results in increases or losses in productivity. This simple awareness has led economists to consider everything related to the accumulation of human capital as an important branch of growth theory, beginning with the pioneer work(s) of Schultz (1961) who offered the first approximations on the quantitative importance of investments in education. [4]

However, there has been some appreciation of the role of human capital from the time of Adam Smith, who pointed out in the Growth of Nations (1776) that the accumulation of capital is the key to economic growth and he considered the concept of capital to include the general abilities of the population of a country or economic space. Nelson and Phelps (1966) considered that investment in human capital is an important factor to include in the function of production, but they cautioned that this must be taken into account together with the effect of technology so as not to fall into an erroneous interpretation of the model. Eicher (1996) referred to the need for qualified labor in order to adapt new technologies to the productive process in the high technology sectors; however, he claimed that once this new technology has been absorbed, there would be a need for less qualified labor. For their part the lower technology sectors, since they use more primitive technologies, also require less qualified labor. Chari and Hopenhayn (1991) develop a theoretical model along the line of the "vintage models" pointing out that each technology requires a specifically qualified human element and that the overall ability of the workforce has an important bearing on the speed with which new technologies are adopted and used.

Romer (1990) includes human capital in his theoretical model dealing with endogenous growth, concluding that "an economy with a greater stock of human capital will experience more rapid growth" [5] and he proposes this as the key element of the research sector that generates new ideas and products to form the technical basis of progress.

Romer goes on to suggest that international free trade will accelerate growth and that low human capital levels may explain lower growth rates in less developed countries that are often more closed to international trade. Grossman and Helpman (1991) follow the same line of reasoning, emphasizing that greater concentration of human capital account for growth in research activity and explain increases in the amount of innovation originating in a given country. [6]

Barro, (1991) in a study of Economic Growth in a Cross Section of Countries, uses a sample of 98 countries over the period 1960-1985 and concludes that the rate of growth in their per capita GNP is positively related to the quantity of human capital initially present. As proxy variables of human capital, he uses schooling indexes at primary and secondary levels for 1960. Faced with the impossibility of using a stock variable because of the unavailability of comparable data on all countries in the sample, he uses a fluid variable, although in considering retarded indices these can show a similar effect to that of a stock variable. [7]

Mankiw, Romer and Weil (1992) use, as does Barro, panel data for a sample of 98 countries for the period 1960-1985. As a proxy variable on the rate of human capital accumulation, they use the percentage of the work age population who have completed secondary education and find that in spite of the fact that this variable has some effect on per capita income, this effect is still less than 30 percent.

The importance of human capital has been emphasized by other notable economists as well, such as Lucas(1988), Romer (1990), Kyriacou (1991), Tamura (1991), Mankiw, Romer and Weil (1992), Freesman and Polasky (1992), Caballé, and Santos (1993), Caballé (1995), Benhabid and Spiegel (1994) Nelson and Phelps (1996) and Gary Becker. Most agree that investment in human capital not only increases productivity but also leads to higher standards of living. Sachs (1997), Blanchard (1997), Mankiw (1998), Dornbush, Fisher and Startz (1998) and others have expressed the view that countries that do not increase their investments in education and health, will have difficulty achieving higher rates of economic growth and standards of living and therefore are not likely to improve significantly.

Therefore in spite of the general consensus around its importance in economic growth, until now there has been little agreement on exactly what human capital is and how to measure it. Some, such as Blanchard (1997) and Sacks (1997), define it as the sum of qualifications and training possessed by the workers in an economy. Mankiw (1998) aligns it with the accumulated investment in people-related programs, such as health, education, professional training and on-the-job training. Argandoña, Gómez and Mochón (1997), commenting on the opinions of some of these scholars, conclude that "human capital includes the sum of

capacities that have an influence on production and that are incorporated in individuals or collectives: education (knowledge, abilities and general attitudes), professional training (knowledge and technical capabilities), health, communal living virtues, etc." (p. 410). Dornbush, Fisher and Startz (1998) point out that although human capital is difficult to measure precisely, the mean number of years of study may be a good approximate representation of human capital. (p.35) [8].

Lucas (1988) and Uzawa (1965) considered that economic output is a function of the stock of human capital. In their view, sustained growth is possible only if human capital can somehow increase without bound. However, this makes it difficult to use years of years of schooling alone as a reliable indicator and leans towards an interpretation of human capital as total accumulated knowledge, which is perhaps more attainable than the former, at least theoretically. The concept of accumulated knowledge may imply considerations more related to the quality (or result) of the educational experience. [9]

In his survey of the literature, Hers (1998) shows that in eleven empirical studies attempting to measure the effect of human capital, six different and widely varying indicators were used, including enrollment, years of schooling, literacy and other variables as can be seen in Table 1. [10]

However, the most frequently used variable in these studies is the average years of schooling amongst the population. Nevertheless, the coefficients that are obtained by these authors show significant discrepancies. For example, the two studies had done by Barro and Lee in 1992 show a 0.04 difference. The same differences are observed in the findings of Romer, Mankiw, Islam, Benhabid and Spiegel, Lau and Judson. See Table 1.

Table 1. *Production Elasticities of Human Capital in Cross- Country Regressions*

Author	Model	h.c. variable	Coefficient	T-value
Mankiw, Romer and Weil(199	*RF*	*Enrollment*	*0.28*	*9.3*
Barro and Lee (1992)	*RF*	*YS*	*0.06*	*3.0*
Barro and Lee (1992)	*RF*	*YS*	*0.02*	*5.2*
Romer(1990)	*RF*	*Literacy*	*0.20*	*2.3*
Islam(1995): cross-section	*RF*	*YS*	*0.24-0.11*	*2.3-0.5*
Islam(1995): panel estimation	*RF*	*YS*	*-0.01- -0.2*	*0.05-1.8*
WDR 1991	*AS*	*YS*	*0.09-0.04*	*2.6-2.0*
Benhabid and Spiegel(1991)	*AS*	*EPI*	*-0.02*	*1.4*
Benhabid and Spiegel(1994)	*AS*	*Various*	*0.02-0.22*	*0.7-2.8*
Lau, Jamison and Louat(1991	*AS*	*YS*	*0.02*	*1.6*
Judson(1993)	*AS/RF*	*Value*	*0.10*	*4.3*

AS= Augmented Solow, RF=id. Reduced Form. Source: Hers, Johannes (1998) , YS= Years Schooling, EPI= Enrollment perp.inv

According to Hers, Barro and Sala – I – Martín (1995), one of the most frequent ways of defining and quantifying

human capital is by calculating the average years of schooling of the working population, and we are, therefore, taking that to be the most reliable single variable hitherto available. However, when we consider the current ambiguity around human capital and its definition, we are not surprised to see that academics have not yet considered it in terms of its variable quality. Yet if most economists are content to regard human capital as a quantifiable element in economic growth, we take the view that human capital varies not only in quantity but in quality as well.

Robert Solow (1990) makes the point this way. Employment, salaries and work satisfaction, he claims, are deeply linked to prevalent social conditions and to the workers' concept of social justice. No other element in the field of labor relations, he claims, has a greater effect in lowering moral within the workplace, in creating personal dissatisfaction, in fostering absenteeism and in lowering productivity, than obvious inequalities in the compensation of individuals within the same workplace. And he goes on to say "once one admits that employment and salaries are closely linked to social conditions and factors of self esteem, one is abandoning the approach given to the labor market in text books." [11] (p.29)

What Solow asserts here supports our view that there exists an array of social and cultural conditions that have a strong bearing on worker performance and, as a result, on human capital and these conditions, in addition to the quality of education, determine in large measure the quality of human capital. The labor market, in the global sense then, cannot be interpreted like any other market, solely by questions of salary, supply and demand and material elements but by numerous other factors that have to do with social organization, justice, fair play and human need, all of which impact profoundly what people are capable of doing and on how well they do their work.

Therefore, we propose two considerations that, we believe, are essential in determining the quality of human capital: the quality of the education and the fairness and efficiency of the economic, administrative, political and social organization within national and regional settings.

III. THE QUESTION OF QUALITY IN EDUCATION

If we are to accept average years of schooling of the working population as the most reliable variable, we should take care to note that there might be significant problems associated with the quality of the education received. Hers (1998) for example, points out that Honigher and Kim establish large quality differences in education across countries and show that quality of education is strongly related to growth differences. And Steedman (1995) argues that levels of social / educational attainment are not

comparable even across OECD countries because of differences in measurement and classification. And using enrollment rates as a proxy builds on the assumption that enrollment patterns do not change much over time and between countries and that is obviously not the case (Hanushenk and Kim, 1995). The Hers' study makes this point as well, arguing that there is an important problem associated with the quality of the data on human capital. "Measures of the formal level of education are inadequate and are often difficult to compare between countries. A comprehensive measure of human capital should account for both the quality of education and human capital accumulation due to learning." (p.2) [7]   N. Gregory Mankiw in his book Principles of Economics, points out that "…a problem that some countries have is the quality of their systems of education. The United States and other developed countries have the best higher education systems, which seems to explain why poor countries send their best students abroad to obtain higher degrees." [12]

The assumption that average years of schooling is the best indicator of human capital seems to assume that education is alike in all countries; if this were so, then one year of education in Japan would have the same impact as one year of schooling in Tanzania and a degree from Harvard or Princeton would have the same productive value as an equivalent degree from the University of Alaska.

Nevertheless, using a sample of 12 countries, López, Tomás and Wang (1998) found that a more educated labor force is positively associated with accelerated growth under conditions of market reform and an economic system oriented towards the external trade but that education does not contribute significantly to economic growth in the absence of market reform and an export oriented productive system. This suggests that the effectiveness of human capital may be qualified, not only by the question of educational quality but by other factors as well.

The obvious conclusion from the foregoing is that if educational models and standards differ from country to country, it cannot then be argued that the average years of schooling of the work-age population translates to higher levels of productivity in equal ratios in all countries and much less to a better quality of life. And disparities in the effectiveness of education are but one of the many factors that, we maintain, impinge significantly on the effectiveness of human capital.

IV. THE PROBLEM OF RESISTANCE FACTORS

In addition to the foregoing, it seems to us that there are certain other dynamics at work within national settings that should be taken into account as well, particularly, but not exclusively, in underdeveloped countries. We refer to these

as "resistance factors" and maintain that they play an important role in determining the end product of human endeavor and thus, we are of the opinion that they should be taken into account in any serious attempt to measure the impact of human capital.

A study by Mauro (1997) pointed to the effect of four of these factors on economic growth; Mauro found that institutional inefficiency (institutional, political and social instability, a lack of efficiency and integrity within the judicial system, bureaucracy and red tape) and corruption hinder both investment in human and physical resources and economic growth and the opposite (institutional efficiency and a lack of corruption) actually promote economic growth. Comments Mauro: "The negative association between corruption and investment, as well as growth, is significant in both a statistical and an economic sense (and) there is a positive and significant correlation between indices of bureaucratic efficiency and political stability…". [13] (p705) And Blanchard (1997) emphasized those problems such as corruption, violence, armed conflict, drug trafficking, poorly defined property rights, political instability, lack of business entrepreneurs, poorly developed financial markets and others are, in effect, significant hindrances to the effectiveness of human capital. [14]

Indeed, whether we are considering countries in which economic development tends to be the product of effective planning and efficient methods of implementing programs or Third World settings where economic planning is apt to occur erratically and unpredictably, we encounter these "hindrances" to the effectiveness of human capital, the presence of which, we believe, involves disturbances in the interaction between the level and quality of schooling, commonly associated with human capital, and the end product which is production. In fact, a veritable host of these limiting factors abounds in Third World settings and are among the concerns that we refer to in this paper as resistance factors. Although Mauro identified four such factors, we suspect that there may be many others; nevertheless the four identified by Mauro will be considered in our research to explain the final result that we outline mathematically in the following section. [15]

When we consider human capital from the broader viewpoint of human organization, then, there seems to be little doubt that there are numerous factors, apart from educational ones, that bear directly on the productive process. These factors, until now only marginally identified, may be looked upon as a compilation of the social, cultural and political realities that underpin economic and social relationships within the culture and that may ultimately determine the outcome of human endeavor within the economic and social system. Indeed, the presence of these conditions, which together define the organizational and communal context of labor and production, suggests that the

way human society is organized has a great deal to do with whether it may be economically productive or stagnant.

This may be considered, not only from the standpoint of the socio-cultural influences that affect worker performance, but also from the viewpoint of economic policies and industrial and social planning which take place within national society, as well as other circumstances that together define the quality of work and determine the performance of employees within the workplace. Some of the more obvious of these have to do with regulations such as minimum wage laws, norms and prerequisites dealing with professional and technical qualifications, educational policies, industrial planning, unemployment benefits policies, social security statutes and so forth. Others have to do with the efficiency or inadequacy of the state administrative apparatus, political stability, the business environment, meaning state policies regarding registering business and the paperwork required, tax laws and so forth.

A study by Pak Hung Mo (2001) shows that corruption (one of the resistance factors considered here) has a negative effect on production, but goes on to point out that the precise transmission channels for this negative effect are not apparent; in other words, it has not been fully identified exactly how this negative effect is achieved. He goes on to claim that factors such as corruption affect political stability, investment, public confidence and human capital and suggests that there is something in the order of a combined effect on human capital and economic growth that results from the combined cultural environment in which business is carried out. We refer to this as the effect of the combined resistance factors.

Indeed, a range of empirical evidence suggests that resistance factors should be taken as a whole as we have done. It is perhaps not altogether coincidental that the most economically backward states tend to be the most bureaucratic as well; the two traditionally go hand in hand. These unwieldy bureaucracies really result from a paradoxical interpretation of the state administrative apparatus and its role with respect to the citizen. The end result of this organizational fallacy, represented by the overbearing, inefficient and corrupt bureaucracy, is that the public finds itself obliged to serve the institutional interests of the state instead of vice versa. In the context of the latent democracies of Latin America, the citizen is apt to interpret his role before the state as that of subject in the presence of the arbitrary, tyrannical and bureaucratic power wielded by the large national or local administrative apparatus.

Such situations lead to a deterioration of public confidence in the political and administrative system and the general acceptance of a tradition that permits the more well to do to use bribes and other corrupt measures to achieve their ends. This reality further erodes public confidence in the state,

however, and translates into sharp diminutions of social capital and a weakening of collective economic effort. The Colombian author John Sudanski claims that without social capital, human capital doesn't account for anything. "In systems such as these, human effort is not rewarded for any inherent excellence but rather for its deviance and perversity and this will render human capital totally ineffective".

The Pak Hung Mo study puts it this way: "As corruption, government regulations, bureaucratic red tape, and even the strength of legislative and judicial systems tend to reinforce each other; multicollinearity prevents us from disentangling their individual effects empirically. However, they may be just the manifestation of a single phenomenon so that their separation is impossible." (pp. 75-77) [16]

Based on these notions, it might be claimed that good and efficient public administration where the rules of the game are clearly and logically set out and where corruption is minimal, is actually productive, in economic terms and its opposite, counterproductive. A society that exhibits these kinds of problems in its social, political and economic environment is readily identifiable to the experienced observer; organizational problems form the basis of these problematic societies and, taken together, comprise a colossal impediment to social wellbeing and economic progress. "Tell me how long it takes to get to talk to a public official on the phone and I'll tell you how likely it is that the society will progress economically within the next decade" paraphrases the words of Robert Putnam (1993) who studied the mutual influence of social capital and public administration in Italy.

Unfortunately, the problems we refer to here do not respond to traditional remedies because they are not themselves economic problems; they result in enormous economic problems for the society, however, and they are bound to come into view at some level and economic production is an obvious place.

This thesis proposes a shift in emphasis from questions of quantity to quality in identifying and measuring human capital. It indicates that the average years of schooling of the working population be normalized by an indicator of quality and by an indicator that gathers the multiple deflectors or disturbances to human capital, with the objective of extracting the real capacities of knowledge and abilities within the population and determine just how these different deflectors play upon the effectiveness of human capital. [17]

V. SOME EVIDENCE OF FACTORS THAT MAY INFLUENCE THE QUALITY OF HUMAN CAPITAL

The object of this section is to correct the average years of education of the workers by an indicator of the quality of education. For this purpose, we have used information from the study by Barro and Lee (1994) that shows the average years of schooling of the workforce for different countries. Similarly, results of the Reading test scores in mathematics and science in 1993-98 were used. [18]

Quality of Education

Table No 3, shows the average years of education of the workforce. The quality of the education factor is represented by test scores in mathematics and sciences. We leave behind of quality of each country and a factor of schooling standardized by the quality factor. From this Table, it is evident that countries that have high levels of schooling do not necessarily have the best quality of education; for example, the United States, New Zealand, Norway, Sweden and Canada which appear with the greatest years of schooling, lag behind the country of reference (Singapore) in quality of education - on an average 20 percent. Another example is South Africa which has a schooling level greater than that of Singapore but lags behind that country in educational quality at a level of 45 percent. Colombia has a lower years-of-schooling average and stalls behind the country of reference at some 40 percent, to occupy the second to last place overall.

When human capital is corrected by the quality of education indicator it can be seen that the United States, after having a human capital rating of 12.2, falls to 9.49 when adjusted and that is some 22% lower. In the same way, appear Sweden, Norway, South Africa and Canada. In the case of Japan, Korea and Hong Kong, these societies show a small lag in comparison to the county of reference.

Countries with low quality education may pay dearly for it. While Colombia shows a lag of some 40% with respect to Singapore, its adjusted human capital is has an effect of 27.8%. The same applies for South Africa, Iran and others. The foregoing shows that the quality of education may be a determining factor in the expected externalities. In this case, taking the average years of schooling as a human capital proxy variable, the effects of education quality can be seen immediately. Countries with lower quality levels have a greater human capital loss and this leads to the conclusion that the elasticity of the product with respect to human capital differs from one country to another depends on certain domestic characteristics that are prevalent in each country. [19]

Table No 2. Schooling, Quality and Human Capital Potential

Country	Schooling*	Quality	φ	(1- φ)	$\dot{S}$
Australia	10.3	530	0.18	0.82	8.49
Austria	8.4	539	0.16	0.84	7.04
Belgium (FI)	8.6	565	0.12	0.88	7.56
Canada	11.2	527	0.18	0.82	9.18
Colombia	4.68	385	0.40	0.60	2.80
Denmark	9.9	502	0.22	0.78	7.73
England	9	506	0.21	0.79	7.08
France	7.9	538	0.16	0.84	6.61
Germany	9.6	509	0.21	0.79	7.60
Greece	8.1	484	0.25	0.75	6.10
Hong Kong	9.33	588	0.09	0.91	8.53
Iran	3.98	428	0.33	0.67	2.65
Israel	9.06	522	0.19	0.81	7.36
Italy	6.6	476	0.26	0.74	4.89
Japan	9.4	605	0.06	0.94	8.84
Korea	10.1	607	0.06	0.94	9.53
Kuwait	6.54	392	0.39	0.61	3.99
Netherlands	8.96	541	0.16	0.84	7.54
New Zealand	11.31	508	0.21	0.79	8.94
Norway	11.82	503	0.22	0.78	9.25
Portugal	4.5	454	0.29	0.71	3.18
Singapore	7.82	643	0.00	1.00	7.82
Sth. Africa	8.07	354	0.45	0.55	4.44
Spain	6.6	448	0.30	0.70	4.60
Sweeden	11.2	519	0.19	0.81	9.04
Switz.	10.2	545	0.15	0.85	8.65
Thailand	5.7	522	0.19	0.81	4.63
USA	12.2	500	0.22	0.78	9.49

* Schooling 1995.Source Barro and Lee (own calculations)

Table No 3. Factors related to Human Organization

Country	$\ddot{S}$	1 − η	η	Epolitic	Sjudic.	Corrup.	Red Tape	Buroc.
Australia	8.07	0.95	0.05	8.5	10	10	9.25	9.75
Austria	5.92	0.84	0.16	9.04	9.5	8	7.25	8.25
Belgium (FI)	6.70	0.89	0.11	8	9.5	9.75	8	9.08
Canada	8.69	0.95	0.05	9	9.25	10	9.5	
Colombia	1.55	0.55	0.45	6	7.25	4.5	4.5	5.42
Denmark	7.24	0.94	0.06	8.5	10	9.25	9.5	9.58
England	6.28	0.89	0.11	8.33	10	9.25	7.75	9
France	5.45	0.82	0.18	8.21	8	10	6.75	8.25
Germany	6.58	0.87	0.13	8.63	9	9.5	7.5	8.67
Greece	3.51	0.58	0.43	5.75	7	6.25	4	5.75
Hong Kong	7.93	0.93	0.07	9.5	10	8	9.75	9.25
Iran	0.63	0.24	0.76	3.25	2	3.25	1.25	2.17
Israel	6.17	0.84	0.16	6.25	10	9.25	7.5	8.92
Italy	3.23	0.66	0.34	7.92	6.75	7.5	4.5	6.33
Japan	8.00	0.91	0.10	9.42	10	8.75	8	9.08
Korea	6.07	0.64	0.36	7.5	6	5.75	6.5	6.08
Kuwait	2.95	0.74	0.26	8.33	7.5	7.75	6.25	7.17
Netherlands	7.36	0.98	0.02	8.83	10	10	10	10
New Zealand	8.67	0.97	0.03	8.5	10	10	10	10
Norway	8.91	0.96	0.04	9.5	10	10	9	9.67
Portugal	1.90	0.60	0.40	7.54	5.5	6.75	4.5	5.58
Singapore	7.82	1.00	0.00	10	10	10	10	10
Sth. Africa	3.06	0.69	0.31	6.5	6	8	7	7
Spain	2.98	0.65	0.35	6.67	6.25	7	6	6.42
Sweden	8.32	0.92	0.08	9	10	9.25	8.5	9.25
Switz.	8.52	0.99	0.02	9.25	10	10	10	10
Thailand	1.53	0.33	0.67	5.83	3.25	1.5	3.25	2.67
USA	9.17	0.97	0.03	9.33	10	10	9.25	9.75

Source: Paolo Mauro. Own calculations

Factors related to Human Organization:

In Table No. 2, the variable   is adjusted, taking into consideration certain resistance factors. To do this we used information from Mauro (1997). From the multiple factors that this author points to - political stability, corruption, ineptitude of the juridical system, bureaucratic inefficiency and the obstacles facing business - were considered. In spite of the fact that the various factors are interrelated, their use is considered appropriate, given the importance that each factor has in determining the efficiency of human capital.
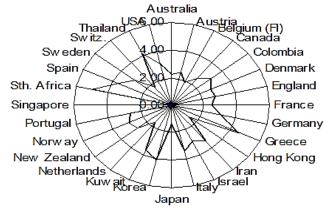
Again, the country of comparison is Singapore, since that country presents the highest rating in each of the factors. Taking a look at the countries in the sample, we observe that countries such as Iran (75%), Thailand (67%), Colombia (45%), Portugal (40%) and Greece (43%) lag behind the country of reference at an average of 42% which suggests that there are numerous resistance factors that mitigate against human capital in these settings.

This is not so in other countries that shows a slighter lag in comparison with Singapore; therefore S finds a more suitable setting for development in these countries.

Graph 1. *Lost Total Human Capital By Country*

Source: J.E. Sáenz Castro. Own Calculations

In this chart, the total loss of human capital, due to educational quality and the presence of resistance factors, is presented. Countries that show the greatest loss are: South Africa (5,01), Greece (4,59), Thailand (4,17), Korea (4,03), and Spain (3,62), Kuwait (3,59), Italy (3,37), Iran (3,35), Colombia (3,13), USA (3,03) and Germany (3,02). In the case of Korea, Tailand and Italy, most loss is due to the presence of resistance factors, while in the case of the United States and Germany, loss occurs mostly because the high level of education is not matched by high quality. The

rest of the countries listed are affected by problems, both in the quality of education and in the presence of resistance factors, although countries such as Colombia and South Africa show major loss coming from quality of education. See Graph 1.

VI. CONCLUSIONS

The results of this study show that while a country does not concern itself with the quality of schooling, education will not have the expected beneficial impact on economic production. In addition, in countries that do not deal with prevailing problems of corruption, bureaucratic inefficiency and so forth, the educated population will tend not to be highly productive. Equally, countries that do not deal with the destructive influence of corruption, social injustice and administrative inefficiency, will experience significant barriers to the effectiveness of human capital in promoting economic progress. Indeed, such countries are likely to meet with frustration in their economic planning while in many cases, the most educated of their citizens are apt to simply conclude that they may have better employment opportunities elsewhere.

The elasticity of the product with respect to human capital varies from one country to the other because it depends on the domestic characteristics (institutional climate and the quality of education) in each country. Therefore, its function on production is apt to vary as well. Countries that do not take such factors into account, may fall into the trap of promoting education while overlooking what is being taught and overlooking the environment in which innovation is hampered by a series of negative externalities.

Factors that traditionally were not taken in account in the relation productivity - the human capital, as the organization of the economic system, the political culture, the aptitudes and individual attitudes, the levels of nutrition and the moral formation, are aspects that have today per today a similar relevancy, or maybe major, that the own formation for the work and the formal education, factors that during decades were in use for measuring the impact of the human capital.

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