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INSTITUTIONS, GOVERNMENT STABILITY AND HUMAN CAPITAL ACCUMULATION

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ABSTRACT

The objective of this article is to study the influence of institutional quality on the human capital accumulation process. This paper builds on prior theoretical developments which establish a micro-foundation link between human capital accumulation and institutional quality. Using a panel data series from 1960 to 2010, we observe that political instability and institutional quality do affect long-term human capital accumulation. The article also emphasizes the importance of proposing an empirical treatment that relates government institutions and stability to the accumulation of human capital and its role, also linked to its quality as a driver for long-term economic growth. Therefore, this work shows that, in the relationship between human capital and economic growth, it is also necessary to take into account the fundamental role of institutions. Greater political stability and better institutions clearly foster human capital growth, thus promoting economic growth and prosperity.

Keywords: Education; Government Stability; Human Capital; Institutions.

RESUMO

O objetivo deste artigo é analisar a influência da qualidade institucional no processo de acumulação de capital humano. Este artigo baseia-se em desenvolvimentos teóricos prévios que estabelecem os micro-fundamentos que ligam a acumulação de capital humano e a qualidade institucional. Utilizando uma série de dados em painel de 1960 a 2010, observamos que a instabilidade política e a qualidade institucional afetam a acumulação de capital humano no longo prazo. Destaca-se a importância deste artigo em propor um tratamento empírico que relacione instituições governamentais e estabilidade à acumulação de capital humano e seu papel, também vinculado à sua qualidade como propulsora do crescimento econômico no longo prazo. Portanto, este trabalho mostra que, na relação entre capital humano e crescimento econômico, também é necessário levar em conta o papel fundamental das instituições. Maior estabilidade política e melhores instituições claramente impulsionam o crescimento do capital humano, promovendo assim o crescimento econômico e a prosperidade.

Palavras-chave: Educação; Estabilidade do Governo; Capital Humano; Instituições.

JEL Code: O43; O47; O15.

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INTRODUCTION

The literature on the role of institutions starts with the causality running from education to institutional quality, as proposed by Lipset (1959). An empirical test of this idea was reported by Gyimah-Brepong et al. (1998). The authors investigated the role of human capital on political instability in Latin America. They found that increasing nations' human capital increases political stability. However, they also reported a regression from political instability to human capital, finding a negative and statistically significant coefficient. Therefore, what they found was an existing relationship between them, but not causality.

Hall and Jones (1999) took a step further on this matter by considering the social infrastructure of the country (institutions) as the main cause of productivity levels. The authors conceptualized the social infrastructure as the institutions and government policies that act in the economy and determine the pattern of productivity by fostering physical, human and technological development. Using instrumental variables, they concluded that institutions can robustly explain the differences in income levels between countries by means of the levels productivity of human and physical capital as well as technology.

However, Glaeser et al. (2004) found that causality may indeed run from education to democracy as the best measure for institutional quality of any country. Again, the causality issue between education and institutions returned to the main scene.

Acemoglu et al. (2005) took Glaeser et al. (2004)'s empirical tests a step further. They ran several regressions where causality runs from education to institutions. According to the authors, once fixed effects are controlled for, the causality running from education to democracy disappears. As a result, the authors concluded that the omitted variables present in the fixed effects may be the cause of both democracy and education changes in the economies. Their main claim was that the historical development path might be the cause for both improvements as predicted by Acemoglu et al. (2005).

Following the same line on the importance of institutions for knowledge creation, Coe et al. (2009) found evidence that better institutions increase the returns to R&D investments. According to them, it also increases the benefit from international R&D spillovers and human capital formation. Moreover, Seck (2012) showed that countries with strong institutions experience a significant increase in the absorption of the international R&D spillovers. Recently, Aisen and Veiga (2013) estimated the effect of political instability on economic growth and found an inverse relationship between political instability and economic growth. When investigating the transmission channels of political instability, the authors found that it affects productivity growth and the accumulation of physical and human capital. Regarding the impact of democracy on economic growth, the authors found a small negative effect.

The above-mentioned studies do not offer a consistent economic model with micro-foundations showing the relationship between institutions and human capital, and their causality. Additionally, their empirical tests do not attempt to measure the direct effect of institutions on overall society´s human capital, as done by Acemoglu et al. (2004).

The first study to build a micro-foundation showing the role of institutions on human capital accumulation process was from Dias and McDermott (2006). Their economic model assumes the existence of a two-step process. The quality of institutions, given by their economic policies, influences the level of entrepreneurs in the economy. Hence, the level of entrepreneurs generates a higher or lower demand for human capital depending upon such economic policies. The empirical test in the paper indeed showed this to be case.

This new micro-foundation venue was further developed by Dias and Tebaldi (2012) in a more detailed model, which presented micro-foundations according to which institutional quality may affect the expected rate of return of human capital. Therefore, they offered a long run view of the human capital accumulation process and of how societies create their own historical development paths, in accordance to the findings of Acemoglu et al. (2004). However, the authors did not directly test the effects of institutional quality on human capital accumulation, as their empirical analysis focused on long run economic growth.

Building on the abovementioned theoretical contributions, this paper seeks to fill a gap in the literature by directly testing the effect of institutional quality and government stability on human capital accumulation. Besides using the human capital variable from the Penn World Table 8.1, we use several measures of structural human capital, which reflect the relative abundances of educated and non-educated (or less educated) people. After showing the positive effect of institutional quality on human capital accumulation, we move on to the effects on economic growth. This is done presenting the results of regressions in which human capital accumulation and structural human capital variables have a positive and statistically significant effect on the growth rate of real GDP per capita. Thus, our paper also contributes to the literature by showing that human capital is a channel through which institutions affect economic growth.

The remaining of the paper is organized as follow: Section 2 briefly presents the main implications of a theoretical model that shows how institutions operate at a micro-level in the economy. Section 3 describes the econometric analysis that uses cross-country panel data from 1960 to 2010. Section 4 reports and discusses the results, and Section 5 presents our main conclusions.

THEORETICAL MODEL

The theoretical model to be developed in this work follows the proposal of Dias and Tebaldi (2012), who emphasized the importance of the educational sector in the economy. Following the models of Uzawa (1965) and Lucas

(1988), the authors created a human capital accumulation function, based on the assumptions that will be described in the sequence.

The models assume that population N grows at a constant rate n. The population consists of educated (h) and uneducated (n) individuals, that is, N = h + n. There are two sectors in the economy: finished goods and education.

An important consideration in this model is that the finished goods sector requires the work of the educated (skilled) and uneducated (unskilled) workers, who are paid according to their marginal product. Thus, because of this fact, educated workers have higher incomes and are more productive. There is an incentive for the uneducated workers to invest in education in order to earn higher wages.

The education sector also uses the work of educated and uneducated individuals to create human capital. In this sector, work is remunerated according to social return. The main contribution of this model is the inclusion of the education sector, which raises the product of the economy to generate income. The derivation of the model can be expressed as follows:

Goods sector

The production function of the goods sector depends on educated and uneducated labor:

$$y(g) = A(an)^{1-\beta}\,(ah)^{\beta} = aAn^{1-\beta}h^{\beta} \quad (1)$$

In which: $y(g)$ is the final product; n is the unskilled work; h is the skilled work and A is the technology.

The real wages of the educated workers, which work in the finished goods sector are: $w_h^g = (W_h^g/AP)$

Where W_h^g is the nominal wage for the educated workers and P is the price level.

The profit function is given by:

$$\pi = an^{1-\beta}h^{\beta} - w_h^g h - w_n^g n, \quad (2)$$

w_h e w_n are the real effective wages of the educated and uneducated.

Considering that the technological level A is given, we have the following wage equation:

$$w_h^g = \beta an^{1-\beta}h^{\beta-1} \quad (3)$$

$$w_n^g = (1-\beta)an^{-\beta}h^{\beta} \quad (4)$$

The income is distributed between the educated and uneducated workers:

$$\left(\frac{w_h}{w_n}\right) = \left(\frac{\beta}{1-\beta}\right)\frac{n}{h} \quad (5)$$

Equation (5) shows that when uneducated workers become educated, there is a continuous reduction in the wage rate. According to Dias and Tebaldi

(2012 p. 305), "This equation suggests that improving institutions would cause the wage-ratio to decrease, that is, there would be a reduction in income inequality between qualified and non-qualified workers".

The educational sector

The model assumes that uneducated workers can be trained and become educated workers. The production function of this sector is given by:

$$y(e) = \gamma[(1-a)n]^{1-\beta}\left[(1-a)h^{\beta}\right], \quad (6)$$

being $0 \leq \gamma \leq 1$ the institutional quality, so that a greater γ implies better institutions. In this specification, it can be said that institutions affect the productivity of educated workers in the process of transferring knowledge to the uneducated.

Combining equations (6) and (1) we get:

$$y(e) = \gamma\left(\frac{1-a}{a}\right)\frac{y(g)}{A}. \quad (7)$$

This equation implies that technological advancement makes the process of creating human capital more complex, since it requires a greater quantity of product to create an increase in human capital. The model also assumes that $w_h^e = y(e)/h$, that is, the return on human capital employed in the education sector is the average cost of producing efficient human capital. It also implies an important role of the quality of institutions in determining social return.

Dias and Tebaldi (2012) also consider that there is perfect mobility in all sectors, so that workers can move from the goods sector to the education sector and vice versa. Using this condition, along with equation (3), we have the equation (8).

$$a = \gamma/(\gamma+\beta) \quad (8)$$

Replacing the equation (6), in (7), we get:

$$\dot{h} = y(e) = \left(\frac{\gamma\beta}{\gamma+\beta}\right)n^{1-\beta}h^{\beta} \quad (9)$$

This equation suggests that improvements in the quality of institutions increase the productivity of inputs to the education sector, that is, $(\frac{\partial y(e)}{\partial y}) > 0$.

The decision to accumulate human capital

Dias and Tebaldi (2012) develop a link between the individual decision to accumulate human capital and market conditions. The representative agent decides whether or not to invest in human capital, the decision depends on the costs incurred in the investment of that capital and on the expected income stream, that is, on the expectation of future earnings.

$$W = \int_t^{\infty} w_h^g\, e^{-\left(\frac{r}{\gamma}\right)(s-t)}ds = \int_t^{\infty}\left(\frac{\gamma\beta}{\gamma+\beta}\right)n^{1-\beta}h^{\beta-1}e^{-\left(\frac{r}{\gamma}\right)(s-t)}ds, \quad (10)$$

In which r is the market rate of return; r/γ is the effective discount, established by institutional inefficiency, created by institutional arrangements. Since r/γ is the investment in education, its inverse can be interpreted as the real rate of return of education. The opportunity cost required to become n is also affected by the temp $(t-T)$. Considering that costs are updated from time to time, the rate φ, then:

$$C = \int_T^t \left[\left(\frac{\gamma}{\gamma+\beta}\right)(1-\beta)n^{-\beta}h^{\beta} + \left(\frac{\gamma\beta}{\gamma+\beta}\right)n^{-\beta}h^{\beta}\right] x\, e^{\varphi(s-t)}ds = \int_T^t \left[\left(\frac{\gamma}{\gamma+\beta}\right)n^{-\beta}h^{\beta}\right] e^{\varphi(s-t)}ds \tag{11}$$

An individual chooses to accumulate human capital if the discounted future income flow is > or = the cost of accumulating human capital. Assuming that, at the margin, uneducated individuals choose to acquire skills to become educated, then:

$$\int_t^{\infty} \left(\frac{\gamma\beta}{\gamma+\beta}\right) n^{1-\beta}h^{\beta-1}\, e^{-\left(\frac{r}{\gamma}\right)(s-t)}ds = \int_T^t \left[\left(\frac{\gamma}{\gamma+\beta}\right)n^{-\beta}h^{\beta}\right] e^{\varphi(s-t)}ds \tag{12}$$

Integrating both sides of the equation, relative to *s*, assuming $T \to -\infty$

$$\frac{h}{n} = \left(\frac{\varphi\beta\gamma}{r}\right) \tag{13}$$

This equation shows that there is an ideal proportion of education for uneducated work, this relationship depends on: the quality of institutions (γ); the participation of human capital in the economy (β); and the discount rate and of the rate attributed to the return cost of capital (φ, r).

Good institutions are associated with the relation between educated to uneducated, that is, the portion of the most educated population in the economy. Replacing (3) in (6), we get:

$$\frac{w_h}{w_n} = \left(\frac{\beta}{1-\beta}\right)\frac{r}{\varphi\beta\gamma} \tag{14}$$

Equation (14) suggests that improvements in institutions reduce wages and income inequality between educated and uneducated.

The dynamic path of accumulation can be obtained by solving equations (13) for n and introducing it into equation (9).

$$\dot{h} = y(e) = \left(\frac{(\gamma\beta)^{\beta}}{\gamma+\beta}\right)\left(\frac{r}{\emptyset}\right)^{1-\beta} h \tag{15}$$

This process of endogenous accumulation of human capital depends on the quality of institutions, differently from Lucas (1988), where the accumulation of human capital was given by $\dot{h} = (1-u)\delta^{*}h$.

The model also implies that income can be generated both in the final goods sector and in the education sector. The production function is:

$$Y = y(g) + y(e) = \omega(\beta + A)h \quad (16)$$

Where $\omega = ((\gamma^{\beta}\beta^{\beta-1})/(\gamma+\beta)(\frac{r}{\emptyset})^{1-\beta}$

By solving the optimization problem on a balanced growth-path, output and consumption per capita should grow at the same rate. The condition shows that:

$$g_y = \frac{\dot{y}}{y} = \frac{\dot{c}}{c} = \frac{1}{\sigma}(\omega r v - \eta - \rho) \quad (17)$$

The interpretation for this equation is that the equilibrium growth rate of output per capita depends on institutions, intertemporal rates, and the share of human capital in the economy. Institutions can be interpreted as having a direct effect on growth, determining the return on the share of human capital in the economy, or having a strong effect on growth because they determine the ideal proportion of human capital in the economy (Eq. (13)).

DATA AND EMPIRICAL MODEL

This section presents a model that examines the empirical relationship among institutions and human capital growth. The major econometric problems regarding this relationship are endogeneity and heterogeneity in data. These problems can be solved by using a dynamic panel data model, where differences among countries are captured over time. This model also allows for obtaining the long-term average growth rate as the constant in the model (check Kenny and Williams, 2001; Dias and Tebaldi 2012, Tebaldi and Emslie 2013).

Departing from a growth regression:

$$y_{it} - y_{i,t-\tau} = \beta y_{i,t-\tau} + w_{i,t}\delta + \eta_i + \xi_t + \varepsilon_{it} \quad (18)$$

We can re-write equation (18) in a way that clearly shows that we have a dynamic model:

$$y_{it} = \tilde{\beta} y_{i,t-\tau} + w_{i,t}\delta + \eta_i + \xi_t + \epsilon_{it,} \qquad \tilde{\beta} = 1+\beta \quad (19)$$

Estimations of this model by OLS, even with fixed or random effects, are inconsistent, since the error term is correlated with the individual effect. Following Arellano and Bond (1991), we can eliminate the individual effect by taking first differences:

$$y_{it} - y_{i,t-\tau} = \tilde{\beta}(y_{i,t-\tau} - (y_{i,t-2\tau}) + (W_{it} - W_{it-\tau})\delta + (\xi_t - \xi_{t-\tau}) + (\varepsilon_{it} - \varepsilon_{i,t-\tau}) \quad (20)$$

Since the error term is correlated with the lagged dependent variable and some variables in vector W may be endogenous or pre-determined, the model is estimated by instrumental variables.

Arellano and Bond (1991) suggest the use of the following instruments: lagged levels (2 or more periods) of the dependent variable and of the endogenous explanatory variables; lagged level (1 or more periods) of the pre-determined explanatory variables and the exogenous variables can be

used as their own instruments. This model is known as the as Difference-GMM. Blundell and Bond (1998) show that there will be a problem of weak instruments when the series are persistent, and suggest the use of a System-GMM model which combines the equation in first-differences with the equation in levels. This System-GMM model will be used in this paper.

The hypothesis that institutional variables affect human capital growth is tested by estimating dynamic panel data models for growth human capital, for consecutive, non-overlapping, 5-year periods. Our sample covers 128 countries, over 10 consecutive and non-overlapping periods of five years, spanning the period 1960-2010. The variables used in the empirical model are:

Pen World Table Version 8.1 – PWT (Feenstra et al., 2015)

GDP per capita : Expenditure-sidereal GDP atchained PPPs(in mil. 2005US$); Human Capital: Index of human capital per person, based on years of schooling (Barro/Lee, 2013) and returns to education (Psacharopoulos, 1994); Physical Capital: Capital stock at current PPPs (in mil. 2005US$); Government (%GDP): Share of government consumption at current PPPs; Investment (%GDP): Share of gross capital formation at current PPPs; Exports – Imports(%GDP): Share of merchandise exports at current PPPs - Share of merchandise imports at current PPPs; Population in millions.

Cross National Time Serie (CNTS) – (Datatabanks International 2011)

Cabinet Change: Number of times in year in which a new premier is named and/or 50% if the cabinet posts are occupied by new ministers. This variable is our main proxy of political instability.

Economic Freedom (EFW) – (Gwartney and Lawson, 2009)

Index Chain: Index documents the relationship between economic freedom and a variety of positive and economic goals.

Chain Area: Index for stronger legal structure and security of property rights.

Polity IV Database (Marshal and Jagger, 2009)

Polity2: Combined Polity Score, captures political regimes authority spectrum, scale ranging from -10 (hereditary monarchy) to +10 (consolidated democracy).

Political Risk Service International Country Risk (ICRG) – (PRS, Group, 2012)

Ethnic Tensions: (Index) This component is an assessment of the degree of tension within a country attributable to racial, nationality, or language divisions.

Religion in Politics: (Index) Religious tensions may stem from the domination of society and/or governance by a single religious group that seeks to replace civil law by religious law and to exclude other religions from the political and/or social process.

Bureaucracy Quality: (Index) the institutional strength and quality of the bureaucracy is another shock absorber that tends to minimize revisions of policy when governments change.

Corruption: (Index) this is an assessment of corruption within the political system.

Government Stability: This is an assessment both of the government's ability to carry out its declared program(s), and its ability to stay in office. The risk rating assigned is the sum of three subcomponents, each with a maximum score of four points and a minimum score of 0 points. A score of 4 points equates to Very Low Risk and a score of 0 points to Very High Risk.

Barro e Lee (2013)

Structural human capital: higher education / no education.

Structural human capital 2: (higher education + completed secondary education) / no education.

Structural human capital 3: (complete higher education + completed secondary education) / no education.

Structural human capital 4: complete higher education / (no education + incomplete primary education).

Table 1 presents the descriptive statistics of the variables used in the econometric model. In general, it is possible to observe the great variability in the data, showing the discrepancy between income levels, physical capital, human capital and institutions between countries. The data sources in which the variables were collected are also presented.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Growth of GDP per capita	1579	0.002	0.004	-0.025	0.026
GDP per capita (log)	1746	8.316	1.225	5.031	11.576
Human capital (log)	1898	3.440	4.244	0.000	26.364
Growth of Human Capital	1181	0.012	0.015	-0.048	0.103
Growth of Physical Capital	1569	0.023	0.032	-0.084	0.385
Government (% GDP)	1746	0.200	0.118	-0.152	0.927
Investment (%GDP)	1746	0.203	0.116	-0.107	1.577
Exports - Imports (%GDP)	1746	-0.069	0.309	-6.393	1.090
Population Growth	1588	0.002	0.001	-0.005	0.015
Cabinet Change	1916	0.456	0.397	0.000	3.000
Index Chain	939	6.035	1.332	1.782	9.141
Chain Area2	893	5.551	2.005	1.143	9.625
Polity2	1653	0.678	7.335	-10.000	10.000
Ethnic Tensions	797	3.902	1.429	0.000	6.000
Religion in Politics	797	4.565	1.337	0.000	6.000
Bureaucracy Quality	797	2.129	1.185	0.000	4.000
Corruption	797	3.044	1.346	0.000	6.000
Government Stability	797	7.536	2.069	1.000	11.625
Structural Institutions	1898	5.806	40.335	0.000	1390.80
Structural Institutions2	1898	19.505	245.835	0.001	10306.53
Structural Institutions3	1898	16.813	228.154	0.000	9604.98
Structural Institutions4	1898	0.541	2.624	0.000	48.438

Sources: Pen World Table Version 8.1; Cross National Time Serie; Economic Freedom; Polity IV Database; Political Risk Service International Country Risk; Barro and Lee.

RESULTS AND DISCUSSION

Political instability, institutions and Human Capital

Tables 2 and 3 present estimates of the impact of institutions on human capital. The variable that represents human capital was taken from PWT 8.1 In all models presented, we used the following explanatory variables: initial human capital, investment, trade openness, government consumption and population growth. Institutional variables were also used to study their impact on human capital: cabinet changes (From CNTS), the Economic Freedom of the World (EFW) index, Area 2 of the index of Economic Freedom (legal structure and security of property rights), and the polity scale (polity2 from the Polity IV database). This procedure was done because the institutions can affect economic growth directly (with an impact on the product), and indirectly (with an impact on human capital).

Table 2. Institutions and Human Capital Growth: Dependent Variable: Human Capital Growth

Variables	(1) hcap_gr	(2) hcap_gr	(3) hcap_gr	(4) hcap_gr
L. Human capital (log)	-0.00719*	-0.0146*	-0.0210**	-0.0147***
	(-1.683)	(-1.907)	(-2.404)	(-3.054)
Investment (%GDP)	0.0316**	0.00427	0.00943	0.0393***
	(2.209)	(0.188)	(0.497)	(3.227)
Trade (%GDP)	0.00132	0.00312	0.000686	0.00350
	(0.302)	(0.548)	(0.0995)	(0.663)
Government (% GDP)	-0.0136	-0.00692	-0.0145	-0.00189
	(-1.144)	(-0.521)	(-1.229)	(-0.156)
Cabinet Changes	-0.0102***			
	(-2.769)			
Population Growth	1.256	1.079	0.0361	2.650**
	(1.275)	(0.632)	(0.0198)	(2.299)
Index of Economic Freedom		0.00502***		
		(2.873)		
Area2 of Economic Fredom			0.00134	
			(1.439)	
Polity scale				0.000435*
				(1.972)
Constant	0.0104**	-0.0224*	0.00586	-0.00187
	(2.087)	(-1.860)	(0.934)	(-0.399)
Observations	1,132	823	784	1,093
Number of countries	130	108	108	124
Number of instruments	142	108	108	142
Hansen (p-value)	0.631	0.243	0.180	0.837
AR1 test (p-value)	0.000	0.000	0.000	0.000
AR2 test (p-value)	0.849	0.873	0.845	0.893

Notes:

– System-GMM estimations for dynamic panel-data models. Sample period: 1960–2010;

– All explanatory variables were treated as endogenous. Their two period lagged values were used as instruments in the first-difference equations and their once lagged first-differences were used in the levels equation;

– t-Statistics are in parentheses. Significance levels at which the null hypothesis is rejected: ***, 1%; **, 5%, and *, 10%.

In Table 2, the dependent variable is the growth rate of human capital, taken from PWT 8.1. The results reported in columns 2, 3 and 4 indicate that there is conditional convergence in human capital. The investment share is statistically significant in columns 1 and 4, indicating that human capital may grow faster when the investment rate is higher. This result makes sense from an economic standpoint, as increased investment translates into higher employment, which can generate incentives for the acquisition of qualifications, because of the better performance of the labor market. The other explanatory variables do not seem to have an impact on human capital.

Regarding the institutional variables, we observe that political instability tends to reduce the growth rate of human capital. Countries with greater economic freedom tend to have greater human capital accumulation. This result also makes sense because economic freedom translates into greater mobility of factors and less regulated labor markets, creating incentives for

human capital accumulation. The variable democracy was also significant, showing that more democratic countries accumulate more human capital.

Table 3 uses institutional variables from the International Country Risk Guide (ICRG), and the other variables are the same of Table 2. There is conditional convergence in human capital, as found in Table 2. The institutional variables religion and bureaucracy are statistically significant and their signs are positive, as expected, but the p-value of the Hansen test is below 0.10 in several estimations, which question the validity of the instrument matrix. It is generally observed that the quality of bureaucracy acts positively on the growth of human capital, which is in accordance with the literature presented in the article, that is, countries that manage to present more dynamic bureaucratic aspects promote an increase in stock of human capital. It happens mainly due to the incentive for new entrepreneurship opportunities and consequently opportunities for opening new businesses, that is, these countries promote production instead of deviations, as advocated by Jones and Vollarth (2015).

Table 3. International Country Risk and Human Capital Growth: Dependent Variable: Human Capital Growth

Variables	(1) hcap_gr	(2) hcap_gr	(3) hcap_gr
L. Human capital (log)	-0.00897	-0.0142**	-0.0168**
	(-1.547)	(-2.201)	(-2.409)
Investment (%GDP)	0.0369**	0.0371*	0.0622***
	(2.082)	(1.901)	(2.766)
Trade (%GDP)	0.00353	0.00627	0.00638
	(0.681)	(1.085)	(1.327)
Government (% GDP)	0.00242	0.00366	0.0231
	(0.178)	(0.283)	(1.627)
Ethnic Tensions	0.000708		
	(-0.465)		
Population Growth	2.522**	2.727**	3.819***
	(2.035)	(2.074)	(3.071)
Religion in Politics		0.00236**	
		(2.307)	
Bureaucracy Quality			0.00482**
			(2.440)
Corruption		0.000789	
		(1.316)	
Government Stability			0.000266
			(0.627)
Constant	0.00740	-0.0105	-0.00372
	(0.881)	(-1.330)	(-0.475)
Observations	643	643	643
Number of countries	114	114	114
Number of instruments	97	97	94
Hansen (p-value)	0.110	0.110	0.129
AR1 test (p-value)	0.000	0.000	0.000
AR2 test (p-value)	0.849	0.900	0.889

Notes:

– System-GMM estimations for dynamic panel-data models. Sample period: 1960–2010;

– All explanatory variables were treated as endogenous. Their two period lagged values were used as instruments in the first-difference equations and their once lagged first-differences were used in the levels equation;

– t-Statistics are in parentheses. Significance levels at which the null hypothesis is rejected: ***1%; **, 5%, and *, 10%.

The above estimates show that the quality of institutions and the stability of government are extremely important in the composition of a country's human capital. In other words, there is a consensus on the importance of human capital in promoting economic growth. In addition to that, it is important to promote policies that stimulate the improvement of the quality of institutions, because it makes it possible to raise the level of human capital and thereby stimulate economic growth. This argument is supported by Coe *et al*. (2009) and also by Dias and Tebaldi (2012). Moreover, this article presents an empirical treatment to the theoretical model already presented.

Structural human capital

In this section, we study the effects of institutions on human capital growth rates using four structural human capital variables, based on ratios of educated to non-educated people, as dependent variables.

Estimates for the effects of the growth rate of human capital and the four measures of structural human capital on the growth rate of GDP per capita are presented in Table 4. The impact of human capital on economic growth is significant and positive in all regressions. We also observe the influence of structural human capital on economic growth. This result is consistent with the theoretical model's implication, i.e., with the idea that changes in structural human capital (in the ratios of educated to non-educated workers) do affect growth.

In column 2, we observe the impact of the variable *structural human capital 2*, i.e., of the ratio of higher education and completed secondary education to no education. Thus, expanding the definition of structural human capital by considering also people with secondary education, the result of the product remains positive. In column 3, we see again the influence of structural human capital, represented by the ratio of complete higher education and completed secondary education to no education.

Table 4. Structural Institutions and Economic Growth: Dependent Variable: Economic Growth

Variables	(1) gdp_gr	(2) gdp_gr	(3) gdp_gr	(4) gdp_gr
L.GDP per capita	0.946***	0.950***	0951***	0.953***
	(58.90)	(64.93)	(63.57)	(65.19)
Government (% GDP)	-0.793***	-0.706***	-0.706***	-0.645***
	(-3.327)	(-3.150)	(-3.149)	(-3.004)
Investment (%GDP)	0.554**	0.541**	0.534**	0.607***
	(2.196)	(2.303)	(2.245)	(2.635)
Trade (%GDP)	-0.0703	-0.0749	-0.0735	-0.0935
	(-0.942)	(1.060)	(1.035)	(1.340)
Population Growth	-43.17***	-38.90***	-38.94***	-36.36***
	(-3.426)	(-3.513)	(-3.486)	(-3.292)
Cabinet Changes	-0.246**	-0.184***	-0.185***	-0.149*
	(-3.029)	(-3.020)	(-2.972)	(-2.535)
Structural human capital	7.40e-05*			
	(0.990)			
L.Structural human capital2		1.07e-05*		
		(1.911)		
L.Structural human capital 3			1.15e-05**	
			(1.880)	
L.Structural human capital 4				0.000401
				(0.284)
Constant	0.813***	0.734***	0.732***	0.668***
	(4.897)	(4.524)	(4.446)	(4.387)
Observations	1,236	1,236	1,236	1,236
Number of countries	128	128	128	128
Number of instruments	120	142	142	152
Hansen (p-value)	0.306	0.598	0.581	0.768
AR1 test (p-value)	8.67e-05	0.000132	0.000132	0.000153
AR2 test (p-value)	0.897	0.902	0.903	0.909

Notes:

– System-GMM estimations for dynamic panel-data models. Sample period: 1960–2010;

– All explanatory variables were treated as endogenous. Their two period lagged values were used as instruments in the first-difference equations and their once lagged first-differences were used in the levels equation;

– t-Statistics are in parentheses. Significance levels at which the null hypothesis is rejected: ***, 1%; **, 5%, and *, 10%.

In sum, the models provide strong evidence indicating that the growth rate of human capital and structural human capital affect long-run economic growth. This result is consistent with the hypothesis that institutions affect human capital, which then affects an economy's growth path. That is, our results are consistent with the view that human capital is one of the channels through which institutions affect economic growth.

The above estimates confirm what was proposed in the theoretical model presented here, that is, institutions affect the level of human capital on the economy, which in turn affects economic growth. Moreover, it's important to consider the importance of the quality of human capital in promoting long-term economic growth, that is, it is necessary not only to improve the level of human capital, but also to prioritize the quality of it.

CONCLUSION

The objective of this paper is to test the influence of the institutions quality on human capital accumulation process. Using a panel data series from 1960 to 2010, we observe that the economic policies and institutions quality do affect long-term human capital accumulation process in the economy. Better institutions do foster human capital growth.

The article shows that, in general, a country's institutions and social infrastructure are important in stimulating or discouraging a country's growth through its role in human capital. These results are defended by Hall and Jones (1999), which points out the need to consider also how institutions can promote or divert production. This analysis was also defended by Seck (2012), which demonstrates the institutional importance of stimulating Research and Development in a country, that is, stimulating human capital.

This paper analyzes the influence of the institutions quality on human capital accumulation process. We find that economic, policy and structural institutions can affect economic growth, through their impact on human capital. In line with the literature, we find that political instability, economic freedom, democracy, ethnic tensions, government stability and structural institutions determining the economic growth.

It was also observed that the institutions act on the human capital, i.e., we observe that the economic policies and institutions quality do affect long-term human capital accumulation process in the economy. Better institutions do foster human capital growth. These results are in agreement with those shown by Aisen and Veiga (2013) that point out the role of institutions for both economic growth and as a transmission channel for other economic variables.

This paper is in line with the proposed Dias and Tebaldi (2012), in which underscored the importance of structural institutions for economic growth. The major policy implication of this process is that countries with poor initial institutions accumulate less human capital because their returns to education tend to be smaller. This lower human capital accumulation will slow economic growth in the long term. We use several institutional indicators, both political and economic, and the results were significant and with expected signs on several variables such as: political instability, economic freedom, democracy, ethnic tensions and government stability.

Finally, it is important to highlight the importance of this article in proposing an empirical treatment relating government institutions and stability to the accumulation of human capital and its role, also linked to its quality as a driver of economic growth in the short term. Therefore, this work shows that, in the relationship between human capital and economic growth, it is also necessary to take into account the fundamental role of institutions.

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