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Quality of Institutions : Does Intelligence Matter?*

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Abstract

This paper analyzes the effect of the average level of intelligence on different measures of the quality of institutions, using a 2006 cross-sectional sample of 113 countries. The results show that average IQ positively affects all the measures of institutional quality considered in our study, namely government efficiency, regulatory quality, rule of law, political stability and voice and accountability. The positive effect of intelligence is robust to controlling for other determinants of institutional quality. It follows that countries with higher IQ levels enjoy institutions of better quality than countries with low levels of IQ. This finding should by no means be interpreted as evidence that there exist some countries with more intelligent populations that build better institutions and some other countries with less intelligent populations that build poor institutions. What our finding points out to is the fact that a country's level of the understanding of the rules and principles that govern the institutions and the degree of cooperation of its human capital within national institutions is important for institutional quality.

Key Words: governance, institutions, intelligence.

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1 Introduction

Numerous studies have documented the effect of national IQs not only on economic growth, but also on an important range of phenomena (Lynn and Vanhanen, 2012). Beside its direct effect on economic growth (Whetzel and McDaniel, 2006; Jones and Schneider, 2006, 2010; Weede and Kämpf, 2002), intelligence has significant effect on other factors that directly affect economic growth, such as corruption (Potrafke, 2012) and governance (Kodila-Tedika, 2012), and therefore indirectly affect economic growth.

This paper analyzes the effect of national IQs on government institutions. We argue that institutional quality serves as a channel through which intelligence affect economic growth. Specifically, high population IQ improves institutional quality and positively affects economic growth through high-quality government institutions. The following measures of institutional quality are considered: government effectiveness/efficiency, political stability, and regulatory quality, rule of law and voice and accountability. We find that, after controlling for other determinants of institutional quality, national IQ positively affects each of the five measures of institutional quality.

We start by submitting that running institutions requires understanding the principles that rule them in order to produce a high quality outcome. This fact allows to put forth our motivation of studying the effect of intelligence on national institutions. First, intelligence is positively related to patience that accompanies the learning process and that allows players in the institutions to have a better understanding of the principles and rules that govern them. Second, as group cognitive skills have more meaningful effect on national outcome than individual intelligence, national IQ captures the level of cooperation within the institutions in order to produce the outcomes that are nationally efficient. In fact, one of the aims of modern institutions is to support pro-market policies. In this vein, high IQ level is expected to have a positive effect on institutions since high IQ individuals appear more likely to support pro-market and pro-trade policies

(Caplan and Miller, 2010) that are implemented within the national institutions.

In the institutional setting, IQ is understood to capture the level of national ability to understand the principles and rules that govern national institutions and to orient their structure toward pro-market and pro-trade policies, with the ultimate objective of benefiting the general population. However, it is reasonable to think of a reverse feedback effect from institutions to intelligence. In the same way that the exposure to some elements of the natural environment has been documented to have an impact on intelligence (Armor, 2004; Wang et al., 2007; Solon et al., 2008), national institutions may be thought to create an environment that influence national intelligence. However, the question of the channels through which institutions can influence IQ is crucial. It can be submitted that by creating an appropriate environment, institutions are able to allow talents to develop and thus to increase population IQ. The education system and the health system are such channels through which governmental institutions can positively influence national IQ outcomes. For example, it is possible to raise IQ with sound public health policies and an excellent education (Armor, 2004).

A model that aims at explaining the effect of national intelligence on the quality of the institutions would logically account for the feedback effect from the ability of government institutions to create an environment that promotes national intelligence. However, doing so will account only for part of the factors that may affect cognitive abilities. For example, it is not possible to disentangle the negative effect of the exposure to arsenic and fluoride and the possible positive effect resulting from an appropriate environment created by sound public health policies and an excellent educational system. A good education system can trivially influence IQ by exposing students to the cultural referents common in some IQ tests. But, as pointed out by Jones (2011), such increases are rarely of interest to psychologists and economists. It is important to mention that neglecting such effects when they are significant may lead to an inaccurate assessment

of the relationship between institutions and IQ levels. However, the main question is whether this makes any difference at all. We shall run regressions in this paper by first considering the unidirectional effect from IQ levels to institutional quality and then considering the feedback effect from institutional quality to intelligence.

The paper is organized in six sections, including this introduction. The second section focuses on a graphical analysis and on the results from simple regressions of the relationship between each of the five measures of institutional quality and national IQ. The empirical model is discussed in section 3 and regression results are presented in section 4. Section 5 discusses the robustness of the findings while section 6 concludes.

2 A graphical Analysis

Figures 1 and 2 portray the relationship between each of the five measures of institutional quality (y-axis) and IQ (x-axis) for the countries included in our sample. In Figure 1, government effectiveness/efficiency is plotted against IQ. It follows that countries with higher IQ enjoy higher government effectiveness. We also represent the fitted line for the simple regression model $Ge_i = \alpha + \beta IQ_i + \epsilon_i$ where Ge is government effectiveness/efficiency. The estimated coefficient for β is positive (+0.060) and strongly significant (p-value = 0.000), showing that high IQ improve government efficiency.

The same conclusion obtains when for the relationship between each of the four remaining measures of institutional quality and IQ. Figure 2 exhibits a positive and significant relationship between each relevant measure of institutional quality and intelligence. In panel (a), $\hat{\beta} = 0.042$ (p-value = 0.000) for voice and accountability; in panel (b), $\hat{\beta} = 0.42$ (p-value = 0.000) for political stability; in panel (c) $\hat{\beta} = 0.054$ (p-value = 0.000) for regulatory quality; and in panel (d) $\hat{\beta} = 0.055$ (p-value = 0.000) for the rule of law.

In each of the simple regression models, IQ explains more than one-third of the variations in the the institutional quality variable: 51.8% of the variations in government effectiveness, 30.5% of the variations in voice and accountability, 30.2% of the variations in political stability; 48.5% of the variations in regulatory quality and 44.1% of the variations in rule of law. In addition, the correlation coefficients between IQ and each of the five measure of institutional quality are respectively 0.752 (p-value = 0.000) for government efficiency, 0.552 (p-value = 0.000) for voice and accountability, 0.550 (p-value = 0.000) for political stability, 0.699 (p-value = 0.000) for regulatory quality, and 0.664 (p-value = 0.000) for rule of law.

However, institutional quality cannot solely be explained by average IQ, and the relationship between the two variables cannot be claimed only based on the above simple regression results. Our aim is to show that the significant relationship between each of the considered measures of institutional quality and average IQ does remains significant and robust when we control for other factors. To do so, we shall next specify and estimate a model that accounts for other determinants of institutional quality.

3 Empirical Model

We estimate the following empirical model:

$$IQI_i = \alpha + \beta IQ_i + Z_i' \delta + \epsilon_i \quad (1)$$

where IQI_i is the institutional quality index for country i , IQ_i is its average IQ, $Z = (z_1, z_1 \dots z_k)'$ is the vector of control variables, and ϵ_i is the error term that is assumed to be normally and independently distributed. Finally, α is the intercept, β captures the effect of average IQ on institutional quality while $\delta = (\delta_1, \delta_2, \dots, \delta_k)$ is the parameter vector for the control variables. Our parameter of interest is thus β .

The measures of institutional quality come from the dataset compile by Daniel Kaufmann, and Art Kraay and Massimo Mastruzzi at the World Bank. This data set aggregates indicators of six broad dimensions of governance (Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption). The six aggregate indicators are based on 30 underlying data sources reporting the perceptions of governance of a large number of survey respondents and expert assessments worldwide.

Our variable of interest, IQ, is a measure of national average intelligence. The data on IQ levels come from (Lynn and Vanhanen, 2002, 2006) who have compiled their dataset by averaging hundreds of IQ tests observed over the 20th and the 21st centuries for 113 countries using best practice methods. Average IQ is a measure of general-purpose human capital as well as a measure of nation's labor quality (Hanushek and Kimko, 2000; Jones and Schneider, 2006). In institutional setting, we consider IQ as a measure of the ability of a nation's human capital to cooperate in order to produce a nationally efficient outcome in terms of pro-market policies.

We include the following control variables: openness to trade, natural resources exports, the log of GDP per capita, legal origin and geographical location. Following the trend in the literature, legal origin is captured by distinguishing between the English, French, German, Scandinavian and socialist legal heritages. Dummy variables for East Asia and the Pacific, Latin America and Caribbean, Middle East and North Africa, Sub-Saharan Africa and South Asia capture the geographical effects. Natural resources exports is measured by the share of primary commodities in total exports of goods to account for the effect of the rent-seeking opportunities due to the presence of natural resources. Finally, openness to trade is measured by the GDP share of the value of total exports and imports. Dummy variables for legal origins come from La Porta et al. (1999) while The data on GDP per capita and trade come from Pen World Tables.

The model in equation (1) is estimated by means of 2SLS, to account for possible endogeneity that results from the inclusion of openness to trade. In fact, while greater openness increases the demand for better institutions, it may be true that countries with better institutions may be more open (Islam and Montenegro, 2002). We use Frankel and Romer (1999)'s variables to instrument for trade.

4 Regression Results

We present the regression results in two subsections. In the first subsection (section 4.1), intelligence enters exogenously the regression model for institutional quality. This follows the practice in growth regressions where IQ enters the model exogenously (Weede and Kämpf, 2002; Whetzel and McDaniel, 2006; Ram, 2007; Jones, 2011) even though it may be argued that growth can create conditions that allow the development of human capital. We then, in section 4.2, consider that institutional quality affects national intelligence by endogenously introducing IQ. Our adopted estimation strategy, the two-stage least square, helps to account for the possible endogeneity of IQ in the model.

4.1 Results with IQ as an exogenous variable

The regression results are presented in Table 1. Each of the columns (2)–(6) displays the estimated model for one of the five institutional quality variables. Our coefficient of interest, $\hat{\beta}$, is positive and significant at the 1% level in the regressions where the dependent variable is the rule of law, and at the 5% level in the other regressions. We thus find that the positive effect of average IQ remains significant after accounting for other determinants of institutional quality. This finding suggests that countries with higher IQ enjoy better government institutions.

We now turn to the performance of the other determinants of institutional quality when IQ is accounted for. First, Table 1 shows that GDP per capita and natural resources have the expected effect on institutional quality. Their coefficients are strongly significant and have the expected sign in all the five regressions. The estimated value of the coefficient for GDP per capita is positive while the one for natural resources is negative, meaning that countries with higher GDP per capita enjoy better government institutions, and that the presence of natural resources negatively affects institutional quality.

Second, the effect and the significance of regional dummies differ from one measure of institutional quality to another. For example, while all the legal origin dummies negatively and significantly affect *Government Efficiency*, only the German legal inheritance significantly affects *Political Stability* and *Regulatory Quality*. On the other hand, the *Rule of Law* is negatively and significantly affected by all the legal origin dummies, except by the British dummy, while *Voice and Accountability* is significantly affected only by the German legal inheritance.

Thirdly, regional dummies have a significant and negative effect on institutional quality in most of the cases. For example, with exception for the Sub-Saharan African dummy, all the regional variables negatively affect the regulatory quality and the rule of law in the countries include in our sample. It is important to note that while the effect of the other regional dummies is negative, the one for Sub-Saharan Africa is positive, although significant only for *Political Stability* and *Voice and Accountability*.

Finally, openness to trade has an unexpected sign in Table 1. In addition, the coefficient of this variable is significant only for Rule of Law and for Voice and Accountability. This finding seems puzzling. However, Kalonda-Kanyama (2012) shows that, when national IQ is accounted for, the relationship between institutional quality and trade may not be linear. Precisely, he finds a positive but diminishing relationship between three

Table 1: Main Regression (Year = 2006)

Variables	Government effectiveness	Political stability	Regulatory quality	Rule of law	Voice and Accountability
Intelligence (IQ), $\hat{\beta}$	0.017** (0.032)	0.035** (0.032)	0.021** (0.026)	0.032*** (0.001)	0.032** (0.034)
Openness	-0.002 (0.324)	-0.008* (0.094)	-0.001 (0.497)	-0.005** (0.020)	-0.009*** (0.001)
Natural resources	-0.005*** (0.000)	-0.005 (0.111)	-0.006*** (0.007)	-0.007*** (0.001)	-0.010*** (0.001)
Log GDP per capita	0.593*** (0.000)	0.542*** (0.000)	0.559*** (0.000)	0.501*** (0.000)	0.602*** (0.000)
East Asia and Pacific	-0.190 (0.172)	-0.243 (0.500)	-0.395** (0.017)	-0.436** (0.028)	-0.461 (0.216)
Europe and Central Asia	-0.581*** (0.000)	-0.662** (0.013)	-0.390** (0.023)	-0.627*** (0.002)	-0.365 (0.248)
Latin America & Carrib.	-0.431*** (0.000)	-0.094 (0.634)	-0.292* (0.091)	-0.702*** (0.000)	0.311 (0.148)
South Asia	-0.495** (0.020)	-1.385*** (0.001)	-0.429* (0.050)	-0.688** (0.033)	-0.572 (0.195)
Sub-Saharan Africa	0.194 (0.258)	0.958*** (0.002)	0.320 (0.199)	0.237 (0.279)	0.771** (0.026)
English legal origin	-0.344** (0.020)	0.176 (0.537)	0.015 (0.921)	-0.067 (0.589)	0.215 (0.359)
French legal origin	-0.641*** (0.000)	-0.197 (0.391)	-0.183 (0.217)	-0.446*** (0.005)	-0.244 (0.241)
German legal origin	-0.495*** (0.000)	-0.484** (0.012)	-0.297* (0.065)	-0.554** (0.010)	-0.599** (0.020)
Socialist legal origin	-0.586*** (0.000)	0.410 (0.173)	-0.091 (0.565)	-0.608*** (0.002)	0.029 (0.924)
Constant	-5.577*** (0.000)	-7.058*** (0.000)	-6.138*** (0.000)	-5.981*** (0.000)	-6.950*** (0.000)
Observations	113	113	113	113	114
R-squared	88.8	36.1	79.8	77.1	51.0

Robust p-values in parentheses
*** p<0.01, ** p<0.05, * p<0.1

measures of institutional quality and trade. The three measures of institutional quality are *Political Stability*, *Rule of Law*, and *Voice and Accountability*.

4.2 Results with IQ as an endogenous variable

We mentioned earlier that institutions can create an environment that can allow talents to develop, such as an excellent educational system and a good health system. As result, model estimation could take into account the feedback effect from institutions to intelligence. However given that increases in the level of national intelligence resulting from such an environment are rarely of interest for economists and psychologists, we presented the regression results in the previous section with IQ entering the regression model exogenously. We shall present regression results for the model with IQ entering endogenously in this section.

In table 2, we introduce endogenously introduce IQ in the estimation, controlling for trade, natural resources, high income, continental locations and the origin of institutions, and instrumenting with regional geographical variables in a 2SLS estimation procedure. The results show that the coefficient associated with IQ is positive and significant at the 1% in the regressions where *Government Efficiency* and *Regulatory Quality* are the respective dependent variables. However, the effect of IQ on the *Rule of Law* and *Voice and Accountability* is only significant at the 10%. In addition the effect on *Voice and Accountability* is negative. Finally, national intelligence does not have a significant effect on *Political Stability* when IQ is introduced as an endogenous variable in our empirical model.

Table 2: Model with IQ as endogenous variable

Variables	Government effectiveness	Political stability	regulatory quality	Rule of law	Voice and accountability
Intelligence (IQ), $\hat{\beta}$	0.048*** (0.001)	0.012 (0.505)	0.039*** (0.002)	0.030* (0.053)	-0.033* (0.075)
Trade	0.001 (0.552)	0.0002*** (0.000)	0.001 (0.302)	0.001 (0.439)	0.002 (0.264)
Natural resources	-0.007*** (0.001)	-0.009*** (0.004)	-0.009*** (0.000)	-0.010*** (0.001)	-0.010*** (0.001)
High income	1.185*** (0.000)	1.264*** (0.000)	1.005*** (0.000)	1.440*** (0.000)	1.141*** (0.000)
Africa	0.120 (0.818)	-0.373 (0.485)	-0.032 (0.955)	-0.313 (0.597)	-1.575** (0.034)
America	-0.236 (0.598)	-0.603 (0.184)	-0.204 (0.685)	-0.689 (0.106)	-0.437 (0.960)
Asia	-0.502 (0.239)	-1.460*** (0.001)	-0.535 (0.256)	-0.813 (0.103)	-1.144* (0.072)
Europe	-0.433 (0.378)	-1.024** (0.031)	-0.179 (0.722)	-0.697 (0.212)	-0.231 (0.723)
English legal origin	-0.450 (0.129)	-0.740*** (0.001)	0.052 (0.785)	-0.402 (0.101)	-0.407 (0.104)
French legal origin	-0.639*** (0.001)	-0.646*** (0.000)	-0.169 (0.237)	-0.561*** (0.005)	-0.528*** (0.002)
German legal origin	-0.311 (0.408)	-0.118 (0.715)	-0.058 (0.860)	-0.163 (0.727)	0.136 (0.609)
Socialist legal origin	-0.720*** (0.009)	0.124 (0.672)	-0.203 (0.425)	-0.627** (0.038)	-0.251 (0.492)
Constant	-3.419** (0.020)	-0.320 (0.855)	-3.051** (0.021)	-1.778 (0.268)	-3.998** (0.038)
Observations	94	94	94	94	94
R-squared	77.5	51.1	73.3	74.1	60.5

Robust p-values in parentheses

*** p<0.01, ** p<0.05, * p<0.1

As this will be seen from the next section, considering IQ as an endogenous variable does not make any difference in terms of the sign and the level of significance of the estimated coefficients in the regressions where *Government Efficiency* and *Regulatory Quality* are the dependent variables, even though the estimated effect is higher when IQ is endogenous. In fact, comparing the results from Table 2 and Table 4 shows that the coefficient associated with IQ is positive and equal to 0.048 when IQ is endogenous, and 0.037 when IQ exogenous in the regression with *Government Efficiency* as the dependent variable. On the other hand, the estimated coefficient is 0.039 when IQ is endogenous and 0.030 when IQ is exogenous in the regression with *Regulatory Quality* as the dependent variable.

5 Robustness Checks

To check the robustness of our findings, we run the same regressions using the data for the year 2002 and report the results in Table 3. Our coefficient of interest, $\hat{\beta}$, is positive and significant in all the regressions that we report in Table 3. All the control variables performed in the same way as in the five regressions. For further robustness checks, we run the regressions in Table 1 with different control variables. First, we used the KOF index of economic globalization (Dreher, 2006; Dreher et al., 2008) instead of trade openness. We also use a dummy variable for high income countries instead of GDP per capita. We motivate the use of this dummy variable by the fact that citizen in countries with high income would demand better institutions. Finally, we use dummies for continents instead of the regional classification of countries. Table 4 shows that our variable of interest is significant for all institutional quality variables, except for *Voice and Accountability*.

Table 3: Robustness regression 1 (Year = 2002)

Variables	Government effectiveness	Political stability	Regulatory quality	Rule of law	Voice and accountability
Intelligence (IQ), $\hat{\beta}$	0.0222*** (0.006)	0.038** (0.019)	0.029*** (0.006)	0.035*** (0.001)	0.026** (0.037)
Openness	-0.003 (0.242)	-0.011* (0.087)	-0.001 (0.658)	-0.006** (0.035)	-0.008*** (0.003)
Natural resources	-0.006*** (0.001)	-0.008** (0.022)	-0.008*** (0.004)	-0.008*** (0.000)	-0.012*** (0.000)
Log GDP per capita	0.583*** (0.000)	0.588*** (0.001)	0.482*** (0.000)	0.516*** (0.000)	0.648*** (0.000)
East Asia and Pacific	-0.194 (0.185)	-0.178 (0.670)	-0.468*** (0.003)	-0.421** (0.045)	-0.440 (0.212)
Europe and Central Asia	-0.523*** (0.000)	-0.604* (0.050)	-0.317* (0.058)	-0.583*** (0.006)	-0.285 (0.331)
Latin America & Carrib.	-0.450*** (0.000)	-0.171 (0.435)	-0.315* (0.0681)	-0.747*** (0.000)	0.267 (0.176)
South Asia	-0.521*** (0.009)	-1.542*** (0.000)	-0.494** (0.014)	-0.711** (0.024)	-0.424 (0.264)
Sub-Saharan Africa	0.200 (0.260)	0.905** (0.011)	0.256 (0.222)	0.205 (0.398)	0.710** (0.023)
English legal origin	-0.276* (0.054)	0.301 (0.367)	0.015 (0.927)	-0.035 (0.819)	0.040 (0.828)
French legal origin	-0.635*** (0.000)	-0.172 (0.547)	-0.257 (0.101)	-0.469** (0.011)	-0.347* (0.086)
German legal origin	-0.600*** (0.000)	-0.727*** (0.002)	-0.431** (0.010)	-0.705*** (0.001)	-0.711*** (0.002)
Socialist legal origin	-0.477*** (0.005)	0.577 (0.172)	-0.101 (0.557)	-0.519** (0.033)	0.043 (0.888)
Constant	-5.593*** (0.000)	-7.329*** (0.000)	-5.961*** (0.000)	-6.166*** (0.000)	-6.692*** (0.000)
Observations	110	110	110	110	110
R-squared	86.0	17.8	78.7	74.8	56.5

Robust p-values in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Robustness Regressions 2 (Year = 2006)

Variables	Government effectiveness	Political stability	regulatory quality	Rule of law	Voice and accountability
Intelligence (IQ), $\hat{\beta}$	0.037*** (0.000)	0.030*** (0.007)	0.030*** (0.001)	0.42*** (0.000)	0.14 (0.323)
Economic globalization	0.015** (0.043)	0.020* (0.050)	0.067** (0.016)	0.007 (0.498)	0.007 (0.497)
Natural resources	-0.005*** (0.002)	-0.007** (0.010)	-0.007*** (0.000)	-0.008*** (0.000)	-0.009*** (0.000)
High income	0.562*** (0.001)	0.477** (0.015)	0.534*** (0.000)	0.605*** (0.001)	0.494*** (0.000)
Africa	-0.074 (0.826)	0.206 (0.432)	-0.121 (0.755)	-0.117 (0.755)	-0.516 (0.295)
America	-0.378 (0.257)	-0.419 (0.103)	-0.337 (0.378)	-0.610 (0.106)	-0.021 (0.960)
Asia	-0.482 (0.114)	-1.124*** (0.000)	-0.534 (0.129)	-0.639* (0.061)	-0.868** (0.035)
Europe	-0.243 (0.690)	-0.695** (0.016)	-0.170 (0.636)	-0.186 (0.631)	0.143 (0.738)
English legal origin	-0.317** (0.039)	-0.442** (0.017)	0.048 (0.705)	-0.237 (0.178)	-0.079 (0.665)
French legal origin	-0.726*** (0.000)	-0.580*** (0.000)	-0.225** (0.037)	-0.617*** (0.000)	-0.414*** (0.003)
German legal origin	-0.219 (0.186)	-0.008 (0.968)	0.062 (0.706)	-0.226 (0.320)	0.056 (0.776)
Socialist legal origin	-1.002*** (0.000)	-0.209 (0.283)	-0.368*** (0.003)	-1.088*** (0.000)	-0.602*** (0.000)
Constant	-3.149*** (0.000)	-3.021*** (0.000)	-3.047*** (0.000)	-3.105*** (0.000)	-0.821 (0.503)
Observations	113	113	113	113	113
R-squared	83.0	64.9	80.0	80.7	72.8

Robust p-values in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Results in Tables 3 and 4 confirm our earlier finding on the positive effect of intelligence, as measured by national average IQ, on institutional quality. An important implication of these results is that national intelligence has an indirect effect on economic growth, one channel of which is institutional quality, in addition to its direct effect that is extensively documented in the literature. In fact better institutions have a positive effect on economic growth.

6 Conclusion

This paper was mainly concerned with the effect of national level of IQ on different aspects of institutional quality. The main finding is that intelligence positively affect each of the five measures of the quality of government institutions that we considered. Therefore, countries with higher average IQ enjoy better government institutions. This finding should in no way be interpreted as an evidence that there exist some countries with more intelligent populations that build better institutions and some other countries with less intelligent populations that build poor institutions. What our finding points to is the fact that the level of cooperation of a country's human capital within its institutions is important. Modern institutions should be built to support pro-market and pro-trade policies, and national IQ score provide a measure of the degree of the support to such policies.

An important implication of our finding is that institutional quality is a crucial channel through which intelligence indirectly positively affects economic growth, in addition to its direct positive effect that is already extensively documented in the literature. More specifically, high population IQ positively affects institutional quality which, in turn, positively affects economic growth. The results in this paper line up with recent findings of the effect of intelligence on political institutions (Jones, 2011), corruption

(Potrafke, 2012) and governance (Kodila-Tedika, 2012). The paper’s main contribution to the literature is that intelligence does indeed matter for the quality of government institutions.

References

- Armor, D. J. (2004). *Maximizing Intelligence: Fact and Fallacies*. Cambridge University Press, Cambridge.
- Caplan, B. and Miller, S. C. (2010). Intelligence makes people think as Economists: Evidence from the general social survey. *Intelligence*, 38(6):636–647.
- Dreher, A. (2006). Does globalization affect growth? evidence from a new index of globalization. *Applied Economics*, 38:1091–1110.
- Dreher, A., Gaston, N., and Martens, P. (2008). *Measuring globalization Gauging its Consequences*. Springer, Berlin.
- Frankel, J. A. and Romer, D. (1999). Does trade cause growth? *The American Economic Review*, 89(3):379–399.
- Hanushek, E. and Kimko, D. (2000). Schooling, labor force quality, and the growth of nations. *American Economic Review*, 90:1184–1208.
- Islam, R. and Montenegro, C. E. (2002). What determines the quality of institutions? Background Paper for the World Development Report: Building Institutions for Markets.
- Jones, G. (2011). National IQ and national productivity: The hive mind across asia. *Asian Development Review*, 28:58–71.
- Jones, G. and Schneider, W. (2006). Intelligence, human capital, and economic growth: A bayesian averaging of classical estimates (bace) approach. *Journal of Economic Growth*, 11(1):71–93.
- Jones, G. and Schneider, W. J. (2010). IQ in the production function: evidence from immigrant earnings. *Economic Inquiry*, 48(3):743–755.
- Kalonda-Kanyama, I. (2012). Determinants of institutional quality: Reexamining the effect of trade, globalization and GDP in a cross-section of countries. UJ Working Paper.
- Kodila-Tedika, O. (2012). Gouvernance et intelligence: Analyse empirique sur données africaines. Université de Kinshasa Working Papers.

- La Porta, R., de Silanes, F. L., Shleifer, A., and Vishny, R. (1999). The quality of government. *The Journal of Law, Economics and Organization*, 15(1):222–279.
- Lynn, R. and Vanhanen, T. (2002). *IQ and the Wealth of Nations*. Praeger Publishers, Westport, CT.
- Lynn, R. and Vanhanen, T. (2006). *IQ and Global Inequality*. Washington Summit Publishers, Augusta, GA.
- Lynn, R. and Vanhanen, T. (2012). National IQs: A review of their educational, cognitive, economic, political, demographic, sociological, epidemiological, geographic and climatic correlates. *Intelligence*. doi:10.1016/j.intell.2011.11.004.
- Potrafke, N. (2012). Intelligence and corruption. *Economic Letters*, 114:109–112.
- Ram, R. (2007). IQ and economic growth: Further augmentation of Mankiw-Romer-Weil model. *Economic Letters*, 94:7–11.
- Solon, O., Riddell, T. J., Quimbo, S. A., Butrick, E., Aylward, G. P., Bacate, M. L., and Peabody, J. W. (2008). Associations between cognitive function, blood lead concentration, and nutrition among children in the central philippines. *Journal of Pediatrics*, 152(2):237–243.
- Wang, S. X., Wang, Z. H., Cheng, X. T., L, J., Sang, Z. P., Zhang, X. D., Han, L. L., Qiao, X. Y., Wu, Z. M., and Wang, Z. Q. (2007). Arsenic and fluoride exposure in drinking water: Children’s IQ and growth in shanyin county, shanxi province, china. *Environmental Health Perspectives*, 115(4):643–647.
- Weede, E. and Kämpf, S. (2002). The impact of intelligence and institutional improvements on economic growth. *Kyklos*, 55(3):361–380.
- Whetzel, D. L. and McDaniel, M. A. (2006). Prediction of national wealth. *Intelligence*, 34:449–458.

Figure 1: Government efficiency and IQ

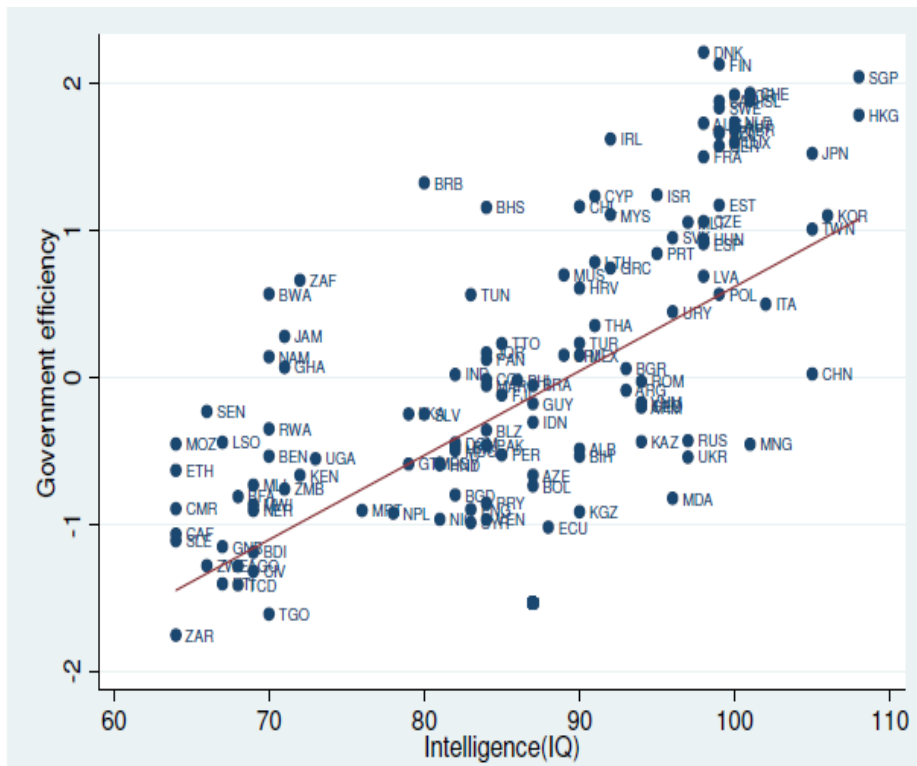
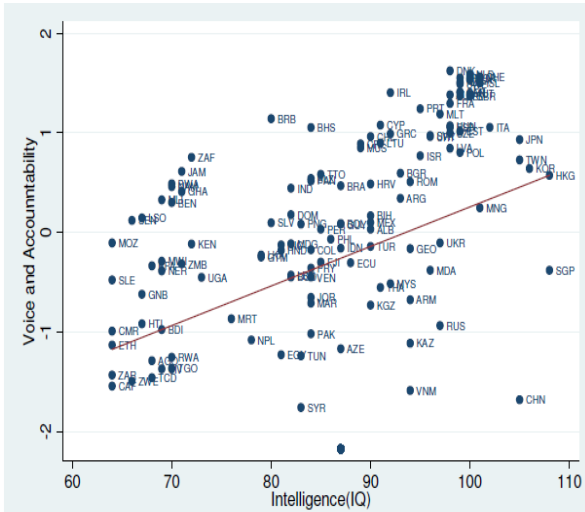
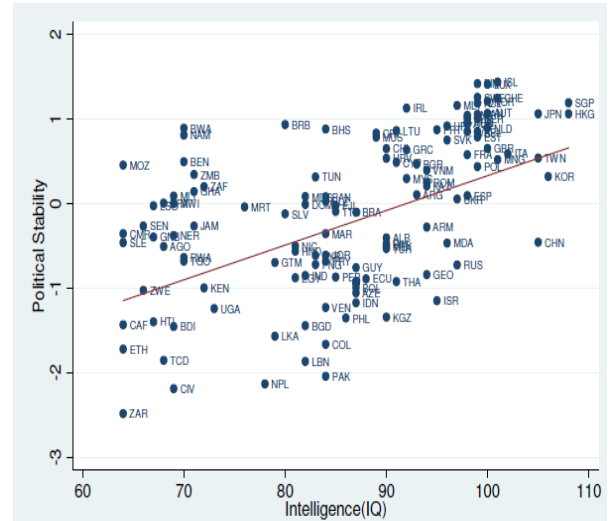


Figure 2: Institutional indicators and IQ

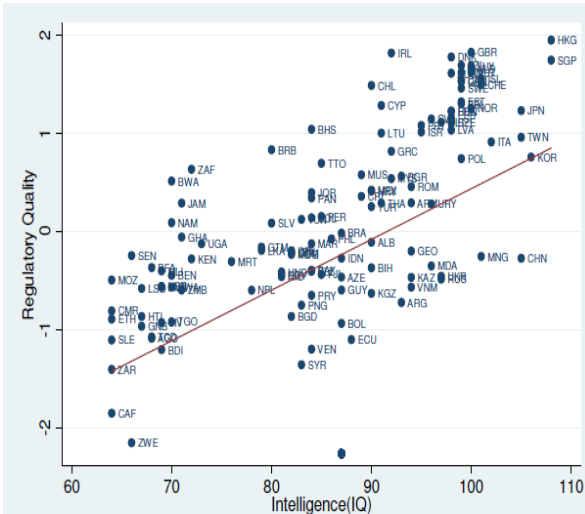
(a)



(b)



(c)



(d)

