Government size, intelligence and life satisfaction

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Highlights:

- The article explores impact of government size and intelligence on life satisfaction
- It finds a novel channel through which bureaucracy impacts subjective wellbeing
- The government size impacts positively life-satisfaction in cognitively able societies
- The paper contributes to the studies on political institutions and intelligence

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Abstract

Recent studies show that psychological factors such as cognitive ability play an important role in the empirical modeling of life satisfaction and suggest that intelligence is an important proxy for political and intellectual capital. These articles, however, only explore the direct effect of intelligence on subjective wellbeing. In this study, we conjecture that intellectual capital is a mechanism through which the size of bureaucracy impacts life satisfaction. Using data from 147 countries, we find that the interaction term between nation-IQ and government size is positive and significant, suggesting that government size increases life satisfaction most in high-IQ countries and least in countries with lower levels of cognitive abilities.

Introduction

Throughout the past decades, improving standards of living have allowed scholars to reexamine the importance of channeling policies toward economic growth. While within societies income and life satisfaction are positively correlated there is no increase in life satisfaction across time when average income across decades rises. (Easterlin, 1974). Moreover, follow-up studies have shown further that the phenomenon that 'money does not buy happiness' exists in both developed and low-income countries (Di Tella & MacCulloch, 2008). Their study argues that economic wealth is produced at the expense of resource depletion, environmental degradation and widening income inequality within society and it leads to lower wellbeing levels. As a result, mainstream literature on the causes of subjective well-being (SWB) has proliferated. One scholarly inquiry that is still in its infancy, nonetheless, is the link between governmental activities and life satisfaction. Some studies find a negative or insignificant association between government size and SWB[2], while others suggest that government size increases life satisfaction.

These studies stem from an ongoing debate between standard neoclassical economic theory and public choice theory. The neoclassical theory posits that government sector eliminates market failures by producing important public goods and maintains legal frameworks without which economy would not operate efficiently or not function at all (Blankart, 2003). In contrast, public choice theory argues that public officials, administrators and bureaucrats as well as politicians tend to seek their personal advantage. Consequently, large public sector may cause excessively large budgets and excessive involvement in – and regulation of – the economy. Moreover, in order to be re-elected bureaucrats may misallocate resources, search for populism and satisfy interest of lobbying groups, consequently, decreasing average national level of SWB.

At the same time, a separate body of literature in psychology reports that intellectual capital is an important ingredient in economic development (Lynn & Vanhanen, 2012) and has direct positive implications for life satisfaction (Veenhoven & Choi, 2012). For example, Kanazawa (2014) reported that general intelligence in childhood is positively associated with the life-course stability of happiness. In a similar vein, Nikolaev and Salahodjaev (2016), using data from 81 countries and 50 US states, showed that intelligence leads to a more equal distribution of

[2] We use "life satisfaction" and "subjective wellbeing" (SWB) interchangeably throughout the paper.

wellbeing within society. Moreover, at the macro-social level intelligence contributes to economic growth (Ram, 2007), quality of government institutions (Kanyama, 2014), good governance, environmental protection (Obydenkova, Nazarov & Salahodjaev, 2016) and the wealth of nations (Rindermann, Kodila-Tedika and Christainsen, 2015).

However, the mediating role of intelligence is another factor in the link between intelligence and SWB that remains largely unexplored by existing studies. For example, ample studies show that higher-IQ nations are associated with efficient bureaucracies and lower levels of corruption (Potrafke, 2012), while other scholars confirm the significant associations between these variables and SWB. It is therefore possible that the impact of bureaucracy on citizens' well-being varies with nations' levels of cognitive ability. Moreover, there may very well be mutual interdependence between the size and efficiency of bureaucracy and national intelligence. For example, the ruling elite in cognitively able societies protect political rights and civil liberties and enhance the relative power of ordinary citizens (Rindermann et al., 2015). In turn, more intelligent individuals who are more actively involved in political processes are more likely to prevent the ruling elite from expropriating resources to achieve personal gain from others without reciprocating any benefits to society through wealth creation. An intelligent electorate provides a check on fraudulent and incompetent bureaucrats and motivates them to distribute wealth more equally within society.

Intelligence, education and knowledge 'broaden man's outlook, enable him to understand the need for norms of tolerance, restrain him from adhering to extremist doctrines, and increase his capacity to make rational electoral choices' (Lipset, 1960). As a result, 'stricter [political and societal] control might restrain bureaucrats' deleterious impact, lead to efficiency gains, and increase people's happiness' (Bjørnskov, Dreher & Fischer, 2007, pp.270-271). Therefore, in high-IQ nations, public policies are more in consonance with voters' preferences. It is important to highlight that there is evidence that intelligent voters tend to elect leaders with cognitive abilities of about 20 IQ points above their general electorate. Taking into account that efficiently functioning government institutions 'depend on a public who can process complex information and actively participate in politics,' we may anticipate that the effect of the public sector on life satisfaction depends on the level of national intelligence. Moreover, research shows that average intelligence of the ruling elite is positively correlated with economic success, moral standards in the government and state spending priorities (Simonton, 1985, 2006a,b). For example,

governments in countries with higher IQs tend to devote less public resources to military spending (Salahodjaev, 2016), ratify international environmental agreements more frequently (Obydenkova & Salahodjaev, 2016), are more likely to invest in health care (Lv & Xu, 2016) and exhibit greater concern for less privileged share of population (Salahodjaev & Azam, 2015). As suggested by Bjørnskov et al. (2007) 'the more efficiently the government produces, the less tax payers' money is wasted, and, consequently, the more beneficial is the trade-off between taxes and public spending from the citizens' perspective'. Therefore may hypothesize that the effect of government size on SWB depends positively on the effectiveness of public sector, degree of political accountability and competition and civic participation of citizens, captured by national intelligence levels.

Using cross-sectional data covering 147 developed and developing countries, we empirically explore the relationship between government involvement, intelligence and life satisfaction. Investigating the effect of intelligence and government size on life satisfaction contributes greatly to the social sciences; in this vain, the paper explores how the relationship between government and SWB is influenced by a country's average level of intelligence. Our proxy for intelligence is average nation-IQ from Lynn and Vanhanen (2012). To measure government size, we use governments' final consumption expenditures as a percentage of gross domestic product (GDP).

In line with extant literature, we find that intelligence has a direct, positive effect on SWB. In the same way, increase in the government size is positively associated with life satisfaction. More importantly, the conditional marginal effect of government involvement in the economy indicates that the level of national intelligence moderates the link between government size and life satisfaction.

Empirical approach and data

The hypothesis to be tested is whether the effect of government size on life satisfaction varies with the level of intelligence. Our measure of life satisfaction comes from the World Happiness Report by Helliwell, Layard and Sachs (2015). We measure life satisfaction by the responses to the Cantril ladder question: 'Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the

bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time? 'Their study is based on nearly 3,000 respondents in each of more than 150 countries.

As a measure of government size, we calculate general government consumption expenditure as a percentage of GDP. The general government consumption expenditure (formerly general government consumption) includes all current government expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security. To reduce the effect of economic cycles, we average government consumption for the period 2010-2015. In our study, government size ranges from 2.8% to 82.4% with higher values representing a larger government sector in the country. Timor-Leste has the largest government size, while Zambia has the lowest.

Our main variable of interest is intelligence as measured by national IQs. The data come from Lynn and Vanhanen (2012). In their first study, Lynn and Vanhanen (2002) compiled country-specific studies in which intelligence tests have been administered. Based on the results of these studies, they estimated national IQs for 81 countries. In their follow-up studies, Lynn and Vanhanen (2006; 2012) estimated national IQs for 111 additional countries, bringing their dataset of national IQs to 192 countries. For interpretation purposes, Lynn and Vanhanen (2002) rescaled the IQ scores by setting the IQ in the UK at 100 (standard deviation =15) and adjust the IQs for remaining countries to this scale. In Table 1, we cluster countries the countries by their average index of cognitive abilities and find that life satisfaction is increasing with nation's IQ.

Table 1. Cluster analysis between life satisfaction and cognitive abilities

Cluster	N	Examples of States	Life satisfaction
Countries with nation IQ below 73	28	Haiti, Benin, Sao Tome and Principe	4.22
Countries with nation IQ from 73 to global average (84)	35	Belize, Bhutan and Madagascar	4.94
Countries with nation IQ above global average (84)	86	Ukraine, Greece and Japan	5.97

Sources: The data on IQ come from Lynn and Vanhanen (2012); The data on life satisfaction come from Helliwell et al. (2015)

We also control for GDP per capita, as economic development is positively correlated with intelligence (Meisenberg, 2012) and life satisfaction (Kacapyr, 2008). Moreover, GDP per capita is also associated with improved living standards, higher wages and technological improvements; it can serve as a catch-all variable. To control for the effect of income inequality, we use the Gini index. The GINI index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. Finally, we also control for ethnic diversity and a dichotomous variable for African countries.

Altogether, we estimate the variants of the following specification to be:

$$LS_i = \alpha_0 + \alpha_1 GS_i + \alpha_2 IQ_i + \alpha_3 (IQ \quad GS)_i + \alpha_4 GDP_i + \alpha_5 GINI_i + \alpha_6 ETHNIC_i + \alpha_7 AFRICA_i + \varepsilon_i \quad (1)$$

where life satisfaction (LS) in "i"th country is a function of government size (GS), intelligence (IQ), the interaction term for government size and intelligence, economic development (GDP), income inequality (GINI), ethnic diversity (ETHNIC), geographical location (AFRICA) and a random error term (ε). In our estimations, we use the ordinary least squares (OLS) estimator. We also mean-center the variables forming interaction term to avoid the problem of multicollinearity (Kraemer & Blasey, 2004; Afshartous & Preston, 2011). The descriptive statistics and correlation matrix are presented in Tables 2 and 3. With respect to our main variables of interest we find that cognitive abilities are strongly correlated with life satisfaction, while the correlation between government size and SWB is very moderate (Table 3). In addition the correlations reported in Table 3 do not suggest any potential multicollinearity problem in our empirical exercise.

Results

The importance of intelligence in determining the effect of government size on life satisfaction may be seen from Figs. 1-2 where the countries are grouped according to their national IQs. Fig. 1 presents scatterplot between government size and SWB in countries with average intelligence above global averages (84 IQ points).

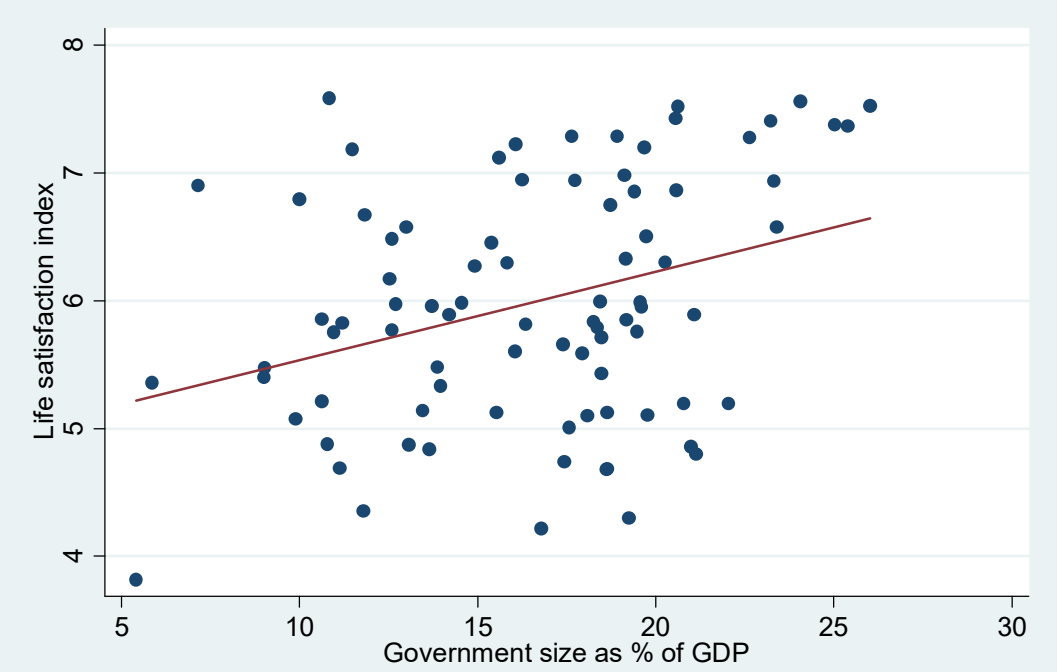

Fig. 1. Government size and SWB in high-IQ countries (IQ 84 and higher) (Group 1).
Correlation coefficient: r = .38 (n = 84)
Source of data: compiled from Helliwell et al. (2015), Lynn and Vanhanen (2012)

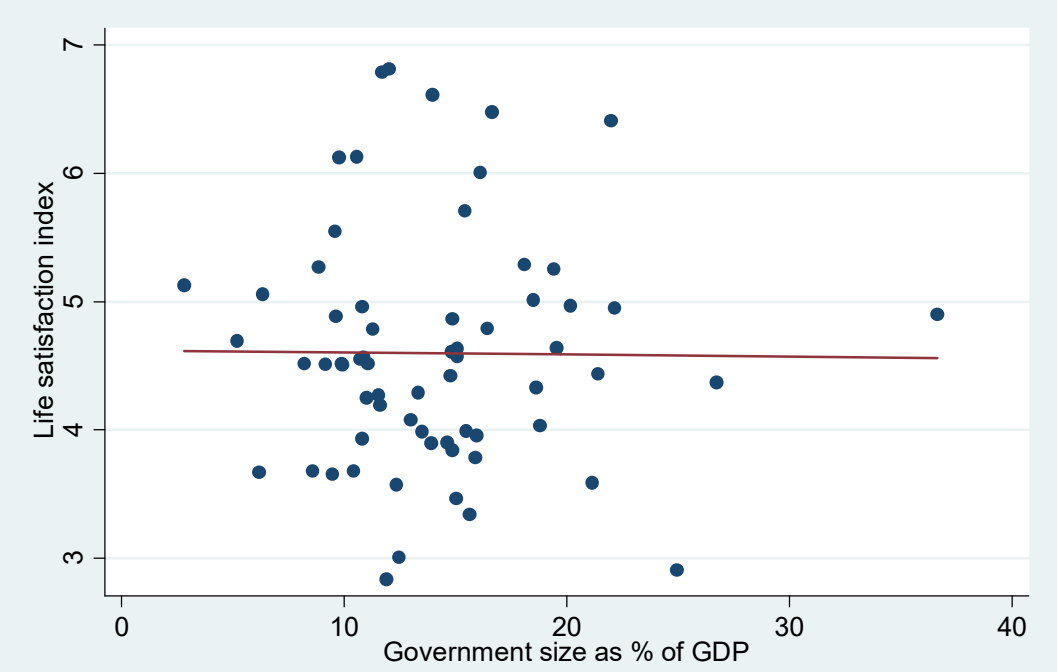

Fig. 1. Government size and SWB in low-IQ countries (below IQ 84) (Group 2).
Correlation coefficient: r = -.01 (n = 61)
Source of data: compiled from Helliwell et al. (2015), Lynn and Vanhanen (2012)

Government size seems to be positively correlated with life satisfaction in countries with intellectual capital above global averages, while in countries with an average level cognitive abilities below global mean levels there is no link between the size of bureaucracy and SWB.

The OLS regression of SWB on government size for Group 1 countries yields, SWB = 4.64 + 0.080*Government size with p-value = 0.00 and R2 = 0.14; and for Group 2 countries, SWB = 4.657 – 0.001*Government size, p-value = 0.95 and R2 = 0.00.

Table 2. Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
Life satisfaction, index	5.38	1.15	2.84	7.59
Government size, %	16.46	7.37	2.80	82.41
IQ	84.10	10.85	60.1	107.1
Economic development, '000 USD	17.78	20.61	0.64	132.97
Gini, index	38.96	8.81	22.9	64.3
Ethnic diversity, index	0.44	0.26	0	0.93
Africa, dummy	0.26	0.44	0	1

Table 3. Pairwise correlation matrix

	SWB	Government size	IQ	Economic development	GINI	Ethnic diversity	Africa
SWB	1						
Government size	.29***	1					
IQ	.66***	.22***	1				
Economic development	.68***	.06	.54***	1			
GINI	-.18**	-.24**	-.40***	-.33***	1		
Ethnic diversity	-.37***	-.32***	-.49***	-.23***	.18**	1	
Africa	-.59***	-.10	-.66***	-.36***	.28***	.46***	1

*** Denotes significance at the 1% level, ** Denotes significance at the 5% level, * Denotes significance at the 10% level

Table 3 presents the correlation matrix and shows the economic development, cognitive abilities and a binary variable for African countries is highly correlated with SWB. On the other hand the correlation between government size and SWB is somewhat lower (r = .29***), further reinforcing the findings presented in Figure 1. Moreover, the correlation coefficients reported in Table 3 do not signal evidence of potential multicollinearity in our multivariate regression analysis.

Table 4 presents the estimates of the multiple regression analysis of SWB, intelligence and government size. Column 1 presents a bivariate specification in which we use government size

as the only regressor for life satisfaction. As expected, we find that government size is positively associated with life satisfaction. In particular, when government final consumption expenditure increases by one standard deviation, the life satisfaction index increases by nearly 0.5 points (slightly less than a half standard deviation). In column 2, government size loses its significance once we add intelligence to the model. On the other hand, the estimate for national IQ is positive and statistically significant at the 1% level. This implies that intelligence mediates the effect of government size on SWB.

We now explore whether the link between government size and life satisfaction varies with the level of national intelligence. As discussed above, we do so by adding an interaction term between government involvement in the economy and national IQ. We find that the interaction term is positive and significant, suggesting that government size increases life satisfaction most in high-IQ countries and least in countries with lower levels of cognitive ability. Moreover, after taking into account the mediating role of intelligence, the estimate for government size is again positive and statistically significant. The results remain robust when we control for GDP per capita, income inequality, ethnic diversity and a dummy variable for African countries (column 4).

Turning to control variables we find that economic development is positively correlated with SWB, while individuals living in African states have less life-satisfaction. Surprisingly, we find that income inequality is positively associated with SWB in our model estimates. One potential explanations is that richer and more educated people (i.e., the beneficiaries of higher inequality) were more likely than poor illiterates to be included in the Gallup World Poll from which the SWB data are drawn. Alternatively, tunnel effect theory posits that in developing countries 'greater degree of income inequality can be interpreted as a sign of better prospects for economic developments and greater availability of employment opportunities' (Wu & Li, 2013 p. 7)[3]. The prospects for economic development can be an important contributing factor in SWB.

In general, the results presented in Table 4 suggest that intelligence has a direct and indirect effect on life satisfaction by mediating the relationship between government size and SWB.

[3] We would like to thank one anonymous reviewer for making this important point.

Table 4 Main results

	(1)	(2)	(3)	(4)	*(5)*
Government size	0.0646***	0.0269*	0.0289**	0.0446***	*.2000****
	(0.0175)	(0.0142)	(0.0140)	(0.0126)	
IQ		0.0653***	0.0655***	0.0206**	*.2013***
		(0.0066)	(0.0066)	(0.0099)	
Government size * IQ			0.0024**	0.0033***	*.1827****
			(0.0011)	(0.0010)	
Economic development				0.0249***	*.4142****
				(0.0039)	
GINI				0.0309***	*.2342****
				(0.0077)	
Ethnic diversity				0.1340	*.0303*
				(0.2917)	
Continent Africa				-0.9243***	*-.3663****
				(0.1928)	
Constant	4.4135***	-0.5649	-0.6463	1.4744	
	(0.2887)	(0.5540)	(0.5489)	(1.0164)	
N	148	147	147	138	138
adj. R^2	0.0789	0.4451	0.4578	0.6579	0.6579

Standard errors in parentheses; The dependent variable is life satisfaction index; OLS standardized betas are reported in column (5); *** Denotes significance at the 1% level, ** Denotes significance at the 5% level, * Denotes significance at the 10% level

Robustness tests

Tables 5, 6, and 7 present results from robustness tests. In Table 5, we include additional control variables to avoid omitted variable bias. The extra control variables include GDP per capita growth, unemployment rate, latitude and share of population living in the tropics. The data on GDP per capita growth and unemployment rate are from the World Bank, while geographic variables are from Nunn and Puga (2012). This robustness test confirms the baseline results.

Table 5 Alternative controls

	(1)	(2)	(3)	(4)	(5)	(6)
Government size	0.0495***	0.0529***	0.0497***	0.0480***	0.0573***	*.256****
	(0.0133)	(0.0136)	(0.0124)	(0.0129)	(0.0137)	
IQ	0.0225**	0.0199**	0.0251**	0.0222**	0.0259**	*.253***
	(0.0101)	(0.0099)	(0.0098)	(0.0100)	(0.0102)	
Government size * IQ	0.0037***	0.0032***	0.0040***	0.0033***	0.0040***	*.222****
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	
Economic development	0.0249***	0.0240***	0.0242***	0.0250***	0.0238***	*.396****
	(0.0039)	(0.0039)	(0.0038)	(0.0039)	(0.0039)	
Gini	0.0318***	0.0314***	0.0158*	0.0271***	0.0171*	*.130**
	(0.0078)	(0.0077)	(0.0091)	(0.0084)	(0.0097)	
Ethnic diversity	0.1050	0.1270	0.1421	0.0938	0.1096	*.025*
	(0.2925)	(0.2900)	(0.2837)	(0.2934)	(0.2890)	
Africa	-0.9280***	-	-	-	-	*-.421****
		0.9243***	1.0765***	0.9183***	1.0627***	
	(0.1926)	(0.1917)	(0.1947)	(0.1927)	(0.1964)	
Economic growth	0.0304				0.0191	*.043*
	(0.0266)				(0.0273)	
Unemployment		-0.0165			-0.0084	*-.044*
		(0.0103)			(0.0116)	
Latitude			-		-0.0094**	*-.209***
			0.0104***			
			(0.0036)		(0.0037)	
Tropical country				0.0020	0.0005	*.019*
				(0.0018)	(0.0019)	

Constant	1.0937	1.5531	1.8647*	1.3773	1.6041	-
	(1.0686)	(1.0115)	(0.9975)	(1.0186)	(1.0800)	
N	138	138	138	138	138	
adj. R^2	0.6587	0.6620	0.6765	0.6588	0.6733	

Standard errors in parentheses; The dependent variable is life satisfaction index; The table reports baseline results conditional on additional control variables; OLS standardized betas are reported in column 6; *** Denotes significance at the 1% level, ** Denotes significance at the 5% level, * Denotes significance at the 10% level

As an alternative robustness test, we re-estimate our baseline model (Table 4) for different time periods. In column 1 of Table 6, we take the average size of the government for the period 2000-2015, while column 2 reports the estimates for the period from 2005 to 2015. Again, the results are nearly identical to our baseline coefficients.

Table 6 Alternative time periods

	(1)	(2)
Government size	0.0377***	0.0389***
	(0.0128)	(0.0127)
IQ	0.0253**	0.0251**
	(0.0098)	(0.0097)
Government size * IQ	0.0030***	0.0030***
	(0.0010)	(0.0010)
Economic development	0.0251***	0.0251***
	(0.0040)	(0.0039)
GINI	0.0272***	0.0283***
	(0.0077)	(0.0077)
Ethnic diversity	0.1544	0.1858
	(0.2814)	(0.2809)
Continent Africa	-0.8294***	-0.8360***
	(0.1901)	(0.1896)
Constant	1.2922	1.2359
	(1.0118)	(1.0060)
N	140	140
adj. R^2	0.6434	0.6469

Standard errors in parentheses; The dependent variable is life satisfaction index; The table reports results for alternative time periods; *** Denotes significance at the 1% level, ** Denotes significance at the 5% level, * Denotes significance at the 10% level

Finally, Table 7 reports the results for different subsamples of countries. In columns 1 and 2, we exclude countries with a population of less than 1 million citizens and greater than 100 million citizens. Columns 3 and 4 present the results when we exclude the poorest (GDP per capita

less than 500 USD) and the richest (greater than 100,000 USD) countries in our sample. Finally, in column 5, we take into account the potential role of geography by controlling for continental dummies for Asia, Europe, Oceania, and North and South America.

Table 7 Sub-samples

	(1)	(2)	(3)	(4)	(5)
Government size	0.0284**	0.0293**	0.0289**	0.0313**	0.0531***
	(0.0144)	(0.0146)	(0.0140)	(0.0142)	(0.0138)
IQ	0.0639***	0.0681***	0.0655***	0.0654***	0.0467***
	(0.0067)	(0.0067)	(0.0066)	(0.0066)	(0.0094)
Government size * IQ	0.0022*	0.0023**	0.0024**	0.0023**	0.0033***
	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)
N	140	135	147	143	146
adj. R^2	0.4422	0.4846	0.4578	0.4632	0.6089

Standard errors in parentheses; The dependent variable is life satisfaction index; The table reports results for various sub-samples; *** Denotes significance at the 1% level, ** Denotes significance at the 5% level, * Denotes significance at the 10% level

Alternative Explanations, Additional Controls and Limitations

A number of studies report that intelligence and GDP per capita are interdependent. While some studies report that cognitive abilities are causal to the wealth of nations (Lynn & Vanhanen, 2012), some scholars argue that significant differences between countries and entire global regions in IQ scores are really just consequences of development that improves nutrition, life expectancy, and education (Barber, 2005). Therefore, we test the robustness of main results by considering the correlation between intelligence and economic development. We apply an approach based on earlier cross-country studies to generate a variable that assesses the effect of GDP per capita that seems to be irrelevant to the level of cognitive abilities. We regressed GDP per capita on IQs and generated the residuals. These residuals represent the international differences in economic development that cannot be predicted by average national cognitive abilities. The results are reported in column 1 of Table 8. The effect of government size and its

interaction term with intelligence remains robust. In addition, unlike in baseline results, in column 2 we control for log-transformed GDP per capita. As it more closely approaches a Gaussian distribution and, more importantly, we can hypothesize that a rise of GDP by a constant fraction, rather than a constant absolute amount, is associated with a constant rise in SWB. The results for our main variable of interests remain robust. However, we also find that the coefficient for IQ is now statistically insignificant. This may be driven by two reasons. First, GDP per capita moderates the link between IQ and life satisfaction. On the other hand, there may be another variable which is now stronger correlated with log transformed GDP per capita and IQ thus capturing part of the relationship. To find this variable we refer to existing literature. Extant literature argues that that measuring correct GDP per capita and its growth rates poses a significant problem for African countries (Andersen & Dalgaard, 2013). In a similar vein, a number of studies argues that national IQs for African countries provided in Lynn and Vanhanen (2012) may contain measurement errors (Wicherts et al., 2010). Therefore, in column 3 we drop a dummy variable for African countries from our regressions. Now the estimate for IQ is positive and significant at 5% level.

Table 8. Further robustness tests

	(1)	(2)	(3)
IQ	0.0499***	0.0058	0.0213**
	(0.0091)	(0.0111)	(0.0105)
Government size	0.0399***	0.0399***	0.0289**
	(0.0127)	(0.0127)	(0.0128)
IQ * Government size	0.0027***	0.0027***	0.0025**
	(0.0010)	(0.0010)	(0.0010)
GINI	0.0215***	0.0215***	0.0196**
	(0.0077)	(0.0077)	(0.0080)
Ethnic diversity	0.3037	0.3037	0.2882
	(0.2902)	(0.2902)	(0.3016)
African continent	-0.6710***	-0.6710***	
	(0.1969)	(0.1969)	
GDP per capita (residual)	0.5421***		
	(0.0847)		
GDP per capita (log)		0.5421***	0.6016***
		(0.0847)	(0.0862)
Constant	-0.2187	2.2479**	0.8484
	(0.9759)	(1.0555)	(1.0109)
N	138	138	138
adj. R^2	0.6583	0.6583	0.6307

Standard errors in parentheses; The dependent variable is life satisfaction index; The table reports results for alternative specifications; *** Denotes significance at the 1% level, ** Denotes significance at the 5% level, * Denotes significance at the 10% level

Finally, one may argue that the effect of government size and its interaction with intelligence may depend on the choice of control variables. Some studies argue, that the interplay between political institutions and, related to it, the quality of government can be influenced by a number of historical factors (Lankina et. al. 2016a) as well as the role of international factors (Obydenkova & Libman 2012). Indeed, some recent research demonstrated the impact of such factors as foreign trade, the role of the EU's projects and even geographic distances on political institutions and on political regime (Lankina et. al. 2016b). In contrast, other studies specified the importance of socio-economic variables in the quality of governance and public policy that potentially may have effects on life-satisfaction of population at both national and subnational levels (Libman and Obydenkova 2014). Obviously, we have to be selective in the number of control variables that might relate to life satisfaction in one econometric model. However, we estimate model robustness, using the mrobust command in Stata. This test which investigates the robustness of a model across possible combinations of specified model ingredients (such as control variables, estimation commands, etc.) and reports on the resulting distribution of estimates. As a choice of our additional control variables apart from base line controls, we also employ: average life expectancy (from World Bank), GDP growth rates (from World Bank), economic freedom index (from Heritage Foundation), unemployment rate (from World Bank), and inflation rate (from World Bank). Consequently, we estimate 4,096 potential models with up to 12 possible control terms. While there is high correlation between intelligence, government size and control variables, the estimate for government size was positive and significant in 98% of the cases. Turning to the estimate for interaction term, we find that the interactive effect of government size conditional on the cognitive abilities is positive and significant in approximately 67% of the regressions.

Finally, we have also checked whether other institutional variables are better than cognitive abilities at moderating the link between government size and life satisfaction. To do so we have standardized the government size and SWB and formed the cross-product between these standardized variables, as a measure for the correlation between them. We then regressed these variables with IQ and two other variables (economic freedom index and corruption perceptions index) highly correlated with national IQ according to the literature and that are hypothesized to

modulate the size and direction of the government size – SWB correlation. The F-test for this regression shows that the model is overall significant at the 5% level ($F = 3.52$; $p = 0.02$) where only corruption perceptions index (CPI) is positive and significant.

This suggests, first, that the quality of anti-corruption policies may moderate the interaction effect of intelligence and government size on SWB. Second, the index of CPI was discussed as being a reflection of subjective perception of corruption rather than measurement of actual corruption. The societies with higher level of corruption scandals exhibited higher level of perception of corruption than corrupted societies without scandals. Third, there is also emerging literature indicating that corruption is often a historical legacy and a product of previous political institutions and social practices that became well-entrenched in a given society at both cross-national and subnational levels (Libman and Obydenkova 2013; Obydenkova and Libman 2015). Thus, including corruption as additional control variable opens up wider horizon for discussion of interaction between social-wellbeing and intelligence. The detailed discussion and analysis of this topic should remain on the agenda of further studies.

There are a number of limitations of this study. First, one of the shortcomings is the fact that main results presented in this paper may be affected by simultaneously of cognitive abilities, size of bureaucracy and subjective wellbeing. One of the solutions to deal with interconnection of main variables is to use cross-section and time series data. However, data on cognitive abilities is only available for the recent years that unavoidably limits our study. Therefore, to partially resolve this issue we have used data for government size from various periods. Due to the cross-country data and complex functional form of the empirical model, the use of more sophisticated methods to address the direction of causality such as instrumental variables regression estimator or general method of moments will remain on the agenda for further studies.

Standardized coefficients reported in Table 3 indicate that the effect of economic development is stronger as compared to national IQ. On the other hand, intelligence is positively correlated with GDP per capita. This study is one of the first steps towards further exploration of interconnection between intelligence, political and economic development.

Conclusion

The importance of human psychology for wellbeing is not a new phenomenon, and one part of this literature is devoted to understanding the role of intelligence in life satisfaction both at

the individual and national levels. Recent research suggests that cognitive abilities measured by psychometric tests are positively associated with SWB and, more importantly, with a more equal distribution of happiness within society. The main goal of this study is to investigate one of the potential channels through which nations with higher cognitive capital achieve higher levels of life satisfaction. Indeed, we argue that the relationship between intelligence and life satisfaction at a national level is more complex. In particular, this study demonstrated that the effect of government policies, the ultimate goals of which are to improve citizens' wellbeing, is moderated by the psychological context within which political processes takes place. The interplay between political institutions, socio-economic and psychological variables becomes an important issue for further investigation and analysis.

To sum up, the findings presented in this paper suggest the need for research on the interaction between intelligence, social and political variables (such as, for example, government size and corruption) and life satisfaction. Using data from 147 countries, we find that the interaction term between nation-IQ and government size is positive and significant, suggesting that government size increases life satisfaction most in high-IQ countries and least in countries with lower levels of cognitive abilities. One possible reason for this may be that, in countries with a larger state sector *and* greater cognitive capital, public policies are more in consonance with peoples' preferences, thus, leading in increase in life satisfaction. As a result, in high-IQ nations, state institutions are more efficient; bureaucrats do not engage in informal and corrupt activities (Potrafke, 2012; Salahodjaev, 2015); the optimal government size infers that the ruling elite are constrained from engaging in activities that impair life satisfaction of population and increase efficiency of bureaucrats. In sum, our results offer new insight into the relationship between politics, psychology and wellbeing and provide for the first steps in cross-disciplinary dialogue between social science and psychology.

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