

SOCIAL VALUES  
TRANSFORMATION,  
ENTREPRENEURSHIP AND  
ECONOMIC GROWTH: CROSS-  
COUNTRY ANALYSIS

by

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Abstract

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The paper investigates interconnection of economic performance and social values of the country. It is hypothesized that evolution towards greater spread of values inherent to entrepreneurship in the society is connected to higher rates of economic growth *ceteris paribus*. Based on previous research internal locus of control, achievement motivation and calculated risk taking represent the specific values inherent to entrepreneurs, and they are believed to be connected with higher rates of growth. Spread of these values was measured in 51 countries across the globe during the period of 1981-2008 employing dataset of the World Values Survey, and it was determined that prevalence of entrepreneurship values cannot predict subsequent economic growth. Still, evolution towards domination of internal locus of control in the society is found to be a significant predictor of higher economic growth on country level. So, the paper suggests that a social program targeted on bringing up internal locus of control is likely to lead to better economic performance of the country.

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## GLOSSARY

**Social values.** Ideals that guide or qualify personal conduct, interaction with others, and other situations of social interaction (Braithwaite and Blamey, 1998).

## *Chapter 1*

### INTRODUCTION

Connections between social values and economic growth have been noted in the beginning of the twentieth century. Max Weber (1905) has claimed that specific “ethos” (which stands in author’s notation for a particular value system) brought by Protestantism has contributed to nascent entrepreneurship, more active trade and accumulation of wealth for investment. Such cultural change relevant for large number of people turned out to be the factor that was able to explain difference in economic performance of European states where different religions dominated. The author also claims that modern Capitalism emerged due to spread of the specific values of Protestantism.

Later, relations of economic developed and values have been studied in context of modernization theories of mid-twentieth century. It has been claimed that change of economic conditions leads to shift in values (Lipset, 1959). Still, interconnection between social values and economic growth is largely underexplored. The most probable reason for this is lack of reliable cross-country data that allows measuring and comparing values for different societies. Another possible reason why linkage between social values and economic development is not thoroughly studied yet is the fact that cultural dimension has not been included in classical economic growth models, such as exogenous growth models (Solow (1956) for instance) or endogenous growth models (Romer, 1990; Lucas, 1988, for example).

Still, the issue of interconnection of symbolic values and economic development has been studied. The researchers, however, have not come to definite conclusion concerning presence of such connection, since there is

number of works that find no relations between values and economic development (such as Pryor, 2005), while some others claim presence of such connection (like Minkov and Blagoev, 2009). Nonetheless, studies that show existence of relations between social values and economic development are criticized (Hanson, 2009), so there is no definite answer whether the relation exists. It is notable that there are very few studies devoted to dynamical aspect of interaction between economical and cultural subsystems. Values tend to be viewed statically by most researchers (see Pryor, 2005; Minkov and Blagoev, 2009; Granato, Inglehart and Leblang, 1996), and this is one of the statements challenged by the current study.

Current research is aimed to investigate whether shifts in the specific set of values that is inherent to entrepreneurs can explain future economic growth. Basing on data of the World Values Survey, the global research with largely invariant set of questions across waves and countries that represents opinions of 90% of world population and covers the period of 1981-2006, it is possible to view dynamics of values and link it to economic growth of countries. So, viewing changes of values instead of levels is the major novelty of the research. Moreover, examination of entrepreneurship values as predictors of economic growth has not been done yet.

Selection of entrepreneurial values as predictors of economic growth is not ad hoc. Such choice is based on the fact that entrepreneurship stimulates economic development (Acs, 2005), and entrepreneurs are bearers of specific culture and set of values (Carland et al, 1984). So, the major hypothesis tested by this study is that spread of values inherent to entrepreneurs in a society stimulates its future economic growth.

The rest of the paper is structured the following way. Firstly, attention is paid to the literature review that covers issues of values stability, interrelations between social values and economic growth, entrepreneurship, its connections to economic development and values inherent to entrepreneurs. Methodology

section discussing choice of values, their quantification and usage as predictors in endogenous growth model follows in chapter 3. Results of the research are in the chapter 4, and conclusions can be found in chapter 5.

## *Chapter 2*

### LITERATURE REVIEW

#### ***Stability of Values***

The concept of values widely used in current research is defined as ideals that guide or qualify personal conduct, interaction with others, and other situations of social interaction (Braithwaite and Blamey, 1998). Social values are principles that indicate how you relate meaningfully to others in social situations, including those involving family, friends, and co-workers.

Several studies concerning both developed and developing countries (Braithwaite and Blamey, 1998; Yoshino, 2006) have reached a conclusion that social values are fairly stable in the period of two decades. Thus, inference about value stability is widely supported by the academic research community, and assumption of non-changeable nature of values is sometimes taken for granted (for instance Minkov and Blagoev, 2009). While this conclusion may be correct for value orientations (which are basic perceptions of right and wrong) and value types (which are basic structures of personal value system), it is not the case for variety of social values that are subject to substantial shifts. It can be seen from graph in Appendix E that values do change significantly in the period of 20 years, and there is no apparent pattern in value evolution. So, there is sufficient variability in data that allows testing of the major hypothesis of the paper.

Evolution of values is not a completely unstudied research area. There are several studies looking at the dynamics of social values. Psychologists Melton and Hoke (2003) tracked changes in personal values. They measured values of freedom and equality in American society in period of 1968-1981 and found that community value orientation has increased substantially over the studied period. Hassan, Antunes and Pavon (2009) studied evolution of moral values of Spanish society over last 20 years. Operating with individual data, researchers constructed

a model that predicted changes in values based on changes in other measurable social characteristics. Thus, for instance, it has been shown that change in marital status or having children is likely to affect values of a person. A study of cultural changes conducted by Abdollahian et al. (2008) views transformation of values in the framework of New Modernization Theory, and considers cultural, political and economic systems of the society. The researched values include two dimensions of rational-secular and self-expression values. Authors assume that change in economic conditions leads to higher existential security, which leads to shift in values towards rational-secular and self-expression values. This shift enforces liberal political institutions that in their turn influence economic development. Using non-linear estimation procedures, the authors come to conclusion that economic development affects values of people and the model has a stable equilibrium meaning that as economic conditions evolve, values tend to converge to highly rational and secular in the long run (approximately 25 years). The authors, however, have not considered influence of value change on economic development, which might be the case. Moreover, estimations of a continuous dynamic model having only 4 discrete time periods for every state might produce misleading results.

Current research tests the hypothesis that value change influence economic growth but not vice versa. It is assumed that changes in values stimulate individual actions, which, in their turn, influence real economic variables.

### ***Economic Development and Social Values***

Although interconnection between social values and economic development is not completely uninvestigated, there is no clear understanding how social and economic spheres are connected. It has been already noted that the question of causality in interrelations of social values and economic growth is

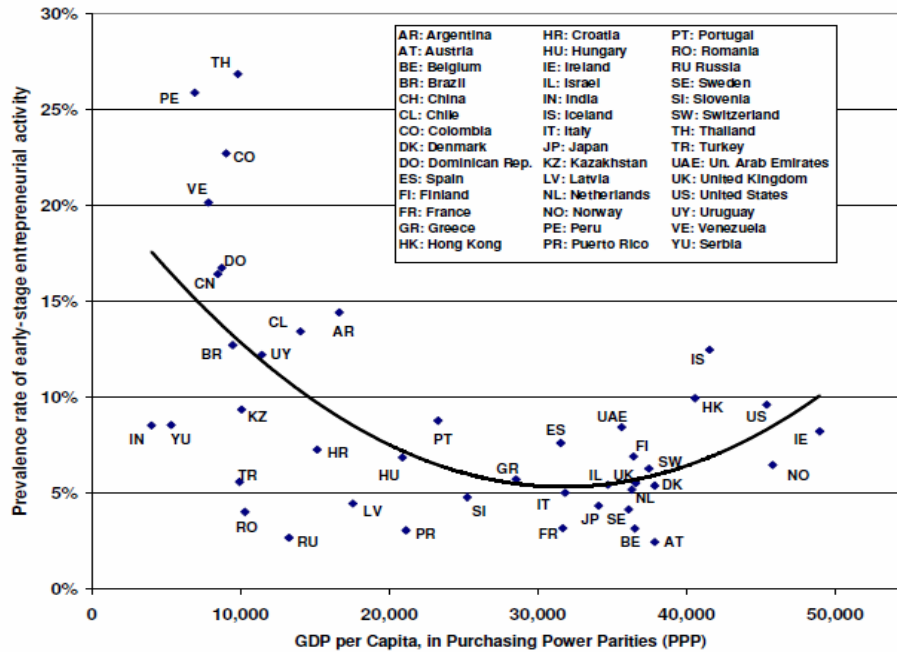
ambiguous. Proponents of modernization theory view economic development as determinant of economic growth (Abdollahian et al., 2008), while other scholars believe the causality to be reversed. Thus, Granato, Inglehart, and Leblang (1996) used data from the World Values Survey of the wave of 1990 and came to conclusion that “achievement motivation” variable (which is a characteristic that measures value of being successful and outperforming others) is statistically significant in endogenous growth regression. Although this article has been severely criticized for the presence of endogeneity and omitted variable bias (Hanson, 2009), it is one of the earliest papers that formalize relations between social values and economic development. With two waves of the World Values Survey Inglehart and Baker (2000) have concluded that values prevailing in the society have an impact on GDP per capita level. There are other studies that support the idea that social values influence economic variables. Corneo and Jeanne (2007) have stated that economic changes and substantial development are related to changes in value system of people at individual level. Having constructed a variation of endogenous growth model the authors investigate an interaction between value system and economic development through occupational choice of individuals. They have concluded that symbolic values have great impact on economic development, and cultural peculiarities can influence the pattern of economic system evolution. Minkov and Blagoev (2009) find that economic growth correlates with the value system. They have built a factor model, which includes a principal component that has strong correlation with economic growth in subsequent periods.

Still, there is a strand of literature that rejects the existence of correlations between value system and economic development. A number of researches that investigate social values and economic growth come to conclusion that there is no statistically significant relationship between the variables of interest. Hanson (2009) has replicated the classical study by Granato, Inglehart, and Leblang (1996) and argued that their finding has been driven by the omitted variable bias. When

controlling for institutional influences, Hanson finds out that impact of the “achievement motivation” is insignificant factor in the model. Another research conducted by Pryor (2005) also has led to the conclusion that connection of social value system and economic growth is insignificant. Using the data from the 1990 wave of the World Values Survey in a factor model, he finds all principal components being uncorrelated with economic development.

### ***Entrepreneurship and Economic Development***

Numerous empirical studies have tested relations between entrepreneurship and economic development. Comparatively recent work of Klapper et al. (2008) investigates the question of relations between entrepreneurship and economic development based on the World Bank Group Entrepreneurship Survey and concludes that “a higher level of entrepreneurship significantly relates to greater economic development, formal sector participation, and better governance” (Klapper et al. 2008, p. 32). Wennekers et al. (2005) finds an empirical support for the hypothesis that the relationship between entrepreneurship activity and level of economic development has a U-shaped form, as Figure 1 reveals. So, the most developed countries enjoy the greatest returns on active entrepreneurship, while in developing countries the impact is significantly lower in magnitude.



Source: Bosma *et al.* (2008)

Figure 1: U-Shaped form of entrepreneurship depending on economic development

Different nature of entrepreneurship in developing and developed countries is a quite logical explanation of the observed distribution form. Acs (2006) has suggested that entrepreneurship in developing and developed countries are different from each other. In developing countries people are forced to establish own businesses, since they have virtually no alternatives. The researcher argues that this kind of entrepreneurship can be called “necessity entrepreneurship”, and such kind of start-ups is not contributing to economic growth much. In case of developed countries people have more opportunities of self realization, so their choice of becoming entrepreneurs is determined by internal factors and personal motivation. Such people seek opportunities and free niches, and their enterprises are usually based on innovative ideas. Acs (2006) calls such type of entrepreneurship “opportunity entrepreneurship”. The author

manages to determine difference in motivation for starting an enterprise in different countries using Global Entrepreneurship Monitor 2007 survey, and his results are quite convincing.

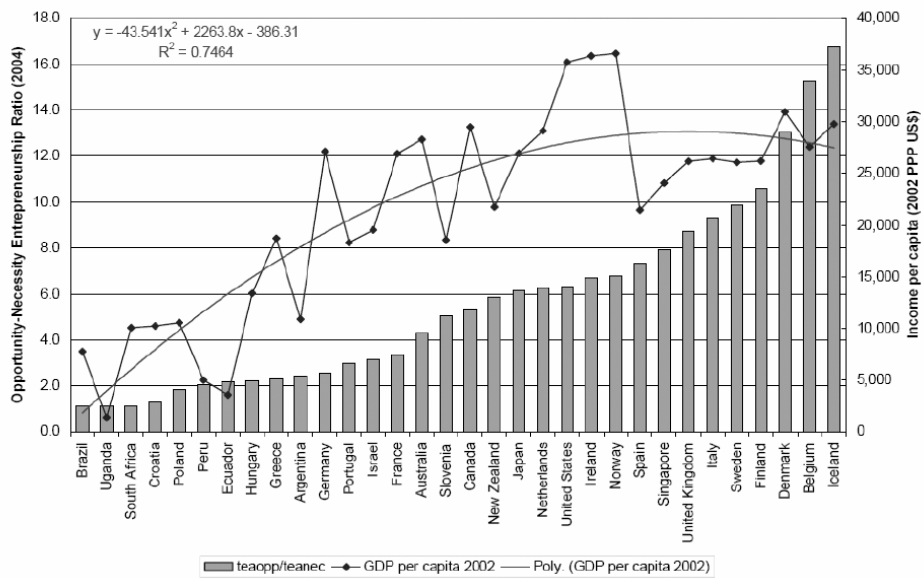


Figure 2: Opportunity vs. Necessity entrepreneurship across the world. Source: Acs, 2006.

It can be seen at Figure 2 that a higher proportion of opportunity entrepreneurship is observed in more developed states. This result can suggest that opportunity entrepreneurs are the bearers of a specific value set which stimulates them to seek for opportunities and to start businesses, while necessity entrepreneurs do not differ much from the general public.

### *Entrepreneurship and Social Values*

Classical papers by Weber (1905) and Schumpeter (1934) suggest that there is a close relationship between entrepreneurship and values. Weber claims that specific “ethos” of Protestantism has contributed to development of entrepreneurship and modern capitalism in general, while Schumpeter has been more interested in specific values that entrepreneurs had and how these values were related to commercial successes. McClelland (1975) suggests that entrepreneurship is connected with such a construct, as “need for achievement” (p. 25). Rotter (1966) has found that “internal locus of control” (the trait that makes people take personal responsibility for everything that happens to them) is substantially higher among entrepreneurs. Finally, Carland et al. (1984) believe that “calculated risk taking” is the most significant factor for predicting entrepreneurship. Chell et al. (1991) determined that a successful entrepreneur should have such traits as “proactivity”, “commitment to others” and “achievement orientation”.

More recent studies in the area support the hypothesis that entrepreneurs have specific set of values and personal traits that distinguish them from the rest of the population (Mitchell et al, 2002). Viewing effective entrepreneurship as a function of inherent values exhibits numerous drawbacks and lacks sufficient predicting power. Nevertheless, it provides evidence that entrepreneurs have different set of values compared with general audience. Current research will be based on the set of values found to be connected with entrepreneurship in various studies in case WVS contains appropriate questions.

So, existing literature tends to view values as stable phenomena that are not subject to transformation in short time periods. Still, the data gives enough evidence that transformation of values can be rather substantial. Most researchers who have investigated linkage of social values and economic development tended to link “time-invariant” social values to economic growth, which is a dynamic

variable. Most papers that consider changes in values (such as Corneo and Jeanne, 2007 or Hassan, Antunes and Pavon, 2009) analyze those changes at individual level. While such papers are useful in studying the value transformation mechanism, they do not allow us to link social values to economic development. This paper proposes to pay attention to changes in values at an aggregated level of the society. Moreover, we offer a look at changes in values, rather than in their magnitude in order to investigate links between social values and economic development. The logic of such choice is the following: economic growth is a change of GDP level, so it is more reasonable to predict change variable using another change variable instead of level variable. It is also supposed that shift of values that are connected with entrepreneurship (and data supports the idea that entrepreneurs are bearers of specific values) would be the best predictors among value of subsequent economic growth.

### *Chapter 3*

#### METHODOLOGY

The paper aims to test the hypothesis that economic growth can be predicted by shifts in social values. This task requires three steps. Firstly, values which can potentially influence economic growth have to be chosen. Secondly, the chosen values have to be quantified and measured for all countries in the sample for every period so that changes in values can be expressed numerically. Lastly, changes of values are used as depended variables in endogenous growth regression. Since social values and economic development are believed to be interdependent, lagged values of value shifts are taken in order to overcome endogeneity problem.

#### *Choice of Values*

It has been already shown that there is dependence between spread of opportunity entrepreneurship and economic development of the state (Acs, 2006). Number of studies show that entrepreneurs are bearers of a specific set of values (McClelland, 1975; Rotter, 1966; Carland *et al*, 1984). According to these researches three major traits are more inherent to entrepreneurs comparing to population in general. They are achievement motivation (entrepreneurs are willing to be successful in activities they are engaged in), internal locus of control (entrepreneurs are more likely to take responsibility for their lives and relate their successes or failures with personal performance), and calculated risk taking (entrepreneurs are likely to engage in risky activities, not talking about pure gambling).

After a careful search of questions in the World Value Survey database has been conducted, the following questions are selected as indicators of the values inherent to entrepreneurs.

**Table 1: Questions selected as indicators of entrepreneurship values**

<p>A032, A039. Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five</p> <p><b><u>Answer “Yes” for the option “Feeling of responsibility“</u></b></p> <p><b><u>Answer “Yes” for the option “Determination, perseverance”</u></b></p>
<p>A173. Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them. Please use this scale where 1 means "none at all" and 10 means "a great deal" to indicate how much freedom of choice and control you feel you have over the way your life turns out.</p> <p><b><u>Scale from 1 to 10</u></b></p>
<p>C018, C019. Here are some more aspects of a job that people say are important. Please look at them and tell me which ones you personally think are important in a job?</p> <p><b><u>Answer “Yes” for the option “A job in which you feel you can achieve something”</u></b></p> <p><b><u>Answer “Yes” for the option “A responsible job”</u></b></p>
<p>E028. I'm going to read out some different forms of political action that people can take, and I'd like you to tell me, for each one, whether you have actually done any of these things, whether you might do it or would never, under any circumstances, do it.</p> <p><b><u>Answers “Done”, or “Would do” for the option “Joining unofficial strikes”</u></b></p>
<p>F115. Please tell me for each of the following statements whether you think it can always be justified, never be justified, or something in between, using this card.</p> <p><b><u>Scale from 1 to 10 for the option “Avoiding a fare on public transport”</u></b></p>

The selected questions appear in all waves of the World Value Survey and in majority of countries of the study. In case some question is missing for a country in some wave, its value is calculated using linear extrapolation of the trend observable in other waves. Missing values constituted 13.5% of all cases, and the pattern of missing values can be found in Appendix A. Extrapolation of question response pattern leads to substantially larger sample, since presence of

only one question unanswered in a country at one wave would lead to exclusion of this wave from analysis leaving substantial amount of data unused.

### ***Quantification of Values***

Although the World Values Survey has been conducted five times already, not all countries participated in its every wave. For tracking value changes it is needed to have at least two observations for every country, so at least two waves of World Values Survey should be available for the countries included in the analysis. There appeared to be 51 such countries and the table with the list of countries and years when the study was conducted can be found in the Appendix B. It is notable that selected countries represent all continents; they are at different levels of development and have different cultural systems. In general, population of the selected countries constitutes more than 80% of the world's population, which is sufficient for generalization of the research results.

Since the questions have different scales (questions a023, a039, c018, c019 are binary, a173, f115, have the scale from 1 to 10, and e028 has the scale from 1 to 3) variables need to be recoded into a uniform scale in order to be comparable and used in later statistical analysis. The new scale has minimal value of 0 (which corresponds to minimal display of the trait), and maximal value of 100 (which is the maximum display of the trait). After this transformation, average values for all questions of every country and wave are calculated. These average values are to be used for further analysis. Table 2 gives descriptive statistics.

**Table 2: Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
Children qualities: feeling of responsibility	138	27,81	92,33	71,2657	14,17066
Children qualities: determination perseverance	138	9,10	69,02	36,2598	12,88889
Important in a job: that you can achieve something	138	,10	100,00	62,2442	19,02053
Important in a job: a responsible role	138	1,00	100,00	51,4155	20,80425
How much freedom and choice	138	34,75	81,21	63,9662	9,40218
Justifiable: avoiding a fare of public transport	138	1,46	44,26	16,3032	8,61963
Political action: joining unofficial strike	138	,10	51,28	14,9319	8,33904

***Factor Analysis***

As soon as questions are chosen principal factor analysis is used to reduce dimensionality and determine connections between the selected questions. Choice of factor analysis method is too great extent subjective, and there are very few clear guidelines that help determine the optimal procedure. Principle component analysis is the most common choice of researchers. Still, it is shown in papers of Fabrigar, Wegener, MacCallum and Strahan (1999) and Preacher and MacCallum (2003) that default options of factor analysis (namely principal component analysis with orthogonal Varimax method of rotation) can produce misleading and erroneous results. The aim of factor analysis is identification of some unobservable latent variables that create covariance among existing

variables. Factor analysis models splits variance of measured variables in two categories: common variance (part of variance accounted by common latent factors) and unique variance (part of variance that cannot be explained by common factors). Unique variance can be split further into specific and error components, which are created by a specific measured variable and error term respectively. Factor analysis methods recognize division of variance into unique and common, so the constructed latent variables account only for common variance of measured variables. On the other hand, principal component method does not separate unique and common variance of the measured variables. This method suits best for data reduction, since its aim is to find such uncorrelated linear combinations of variables that can explain as much variation in measured variables as possible. Still, neglecting the error terms in measured variables can make the obtained components unreliable and difficult to interpret (Costello and Osborne, 2005). Nonetheless, conventional perception of principal component analysis as non-reliable technique is challenged by some researchers (Guo, 2009). It is claimed that although principal component analysis does not include error term in original model explicitly, it deals with it on the stage of selecting components. The procedure of principal component analysis implies generating independent linear combinations of measured variables and removing the combinations that explain small part of variation. It is claimed by Guo (2009) that by doing so, principal component analysis removes error component dimensions reducing portion of unique variance that original data contains. Although not all unique variance is removed from the principal component model, it is not correct to assert that principal component model is inferior to factor analysis methods due to neglecting error terms and unique variances of measured variables. The method of principal components allows getting the fullest picture of common variance of measured variables, which is its major strength. Factor analysis, on the other hand, allows researchers to get more reliable and theoretically grounded techniques for explanatory analysis. Generally, it is suggested in literature that

consistency of principal component analysis and factor analysis indicates reliability of a model (Fabrigar, Wegener, MacCallum and Strahan, 1999). Still, in case discrepancies are present, factor analysis solution should be chosen.

Fabrigar, Wegener, MacCallum and Strahan (1999) suggest that Maximum Likelihood method of Factor Analysis is optimal in case measured variables follow multinomial normal distribution. In case assumption of multinomial normality is severely violated, principal factor methods (which entail no distribution assumptions) would produce better results. Distributions of questions included in analysis are far from normal (see Appendix C), so assumption of multinomial normality does not hold. Thus, principal axis factoring method is used. It is notable that both principal axis factoring and principal component methods yield very similar results. Correlations between factors obtained via principal are given in Table 3, and factor loadings are given in Appendix D.

**Table 3. Correlations between principal components and factors of principal axis factoring.**

<i>Pearson Correlation</i>	Principal component Component 1	Principal component Component 2	Principal Copnoment Component 3
Factor Analysis Factor 1	0,958(**)	-0,028	-0,002
Factor Analysis Factor 2	0,016	0,916(**)	-0,045
Factor Analysis Factor 3	-0,005	0,452(**)	0,945(**)

\*\*Correlation is significant at the 0.01 level (2-tailed).

Following the suggestion of Fabrigar, Wegener, MacCallum and Strahan (1999), principal axis factoring is used for further analysis. Oblique method of rotation that allows factors to correlate with each other (Oblimin rotation) is used in order to get factor solution that is easy to interpret. Kaiser-Meyer-Olkin

Measure of sampling adequacy is 0.451 implying that factor analysis is suitable for the given set of questions as variance-covariance matrix of questions is not the unit matrix.

The scree plot presented on Figure 3 helps determine the number of components that should be extracted. The rule of thumb suggests choosing all components that have eigenvalues over unity (so that the chosen components explain more variation than one question). This is the so-called Kaiser criterion. Another rule of thumb suggests choosing number of components that correspond to the section of scree plot where it becomes comparatively flat. This is the second method used for determination of number of factors that should be retained. Finally, there is the third method called parallel analysis. The essence of the method is the following: random samples (number of which coincides with number of measured variables in the analysis) with number of observations equal to number of observations in the analysis are subjected to factor analysis technique employed in the study. Two scree plots (one of the actual analysis and one of the simulation) are laid over and investigated. The factors that have higher eigenvalues comparing with simulation are suggested to be retained.

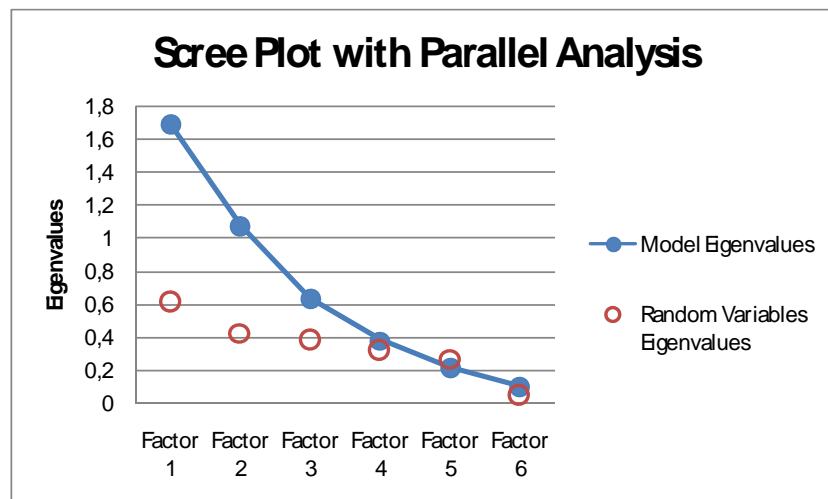


Figure 3: Scree plot with parallel analysis

All three methods suggest leaving three factors in the model, so their scores are stored as variables and used for further analysis. Three factors explain 48.5% of variance in the selected questions, and comparative weight of each component can be seen in the Table 4. Low percentage of explained variance can be explained by the nature of procedures employed in the analysis (factors are composed only from common variance neglecting unique variance of the measured variables). When factors are correlated, sums of squared loadings cannot be added to obtain a total variance, so rotation sum of squared loadings cannot be computed.

**Table 4: Variance explained by each factor**

Factor	Extraction Sums of Squared Loadings		
	Eigenvalue	% of Variance	Cumulative %
1	1,713	24,474	24,474
2	1,059	15,134	39,607
3	0,624	8,911	48,518

Analysis of the rotated component matrices are given in the Tables 5 and 6. The first one is Pattern Matrix with is equivalent to factor loading matrix in models of orthogonal rotation. Its coefficients can be interpreted similarly as standardized regression coefficients, and it shows the importance of that variable to the factor with the influence of the other variables partialled out. Structure Matrix elements are simple correlations of the variables with factors, so these numbers take into account correlation among factors. For example, value of the component “achievement” has correlation of 0.94 with response to the question “It is important in a job that you have a responsible role”, and almost zero correlation with question “It is important to teach a child determination and

perseverance”. The same structure holds if correlations between factors are taken into account, implying that correlations are small in magnitude. Table 7 shows factor correlations, and it confirms that all correlations except one are below 0.1.

**Table 5: Pattern Matrix**

Questions	Component correlations		
	<i>Achievement (1)</i>	<i>Perseverance (2)</i>	<i>Locus of control (3)</i>
Important in a job: a responsible role	0,943	-0,048	0,123
Important in a job: that you can achieve something	0,829	0,176	0,133
Justifiable: avoiding a fare on public transport	-0,342	0,065	0,147
Children qualities: determination perseverance	0,037	0,918	-0,249
Children qualities: feeling of responsibility	-0,066	0,372	0,296
Political action: joining unofficial strike	0,006	0,213	0,150
How much freedom and choice	0,043	-0,072	0,699

**Table 6: Structure Matrix**

Questions	Component correlations		
	<i>Achievement (1)</i>	<i>Perseverance (2)</i>	<i>Locus of control (3)</i>
Important in a job: a responsible role	0,938	-0,050	0,059
Important in a job: that you can achieve something	0,815	0,182	0,139
Children qualities: determination perseverance	0,015	0,845	0,011
Children qualities: feeling of responsibility	-0,096	0,459	0,406
Political action: joining unofficial strike	-0,011	0,255	0,210
How much freedom and choice	0,008	0,125	0,676

**Table 7. Factor Correlation Matrix**

Factor	1	2	3
1	1,000	-0,039	-,053
2	-0,039	1,000	0,285
3	-0,053	0,285	1,000

Extraction Method: Principal Axis Factoring.

Rotation Method: Oblimin with Kaiser Normalization.

From the Tables 5 and 6 it can be seen that the first factor has largest correlations with questions about importance of such job characteristics as

achievement and taking responsible roles, so this component is interpreted as one measuring **achievement motivation**. The second factor has the highest correlations with questions about importance of such children qualities as feeling of responsibility and determination, and lower (but still substantial) correlation with the question concerning readiness of participation in unofficial strike. It can be concluded that higher scores of this component are related to greater personal determination to achieve personal goals, which can be called **perseverance**. Finally, the third factor has the highest correlations with question concerning freedom and choice in life and a bit lower correlation with the question of importance of such children quality as responsibility. This component can be interpreted as locus of control, and higher values of it correspond to domination of **internal locus of control**.

Scores of every factor are saved for every observation, so now it is possible to see whether obtained measurements of values evolve over time (so that we have sufficient variability for analysis). Graphs showing variability of values (aggregated by geographical regions) can be found in Appendix E. It is notable that values reveal substantial variability. Components by construction have mean value of zero and variance of unity, so variation of several standard deviations (which is the scale on graphs) is fairly substantial supporting the hypothesis that social values do change. It is important to mention that there are no visible systematic trends of value changes. There is no consistency in value evolution of different parts of the world, and there is no general tendency of value change in general. Still, there are some notable facts. For example, perseverance in European states increased substantially over last 25 years; achievement motivation in Asia has skyrocketed over the same period of time; locus of control in states of Latin America evolved to be substantially higher comparing with other parts of the world. Current research does not aim to explain these shifts, but to investigate whether they are connected with economic growth of the state.

### *Changes of Values as Growth Determinants*

After component scores for every state and wave are calculated, changes in values for every country are obtained and inserted in endogenous growth regression model. According to representatives of endogenous school of economic growth engines of rise might be different. Romer (1990) claims that expenditures on Research and Development (R&D) play a major role in technological development resulting in increasing returns to social knowledge. On the contrast, Lucas (1988) argues that higher levels of human capital, which can be measured both in a higher educational level and “learning by doing”, is the most important source of steady economic growth. Studies by Levine and Renelt (1992), Barro (1991), Helliwell (1994), Mankiw, Romer and Weil (1992) show that initial level of wealth, magnitude of physical investments and investment in human capital and population growth have positive and statistically significant relations to economic growth, so they have to be inserted in the model along with variables reflecting changes in values.

Formally, basic human-capital augmented Solow model is based on neoclassical production function

$$Y(t) = K(t)^\alpha H(t)^\beta (A(t)L(t))^{1-\alpha-\beta}, \quad \alpha + \beta < 1 \quad (1)$$

Where Y measures output, K is physical capital, H is human capital, L is labor and A is level of technology that is related to labor. It is also assumed that labor force grows at rate  $n$ , given exogenously, and this rate differs across countries. Technology is assumed to grow at exogenous rate  $g$ , which is assumed to be constant for all countries. The countries, however, have specific initial value of technical efficiency denoted by  $A(0)$ . Level of initial labor endowment is  $L(0)$ . So,

$$L(t) = L(0)e^{nt} \quad (2)$$

$$A(t) = A(0)e^{gt} \quad (3)$$

According to this model, evolution of capital stock and human capital given assumption that constant shares of output are invested for different types of

capital can be described by the following equations derived by Mankiw, Romer and Weil (1992):

$$\dot{k} = s_k y(t) - (n + g + \delta)k(t) \quad (4)$$

$$\dot{h} = s_h y(t) - (n + g + \delta)h(t) \quad (5)$$

Where  $k$  is defined as  $K/AL$ ,  $h$  is defined as  $H/AL$ , and  $y$  is  $Y/AL$ , so that quantities are given per effective unit of labor.

Finding steady state of physical and human capital yields the following equation

$$\ln\left(\frac{Y(t)}{L(t)}\right) = \ln A(0) + gt - \frac{\alpha + \beta}{1 - \alpha - \beta} \ln(n + g + \delta) + \frac{\alpha}{1 - \alpha - \beta} \ln(s_k) + \frac{\beta}{1 - \alpha - \beta} \ln(s_h) \quad (6)$$

So, what is the place of social values in this specification? First of all, the term  $A(0)$ , which stands for initial technical efficiency, represents “permanent differences in production functions” (Mankiw, Romer and Weil, 1992, p. 424) of countries, which can be due to different values along with other factors. The authors make critical assumption that  $\ln A(0)$  can be decomposed as a constant and a country-specific shock that is independent from rates of investment and population growth. This assumption allows using a cross-sectional OLS estimation of the equation describing steady state (6).

Examination of growth requires some additional manipulations with data.

Thus, Taylor series approximation around the steady state (6) gives the following model where

$$\ln\left(\frac{Y(t_2)}{L(t_2)}\right) - \ln\left(\frac{Y(t_1)}{L(t_1)}\right) \text{ is approximately the percentage change of } Y/L \text{ when}$$

change is close to zero.

$$\begin{aligned} \ln\left(\frac{Y(t_2)}{L(t_2)}\right) - \ln\left(\frac{Y(t_1)}{L(t_1)}\right) &= \gamma \ln A(0) + g(t_2 - e^{-\alpha\tau} t_1) - \gamma \frac{\alpha + \beta}{1 - \alpha - \beta} \ln(n + g + \delta) + \gamma \frac{\alpha}{1 - \alpha - \beta} \ln(s_k) + \\ &+ \gamma \frac{\beta}{1 - \alpha - \beta} \ln(s_h) - \gamma \ln\left(\frac{Y(t_1)}{L(t_1)}\right) \end{aligned} \quad (7)$$

Where  $\gamma = (1 - e^{-\lambda\tau})$  for  $\tau = t_2 - t_1$ . So, it should be noted that growth determinants include determinants of the steady state and level of initial income.

Technological growth  $g$  is assumed to be constant, and  $A(0)$  are also believed to be equal for different countries except for random country-specific shocks that are uncorrelated with regressors (in order to be able to run OLS). However, in case there are systematic differences in  $A(0)$ , they should correlate with initial income and maybe investment share in output.

So, in case there is heterogeneity present in the term  $A(0)$  it might lead to omitted variable bias, shifting coefficient of the initial value of wealth downwards, and the coefficient of investment share in output upwards. So, values, which are likely to shift technological efficiency, might remove some of the bias.

Secondly, values might lead to different rates of technological progress  $g$  that is assumed to be constant in Solow model. For instance, higher innovation orientation in the society is likely to shift this variable. It is also reasonable to assume that technological progress in developed countries is faster comparing with developing ones.

Thirdly, values might enter the model as factors that influence not only labor productivity, but also general productivity that includes productivity of various types of reproducible capital. In such case the model would include a time varying efficiency term affecting both physical and human capital.

Since there is no single component where social values can enter the model it is offered not to impose specific functional form on them and insert into regression in form of standardized variables. Although such approach might not be the best, it allows seeing relationship between economic growth and shifts of values in the first approximation.

Formally, the model for estimation (fixed effects) would have the following specification

$$\ln(y_{i,t}) - \ln(y_{i,t-4}) = a_{0,t} + u_i + \beta_1 \ln(\overline{n_{i,t-4} \dots n_{i,t}}) + \beta_2 \ln(\overline{H_{i,t-4} \dots H_{i,t}}) + \beta_3 \ln(y_{i,t-4,prev}) + \beta_4 \ln(\overline{I_{i,t-4} \dots I_{i,t}}) + \sum_{k=1}^3 \gamma_k (V_{k,i,t-4} - V_{k,i,t-8}) + e_{i,t} \quad (8)$$

Where  $y_{i,t}$  - per capita GDP in country  $i$  in year  $t$  (measured as PPP);

$a_{0,t}$  - is a model intercept;

$\mu_i$  - a country specific intercept;

$\overline{n_{i,t-4} \dots n_{i,t}}$  - average growth of population for period  $\{t-4 \dots t\}$ ;

$\overline{H_{i,t-4} \dots H_{i,t}}$  - average gross enrollment rate in secondary education for period  $\{t-4 \dots t\}$ ;

$y_{i,t-1}$  - per capita GDP in country  $i$  in year that preceded the first observation.

For example, if first time World Value Survey was conducted in 1999, value of GDP per capita in 1998 is taken. Such choice of independent variable is taken in order to avoid inclusion of the dependent variable in list of independent variables, which would lead to biased results. Inclusion of a shifted value of GDP per capita is common in growth literature (Bassanini, Scarpetta and Hemmings, 2001);

$\overline{I_{i,t-4} \dots I_{i,t}}$  - average share of investments in GDP for period  $\{t-4 \dots t\}$ ;

$V_{k,i,t}$  - saved component score that represents specific value

$e_{i,t}$  is an error term.

Data on all variables except value scores is obtained from the World Bank Database online

([http://ddp-ext.worldbank.org/ext/DDPQQ/member.do?method=get](http://ddp-ext.worldbank.org/ext/DDPQQ/member.do?method=getMembers&userid=1&queryId=135)

Members&userid=1&queryId=135). Enrollment rate in secondary education is taken as proxy for investment in physical capital,  $g$  and  $\delta$  are assumed to be county-specific, so they would be included in country-specific intercept.

*Chapter 4*

RESULTS

Several models were estimated to investigate the question of the link between value changes and economic growth. More specifically, ordinary least squares, fixed effects and random effects panel models were estimated. The first model is employed in classical papers including Mankiw, Romer and Weil (1992). Two configurations of this model are included in the analysis. The first includes value scores, while the second has changes of values as independent variables. Results of model estimation are given in Table 8.

**Table 8: Estimation Results**

	<b>OLS in Levels</b>	<b>OLS for value <math>\Delta</math>'s</b>	<b>Fixed Effects</b>	<b>Random Effects</b>
<b>Explanatory variable: change in GDP per capita (PPP) during a 4-year period (t-4..t)</b>				
<b>Constant</b>	0.196 (0.233)	0.364 (0.255)	0.001 (0.00)	0.364 (0.255)
$\ln(\overline{I_{i,t-4} \dots I_{i,t}})$	0.095 (0.046)*	0.082 (0.052)	0.218 (0.133)	0.082 (0.052)
$\ln(y_{i,t\_prev})$	-0.063 (0.015)**	-0.056 (0.017)**		-0.056 (0.017)**
$\ln(\overline{H_{i,t-4} \dots H_{i,t}})$	0.059 (0.047)	0.016 (0.054)	-0.089 (0.148)	0.016 (0.054)
$\ln(\overline{n_{i,t-4} \dots n_{i,t}})$	-0.022 (0.014)	-0.026 (0.014)*	-0.101 (0.067)	-0.026 (0.014)*
<b>Achievement, factor score</b>	0.003 (0.012)			
<b>Locus, factor score</b>	0.016 (0.016)			

**Table 8: Estimation Results - Continued**

	<b>OLS in Levels</b>	<b>OLS for value <math>\Delta</math>'s</b>	<b>Fixed Effects</b>	<b>Random Effects</b>
<b>Perseverance, factor score</b>	0.001 (0.013)			
<b><math>\Delta</math> Achievement</b>		-0.019 (0.018)	-0.012 (0.044)	-0.019 (0.018)
<b><math>\Delta</math> Locus</b>		0.047 (0.023)**	0.032 (0.037)	0.047 (0.023)**
<b><math>\Delta</math> Perseverance</b>		-0.011 (0.014)	0.004 (0.028)	-0.011 (0.014)
	N=138 R <sup>2</sup> =0.22	N=87 R <sup>2</sup> =0.37	N=87 R <sup>2</sup> =0.22	N=87

\* 10% significance level

\*\* 5% significance level

(standard errors in parenthesis)

It can be seen that initial wealth is highly significant determinant of economic growth in all models where initial wealth is not dropped from the model, and it has the correct sign. Other significant coefficients of factors included in classical researches are 10% significant and also have correct signs. It suggests that the model is adequate and in line with previous research.

The first model tested tests whether countries with higher prevalence of entrepreneurship specific values (levels, not differences) grow faster than other countries using Ordinary Least Squares estimation procedure. All three factors representing value prevalence appear to be statistically insignificant in the model supporting idea of Hanson (2009) that greater dissemination of achievement motivation is not connected with economic growth. It also supports the hypothesis of the current research that prevalence of values cannot account for economic growth.

The second model is also estimated using Ordinary Least Squares technique. At this time, however, changes of values instead of their levels are taken as explanatory variables. The estimation shows that changes in achievement

motivation and perseverance are not statistically significant in the model. However, evolution of locus of control from external to internal one has a positive coefficient in the growth regression model, which is significant at 5% confidence level.

Since it is natural to expect presence of country specific effects in the model, fixed effects regression is conducted, and its results can be seen in the second column. This model differs substantially from OLS estimation. Overall explanatory power of the model is substantially lower comparing to other models, and magnitude of coefficients does not correspond to other estimated models. Such effect can be explained by omitted variable bias, as initial wealth variable that showed up to be significant in OLS regression was dropped from the analysis due to its time-invariant nature. It is expected that the model has not only a country-specific effect, but also the country-specific effect that evolves over time. So, it should be determined whether fixed effect or random effect model is more appropriate in the context of the research. Hausman test and Breusch-Pagan Lagrange multiplier test have been conducted in order to test what model is suitable. Hausman test has the null hypothesis that two estimations are not different. In case they are not, random effect technique is advised to be used as the more effective estimator. Hausman test, results of which can be seen in Appendix F, determined that random effect model can be used in this case. Breusch-Pagan Lagrange multiplier test (Appendix F) also indicates that random effect model is appropriate to be used. So, results of random effect estimation are given in the last column of Table 8, and they are used for drawing final conclusions.

It is visible that random effects model is very similar in estimations to OLS in terms of magnitude and significance of coefficients, meaning that country specific intercepts are not significant in the model. Change in achievement motivation has non-significant coefficient, while locus of control is significant in the model at 95% confidence level. So, it can be suggested that there is evidence

that evolution towards higher prevalence of internal locus of control leads to faster economic growth.

## *Chapter 5*

### CONCLUSIONS

The conducted research supports the hypothesis that symbolic and economic systems are interconnected, so bringing up specific values in the society is likely to lead to better overall economic performance. Level of achievement motivation, which is the significant predictor of economic growth in the model of Granato, Inglehart, and Leblang (1996) is not found to be significant for country growth. Levels of other values inherent to entrepreneurs are also insignificant predictors of growth. At the same time, evolution towards domination of internal locus of control in society can predict more rapid subsequent economic development. So, stimulating more people to believe that their successes and failures depend solely on them is likely to contribute to faster growth. Thus, introduction of state programs that stimulates spread of the belief that life of each person depends mainly on person's actions is likely to lead to better economic performance. This conclusion, however, needs to be tested on a larger dataset in order to get more statistically reliable inference. Larger dataset with more time variability might help establish more robust connections between shift in values and economic growth.

## WORKS CITED

- Abdollahian, M., T. Coan, H. Oh and B. Yesilada. 2008. Dynamics of Cultural Change: The Human Development Perspective. *World Values Research* 1(February): 91-115.
- Acemoglu, D., Johnson, S., and J. Robinson. 2001. The colonial origins of comparative development. *American Economic Review* 91 (June): 1369-1401.
- Acs, Z. 2006. How Is Entrepreneurship Good for Economic Growth, *Innovations*, Retrieved December 18, 2009 from <http://www.mitpressjournals.org/doi/pdf/10.1162/itgg.2006.1.1.97>.
- Barro, R. 1991. Economic growth in a cross section of countries, *Quarterly Journal of Economics* 106 (May): 407-444.
- Bassanini, A., Scarpetta, S. and P. Hemmings. 2001. Growth: The Role of Policies and Institutions: Panel Data. Evidence from OECD Countries, *OECD Economics Department Working Papers 283*, OECD, Economics Department.
- Bosma, N., K. Jones, E. Autio and J. Levie. 2008. *Global Entrepreneurship Monitor, 2007. Executive Report*, Babson College, Babson Park, MA, US / London Business School.
- Braithwaite, V., and R. Blamey. 1998. Consensus, Stability and Meaning in Abstract Social Values, *Australian Journal of Political Science* 33(March): 363-380.
- Carland, J. W., Hoy, F., Boulton, W. R., and J.A. Carland. 1984. Differentiating entrepreneurs from small business owners: A conceptualization. *Academy of Management Review* 92(April): 354-359.
- Chell, E., Haworth, J. and S. Brearley 1991. *The Entrepreneurial Personality: Concepts, Cases and Categories*. London: Routledge.
- Corneo, G. and O. Jeanne, 2007. Symbolic Values, Occupational Choice, and Economic Development, *Institute for the Study of Labor*, Discussion Paper #2763.

- Costello, A. and J. Osborne, 2005. Best Practices in Exploratory Factor Analysis: Four Recommendations for Getting the Most From Your Analysis. *Practical Assessment, Research & Evaluation* 10 (July): 1-9.
- Fabrigar, L., Wegener, D., MacCallum, R., and E. Strahan. 1999. Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods* 4 (May): 272-299.
- Granato, J., Inglehart, R., and D. Leblang. 1996. The Effect of Cultural Values on Economic Development: Theory, Hypotheses, and Some Empirical Tests. *American Journal of Political Science* 403 (March): 607–631.
- Guo, W. 2009. Uplifting the Quality Of Exploratory Factor Analysis: Insights from Mathematics. *Proceedings of the 10th International Business Research Conference*, 8-9 April 2009, New York.
- Hair, J., Anderson, R., and R. Tatham. 1987. *Multivariate data analysis with readings*, London: Macmillan.
- Hanson, J. 2009. Cultural Values and Economic Growth: A New Look at Past Findings. *Paper presented at the annual meeting of the Midwest Political Science Association*, Palmer House Hilton, Chicago, IL, April 2-5, 2009.
- Hassan, S., Antunes, L., and J.Pavon. 2009. A Data-Driven Simulation of Social Values Evolution. In *Conf. on Autonomous Agents and Multiagent Systems AAMAS 2009*, ed. Decker, Sichman, Sierra and Castelfranchi, May, 10–15, 2009: 1337-1348, Budapest, Hungary.
- Helliwell, J. 1994. Empirical linkages between democracy and growth, *British Journal of Political Science* 24(February): 225-249.
- Inglehart, R. and W. Baker. 2000. Modernization, cultural change, and the persistence of traditional values. *American Sociological Review*, 65 (June): 19-51.
- Klapper, F., Amit, M., and J. Guillen. 2008. Entrepreneurship and Firm Formation Across Countries, *Policy Research Working Paper Series of the World Bank #4313*.
- Levine R. and D. Renelt. 1992. A sensitivity analysis of cross-country growth regression, *American Economic Review* 82 (February): 942-63.

- Lipset, S. 1959. Some Social Requisites of Democracy: Economic Development and Political Legitimacy. *American Political Science Review* 53(March): 69–105.
- Lucas, R. 1988. On the Mechanics of Economic Development, *Journal of Monetary Economics* 1(April): 3-32.
- Mankiw, G., Romer, D., and D. Weil, 1992. A contribution to the Empirics of Economic Growth, *Quarterly Journal of Economics* 152 (May): 407-432.
- McClelland, D. 1975. *Power: The Inner Experience*. New York: Irvington/Halstead
- Melton, W. and B. Hoke. 2003 Exploring Shifts and Differences in American Social Values Priorities: Freedom versus Equality, 1968 to 1981. *Paper presented at the annual meeting of the American Sociological Association*, Atlanta Hilton Hotel, Atlanta, GA Retrieved September 15, 2009 from [http://www.allacademic.com/meta/p106825\\_index.html](http://www.allacademic.com/meta/p106825_index.html)
- Minkov, M., and V. Blagoev. 2009. Cultural Values Predict Subsequent Economic Growth, *International Journal of Cross Cultural Management* 9 (November): 5-24.
- Mitchell, R., Busenitz, L., Lant, T., McDougall, P., Morse, E., and J. Smith, 2002. Towards a theory of entrepreneurial cognition. *Entrepreneurship Theory and Practice* 27(October): 93-104.
- Preacher, K. and MacCallum, R. 2003. Repairing Tom Swift's electric factor analysis machine. *Understanding Statistics* 2 (January): 13-32.
- Pryor, F. 2005. National Values and Economic Growth, *American Journal of Economics and Sociology* 64(July): 451-483.
- Rotter, J. 1966. Generalized expectancies for internal versus external control of reinforcements. *Psychological Monographs*, 80, Whole No. 609: 54-67.
- Schumpeter, J. 1934. *The theory of economic development*. Cambridge, MA, Harvard University Press.
- Weber, M. 2002 (1905). *The Protestant Ethic and The Spirit of Capitalism*. New York: Penguin books.
- Wennekers, S.van Wennekers, A., Thurik, R, and P. Reynolds. 2005. Nascent Entrepreneurship and the Level of Economic Development. *Small Business Economics* 24 (May): 293-309.

- Wong, C. 1998. Determining Factors for Local Economic Development: The Perception of Practitioners in the North West and Eastern Regions of the UK, *Regional Studies: The Journal of the Regional Studies Association*, 32 (March): 707-720.
- Yoshino, R. 2006. A social value survey in China: On the Change and Stability in the Chinese Globalization, *Behaviormetrika* 33 (December): 110-130.

APPENDIX A

**Table 9: Missing Values for Countries in Analysis**

		Children qualities: feeling of responsibility	Children qualities: determination perseverance	Important in a job: that you can achieve something	Important in a job: a responsible role	How much freedom and choice	Justifiable: avoiding a fare of public transport	Political action: joining unofficial strike
Country	Wave	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Albania	1994-1999	30.93	40.74	52.15	17.32	41.05	12.63	1.92
	1999-2004	68.20	52.90	51.30	25.40	55.02	14.83	4.44
Argentina	1981-1984	58.11	16.82	33.83	33.13	66.56	14.43	16.91
	1989-1993	80.34	29.04	50.20	58.18	68.80	12.08	12.80
	1994-1999	79.24	28.27	53.57	45.69	66.99	16.15	10.49
	1999-2004	76.48	22.73	47.50	40.16	70.33	15.70	10.27
	2005-2008	71.36	25.15	.	.	75.43	17.20	.
	1981-1984	29.64	18.00	74.27	52.12	67.12	15.01	16.12
Australia	1994-1999	66.55	36.08	71.83	37.94	72.41	11.85	24.06
	2005-2008	71.99	50.81	.	.	73.57	14.62	.
	1994-1999	39.41	53.44	53.64	50.95	58.56	1.46	30.40
Bangladesh	1999-2004	53.27	35.87	88.00	87.93	51.18	1.76	15.42
	1994-1999	61.25	42.58	61.67	38.00	51.32	13.38	29.33
Bosnia and Herzegovina	1999-2004	73.75	46.08	66.17	45.75	58.77	9.28	18.98
	1989-1993	72.00	25.48	53.31	60.10	68.78	20.69	17.02
Brazil	1994-1999	64.58	34.55	49.78	42.12	70.61	23.19	13.94
	2005-2008	77.93	31.40	.	.	74.01	32.58	.
	1994-1999	63.62	44.31	58.02	32.74	46.75	14.95	21.08
Bulgaria	2005-2008	73.13	56.04	.	.	52.82	14.88	.
	1989-1993	81.48	39.51	42.27	27.00	.	22.87	16.70
Belarus	1994-1999	62.33	41.40	31.12	16.35	46.19	34.15	8.75
	1999-2004	77.16	47.49	73.85	43.55	73.75	13.53	20.88
Canada	2005-2008	72.92	48.11	.	.	72.90	13.46	25.02
	1989-1993	88.33	30.93	58.40	52.20	66.85	23.58	16.36

Table 9: Missing Values for Countries in Analysis - Continued

		Children qualities: feeling of responsibility	Children qualities: determination perseverance	Important in a job: that you can achieve something	Important in a job: a responsible role	How much freedom and choice	Justifiable: avoiding a fare of public transport	Political action: joining unofficial strike
	1994-1999	74.40	34.20	62.10	40.50	67.76	17.89	14.29
	1999-2004	84.50	43.42	63.42	43.75	67.94	26.64	16.53
	2005-2008	84.60	46.10	.	.	69.35	31.20	.
China	1989-1993	66.90	45.00	37.60	22.30	66.50	6.33	.
	1994-1999	34.47	36.27	49.67	25.87	63.85	6.66	.
	1999-2004	63.60	16.00	30.70	22.40	67.64	3.77	.
	2005-2008	64.12	24.91	.	.	68.58	11.06	.
Taiwan	1994-1999	81.03	34.36	68.72	70.26	70.74	11.60	6.13
	2005-2008	91.93	34.80	.	.	70.37	11.24	.
Colombia	1994-1999	76.90	19.48	44.26	20.13	75.77	28.45	14.08
	2005-2008	82.91	20.13	.	.	77.48	.	.
Czech Republic	1989-1993	64.07	43.29	46.97	45.35	55.29	.	.
	1994-1999	69.14	35.05	48.74	34.96	60.53	24.27	20.66
Finland	1981-1984	.	.	2.19	1.00	73.19	9.87	13.35
	1994-1999	87.03	44.38	60.28	35.76	73.39	14.39	16.19
	2005-2008	90.14	64.60	.	.	70.95	14.05	.
Georgia	1994-1999	67.58	36.55	45.07	27.84	56.84	19.41	12.77
	2005-2008	81.07	26.47	.	.	59.41	8.95	.
Germany	1994-1999	92.25	41.02	53.95	33.07	65.22	23.24	13.24
	2005-2008	84.40	62.50	.	.	63.01	13.42	.
Hungary	1981-1984	44.95	17.08	66.39	62.02	64.12	7.63	.
	1994-1999	85.08	62.31	59.23	26.46	59.05	30.47	12.24
India	1989-1993	60.08	27.56	60.72	64.52	59.51	5.05	14.24
	1994-1999	48.24	28.82	60.93	67.84	61.67	5.91	14.15
	1999-2004	67.63	46.35	68.93	73.38	51.18	12.25	18.77
	2005-2008	68.02	40.73	.	.	55.52	25.00	.
Indonesia	1999-2004	81.77	43.53	87.55	95.42	68.70	4.02	5.23
	2005-2008	83.92	41.54	.	.	70.24	6.55	.
Iran	1999-2004	71.96	28.40	52.53	57.50	61.79	9.12	.
	2005-2008	81.14	30.26	.	.	66.70	18.42	.
Japan	1981-1984	68.52	24.67	36.13	43.11	49.96	6.54	10.26

Table 9: Missing Values for Countries in Analysis - Continued

		Children qualities: feeling of responsibility	Children qualities: determination perseverance	Important in a job: that you can achieve something	Important in a job: a responsible role	How much freedom and choice	Justifiable: avoiding a fare of public transport	Political action: joining unofficial strike
	1989-1993	84.27	58.85	47.48	48.27	49.20	5.76	9.67
	1994-1999	87.57	61.48	69.64	70.59	52.07	6.18	11.80
	1999-2004	90.75	69.02	69.68	66.89	54.97	6.85	12.36
	2005-2008	90.60	67.24	72.71	69.86	55.83	6.39	.
Jordan	1999-2004	65.33	16.35	93.05	91.74	67.86	3.57	2.87
	2005-2008	62.33	32.17	.	.	73.57	9.26	.
South Korea	1981-1984	54.12	26.70	0.10	21.44	45.10	11.84	8.85
	1989-1993	90.81	31.10	23.98	22.46	71.80	19.48	.
	1994-1999	88.07	35.63	.	.	.	18.07	22.32
	1999-2004	92.33	42.42	91.83	91.33	67.55	19.20	36.80
	2005-2008	89.83	45.00	.	.	63.77	19.68	.
Mexico	1981-1984	55.53	10.34	47.03	48.29	72.17	27.22	7.44
	1989-1993	76.62	37.10	66.04	56.96	68.91	35.24	25.33
	1994-1999	65.14	41.88	59.81	57.32	71.31	25.97	23.25
	1999-2004	78.05	35.31	54.98	53.36	79.40	30.71	9.05
	2005-2008	77.76	36.35	.	.	81.21	36.45	.
Moldova	1994-1999	66.46	29.47	50.51	29.47	52.60	27.95	7.55
	1999-2004	82.64	33.73	64.19	42.06	55.54	39.30	24.14
	2005-2008	69.60	25.24	.	.	65.01	26.26	.
Morocco	1999-2004	64.40	16.39	93.33	83.88	57.82	11.33	2.93
	2005-2008	69.00	27.25	.	.	47.27	13.52	.
New Zealand	1994-1999	58.87	39.30	82.51	51.12	75.19	11.67	22.56
	2005-2008	63.00	48.74	81.87	48.43	76.03	11.61	21.98
Nigeria	1989-1993	35.96	21.18	91.41	83.92	62.27	15.62	12.68
	1994-1999	27.81	39.68	84.97	85.32	65.23	14.51	13.50
	1999-2004	33.14	22.90	81.50	83.63	66.72	14.20	15.98
Norway	1994-1999	92.28	35.49	74.36	42.06	67.97	10.28	19.10
	2005-2008	89.07	42.24	.	.	73.80	14.12	.
Peru	1994-1999	77.46	24.19	35.51	38.48	64.31	24.05	11.56
	1999-2004	78.88	33.51	46.64	48.23	68.57	19.15	11.38
	2005-2008	73.07	17.40	.	.	67.45	.	30.80

Table 9: Missing Values for Countries in Analysis - Continued

		Children qualities: feeling of responsibility	Children qualities: determination perseverance	Important in a job: that you can achieve something	Important in a job: a responsible role	How much freedom and choice	Justifiable: avoiding a fare of public transport	Political action: joining unofficial strike
Philippines	1994-1999	57.92	28.58	61.42	59.08	66.44	25.15	5.95
	1999-2004	66.50	37.17	54.50	57.58	63.75	28.54	5.90
Poland	1989-1993	.	.	.	.	59.41	.	18.07
	1994-1999	77.97	.	72.77	58.63	.	10.62	11.47
	2005-2008	81.50	25.70	.	.	61.19	16.48	.
Puerto Rico	1994-1999	83.76	21.99	66.92	63.32	80.20	11.48	11.56
	1999-2004	74.31	23.75	53.19	54.44	80.01	7.25	8.81
Romania	1994-1999	82.73	62.95	78.85	50.69	57.98	12.23	17.38
	2005-2008	68.75	30.35	.	.	73.01	11.15	.
Russian Federation	1989-1993	69.51	39.67	27.64	20.55	57.58	19.38	17.52
	1994-1999	70.44	41.37	39.90	25.00	48.39	33.41	9.24
	2005-2008	80.96	53.07	.	.	67.11	32.15	.
Slovakia	1989-1993	66.95	39.70	50.21	52.15	54.90	.	.
	1994-1999	68.86	30.50	49.50	38.81	59.18	28.73	17.68
Viet Nam	1999-2004	70.30	49.50	67.90	66.80	71.42	3.39	5.53
	2005-2008	75.32	62.54	.	.	66.68	7.48	.
Slovenia	1994-1999	70.31	48.46	89.67	64.85	64.82	19.37	18.57
	2005-2008	73.87	63.16	.	.	71.37	24.43	.
South Africa	1981-1984	29.76	17.67	56.39	45.05	61.61	15.12	10.36
	1989-1993	48.46	31.91	.	25.95	66.66	.	14.88
	1994-1999	50.70	29.81	.	.	61.18	13.39	11.39
	1999-2004	64.87	38.70	73.87	63.70	64.76	15.10	12.37
	2005-2008	56.83	33.47	.	.	74.88	18.79	.
Spain	1989-1993	73.71	22.32	39.54	32.58	63.88	12.33	19.68
	1994-1999	69.86	21.22	37.99	35.43	58.63	10.63	12.34
	1999-2004	79.98	30.77	48.88	41.52	62.90	13.44	16.68
	2005-2008	69.58	29.50	.	.	64.67	15.47	.
Sweden	1994-1999	88.40	31.62	73.64	52.82	68.86	20.73	22.36
	1999-2004	86.70	29.46	72.32	54.68	70.60	.	28.29
	2005-2008	91.63	49.05	.	.	75.16	19.05	.
Switzerland	1989-1993	76.86	.	.	.	69.96	7.69	13.42

Table 9: Missing Values for Countries in Analysis - Continued

		Children qualities: feeling of responsibility	Children qualities: determination perseverance	Important in a job: that you can achieve something	Important in a job: a responsible role	How much freedom and choice	Justifiable: avoiding a fare of public transport	Political action: joining unofficial strike
	1994-1999	79.95	44.55	57.84	60.73	68.02	14.11	10.83
	2005-2008	88.72	67.61	.	.	71.75	8.86	.
Turkey	1989-1993	65.73	20.29	86.02	78.16	.	10.56	4.67
	1994-1999	66.54	21.19	88.41	76.98	41.99	.	6.25
	1999-2004	65.10	22.52	93.06	89.18	49.22	.	8.94
	2005-2008	74.81	37.00	.	.	70.44	9.40	.
Ukraine	1994-1999	65.78	42.12	40.70	26.97	45.77	36.97	7.34
	2005-2008	66.40	48.60	.	.	55.94	30.57	.
Macedonia	1994-1999	73.77	47.14	57.89	49.45	56.06	15.41	14.38
	1999-2004	74.22	42.75	50.24	38.39	52.43	11.17	19.14
Egypt	1999-2004	50.77	9.10	70.73	73.20	49.17	7.57	1.38
	2005-2008	77.32	21.53	.	.	54.66	8.08	.
United States	1994-1999	69.91	41.12	72.31	50.06	71.91	9.59	16.24
	1999-2004	72.00	44.58	84.00	54.75	76.81	18.08	24.89
	2005-2008	71.98	38.99	.	.	73.60	15.89	.
Uruguay	1994-1999	82.80	44.00	61.10	50.20	66.22	13.72	21.44
	2005-2008	79.50	39.00	.	.	74.74	18.63	11.32
Venezuela	1994-1999	74.00	18.58	80.00	77.83	77.14	8.71	6.03
	1999-2004	87.58	44.92	.	.	79.83	20.42	5.66
Serbia and Montenegro	1994-1999	65.20	43.88	73.75	44.47	56.56	18.64	17.72
	1999-2004	69.87	42.21	51.55	21.46	54.49	15.87	21.38

APPENDIX B

Table 10: Countries in the Analysis and Years of Survey Conduction

Countries	Wave 1			Wave 2			Wave 3						Wave 4				Wave 5			
	1981	1982	1984	1989	1990	1991	1994	1995	1996	1997	1998	1999	2000	2001	2002	2004	2005	2006	2007	2008
Albania											+				+					
Argentina			+			+		+				+							+	
Australia	+							+										+		
Bangladesh									+						+					
Belarus					+				+											
Bosnia and Herzegovina											+			+						
Brazil						+				+									+	
Bulgaria										+									+	
Canada													+						+	
Chile					+				+				+					+		
China					+				+				+					+		
Colombia										+								+		
Czech Republic					+						+									
Egypt													+							+
Finland	+								+									+		
Georgia									+											+
Germany										+									+	
Hungary		+									+									
India					+			+						+				+		
Indonesia														+				+		
Iran													+						+	
Japan	+				+			+					+					+		
Jordan														+					+	
Korea		+			+				+					+				+		
Macedonia											+			+						
Mexico	+				+				+				+					+		
Moldova									+						+				+	
Morocco														+					+	

Table 10: Countries in the Analysis and Years of Survey - Continued

Country	1981	1982	1984	1989	1990	1991	1994	1995	1996	1997	1998	1999	2000	2001	2002	2004	2005	2006	2007	2008
New Zealand											+					+				
Nigeria					+			+					+							
Norway									+											+
Peru									+					+						+
Philippines									+					+						
Poland				+						+							+			
Puerto Rico								+						+						
Romania											+						+			
Russia					+			+										+		
Serbia and Montenegro									+					+						
Slovakia					+						+									
Slovenia								+									+			
South Africa		+			+				+					+					+	
Spain					+			+					+						+	
Sweden									+			+						+		
Switzerland				+					+										+	
Taiwan							+												+	
Turkey					+				+					+					+	
Ukraine									+									+		
United States								+				+						+		
Uruguay									+									+		
Venezuela									+				+							
Viet Nam														+				+		

APPENDIX C

**Table 11: Spapiro-Wilk W Test for Normal Data**

Variable	Obs	W	V	Z	Prob>z
Children qualities: feeling of responsibility	138	0.92172	8.482	4.826	0.00000
Children qualities: determination perseverance	138	0.97627	2.571	2.131	0.01654
Important in a job: that you can achieve something	138	0.98455	1.674	1.163	0.12240
Important in a job: a responsible role	138	0.98273	1.872	1.415	0.07859
How much freedom and choice	138	0.96852	3.411	2.769	0.00281
Justifiable: avoiding a fare on public transport	138	0.94809	5.624	3.898	0.00005
Political action: joining unofficial strike	138	0.95170	5.233	3.736	0.00009

APPENDIX D

**Table 12: Loadings for Principal Components**  
Pattern Matrix 1

	Component		
	1	2	3
Important in a job: a responsible role	0,920	-0,034	0,146
Important in a job: that you can achieve something	0,892	0,203	0,117
Justifiable: avoiding a fare on public transport	-0,550	0,176	0,255
Children qualities: determination perseverance	0,057	0,870	-0,436
Children qualities: feeling of responsibility	-0,083	0,665	0,242
Political action: joining unofficial strike	0,021	0,498	0,127
How much freedom and choice	0,082	0,046	0,896

Extraction Method: Principal Component Analysis.  
Rotation Method: Oblimin with Kaiser Normalization.  
a Rotation converged in 10 iterations.

**Table 13: Pattern Matrix for Principal Axes Factoring method**

	Factor		
	1	2	3
Important in a job: a responsible role	0,943	-0,048	0,123
Important in a job: that you can achieve something	0,829	0,176	0,133
Justifiable: avoiding a fare on public transport	-0,342	0,065	0,147
Children qualities: determination perseverance	0,037	0,918	-0,249
Children qualities: feeling of responsibility	-0,066	0,372	0,296
Political action: joining unofficial strike	0,006	0,213	0,150
How much freedom and choice	0,043	-0,072	0,699

Extraction Method: Principal Axis Factoring.

Rotation Method: Oblimin with Kaiser Normalization.

a Rotation converged in 12 iterations.

APPENDIX E

Variability of Values

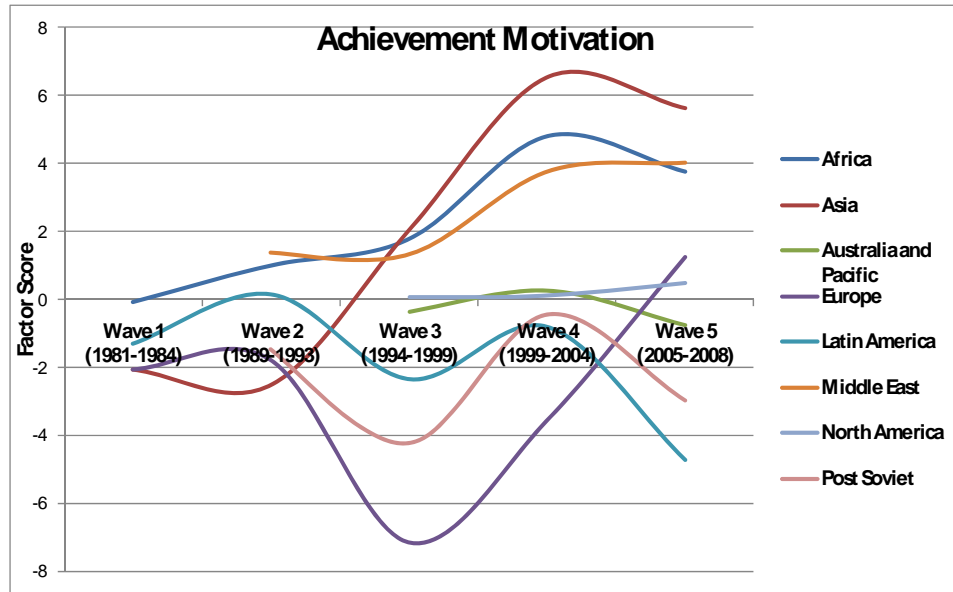


Figure 4: Achievement Motivation Variability

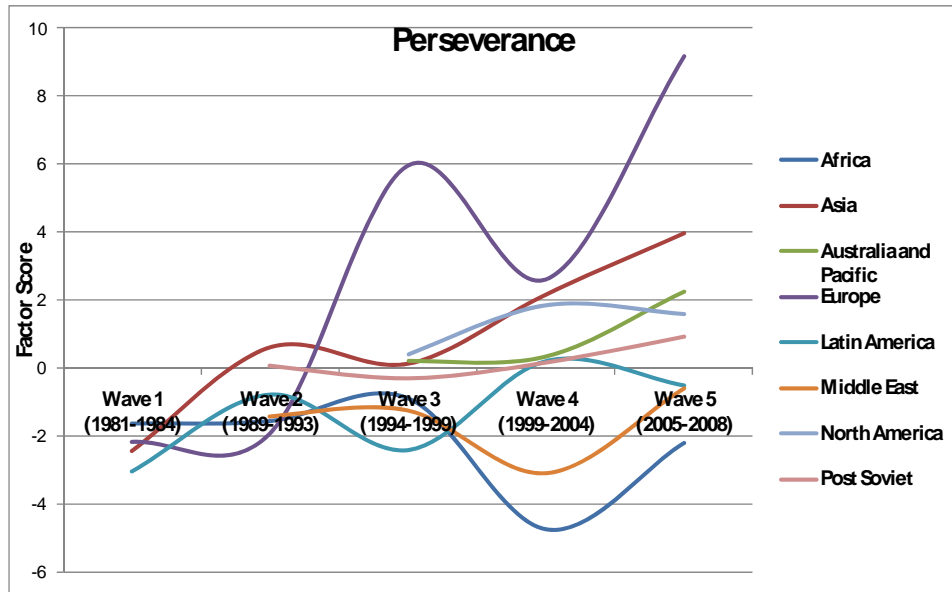


Figure 5: Perseverance Variability

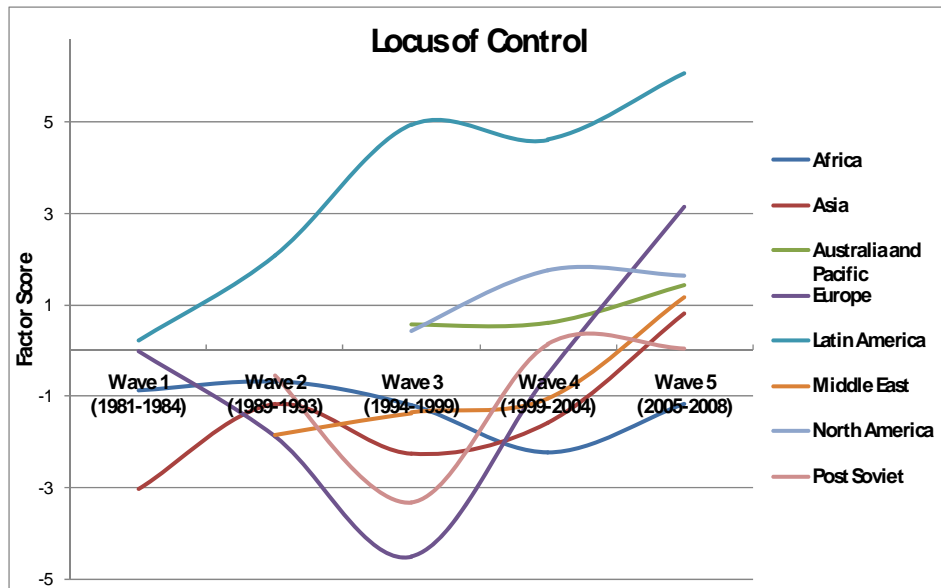


Figure 6: Locus of Control Variability

APPENDIX F

Comparison of Fixed and Random Effect Models

Table 14: Hausman Test

	Coefficients			
	(b) F.E	(B) R.E	(b-B) Difference	sqrt (diag(V_b-V_B)) S.E.
$\ln(\overline{I_{i,t-4} \dots I_{i,t}})$	.2183495	.0823345	.136015	.1229757
$\ln(\overline{H_{i,t-4} \dots H_{i,t}})$	-.0894025	.0194855	-.108888	.1376532
$\ln(\overline{n_{i,t-4} \dots n_{i,t}})$	-.1009208	-.0256986	-.0752223	.0657686
<b>Δ Achievement</b>	-.0116249	-.018702	.0070772	.0397825
<b>Δ Perseverance</b>	.0040782	-.0107229	.0148011	.0241857
<b>Δ Locus</b>	.0326628	.0471533	-.0144905	.0290951

b = consistent under Ho and Ha; obtained from fixed effect model

B = inconsistent under Ha, efficient under Ho; obtained from random effect model

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \chi^2(6) &= (b-B)'[(V_b-V_B)^{-1}](b-B) \\ &= 2.79 \\ \text{Prob}>\chi^2 &= 0.8344 \end{aligned}$$

**Breusch and Pagan Lagrangian multiplier test for random effects:**

$$\text{growth}[\text{country}] = Xb + u[\text{country}] + e[\text{country},t]$$

Estimated results:

**Table 15: Breusch and Pagan Lagrangian multiplier test**

	Var	sd = sqrt(Var)
Growth	.0133437	.1155147
e	.0108766	.1042908
u	0	0

Test:  $\text{Var}(u) = 0$   
 $\text{chi2}(1) = 1.38$   
 $\text{Prob} > \text{chi2} = 0.2399$

## APPENDIX G

### Stata do-file & SPSS syntax file

#### SPSS syntax file

```
CTABLES
  /VLABELS VARIABLES=s002 locus1 achievement1 locus2
achievement2 achievement3 risk2 risk4 risk5 s003
  DISPLAY=DEFAULT
  /TABLE s003 BY s002 > (locus1 [MEAN] + achievement1 [MEAN] +
locus2 [MEAN] + achievement2 [MEAN] + achievement3 [MEAN] +
  risk2 [MEAN] + risk5 [MEAN])
  /CATEGORIES VARIABLES=s002 s003 ORDER=A KEY=VALUE
EMPTY=EXCLUDE.

FACTOR
  /VARIABLES VAR00002 VAR00003 VAR00004 VAR00005 VAR00006
VAR00007 VAR00009 /MISSING LISTWISE /ANALYSIS VAR00002
VAR00003
  VAR00004 VAR00005 VAR00006 VAR00007 VAR00009
  /PRINT INITIAL CORRELATION SIG KMO EXTRACTION ROTATION
FSCORE
  /FORMAT SORT
  /PLOT EIGEN ROTATION
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PC
  /CRITERIA ITERATE(25) DELTA(0)
  /ROTATION OBLIMIN
  /SAVE REG(ALL)
  /METHOD=CORRELATION .

FACTOR
  /VARIABLES VAR00002 VAR00003 VAR00004 VAR00005 VAR00006
VAR00007 VAR00009 /MISSING LISTWISE /ANALYSIS VAR00002
VAR00003
  VAR00004 VAR00005 VAR00006 VAR00007 VAR00009
  /PRINT INITIAL CORRELATION SIG KMO EXTRACTION ROTATION
FSCORE
  /FORMAT SORT
  /PLOT EIGEN ROTATION
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(25) DELTA(0)
  /ROTATION OBLIMIN
  /SAVE REG(ALL)
  /METHOD=CORRELATION .
```

## Stata do-file

```
use "c:\Documents and Settings\Admin\Мои
документы\database logs.dta"
edit
tsset contntry year
reg growth ln_invest ln_school ln_pop_growth lnwealth
P_A_Dir_oblim1 P_A_Dir_oblim2 P_A_Dir_oblim3
reg growth ln_invest ln_school ln_pop_growth lnwealth
d_P_A_1 d_P_A_2 d_P_A_3
xtreg growth ln_invest ln_school ln_pop_growth lnwealth
d_P_A_1 d_P_A_2 d_P_A_3, fe
xtreg growth ln_invest ln_school ln_pop_growth lnwealth
d_P_A_1 d_P_A_2 d_P_A_3, re
xttest0
xtreg growth ln_invest ln_school ln_pop_growth lnwealth
d_P_A_1 d_P_A_2 d_P_A_3, fe
estimates store fixed
xtreg growth ln_invest ln_school ln_pop_growth lnwealth
d_P_A_1 d_P_A_2 d_P_A_3, re
estimates store random
hausman fixed random
```