# Cultural Indicators of Economic Development: Comparison between Hofstedes' Cultural Dimensions and Grid/Group Index

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#### Abstract

While measures of economic development like "cultural indicators" have been discussed periodically and the importance of cultural indicators remains undisputed, empirical measures of cultural states in predicting economic development remain rather undeveloped. Thus, this paper analyzes three different waves of data from World Values Survey that goes beyond simple indices of economic development to reflect cultural states in which meaning is embedded. This paper is a first step in a theoretical reexamination of Hofstede's cultural dimensions and the assessment of the use of the grid/group index as a roadmap for future work. We present a basic review of the main theoretical and applied aspects of the two established cultural dimensions framework as economic indicators in order to develop a conceptual framework for integrating empirical measures of culture with indices of social and economic conditions.

Our purpose is to show that specific indicators of culture, interpreted either as social norms or individual values, are correlated both with historical patterns and with current economic development, and to suggest a causal interpretation of these correlations. Through this analysis method, we make comparison between two cultural indicators: Hofstede cultural values and Grid-Group index. We conduct a series of exploratory empirical comparisons of the relative strengths and weaknesses of grid-group theory and Hofstede's cultural measures.

## **1. Introduction**

The most common candidate of culture variable in empirical works is the survey results with questionnaire in which people need to answer a variety of issues related with people's beliefs such as the World Value Survey and Hofstede's Cultural Dimensions. These data are the most widely collected and available of all sources of data. The variables used in different researches are usually generated through aggregating selected questions in the surveys. Such method of constructing variables is questionable due to the complexity of measuring culture. Hofstede's Culture dimensions<sup>1</sup> have five different variables and World Value Surveys have more than 250 questions related with different aspects of culture and value. As a result, when people evaluate the relationship between culture and other economic indicators, the results are not comparable. For example, the often-used Hofstede Culture variables including individualism-collectivism, power distance, uncertainty avoidance and masculinity cannot be incorporated into the same empirical model and have to be separately used for different purposes. Similarly, Granato et al (1996) generated an index that included only aspects related with an individual's emphasis on autonomy and economic achievement and omitted other important culture aspects. A simplified cultural indicator based on fundamental culture theory, hence, is very important and necessary. This paper, therefore, tries to provide a new cultural indicator as we called Gird-Group Indices for such purpose. – This paper, therefore, attempts to provide a new cultural indicator through the use of grid-group indices?

The Grid-Group indices are constructed through the World Value Survey (WVS) and consist of two variables: grid and group. Grid refers to "the complimentary bundle of constraints on social interaction" (Gross & Rayner, 1984, p. 6) and the degree to which an individual is "constrained by external rules" (Caulkins & Peters, 2002). Group refers to the social unit and "represents the extent to which people are restricted in thought and action by their commitment to a social unit larger than the individual" (Gross & Rayner, 1985, p. 5). The grid and group theory provide broader concepts of culture than traditional individualism/collectivism theory and simpler than Hofstede's five dimensions. Therefore the Grid/Group indices can be incorporated into a single empirical model and can be easily interpreted in economic theory.

The paper is arranged as follows. In the next section, we introduced Individualism/Collectivism theory and the Hofstede Cultural Variables. Section 3 will provide the theoretical background of the Grid-Group theory and new cultural variables, the Grid index and the Group index. Then we also provide comparison between Grid-Group Indices and Hofstede's Cultural Dimension. In section 4 we provide the empirical application with the new cultural indicator. Section 5 concludes.

<sup>&</sup>lt;sup>1</sup> Franke, Richard H.; Geert Hofstede and Michael H. Bond. 2007. "Cultural roots of economic performance: A research note," Strategic Management Journal, 12(1): 165 – 173.

#### 2. Review of Individualism/Collectivism: Theory and Application

As summarized by (Triandis et al, 1990), the concepts relating to individualism and collectivism have been studied for about a hundred years in the fields of sociology, anthropology, and psychology. Early attempts to define individualism and collectivism were abstract and unfocused (Leung & Bond, 1984). However, as research of individualism and collectivism progressed, understanding increased and the definitions of the constructs grew in complexity. These definitions became clearer as individualism and collectivism came to be conceptualized as two extremes of one bipolar one-dimensional continuum (Hofstede, 1980; Hui, 1984; Triandis & Hui, 1986). Most of the research on individualism and collectivism occurred while the two were still conceptualized as a single dimension.

Empirically, researchers of individualism have argued the existence of several social, economic, cultural, technological, psychological, medical, and political antecedents and consequents of individualism and collectivism. These have been concisely summarized by Triandis et al (1990). Although some of these antecedents and consequents are plagued by problems of circular reasoning, they, nevertheless, offer a wealth of ideas of how the constructs of individualism and collectivism can be applied to a wide variety of socio-psychological phenomena.

Two major antecedent conditions of individualism are thought to be *cultural complexity* (Murdock and Provost,1973) and *affluence* (Triandis et al., 1988; Triandis, 1989). Highly complex cultures, such as those of modern industrialized nations, allow for a multitude of possible in-groups. Members of these modern *neoindividualistic* cultures are characterized by both independence and emotional detachment from in-groups. However, some highly complex cultures which have come from a solidly collectivistic background, such as Japan, still remain collectivistic, as cultures change slowly (Triandis et al., 1988).

High affluence, as represented by high Gross National Product (GNP), allows liberty of individuals from their in-groups (Triandis, 1989). Hofstede (1980) found a positive and statistically significant correlation between a nation's individualism score and its GNP. Affluent people are less financially dependent on their in-groups (Triandis et al (1990). They also tend to have fewer children, who tend to be idiocentric because they are not raised in a large family in which they are forced to live cooperatively. Instead, children are raised to be creative, self-actualized, self-reliant, autonomous, and independent from the family (Triandis, 1989; Triandis et al, 1990).

Triandis et al. (1988) suggest three other antecedents of individualism: a culture should have a frontier, many immigrants, and social and geographic mobility. They cite Hofstede's (1980) classification of the United States, Australia, and Canada as being highly individualistic cultures. These antecedent factors create an opportunity for individuals to be exposed to different social norms of other cultures and in-groups, allowing him/her to choose whether or not to hold to the values, goals or membership of his/her original in-group(s) (Triandis, 1989). People who have migrated to other countries or from rural areas to urban ones tend to be individualistic (Triandis et al, 1990; Dragonas, 1983).

Cultures will often develop collectivity if its people do work that requires cooperation and obedience to authorities (e.g. agriculture) (Berry, 1979; Triandis et al, 1990). Quality of cooperation seems to depend on the solidarity of the group. This is seen in the emphasis of collectivistic cultures on homogeneity (e.g. of attitudes, values, beliefs, norms, and affect) and its maintenance. Allocentric people unquestioningly accept ingroup norms and empathize with other in-group member's feelings (e.g. cry when they cry and laugh when they laugh) (Triandis, 1990; see Mills & Clark, 1982). External threats to several in-groups will cause the groups to pull together to defend against the common enemy (e.g. competing out-groups or invading nations) and thus increase the size of the resultant collective (Triandis et al., 1988; see Zavalloni, 1980), and perhaps increase the homogeneity among those cooperating groups.

In collectivistic societies, such as subsistence-level agricultural communities of developing nations and working-class communities of developed nations, children are raised according to strict rules of socialization and conformity (Berry, 1967, 1979; Kohn, 1969, 1987). This emphasis on conformity may limit innovation and, hence, impede economic development (Adelman and Morris, 1967; Triandis, 1984).

Allocentrics usually have only a few in-groups(Triandis and Vassiliou, 1972). They communicate mostly with their own in-group members and often have little regard for those outside their in-group. Naroll (1983) termed primary in-groups as *moral nets*. Strong moral nets are normative reference groups which bear collectivistic qualities, such as cultural homogeneity, strong social ties, emotional warmth, and prompt punishment (e.g. shame) for deviance. These strong moral nets were found to be correlated with low homicide, suicide, crime, juvenile delinquency, divorce, domestic violence, substance abuse, and mental disease rates. Strong moral nets did also have some disadvantages: dissatisfaction with family life, low economic development, and low GNP per capita (Middleton, 1963).

Although there are different hypotheses and empirical investigations, the dominant variable that represents individualism and collectivism is Hofstede's cultural variable. Developed in the early 1980s, Hofstede's cultural dimension includes four dimensions<sup>2</sup> of cultural variation: individualism-collectivism, power distance, uncertainty avoidance and masculinity. Power distance implies the degree to which unequal power distribution is prevalent in institutions. The masculinity dimension refers to the extent to which they value masculine values such as achievement and material success, or feminine values such as caring and interpersonal harmony. Uncertainty and avoidance taps the degree to which a culture tolerates uncertainty and ambiguity. Among the four variables, individualism/collectivism is the most often used as the variable for empirical researches although it has many restrictions. By using the Grid-Group Culture Theory, we introduce the new cultural variables and compare the advantage and disadvantage between the two candidates of empirical variables.

<sup>&</sup>lt;sup>2</sup> There is also a fifth variable, long term orientation was added to the culture dimension later from other studies and related with Confucius culture. Values associated with Long Term Orientation are thrift and perseverance; values associated with Short Term Orientation are respect for tradition, fulfilling social obligations, and protecting one's 'face'. Since the data on long term orientation is not available for most countries, we exclude this variable from the variables we will use.

### 2. Grid-Group Culture Theory and the New Cultural Variables

The 'Grid-Group Analysis' evolved as anthropologist Mary Douglas' interest in how the beliefs and social environment correlate grew (Duval, 2006). Her awareness of the topic grew and soon the Grid-Group Framework became an analysis which was applied as a specific theory of sociality (Mamadouh, 1999). It is believed that an individual's preferences and justifications for their actions shape the world of social relations. Everything an individual does or wants is seen as culturally biased.

As the name suggests, the Grid-Group Framework consists of two components: grid and group. These two dimensions address "two central and eternal questions of human existence: 'who am I?' and 'how should I behave?'" (Schwarz & Thompson, 1990, p. 6). According to John Hendry (1999), the Grid-Group Framework is characterized by three main ideals: classification, power, and moral order. From these ideals, Mary Douglas developed the original schematic image (Figure 1) of the Grid-Group Framework, which she later revised. – We may consider deleting Figure 1 since it is redundant with Firgure 2

Figure 1. Douglas's Cultural Map: Two Dimension, Four Types



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Source: Douglas (1978, p. 7)
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According to Kemper and Collins (1990), the dimensions of micro-interaction can be seen in terms of power (grid) and status (group). Power (grid) includes a high degree of hierarchy and ranking within the group itself. On the other hand, status (group) places a great deal of "emphasis on [the] boundaries between the society and outsiders" (Kemper & Collins, 1990, p. 47).

In this cultural map, Douglas categorizes the four types based on her two cultural dimensions: grid and group. As shown in Figure 2, the grid-group theory can be split into four quadrants, which can be applied to different attitudes a person may have.

High Grid	B. Fatalism	C. Hierarchy
Low Grid	A. Individualism	D. Egalitarianism/enclave
	Low Group	High Group

#### **Figure 2. Grid-Group Analysis**

Quadrant A, as defined by the Grid-Group Theory, is the individualism culture, which have both low grid and low group characteristics. Similarly, Grid-Group Theory defines the characteristics of low group and high grid as Fatalism culture, defines the characteristics of high group and high grid as Hierarchy culture and defines the characteristics of high group and low grid as Egalitarianism culture. It is noted that although the figure only shows the relative culture type. We therefore can tell that the Individualism (and versus its opposite, Collectivism) is included in the grid-group theory although not explicitly expressed. Hence, the Grid-Group Theory includes but is beyond the Hofstede's individualism-collectivism variable.

Moreover, although people still have some reservations (Hendry, 1999), the Grid-Group Theory has many other advantages for the culture researches. Kemper and Collins (1990) stated that the Grid-Group framework can be applied to a variety of situations, not only to cultural comparisons. "The structural features underlying the two dimensional model[s] can be usefully applied not only to cross-cultural comparisons among whole societies, but also to comparison[s] among classes and occupational and professional groups." Caulkins (2007)'s research has shown that Grid-Group framework has been applied by an interdisciplinary variety of scholars, which includes among other applications, interpretations of environmentalist views, perceptions and dangers of risk, public administration, religious communities, high-technology firms, and work cultures. Hofstede and McCrae (2004) argue that while many multidimensional theoretical models have been proposed, the Grid-Group Theory included, these models represent "subjective reflective attempts to order a complex reality. Considering all these advantages, the Grid-Group theory provides another opportunity for economic development model to include culture value from both grid and group aspects and test the culture effects of different type of society.

Based on the Grid-Group Theory, we generate two variables for the measurement of culture from the World Value Survey (WVS). WVS is the most famous survey database for the value and cultural researches, which includes about 350 questions on economic, political, and cultural aspects. While the core questions remain constant, the survey has been modified four times, and carried out in four 'waves', beginning in 1981,1990, 1995, and 1999. The WVS has completed representative national surveys of basic values and beliefs in over 65 independent countries whose combined populations account for 80 percent of the world's inhabitants. Initially most participating countries were European, but the last two waves of surveys have included developing countries to a much greater extent. This database is an empirical resource for many analyses of values and value changes<sup>3</sup>. Welzel and Inglehart are two of a number of writers who have used the WVS to study value priorities in societies that are undergoing modernization. Inglehart's central thesis is that "economic, cultural, and political changes go together in coherent patterns that are changing the world in predictable ways." (Ingelhart, 1997) He studies the changes in values that accompany material and economic transformations during modernization. However, the variable they choose is not theoretically based and therefore limited. Ingelhart (1997)'s cultural variable was the selected questions on people's opinions on economic issues, which is obviously related with economic development and cannot overcome the problem of reverse causality. In other words,

<sup>&</sup>lt;sup>3</sup> WVS web page states that over 300 publications in 16 languages analyze its data.

differences in beliefs on economic issues may also be a consequence of different economic and institutional environments. – good rationale

Differing from Ingelhart (1997), our grid and group indices are selected from the whole questionnaire based on the Grid-Group Theory. Chai, Liu and Kim (2008) provide a full discussion of the methodology of generating the Grid and Group indices. Firstly, we eliminated 40% questions that are not related with culture and values. Then according to the Grid-Group Theory, we choose 22 questions that represent people's grid and group characteristics with 11 questions for each index. Finally, we generate the index through aggregation and normalization<sup>4</sup>.

Compared with Hofstede's cultural variables, the Grid and Group variables have the following advantages:

Firstly, although four variables can represent broader aspects of culture, not all of the variables are correlated with economic development issue. Masculinity and Uncertainty Avoidance in Hofstede variables mainly focus on the specific topics that are rarely considered as the main cause for economic development. The last two variables, Power Distance and Individualism are highly negatively correlated. As a result, usually only one variable can be included in the empirical model for economic development. Actually, when people talk about the impacts of culture on economic development, individualism and collectivism are far too simple. As we argued above, the Grid-Group culture dimension also covered Individualism so indicate "deeper" and more general structure of culture. Therefore, Grid-Group cultural variables provide broader concepts for different empirical research.

Secondly, relative to the country-mean value of Hosftede variables, the Grid-Group can provide very detailed individual-level information. As we all know, the mean value of culture in a country usually ignores the variance within the society. For a single religion and single ethnicity society such as the new-independent countries based on the ethnicities, it is not a big problem. However, for a large society with multiple ethnicities and multiple regions, such as the United States and China, it will be very critical to understand the culture variance within the societies. The mean value itself is not enough. Grid-Group score, based upon individual level, hence provide the opportunity of understanding the culture variance.

Thirdly, Hofstede's variables are obtained from the survey led in 1980s, when he administered a questionnaire on work-related values to 116,000 service and marketing managers of IBM in 66 countries. Hofstede computed mean scores for each value statement in each country and performed a factor analysis on these means by treating each country as a unit of analysis. Such survey approach only focused on one company and hence lacksing representativeness of the overall culture. The company analyzed was IBM, which is strongly affected by the US enterprises culture. Moreover, Triandis et al (1990) proved that out of the 66 countries only 40 had sufficient numbers of employees to provide stable means. The variables generated from such survey, therefore, are weak relative to big general survey such as WVS.

<sup>&</sup>lt;sup>4</sup> For the full methodology, please refer to Chai, Liu and Kim (2008).

Finally, the Grid and Group variables can represent four different types of culture. For empirical research, it has many advantages. On the one hand, the two variables can directly enter the empirical model and can be interpreted according to the sign and significance. On the other hand, researchers can also categorize the countries into the four types of cultures (Individualism, Fatalism, Hierarchy and Egalitarianism) by the gridgroup variables. People can compare the culture effects on economic development through dummy variables for each type of culture.

Table 1. Comparison between Hofstede culture index and Grid-Group culture index							
Country	PDI	INV	MAS	UAI	LTO	Grid	Group
Saudi Arabia	80	38	52	68		0.811	0.563
Argentina	49	46	56	86		0.669	0.543
Bangladesh	80	20	55	60	40	0.924	0.444
Canada	39	80	52	48	23	0.558	0.517
Chile	63	23	28	86		0.712	0.556
China	80	20	66	30	118	0.659	0.51
India	77	48	56	40	61	0.752	0.568
Indonesia	78	14	46	48		0.837	0.5
Iran	58	41	43	59		0.826	0.547
Israel	13	54	47	81		0.613	0.472
Japan	54	46	95	92	80	0.513	0.488
Mexico	81	30	69	82		0.709	0.51
Morocco	70	46	53	68		0.867	0.507
Pakistan	55	14	50	70	0	0.893	0.578
Peru	64	16	42	87		0.722	0.475
Philippines	94	32	64	44	19	0.81	0.519
Singapore	74	20	48	8	48	0.737	0.498
South Africa	49	65	63	49		0.749	0.489
South Korea	60	18	39	85	75	0.675	0.519
Spain	57	51	42	86		0.531	0.592
Turkey	66	37	45	85		0.757	0.527
United States	40	91	62	46	29	0.591	0.499
Venezuela	81	12	73	76		0.762	0.549
Vietnam *	70	20	40	30	80	0.749	0.525
Mean	64	37	54	63	52	0.726	0.521

*Resource*: Hofstede website: <u>http://www.geert-hofstede.com/hofstede\_dimensions.php</u>

PDI: Power Distance, INV: Individualism, MAS: Masculinity, UAI: Uncertainty Avoidance, LTO: Long-Term Orientation

In Table 1, we provide the Hofstede scores for the countries that are also investigated by WVS in wave three or wave four. There are 24 countries are invested by both surveys. For the Hofstede culture values, the United States registered the highest individualism score (91) and Canada ranks the second position (80). Venezuela (12), Indonesia (14), and Pakistan (14) are three countries that have lowest scores. We observed that the variance for Muslim countries is large. Iran, Turkey and the Arab world<sup>5</sup> have much higher scores than Indonesia and Pakistan. According to the definition,

<sup>&</sup>lt;sup>5</sup> Hofstede's research didn't provide a score for Saudi Arabia but provided a score for overall Arabic countries, so we use this score as the proxy of the score of Saudi Arabia.

lower individualism scores indicate higher collectivism scores. However, with the definition of Grid-Group Dimension, individualism must have two significant characteristics: low grid and low group. Therefore, some countries that have lower grid scores but higher group scores belong to the fatalism category. For example, with the Hofstede culture value, the IDV score of Spain is higher than the average value and can be categorized into the relatively individualistic society. However, by using the Grid-Group index, we can find that Spain is not categorized into the relatively individualistic culture but into the relatively egalitarianist society. Venezuela, another example, is considered a hierarchy society instead of a simple collectivist society, as it has relatively high grid and high group scores. For this purpose, the Grid-Group dimension can provide more detailed information to differentiate one culture from the other.

We tried to apply the new cultural variables, the Grid and Group variables in the economic development model and check the culture effects in economic development.

# 3. Application of the Grid-Group Variables, the Model, the Variables and the Data

The question of how culture influences economic development in economic theories is controversial. Modern neoclassical economics tends to neglect the function of culture to economic development. Simplified microeconomic theoretical models assume that human beings are rational utility-maximizing individuals, and that such maximizing behavior is largely invariant across different human societies. Similarly, the neoclassical economic growth models also consider economic development as a function of capital, labor and technology (Solow). Culture is left as a kind of residual factor that one appeals to when other explanations fail (Fukuyama).

The institutional approach, on the other hand, has alleviated the shortcomings of the simplified and not rational conceptualization of the economy in the neoclassical tradition (North, 1990). Many institutional economists considered culture as a fundamental determinant of economic development during the past three decades (North, 1981; Landes, 1998 and Jones, 2006). In the formal definition of institutional economists, culture corresponds to the social norms and individual beliefs that sustain Nash equilibria as focal points in repeated social interactions (Schotter 1981; Myerson 1991; Greif 1994). In this interpretation, culture is one aspect of broadly defined institutions, and contributes to shape individual behavior through values and preferences. Granovetter (1985) pointed out that "social relations, rather than institutional arrangements or generalized morality, are mainly responsible for the production of trust in economic life" (p 491) (Akerlof and Kranton 2000; Rabin 1993). Others have pointed out that social norms and individual values could interact in systematic fashions (Bernheim 1994, Benabou and Tirole 2006).

Empirically, many statistical analyses provide supports to the relationship between culture and economic development. Granato et al (1996), after reviewing the economic development theory, argued an empirical model that incorporates both cultural and economic variables and is therefore superior to an explanation emphasizing only one set of these variables. In addition, they tested their results with different econometric analysis. Such results were also supported by the later multiple investigations by Inglehart (1997, 1998, 2004) and other studies. Through a cross-country comparison, Hall and Jones (1999)<sup>6</sup> found that countries produce high levels of output per worker in the long run are not only because of their high rates of investment in physical capital and human capital and high level of productivity, but also because of the social infrastructure that determined by cultures. – need to rephrase. Sounds awkward. Acemoglu, Johnson and Robinson (2001)<sup>7</sup> also showed that colonial origin (measured by mortality rates amongst early European settlers in the New World) is strongly correlated with current economic performance. Guiso et al (2003, 2006) also showed that the intensity of religious beliefs and religious denomination are correlated with a variety of individual attitudes such as trust in others, government's role, views of working women and the importance of thrift and these attitudes, aggregated at the country level, are correlated with cross-country aggregate outcomes.

Based on the previous research (Barro, 1990 and Kormendi and Mequire, 1985), we defined our empirical model of cultural effects on economic development as follow:

$$Y=f(E, I, C) \tag{1}$$

The econometric equation of the function form (1) can then be expressed as

$$Y_i = \alpha + \beta E_i + \gamma I_i + \delta C_i + v_i \tag{2}$$

Where Y is the variable of economic development, E is a vector of economic variables that affect economic growth, *I* represents institutional variables and C is a vector of culture variables.

In empirical investigations of economic development, the economic variables are main variables including capital, human resource, and technology. Economic freedom index is also included to represent a country's institutional level. Culture variables include the Grid variable and Group variable.

It is noted that we have to deal with reverse causality of the model. On the one hand, culture may affect economic development. On the other hand, differences in beliefs may be solely a consequence of different economic and institutional environments. The OLS result will hence be inconsistent. To solve such problem, generally we need to run a dynamic model with instrumental variables. Unfortunately, like Hofstede variable is confined in 1981, the WVS variable is only limited either in 1995 or 2000 and is not a panel data. Therefore, we use the advanced economic development variables as discussed below. – I don't see how this solves the problem of reverse causality. We need to explain more specifically how using advanced economic development variables avoids the reverse causality problem.

There are many variables that can measure economic development. We adopted the most popular variable: GDP per capita. We obtained GDP data from the Penn World Table. The Penn World Table contains data for 188 countries from 1950-2004. GDP per capita is measured in constant (year 2000) US Dollars. Note that consider the

<sup>&</sup>lt;sup>6</sup> Hall, R.E. and C. Jones (1999), "Why do some countries produce much more output per worker than others?", *Quarterly Journal of Economics*, 114.1:83-116.

<sup>&</sup>lt;sup>7</sup> Acemoglu, D., S. Johnson and J. A. Robinson (2001), "The Colonial Origins of Comparative Development: An Empirical Investigation", *American Economic Review*, 91:1369-1401.

endogeneity problem, because the cultural variables are the generated from the 1995 and 2000 WVS data, GDP per capita for each country is calculated from the average of 2000-2004.

The first regressor included in our model is population as the proxy of human capital. Population data is also obtained from Penn World Table. Similar as GDP per capita, we also obtained s country's population data from the average value of 2000-2004.

The second variable is Foreign Direct Investment (FDI) inflow to represent the capital availability. FDI data is obtained from United Nations Conference on Trade and Development (UNCAD). The dataset includes more than 200 countries and provide the compiled comprehensive data and other information on flows and stock of FDI since 1990. We choose the mean value from 1996-2000 as our variable.

Economic Freedom Index is also included as one of our predictor variables to represent the institutional effects. Economic Freedom Index includes five areas and 48 variables that cover both evaluation on market freedom and openness. The Economic Freedom Index covers 123 countries from 1970 to 2005. Before 2000 the index is available for every five years and after 2000, the index is available for every year. We choose the value of 2000 as our variable.

We also included the origin of the country's legal system as control variables in robustness checks. La Porta et al. (1996) provide the basic description on the country's legal description and in the 2007 they sorted all the countries according to five categories: British, French, German, Scandinavia, and Socialist commercial law legal origins. As the majority of the worlds follow British and French law, two dummy variables are therefore created. – what are the two dummy variables? Isn't it one dummy variable (British vs. French law)?

Considering the data availability, we created a dataset for 50 countries, the data summary is given in table 2.

Table 2. Basic Statistics						
Variable	Mean	Std. Dev.	Min	Max		
GDP per apita (\$)	12710.6	10207.1	1118.8	36453.1		
Grid	0.67	0.13	0.34	0.90		
Group	0.51	0.04	0.43	0.59		
Population (000)	98328.9	228292.0	1416.2	1278908.0		
Economic Freedom	6.55	1.06	4.10	8.60		
FDI (million \$)	11455.1	29706.5	1.0	191934.0		

Among the 50 countries, the economic development levels are different. The United States registered the highest income level and GDP per capita of Uganda is the lowest in our sample. China has more than 1.2 billion people and Estonia's population is only 1.4 million. Iraq almost has no FDI flows and the United States' FDI is more than 191 billion dollars. For the group and grid value, as we found in our methodology paper, the variance of grid is bigger than that of group. Egypt has highest grid score and Sweden has the lowest grid score. Pakistan and United Kingdom rank the highest and lowest group score respectively.

Table 3. The Regression Result					
	(1)	(2)			
	OLS with Grid-Group	OLS with Dummy			
	21**	.55			
Log (Population)	(.06)	(.33)			
	.21**	56*			
Log (FDI: Foreign direct investment)	(.06)	(.32)			
	1.01*	.65			
Log (Economic Freedom)	(.59)	(3.31)			
	-1.54**				
Log (Grid)	(.48)				
-	.97				
Log (Group)	(.97)				
		39			
Fatalism		(1.12)			
		2.12*			
Egalitarianism/enclave		(1.19)			
		1.92			
Individualism		(1.30)			
	7.78**	75			
Constant	(1.34)	(6.60)			
$R^2$	.74	.15			

Note: Standard errors are in parenthesis. \* means statistically significant at 10% level and \*\* means statistically significant at 5% level.

Table 3 reports the basic regression results. All variables are taken logs except the dummy variable. In column (1), we incorporate the grid and group variables and in column (2), we used the dummy variable created based upon the relative grid and group score in our sample.

Firstly, population, FDI and economic freedom are all statistically significant and the signs are as expected. Because the population is the denominator of GDP per capita, it is not surprising that the more population, the less GDP per capita. FDI is positively related with economic development, 1% increase of FDI will result 0.21% increase of GDP per capita. Economic Freedom is also positively correlated with economic development. The higher the economic freedom is, the higher the GDP per capita will be.

The effects of the cultural variable, however, indicate that a country's grid-ness characteristic is more important for economic development than its group-ness characteristic. The coefficient of Group is positive but statistically insignificant and the coefficient of Grid is negative and statistically significant. A country that has a higher grid score is more likely to have lower economic development. In our model, 1% decrease of grid score will result 1.54% increase of GDP per capita. It also shows that the Grid-Group Theory can better explain economic development although individualism also has low grid properties.

It can be even clearer when we include the three dummies, we found that except Egalitarianism/enclave, all other dummies are insignificant at all. It also indicates that individualism/collectivism is not a good candidate to explain the economic development.