

Charles University in Prague

Faculty of Social Sciences
Institute of Economic Studies



BACHELOR THESIS

**Effects of Culture on Production
Influence of Cultural Differences
on Economic Performance of Human Capital**

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Academic Year: 2011/2012

Declaration of Authorship

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The author declares that the thesis has not been used for obtaining another title.

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Prague, July 31, 2012

Signature

Acknowledgments

I would like to express my sincere gratitude to my supervisor Vladimír Benáček for his expertise and understanding. My thanks go also to Martin Kníže for his valuable advices and his patience and to Aleš Čornanič for his comments and his solutions to my difficulties with the model.

A very special thanks go to Miroslav Jop for his endless moral support.

Abstract

Within the Thesis the concept of production function is described and human capital as one the main inputs is further examined. The main focus of this thesis is to discover whether there is any effect of culture on production. Such aim will be examined by testing the null hypothesis that there is no effect of cultural dimensions on production. The null hypothesis is tested by regression analysis.

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|----------------------------|---|
| JEL Classification | D24, E24, J24, Z19 |
| Keywords | Production, Production Function, Human Capital, Culture, Cultural Dimensions, Hofstede, Long-Term Orientation |
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Abstrakt

Bakalářská práce se zabývá konceptem produkční funkce a lidský kapitál jako jeden z hlavních vstupů produkce je blíže analyzován. Hlavním cílem této práce je odhalit, zda existuje nějaký efekt kultury (kulturou se rozumí společné charakteristiky dané společnosti/státu) na produkci. Regresní analýzou je testována nulová hypotéza, která říká, že není žádný efekt kulturních rozdílů na produkci.

| | |
|-------------------------------|---|
| Klasifikace JEL | D24, E24, J24, Z19 |
| Klíčová slova | Produkce, Produkční funkce, Lidský kapitál, Kultura, Kulturní dimenze, Hofstede, Orientace na dlouhodobé cíle |
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Bibliographic Entry

ŠENKÝŘOVÁ, Jitka. *Effects of Culture on Production: Influence of Cultural Differences on Economic Performance of Human Capital*. Prague, 2012. 92 p. Bachelor Thesis. Charles University, Faculty of Social Sciences, Institute of Economic Studies. Thesis Supervisor Doc. Ing. Vladimír Benáček, CSc.

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Acronyms

| | |
|-------------|-----------------------------|
| GDP | Gross Domestic Product |
| GNI | Gross National Income |
| GNP | Gross National Product |
| IDV | Individualism Index |
| LT | Long Term |
| LTO | Long-Term Orientation Index |
| MAS | Masculinity Index |
| p.c. | Per Capita |
| PDI | Power Distance Index |
| PF | Production Function |
| pp | Percentage Points |
| PPP | Purchasing Power Parity |
| ST | Short Term |
| TFP | Total Factor Productivity |
| UAI | Uncertainty Avoidance Index |

Bachelor Thesis Proposal

| | |
|-----------------------|--|
| Author | Jitka Šenkýřová |
| Supervisor | Doc. Ing. Vladimír Benáček, CSc. |
| Proposed Topic | Cost and Efficiency of Human Capital: Influence of the Cultural Differences and the Nature of the Nations on the Economic Performance of Human Capital in Japan and Czech Republic |

Topic Characteristics Two firms in the same industry with the same number of employees (labor) and the same amount of the capital (capital) product still have almost always different added value, provided they come from different cultural background. There are some theories such as Total Factor Productivity (TFP), where the difference is hidden in the TFP but is not explained. In my Bachelor Thesis I will try to explain this difference by the human capital features.

Outline

1. Introduction
2. Theories
 - (a) Economic Theories
 - i. Institutional Economics
 - ii. Total Factor Productivity
 - iii. Others
 - (b) Characteristics of Nations
 - i. Czech Nation – Main Characteristics
 - ii. Japanese Nation – Main Characteristics

- (c) Firm – Human Recourses – Cost of the Human Capital
3. Research – Econometric Modeling
 - (a) Selection of the Most Important Variables
 - (b) Creating an Econometric Model
 - (c) Weighing of the Variables and Calculation using collected data
 - (d) Explanation of the Results
 - (e) Potential use of the Results
 4. Summary
 5. Appendixes

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Author

Supervisor

Chapter 1

Introduction

Why some firms make different output when using the same measurable inputs? One of the reasons is that there are some hidden characteristics of human capital that play a crucial role for its productivity.

While spending one year in Japan I observed that the behavior of local people was so different from the behavior of the Czechs. Their indefinite desire to follow the rules at all costs is seen by others as inefficient. Sometimes the even the easier solution could be found, the Japanese would not take that solution if it is combined with the risk of breaking the rules. On the other hand they think that others will also follow the rules and that they can rely on these rules. At that time the idea that there just must be differences in productivity of human capital according to their cultural background came to my mind.

The issue of productive and unproductive labor and differences between nations had already attracted the attention of Adam Smith. Many years later Geert Hofstede identified several dimensions that determine the differences between cultures. People with the same cultural background tend to have similar scores of the dimensions.

The concept of production function became a very interesting topic for classical economists. Later on Robert Solow determined the total factor productivity and incorporated it to the production function concept. Solow residual includes any kind of shift in the production function which could not be explained by change of factors (capital and labor) used. The logical consequence of such a concept is the effort to explain some parts of the residual.

The thesis is structured as follows:

The purpose of Chapter 2 (page 9) is to cover the theory of production. In the first part of the chapter the history of production function (PF) is described (page 4). Second part is dedicated to the fundamental types of PF (page 6). Third part introduces the total factor productivity variable (page 8).

Chapter 3 (page 9) is focused on the theory of human capital and on the factors that influence it. Important aspects that influences the productivity of human capital are described in the first part of the chapter (page 10). The second part is devoted to theory of cultural differences (page 13).

The objective of Chapter 4 (page 35) is to test the potential effect of culture of different countries on their production. In the first part of the chapter the data used to test the null hypothesis are specified. Second part is dedicated to the framework of the model (page 36). In the third part the regression results are described (page 38). In the fourth part the required assumptions are tested (page 44). The final part summarizes the main conclusions of data analysis (page 46).

Chapter 5 (page 48) summarizes all crucial results of the Thesis.

The main focus of this thesis is to discover whether there is any effect of culture on production. Such aim will be examined by testing the null hypothesis that there is *no effect of cultural dimensions on production*. The null hypothesis is tested by regression analysis.

Chapter 2

Theory of Production

“All theory depends on assumptions which are not quite true. That is what makes it theory.” (Solow 1956)

The purpose of this chapter is to cover the theory of production. In the first part of the chapter the history of production function (PF) is described (page 4). Second part is dedicated to the fundamental types of PF (page 6). Third part introduces the total factor productivity variable (page 8).

The production issue has been investigated by men since the time they started cultivating the soil. The basic question is “How to produce the biggest output while using available inputs?”

From ancient times the concern about the efficiency of production could be observed. Plato in his *Politea (Part II)* discussed best division of labor within the State to ensure higher efficiency. The core of all these thoughts is that *people should do what they are best suited for.*

The question of production efficiency is still crucial. Natural resources are scarce and the population is growing. Probably more than ever before countries as well as companies “desire” for more effective production.

Recently in economics, production is mainly analyzed by various types of production function (PF). Production function is an attempt to the best approximation of production by the theoretical instrument. It could be seen as transformation function which transforms inputs into output. (based on Gordon 2011; page 65) Production function tells us “the maximum quantity of an output that can be produced using various combinations of inputs given certain knowledge.” (Gordon 2011; page 65)

2.1 History of Production Function Concept

2.1.1 Production Surface

Production has started to be considered as one of the key topics by the classical economists during 18th century. They deeply investigated the process of production and the factors that influence it.

A French economist Anne Robert Jacques Turgot (1727-1781)¹ described the conception preceding the production function. Turgot in his work *Observation sur un Memoire de M. de Saint-Peravy* from 1767 discovered the concept of “Intensive Margin” which contains the idea of lately described *Law of Decreasing Returns*. He specifies the relation of firstly increasing and then decreasing returns depending on types and amount of factors used. Thus Turgot didn’t discover the production function but rather the “production surface”. (based on Schumpeter 1987; pages 259-260)

A Scottish economist and philosopher Adam Smith (1723-1790)² in his work deals widely with the question of productivity and production, especially in his most popular book *The Wealth of Nations*. Within his work he presents three factors of production: labor, capital and land. (based on Smith 2009; Chapter III) In his work the production function is not exactly described but the scheme of three factors input and the production as output is clearly stated.

Smith also introduces the concept of the productive and unproductive labor, and of the differences in productivity of nations. (based on Schumpeter 1987; pages 629-630) The volume of what is produced in the nation, and purchased by the nation, is regulated “by two different circumstances: first, by the skill, dexterity, and judgment with which its labour is generally applied; and, secondly, by the proportion between the number of those who are employed in useful labour, and that of those who are not so employed.” (Smith 2009; page 5) Smith is pointing out to the fact that the efficiency of labor highly determines the production of the nation (this issue is further described in the section Human Capital on the page 9).

¹Basic information about the author from the web page The Library of Economics and Liberty

²Basic information about the author from the web page The Library of Economics and Liberty

2.1.2 Function Formation

At the turn of 18th and 19th century classical economists from United Kingdom expressed numerically Turgot's concept of production function. An English economist Thomas Malthus (1766-1834)³ introduced the ratios that imply the logarithmic production function. In his essay he describes the population increase tendencies by geometric series and food output increase tendencies by arithmetic series. Malthus verbally describes the relation between *labor force* (L) and *time* (t) and between *food output* (P) and time. If these equations are emerged the first logarithmic production function (see 2.1) "is born". On the one hand there is a falling marginal (also average) productivity of labor in the derived production function, but on the other hand there is no upper limit to output. (based on Malthus 1798; pages 6-11 and on Humphrey 1997; page 56)

$$P = f(L) = 1 + (\text{constant}) \log L \quad (2.1)$$

David Ricardo (1772-1823)⁴ was another well known English economist that deeply influenced the beginning of the production function concept. Ricardo in his book presents numerical example showing the marginal product of labor. Based on his findings the following equation is created (see 2.2). His concept refers to the decreasing ratio of marginal to average product with increasing *capital* (L), where L refers to "labor and capital". (based on Ricardo 1817; Chapter 15 and on Humphrey 1997; page 58)

$$P = f(L) = 190L - 5L^2 \quad (2.2)$$

German neoclassical economist Johann Heinrich von Thünen (1783-1850) in his book *The Isolated Island* explicitly states the marginal productivity as partial derivation of production function. His work is original and innovative and does not build on his predecessors. Based on his work the exponential production function was created (see 2.3). The rate κ stands for the *decline in marginal productivity of factor*, three factors are *labor* (L), *capital* (K), and *fertilizer* (F) – for fixing the land. *Constant A* denotes the *finite maximum of production*. Two revolutionary features of the equation are that "output is zero when any factor is zero" and "output approaches its maximum level A as all factors are increased indefinitely". (based on Humphrey 1997; pages 61-63)

³Basic information about the author from the BBC web page

⁴Basic information about the author from the web page of The Library of Economics and Liberty

$$P = f(L, K, F) = A(1 - e^{-\kappa_L L})(1 - e^{-\kappa_K K})(1 - e^{-\kappa_F F}) \quad (2.3)$$

2.2 Types of Production Function

There have been many types of production functions devised during the history. The most important and the most influential of them are briefly described in this section.

The basic concept of the PF is that *dependent variable* Y which represents the output is the function of *explanatory variables* X_i which represent inputs.

$$Y = f(X_i) \quad i = (1, \dots, n)$$

Linear Production Function

Linear production function is the basic and most intuitive display of production relations. The foundation of linear PF could be seen in Malthus' linear relation between production of food and time ($P = t + 1$). The linear PF was firstly expressed by an English philosopher and economist Philip H. Wicksteed (1844-1927)⁵ (based on Humphrey 1997; page 71) Linear PF captures the linear dependence of *output* Y on the *inputs* X_i .

$$Y = \beta_0 + \sum \beta_i X_i \quad i = (1, \dots, n)$$

Leontief Production Function

Russian economist Wassily Leontief (1906-1999)⁶ worked on his input-output analysis capturing the process by which inputs in one industry produce outputs either for consumption or as input into another industry. (based on Library of Economics and Liberty – Leontief) Leontief constructed the “fixed proportions function” (see 2.4), where α and β are *constants that are predetermined technologically*, Y is *output* and K and L are *inputs*. (based on Allen 1968; page 35)

The basic idea of this type of function is that the two basic inputs can't be substituted, for the higher production additional amount of both is necessary.

⁵Basic information about the author from the web page of The Online Library of Liberty

⁶Basic information about the author from the web page The Library of Economics and Liberty

$$Y = f(K, L) = \min[\alpha K, \beta L] \quad (2.4)$$

Cobb-Douglas Production Function

The Cobb-Douglas production function originates from the year 1928 where an American mathematician and economist Charles Wiggins Cobb (1875-1949)⁷ and an American politician and economist Paul Howard Douglas (1892-1976)⁸ published an article in the American Economic Review. Within this article they introduced theory of production based on the empirical facts. Cobb and Douglas tried to specify the relationship between labor, capital and product. The original Cobb-Douglas Production Function derived in the article had its specific values of coefficients: $P' = 1.01L^{\frac{3}{4}}C^{\frac{1}{4}}$. Cobb and Douglas are “attempting to measure the capital which aids in the production of goods.” (Cobb & Douglas 1928; page 140) As capital they considered only fixed capital, i.e. factory buildings with equipment and machinery. Their function was lately generalized to the form known today. (based on Cobb & Douglas 1928)

$$Y = AK^\alpha L^{(1-\alpha)} \quad (2.5)$$

CES Production Function

The Constant Elasticity of Substitution (CES) Function was firstly introduced by an American economist and Nobelist Robert Merton Solow (born 1924)⁹. He derives new type of production function based on the work of his predecessors. The function was lately improved (see 2.6) by Arrow and Solow himself. The *output* Y is seen as the function of *productivity factor* F and the combination of *inputs* K and L with respect to *elasticity of substitution* s ($r = \frac{s-1}{s}$). The name of the function should navigate to the fact that there is constant elasticity of substitution between inputs (capital and labor).

In this concept the Cobb-Douglas function and Leontief function could be seen as special types of CES production function.

$$Y = F(\alpha K^r - (1 - \alpha)L^r)^{1/r} \quad (2.6)$$

⁷Basic information about the author from the book Trahair 1994; page 133

⁸Basic information about the author from the web page The Biographical Directory of the United States Congress

⁹Basic information about the author from the web page The Library of Economics and Liberty

2.3 Productivity Factor

It is widely believed that the father of the total factor productivity theory is Solow. The *Total Factor Productivity variable* is also called Solow residual. In his article from 1957 he introduced the concept of technical change. Solow describes the production function (see 2.7) with three main factors on the right side of equation, two inputs – *capital C* and *labor L*, and the *technical change in time A(t)*.

$$Q = A(t) f(K, L) \quad (2.7)$$

The technical change is “any kind of shift in the production function” (Solow 1957; page 2). Technical change concerns any reason of shift of the function, for example the better education of human capital (as stated in the article). Solow explained the shifts of aggregate production. There is an empirical analysis showing that gross output per man hour increased for 100%, from which 87,5% is explained by the technical change and the rest by the increase of the use of capital. This demonstrates that there are factors that affect production that are not covered, and explained, in the production function.

There are many studies that deal with the influence of some factors on production – especially of technology. Most of production functions content the variables representing capital and labor, and some also technology (or land, especially in history). Although Solow directly expressed the fact that part of the total factor productivity could be caused by characteristic of human capital, there are not many studies that address this issue. There are some studies that observe how people characteristics influence the production – the influence of education, sex, age – but there are hardly any studies focused on the effect of cultural differences on economic production. The only study I found is the Hofstede’s observation of relation during development of dimensions.

This Thesis is therefore trying to find relationship between cultural background of people and production. Characteristics describing cultures could be than used to improve the production function concept.

Chapter 3

Human Capital

This chapter is focused on the theory of human capital and on the factors that influence it. There are several aspects of human capital that are really important and influence a lot a productivity of firms, and productivity of the state subsequently described in the first part of the chapter (page 10). The second part is devoted to theory of cultural differences (page 13). This chapter represents the necessary background of theory of human capital that have to be known to understand the importance of culture.

Human Capital is explained as “the skills, knowledge, and experience possessed by an individual or population, viewed in terms of their value or cost to an organization or country.” (OxfordDictionaries/Human Capital) In this concept people are viewed as capital which could be improved by investment.

The basic idea of human capital in this sense was formed by Saint Lucian economist William Arthur Lewis (1915-1991)¹ in his article *Economic Development with Unlimited Supplies of Labour*. He doesn't use the term “human capital” but rather “human material”. Lewis describes the influence of the human capital on the productivity of the country. “Productivity depends also on the human material. Even though the genetic composition of peoples may be much the same, as far as potential productivity may be concerned, their cultural inheritance is very different. Differences in literacy, forms of government, attitudes to work, and social relations generally may make a big difference to productivity.” (Lewis 1954) Lewis specifies human capital by its cultural inheritance. He recognizes that there are some differences between people that could

¹Basic information about the author from the web page The Library of Economics and Liberty

affect the productivity. His “attitudes to work” and “social relations” show that he recognizes the effect of such characteristics of nation on productivity.

It is widely believed that the term “human capital” was firstly used by the British economist Arthur Cecil Pigou (1877-1959)². Pigou in his study describes the similarity of investment into human capital and other type of capital – material capital. “There is such a thing as investment in human capital as well as investment in material capital. So soon as this is recognised, the distinction between economy in consumption and economy in investment becomes blurred.” (Pigou 1928; page 29) He sees consumption as investment into personal productive capacity.

Then the term “human capital” have started to be used by more economists. Especially Jacob Mincer in his studies, firstly in his article from 1958 *Investment in Human Capital and Personal Income Distribution*, and Gary Becker in his book called *Human Capital* (firstly published in 1964).

3.1 What Influences Human Capital

Human capital is the core for many industries in nowadays world. During the history many economists created classifications of capital. Between these classifications could be found the common principle. There are two basic types of capital: material capital – such as commodities, funds, machines and buildings, and people – human capital. The concept of third factor – land or technology (currently used) is also used often.

“For many years, productivity has been a key topic for the national development strategy due to its significant impacts on economic and social development. In other words, the concept of productivity is not only known for economists and managers today, but for all those who are involved in economic activities. Thus, it is important for everyone to know how costs can be reduced and how profits in economic activities can be increased.” (Afrooz & Rahim 2010; page 71)

“Human capital is one of the most important factors that imposes effects on productivity (especially labour productivity), i.e. increasing human capital cause increase productivity. In one hand, education, and learning experience increase human capital and on the other hand, increase wages (forces income). In the new models of micro and macro, wages have strong effect on productivity

²Basic information about the author from the web page The Library of Economics and Liberty

special labour productivity. Therefore, there is a close relationship between human capital, wages and productivity.” (Afrooz & Rahim 2010; page 71)

Factors that are generally viewed to affect human capital at most are education, age, gender and wage. Another widely acknowledged factors that affect productivity are talent, family background, religion and others. Production of the state is also influenced by institutions and rules, health conditions and wealth of country. As will be lately covered all these factors are related to the culture of the country.

3.1.1 Education

“Education and training are the most important investment in human capital.” (Becker 1993; page 17) In many studies there have been proved affect of the education on the human capital and on the wage of the people.

Many studies show that education at high school and college raises person’s income significantly, even after clearing the costs of education and better family background. Better educated people have higher wage than average, these differences are even higher in less-developed countries. In the same logic unemployment is negatively correlated to education. (based on Becker 1993; pages 12, 17 and on World Economic Forum 2011)

The education level highly determines the occupation and occupation predetermines the social class. Usually people with high education belong at least to middle class. Education level, occupation and social class are therefore closely linked. (based on Hofstede *et al.* 2010; page 64) Social class of the family usually predetermines the education level of the children. The circular situation arises.

3.1.2 Age

Age is considered as one of the crucial determinants of productivity of people. The productivity of the firm is influenced by age of its workers. Aging of population is haunting almost all developed countries. On the one hand in some studies the positive influence is pointed out. “The growth of experience and hence of productivity is reflected in increasing earnings with age, up to a point when biological decline begins to affect productivity adversely.” (Mincer 1958; page 301) On the other hand there are some studies where mostly negative influence is considered. “Productivity reductions at older ages are strongest for job tasks where problem-solving, learning and speed are important, whereas

there is less or no reduction in the productivity of elderly workers for the work tasks where experience and verbal abilities matter more.” (Afrooz & Rahim 2010; page 78) Both studies content the idea of ”both-way” influence of age, but each from different perspective.

The overall attitude of the country to the question of age and age respective values is included in Hofstede’s dimensions, especially in dimensions Power Distance (more about this dimension on the page 18), Uncertainty Avoidance (page 24) and Long-Term versus Short-Term Orientation (page 26) .

3.1.3 Gender

The influence of the gender on the work productivity and on the skills probably exists. Despite currently popular theories (popular especially in developed world) about the gender equality there are some different characteristics of men and women that on average influence their productivity across different occupations.

Asano and Kawaguchi describe and summarize all the possible reasons of the difference in the female and male wages. In their study they have no doubts about the existence of productivity differential between sexes. “In an attempt to explain the male-female wage differential, we estimated the relative marginal productivity and relative wage of female workers compared to those of male workers, using panel data from Japanese firms. The estimation results indicate that firms hiring 10 percentage points more women produce 0.8 percent more given the total wage bill and other inputs. Cross-sectional estimates that neglect firm fixed effects indicate that female workers’ marginal productivity is 45 percent of male workers’, while female wage is 30 percent of male wage.” (Asano & Kawaguchi 2007; page 1)

According to Asano and Kawaguchi the average productivity of the firm rises with an additional woman by less than half of the rise of productivity with an an additional men. The survey included all types of industries. Also Afrooz and Rahim in their article summarize several studies and conclude that “race and sex discrimination affect both wages and productivity”. (Afrooz & Rahim 2010; page 78)

The core difference in the average attitude of countries to this issue is captured in the model by the third Hofstede’s dimension Masculinity versus Femininity (more in the part Third Dimension – Masculinity versus Femininity on the page 22).

3.1.4 Wage

There have been created many studies on the influence of wages on productivity. In some of them could be found that productivity influences wage and in others that wage influences productivity. In the review made by Afrooz and Rahum “the positive relation between productivity and real wages” is stated. (Afrooz & Rahim 2010; pages 73, 78)

The influence of wages on productivity is within the model partly captured by the variable Ranking of GDP per capita PPP (see page 35).

3.2 Differences of Nations

The well known key issues that influences human capital are described in the section What Influences Human Capital (page 10). But even if all these aspects were clear and known there are still some crucial characteristics of the human capital that is missing. This is the core of the people. The production per person of two branches of the same firm with the same equipment could be different. The difference is made by the nature of the people, by their cultural basis.

3.2.1 Culture

The Oxford Dictionary defines culture as “the ideas, customs, and social behavior of a particular people or society”.(OxfordDictionaries/Culture) Lets broaden this definition by stating that culture means ideas, customs and social behavior that has conscious and unconscious influence on the behavior and decision making of people or society. This fact of “unconsciousness” is supported in Hofstede’s work. “If one asks people why they act as they do, they may say they just “know” or “feel” how to do the right thing.” (Hofstede *et al.* 2010; page 11)

Culture has evolved in some particular area under certain circumstances. Culture affects behavior of all the people within the certain area. The nationalities that developed their existence on islands are more deeply influenced by their culture and often more proud about their nationality than those from “continent”. Englishmen still honor their queen and are proud of British pound. Recently in ages of globalization, high migration, and internet the influence of particular culture widened to broader area (e.g. out of the country border) but at the same time it became less intensive.

3.2.2 Hofstede's Cultural Dimensions Background

Overview The Dutch social psychologist Geert Hofstede (born 1928) introduced in 1970's general problems of all human societies. He studied data of a broad sample of IBM workers from over fifty countries. From that survey he empirically pointed out several areas of these basic problems. These areas were supported by similar findings of previous study made by two Americans Alex Inkeles and Daniel Levinson in 1954. Inkeles and Levinson defined similar areas defining national culture from a broad survey of English-language literature. Based on these two surveys there have been identified by Hofstede four basic problem areas of human societies called cultural dimensions – *power distance*, *collectivism versus individualism*, *femininity versus masculinity*, *uncertainty avoidance*.

In later years the results were verified on other people outside the IBM company. An important study that justified the original findings was the survey of Michael H. Bond. Later on Hofstede with Bond identified potential problem that only people from western countries (USA and Canada) prepared the survey underlying questions on which the whole theory is build up. There could have been some important questions that had not been asked and many irrelevant that had been asked.

In response Bond asked his Chinese college professors to create another survey. This Chinese Value Survey resulted in four dimensions, three had the same meaning as the original dimensions, but the fourth was new. Hofstede added this new dimension – *long-term versus short-term orientation* – into his dimension range as the fifth dimension. Later on many other data were collected. Bulgarian academic Michael Minkov (born 1959) detected new three dimension while examining these data, from this three dimensions one was used and integrated into Hofstede's dimensions as sixth dimension – *indulgence versus restraint*. Minkov became part of the authors team. (Overview is based on Hofstede *et al.* 2010; pages 29-45, 559)

Mental Programming According to Hofstede there are three levels of human “programming of the mind“. The first, broadest level, is the *human nature*, which is common for all people. It represents the ability to have feelings and the need to associate with others. The second, or middle level, is represented by *culture*. “Culture is learned, not innate. It derives from one's social environment rather than from one's genes.“ (Hofstede *et al.* 2010; page 6) On the top

stands the *personality*, the third level of whole pyramid. It is partly learned and partly inherited “unique set of mental programs“. (based on Hofstede *et al.* 2010; pages 6-7)

Cultural Differences in Levels Hofstede manifested cultural differences within four terms pictured as the skin of onion – *symbols, heroes, rituals, values*. The upper skin is represented by symbols. “Symbols are words, gestures, pictures, or objects that carry a particular meaning that is recognized as such only by those who share the culture.” (Hofstede *et al.* 2010; page 8) Symbols from one group could be easily copied by another. For this reason symbols represent the upper layer.

“Heroes are persons, alive or dead, real or imaginary, who possess characteristics that are highly prized in a culture and thus serve as models for behavior.” (Hofstede *et al.* 2010; page 8) Heroes are placed in the second layer (from outside). According to Hofstede heroes are American Barbie and Batman and French Asterix. In the Czech republic the typical hero could be Good Soldier Švejk. For the Japanese I would choose Pikachu, it is probably not the most perfect representative of Japanese heroes but it is well known. The main characteristics of it is its strong loyalty, that is one of the most important features for Japanese.

“Rituals are collective activities that are technically superfluous (too many) to reach desired ends but that, within a culture, are considered socially essential. They are therefore carried out for their own sake.” (Hofstede *et al.* 2010; page 9) Rituals represent the third layer from outside. “Symbols, heroes, and rituals have been subsumed under the term practices.” (Hofstede *et al.* 2010; page 9) These practices could be seen from outside the culture but their meaning could be interpreted usually only by people from the culture.

“The core of culture ... is formed by values. Values are broad tendencies to prefer certain states of affairs over others.” Values creates the basis, or the “core of onion“, of the whole culture. (whole part based on Hofstede *et al.* 2010; pages 8-9)

Subculture There are more subcultures that occupy one country. This fact should be forgotten when analyzing the culture. According to Helen Deresky “generalization in cultural profiles will produce only an approximation ... of national character” (Deresky 2008; page 63).

This fact should not be abandoned. Hofstede divides some countries, es-

pecially according to the language they use, to more "subcultures". As there is almost none such detailed data in all variables I am not able to incorporate this fact in the model.

Culture Development Culture changes a lot. Nowadays in the world of internet and new technologies the world became smaller. There are many companies that do their business worldwide.

"Culture change can be fast for the outer layers of the onion diagram, labeled practices." (Hofstede *et al.* 2010; page 19) That is because practices are visible for people outside the culture. "New practices can be learned throughout one's lifetime; people older than seventy happily learn to surf the Web on their first personal computer, acquiring new symbols, meeting new heroes, and communicating through new rituals." (Hofstede *et al.* 2010; page 19) But the change for the center or core of the onion, for values, is slow. Main reason for this slow change is that these values were learned in childhood. (part based on Hofstede *et al.* 2010; pages 18-20)

There are some differences between humans that could be seen at the first look, for example the origin of their ancestors. But currently the cultural background doesn't depend only on one's race but also on his or her "adoptive nationality". There are many immigrants in USA that live according to christian culture. (based on Hofstede *et al.* 2010; page 15) Such immigrant in decades create new subculture, which is influenced by both original cultures. Culture of immigrants is affected by new home state and when the immigrants population is substantial the home culture is influenced by immigrants' original culture.

The culture is transmitted from generation to generation. "Culture is ... passed on to newcomers by its members." (Hofstede *et al.* 2010; page 26) The culture is transmitted into you by people who surround you – your family, people from school, town and people you know from media.

Sources of Differences between Countries The cultural differences between countries stem from three pillars – *identity*, *values* and *institutions* (see figure 3.1 on the page 17). All of these are rooted in history.

First pillar is identity. It correlates with practices (symbols, heroes, rituals) defined in part Cultural Differences in Levels (on the page 15). Identity is explicit – it could be expressed in words and also visible and understandable by people outside the culture. The second pillar, values is implicit – values are

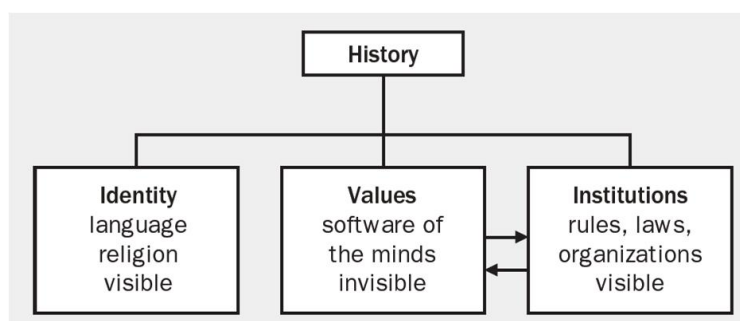
not obvious and visible to others and sometimes not even to ourselves, “they belong to the invisible software of our minds”. (Hofstede *et al.* 2010; page 23)

The third pillar are institutions. These are informal and formal rules (such as law) and organizations dealing with family, school, business and others that regulate human behavior. Institutions have developed over time, each country has though different institutions according to their values, and also to identity. (based on Hofstede *et al.* 2010; pages 22-24) “Similar laws work out differently in different countries ... Institutions cannot be understood without considering culture, and understanding culture presumes insight into institutions.” (Hofstede *et al.* 2010; page 24)

Hofstede saw much higher relation between values and institution than between identity and institutions. I consider the influence of the religion on institutions as quite high, especially in its historical development. For example the Czech academic title “JUDr.” of the law school originates from Middle Ages. The original meaning in Latin *juris utrisque doctor* – doctor of both laws, secular (Roman) and canon law. Until the 15th century the canon law had still existed in Europe, it has determined the current law. But even the informal rules and organizations such as behavior within family strongly depends on family’s religion, even on its religious roots. Such as in the Czech Republic most people are atheists but the Christian foundations influence the behavior and thinking of the most of them.

The way how people think and act can not be changed by only transferring institutions from other successfully developed countries. (based on Hofstede *et al.* 2010; page 24) Each country needs time to its own development.

Figure 3.1: Sources of Differences between Countries)



Source of the figure: Hofstede *et al.* 2010, page 22

3.2.3 Dimensions

There are five Hofstede's cultural dimensions that are used in this Thesis to test the potential effect of culture. ³

First Dimension – Power Distance

First dimension *Power Distance* should reflect how people deal with the fact that there exist inequalities between their status and status of others. "Power distance can ... be defined as the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally. Institutions are the basic elements of society, such as the family, the school, and the community; organizations are the places where people work." (Hofstede *et al.* 2010; page 61)

Power distance index (PDI) originally varied from 0 for the small-power-distance countries to 100 for the large-power-distance countries. Later on there were added some new countries and two of them scored higher than 100 (Slovakia was one of these two countries, scored 104). In small-power-distance countries the dependence of subordinates on bosses' decisions is limited, the subordinates prefer (and are "allowed to") to consult decisions with their bosses. The distance between individual levels of power is small. In large-power-distance countries the dependence of subordinates on bosses' decisions is high. The subordinates either accept or reject the decision rather than consult it with the boss. The rejecting of the decision is also called counterdependence (dependence with negative sign). The distance between individual levels of power is large. (based on Hofstede *et al.* 2010; pages 55-62)

As a bit ambiguous could be seen the fact that this dimension is based on answers from the less powerful members, from employees. The employees were asked three questions. First was investigating whether employees are afraid to express disagreement with their managers. Second was focused on "subordinates' perception of the boss's actual decision-making style" and third on "subordinates' preference for their boss's decision-making style". (based on and quoted from Hofstede *et al.* 2010; page 56) Rating the subordinates gave to junior managers (at the first level) is similar to rating junior managers gave to their bosses (managers at the second level). (based on Hofstede *et al.* 2010;

³All dimensions are expressed by index scores. Scoring of tested countries is included in appendix on the page I

page 62) This empirical findings eliminates potential problems of subordinates' subjectivity.

Power Distance in Real Life The impact of the power distance volume could be seen in real live in almost all situations where people have to deal with each other, e.g. in family, at school, in the workplace. As concrete example could be used the health care. The significant positive correlation was found between PDI and the prescription of antibiotics. In countries with high PDI medical doctors don't consult much with patients and therefore they more frequently prescribe antibiotics. (based on the findings from the article of Deschepper *et al.* 2008)

Relation with Characteristics of Countries PDI is related to the following characteristics of the country. Firstly it is related to the country's geographic latitude ("the distance from the equator of a country's capital city"). Higher latitudes are usually associated with lower PDI. Secondly it relates to its population size – larger size is usually associated with higher PDI. And finally it is linked to the country's wealth. Richer countries are usually associated with lower PDI. (based on Hofstede 2001; pages 115-117 and Hofstede *et al.* 2010; pages 84-85)⁴

Second Dimension – Individualism versus Collectivism

Second dimension *Individualism versus Collectivism* should represent the fact that some people tend to live closer to each other and tend to support others a lot, these people often accept group interests, while others do care more about themselves and their own lives.

The Individualism Index (IDV) varies from about 0 for most collectivist countries to about 100 for the most individualistic ones.

First group to which people usually belong is their family. Within the family, relatives teach children basic rules. In collectivist societies usually larger families live together or at least meet frequently and spent a lot of time together. A person that grows up in this society perceives him- or herself as a part of a group. In individualistic societies children are born to small families and after they leave their homes they don't spent that much time with their relatives,

⁴Presence of such relations may cause the collinearity of variables of the model, thus higher attention is paid to collinearity testing in Data Analysis

often not even with their parents. They think about themselves as “I”. (based on Hofstede *et al.* 2010; page 91)

“Individualism pertains to societies in which the ties between individuals are loose: everyone is expected to look after him- or herself and his or her immediate family. Collectivism as its opposite pertains to societies in which people from birth onward are integrated into strong, cohesive in-groups, which throughout people’s lifetime continue to protect them in exchange for unquestioning loyalty.” (Hofstede *et al.* 2010; page 92)

Individualism in Real Life In collectivist countries people usually spend a lot of time together, in some extreme cases people aren’t left alone in the room at all. People from collectivist countries aren’t used to direct confrontation with others. Rather than saying directly “no” they would answer evasively, e.g. “I will think about it”. (based on Hofstede *et al.* 2010; pages 106-107)

On the other hand people in individualistic countries are taught to tell the truth, and being honest is seemed as a good human characteristic. (based on Hofstede *et al.* 2010; page 107)

Collectivism and individualism also affect the work life. In the collectivist society the resources are shared. If just one person of the big family has payed job he is supposed to and expected to help satisfying the needs of whole family. This doesn’t work this way in individualistic countries. (based on Hofstede *et al.* 2010; page 108)

Employees from individualistic societies usually act according to their own interest, employer treats them as individuals. Employees in collectivist societies are usually hired as a group and are treated by employer as a part of a group. (based on Hofstede *et al.* 2010; page 119) In collectivist societies before any important business could be completed, the trust between committed people should be established. (based on Hofstede *et al.* 2010; page 119) In collectivist countries occupational mobility is lower than in individualistic countries. (based on Hofstede *et al.* 2010; page 124)

Relation with Characteristics of Countries Almost all wealthy countries achieved high score on IDV, these countries are more individualistic; also nearly all poor countries scored low. IDV is also correlated with geographical latitude, countries closer to the equator have lower score on IDV – are more collectivistic. (based on Hofstede *et al.* 2010; pages 89-91, 123, 132) The absolute size of the population is not related to collectivism. The growth of the population is

related to collectivism, but it is more correlated with the wealth of the country. In poor countries families tend to have more children and the children from big families usually have collectivistic values. (based on Hofstede *et al.* 2010; page 133) ⁵

“At equal levels of per capita income, countries also preserve individualist and collectivist values from their history. ... As far as the poor countries of the world are concerned, they cannot be expected to become more individualist as long as they remain poor.” (Hofstede *et al.* 2010; page 134) People from poor countries with poor or almost none social policy would tend to have more children which could help them when they become old. The big family is better established to take care of individuals in difficulties. Children from such big families learn the same model from their parents. The values persist.

Impact on Economic Theories Adam Smith presented in his work an idea of the invisible hand, one of the crucial ideas of market economy. In the perfect market, agents by trying to maximize their own profit also increase the wealth of the society, they are guided by an invisible hand of the market.

This strongly individualistic idea originates from Great Britain, country with high IDV. According to Hofstede economics has been an individualistic science and most of the main economists have come from individualistic countries. (based on Hofstede *et al.* 2010; page 128)

An American economist and scientist Mancur Lloyd Olson (1932-1998)⁶ researched the collective thinking and theory of groups. Mancur doesn't agree with the widely believed fact that individuals with the same interest would as a group achieve the desired results. “Rational, self-interested individuals will not act to achieve their common or group interest.” (Olson 1965; page 2) The individuals in the large group will be not acting to achieve the common goal even if they prosper from its achievement. They would act in the way to achieve the goal only if they are forced to, or if they are offered some special deal. (based on Olson 1965; page 2)

From this situation could be easily observed that Olson had been also inherited by its cultural background. This research could be strongly influenced by the culture of the “group”. If the members of the group were from collectivist society the results could be ambiguous or even opposite. According to Hofstede

⁵Presence of such relations may cause the collinearity of variables of the model, thus higher attention is paid to collinearity testing in Data Analysis

⁶Basic information about the author from the article of McGuire 1998

people from collectivist societies are taught from the early childhood to behave according to the interest of their families – of the groups.

Third Dimension – Masculinity versus Femininity

Third dimension *Masculinity versus Femininity* represents the fact that some societies pursue more equal roles for men and women in the society, they do care more about the environment and about other people, they try to live both work- and personal- lives while other societies don't.

“A society is called masculine when emotional gender roles are clearly distinct: men are supposed to be assertive, tough, and focused on material success, whereas women are supposed to be more modest, tender, and concerned with the quality of life. A society is called feminine when emotional gender roles overlap: both men and women are supposed to be modest, tender, and concerned with the quality of life.” (Hofstede *et al.* 2010; page 140)

Masculinity index (MAS) “was based on the country's factor score in a factor analysis of the fourteen work goals.” (Hofstede *et al.* 2010; page 140) The range of the MAS varies from 0 for the most feminine countries to about 100 for the most masculine countries. The most masculine country is Slovakia (MAS = 110) the second one is Japan. (based on Hofstede *et al.* 2010; pages 140-144)

Masculinity in Real Life For most of people socialization is primarily learned within the family. “Socialization means that both girls and boys learn their place in society, and once they have learned it, the majority of them want it that way.” (Hofstede *et al.* 2010; page 151) The parent-child relationship within society predetermines the future power distance dimension of the country and wife-husband relationship predetermines the masculinity versus femininity dimension.

There is an influence of MAS score of the country on working life of its inhabitants, on the occupation they choose and on the industry orientation of the country. The basic difference could be seen in the motto of people from the both ends of the MAS score. In masculine societies the basic idea is “people live in order to work”, in feminine societies “people work in order to live”. (based on Hofstede *et al.* 2010; page 170)

Within masculine countries conflict are solved by some kind of fighting

“Let the best man win.”, within feminine countries they are rather solved by negotiation and compromises. (based on Hofstede *et al.* 2010; page 166)

People in masculine societies prefer higher salaries rather than same salaries but less working hours, people in feminine societies would prefer leisure time. (based on Hofstede *et al.* 2010; pages 167-168)

“Based on their cultural characteristics, masculine and feminine countries excel in different types of industries. Industrially developed masculine cultures have a competitive advantage in manufacturing, especially in large volume: doing things efficiently, well, and fast. ... Feminine cultures have a relative advantage in service industries such as consulting and transportation, in manufacturing according to customer specification, and in handling live matter ...” (Hofstede *et al.* 2010; page 169)

“There is an international division of labor in which countries are relatively more successful in activities that fit their population’s cultural preferences than in activities that go against these preferences.” (Hofstede *et al.* 2010; page 169) For example there is Japan and its high-quality electronics. (based on Hofstede *et al.* 2010; page 169)

Within masculine societies performance seems to be the really important. On the national level economy should continue growing regardless of the environment. Within feminine societies welfare is important, people have to help others and environment should be preserved. (based on Hofstede *et al.* 2010; page 180)

All above stated relations from Hofstede’s book indicate that there could be the significant influence of MAS on the production of the country.⁷

Historical Development The masculinity and femininity differences among countries have their roots formed centuries ago. The German sociologist Norbert Elias (1897-1990)⁸ claimed that “the balance of power between the genders varies with the development of a society. During the Roman Republic and early Empire (400 b.c. to 100 a.d.), the influence and rights of patrician women improved gradually along with the development of the city-state into a world empire and of the senatorial class from peasant warriors into aristocrats.” (Hofstede *et al.* 2010; page 181)

Northern countries with cold climate tend to be more feminine. This could

⁷Data Analysis does not prove these expectations, MAS is the least significant cultural dimension (page 38)

⁸Basic information about the author from the web page of Norbert Elias Foundation

raise an idea that closer cooperation and relationship between men and women could improve their lives and the economic growth. (based on Hofstede *et al.* 2010; page 182) This could better support the continuous life cycle of the nation.

Influence of Religion There is strong influence of the religion on the development of society, and also on its masculine and feminine values. And reversely there is a strong influence of MAS on development of religion in society. These two phenomena could be observed in Christianity. “On average, countries with a Catholic tradition tend to maintain more masculine values and those with Protestant traditions more feminine values.” (Hofstede *et al.* 2010; page 176)

Dutch sociologist Johan Verweij in 1990’s tried to explain secularization in Christian countries. Despite the fact that actual theories at that time perceived as the main reason the modernization of society, Verweij found stronger relationship between secularization of the country and the degree of femininity. Feminine countries had secularized faster than masculine ones. (based on Hofstede *et al.* 2010; page 176)

Relation with Characteristics of Countries Masculine cultures mean larger families in poor countries and smaller families in wealthy countries. (Hofstede *et al.* 2010; page 184) Other study exhibited that population increases at most in countries where women are subordinated to men. (based on Levinson 1977; page 763)

In wealthier countries lower fertility or smaller families causes an aging population. There is strong negative relation between age and masculinity index, older people tend to have feminine values. Aging of population in wealthier countries causes that values of this population are becoming more feminine.

Fourth Dimension – Uncertainty Avoidance

Fourth dimension *Uncertainty Avoidance* should represent the fact that some people feel more stressed than other about unpredictable and new situations.

“Countries differ in their tolerance of the ambiguous and the unpredictable.” (Hofstede *et al.* 2010; pages 188-189) People feel uncertain about situations they haven’t experienced yet. To eliminate uncertainties people exploit technology, law and religion. Technology eliminates uncertainties caused by nature. Rules and law help people to handle uncertainties caused by other people. Religion

strongly lower the uncertainty in the eyes of its followers. It usually brings good future, and another life or heaven after the death. (based on Hofstede *et al.* 2010; page 189)

“Uncertainty avoidance can ... be defined as the extent to which the members of a culture feel threatened by ambiguous or unknown situations. This feeling is, among other manifestations, expressed through nervous stress and in a need for predictability: a need for written and unwritten rules.” (Hofstede *et al.* 2010; page 191)

The Uncertainty Avoidance Index (UAI) is based on answers on several questions about job stress, breaking of company’s rules and the expected length of employment. (based on Hofstede *et al.* 2010; page 190, 194) The score is ranked in the range from “around 0 for the country with the weakest uncertainty avoidance to around 100 for the strongest.” (Hofstede *et al.* 2010; page 195)

Uncertainty Avoidance in Real Life Societies with strong uncertainty avoidance usually have more rules and laws that lead and control people; in companies there are more internal regulations. People from these societies usually feel more comfortable in the structured environment, where the rules have been set. (based on Hofstede *et al.* 2010, page 209) This emotional need for rules could lead to dysfunctional and noneffective behavior.⁹

While in some countries, such as in Japan, rules have to be perfectly followed, in some countries the situation is just opposite, e.g. in the Czech Republic. Most of people feel satisfied when they succeed in breaking some – usually inefficient – rules.¹⁰

“In strong uncertainty-avoidance societies, people like to work hard or at least to be always busy. Life is hurried, and time is money. In weak uncertainty-

⁹ I would like to demonstrate this fact on the story that happened to my professor in Japan. During summer holiday at one university in Tokyo there had been taught some intensive courses. University’s support offices were closed and only one temporary office served for professors as assistance. One American professor from Business School needed to copy several materials for his intensive course. He asked assistant in the temporary office to copy them for him. This assistant went to another building at the other side of the campus to copy the materials because the professor belonged to different department then the temporary office was in. There was the rule that materials should be copied only at corresponding copy machines because all parts have their own budgets. The U.S. professor was cultural-shocked (even though he had lived in Japan for several years) and came late to our lecture. This was one of the moments that led me to the idea of this Thesis.

¹⁰ This could be easily observed in supermarkets where there are special lines for people with few things to buy and there are usually some people waiting with many things in the basket. Or at the doctor’s waiting room when people are knocking even though there is the “non-knocking sign”. Or the everyday situation when people are crossing the route at the red lights. These situation are observed in Japan just when you are looking at other foreigners.

avoidance societies, people are able to work hard if there is a need for it, but they are not driven by an inner urge toward constant activity. They like to relax.” (Hofstede *et al.* 2010, page 210)

The influence of the uncertainty avoidance score on the work could be observed. In countries with high UAI there are detailed job description and more complex manuals how to deal with unpredictable situations. In strong uncertainty avoidance countries people believe that specialist at work eliminate ambiguity, so that there are more specialists in the organizations. In weak uncertainty avoidance countries there is a belief in common sense. (based on Hofstede *et al.* 2010, pages 210-211, 217)

There are a contradictory phenomenons when observing influence of UAI on innovations. Weak uncertainty avoidance countries are better suited for initial ideas and basic innovations but people from these countries aren't really able to develop these ideas into final products or services. Implementation of these ideas needs accuracy and punctuality, these characteristics are often found in strong uncertainty avoidance countries. (based on Hofstede *et al.* 2010, pages 192,194,212-213)

In countries with high UAI there are usually found xenophobic tendencies, while in countries with low UAI people are usually positive or at least neutral toward foreigners. (based on Hofstede *et al.* 2010, page 231)

Relation with Characteristics of Countries Neither gender nor occupation showed the dependence on UAI. On the other hand there exists relation between UAI and average age of investigated IBM employees. In countries with stronger uncertainty avoidance people stay longer with the company and that's why they are older. (based on Hofstede *et al.* 2010, page 200) The relation should be therefore considered as the relation between uncertainty avoidance and the number of years spent with the company (than between uncertainty avoidance and age).

Fifth Dimension – Long-Term Orientation versus Short-Term Orientation

The fifth dimension *Long-Term Orientation versus Short-Term Orientation* reflects the fact that some people think and focus more on the future, on persistence and on consequences of their actions, while others on today and on immediate results.

This dimension originates from Chinese Value Survey. Originally this research detected four dimensions, but three of them are strongly correlated with Hofstede's dimensions. The fourth dimension was not related with any of them, but was strongly correlated with recent economic growth. The Long-Term Orientation not only correlated with current growth but it also partly predicted future growth.¹¹ (based on Hofstede *et al.* 2010, page 236)

The Long-Term Orientation Index (LTO) varies from about 0 for ST oriented countries to about 100 for the most LT oriented countries.

“Long-term orientation stands for the fostering of virtues oriented toward future rewards – in particular, perseverance and thrift. Its opposite pole, short-term orientation, stands for the fostering of virtues related to the past and present – in particular, respect for tradition, preservation of “face,” and fulfilling social obligations.” (Hofstede *et al.* 2010, page 239)

In LT oriented countries people are able to wait for the reward of their actions for longer time, while in ST oriented countries people expect the rewards to come in short time period. Children in all cultures represent the short-term oriented individuals.

Long-term orientation is strongly connected with teaching of Confucius. LT orientation dimension is a combination of several values. Some of these values seem similar to elements of the teaching of Confucius. These are persistence, thrift, ordering relationships by status and observing this order and having a sense of shame. These four basic values of the dimension could be found in one of Confucius's principle of teaching.¹² (based on Hofstede *et al.* 2010, page 237-238)

Long-Term Orientation in Real Life LT oriented cultures are those who focus more about future and also about distant future. People from these countries are able and are prepared to wait longer until their needs are satisfied, they are able to work hard for long time period without seeing that much progress in fulfillment of their long-term goals. According to Norbert Elias self-control and the development of long-term view on people's life is an important part of civilization process. People from LT oriented cultures are patient and persistent in their goals, which makes them good entrepreneurs. Thrift is also

¹¹Similar findings arises from the data analysis

¹²*Virtue with regard to one's tasks in life consists of trying to acquire skills and education, working hard, not spending more than necessary, being patient, and persevering.*

one of their characteristics, which helps them to save some money that could be reinvested in their businesses. (based on Hofstede *et al.* 2010, pages 242-243)

In long-term oriented societies companies focus on longer horizon. There is stress putted into the strategic planning within next ten years and even longer. While in short-term oriented societies companies stress about this year and the next year's profits. The main work values respected in LT oriented countries are honesty, adaptability, self-discipline, learning and accountability, while in ST oriented countries main work values are rights, freedom, thinking for oneself and achievement. (based on Hofstede *et al.* 2010, pages 244, 251)

Relation with Characteristics of Countries Long-term orientation is correlated with economic growth. There is a relation of ST and LT orientation on poor countries. LT oriented poor countries have quite fast economic growth, while ST oriented poor countries have slow or even non economic growth.¹³ (based on Hofstede *et al.* 2010; pages 262-275)

Countries and societies that have problematic economic development are usually short-term oriented, e.g. African countries and Australian aborigines. In Africa the problem seems to be even worth, because institutions that are helping Africa, such as the International Monetary fund, are solving problems in short-term horizon. (based on Hofstede *et al.* 2010; page 274) People from ST oriented societies don't have much thrift, their overspending seems to be the core of new economic crisis. (based on Hofstede *et al.* 2010; page 265)

There was also found a correlation between LT orientation and between economic growth in rich countries, this correlation was negative. This fact wasn't studied or covered further in Hofstede's book. This negative correlation was found while measuring thirty wealthy countries from whole world comparing 1995 and 2005 per capita GNI. (based on Hofstede *et al.* 2010; pages 265, 501)

¹³In 1970's one of the key world's issues to solve was an economic development and elimination of poverty. Some countries were very successful and during 1970 and 2000 they moved from "rags to riches". Five Dragons – Taiwan, Hong Kong, South Korea, Singapore and Japan – were made the biggest progress. Taiwan raised its per capita GNI (in USD) by thirty-six times and Japan by eighteen times. This success had not been predicted and wasn't even sufficiently explained by economists. "Economic success of the countries of East Asia could be attributed to Confucian values, common cultural roots going back far into history." (Hofstede *et al.* 2010; page 263, based on results from Kahn & Institute 1979) This idea was proved by Chinese Value Survey. Economic growth was significantly correlated with LT Orientation dimension during that thirty years (1970-2000). (based on Hofstede *et al.* 2010; pages 262-263)

Sixth Dimension – Indulgence Versus Restraint

The sixth dimension *Indulgence Versus Restraint* should cover how happy and free people feel or how restrained they feel in certain country. The dimension will not be tested in the model, but as it is the sixth Hofstede's dimension it is briefly described in these part. The explanation of not using the dimension in the model is stated.

“Indulgence stands for a tendency to allow relatively free gratification of basic and natural human desires related to enjoying life and having fun. Its opposite pole, restraint, reflects a conviction that such gratification needs to be curbed and regulated by strict social norms.” (Hofstede *et al.* 2010; page 281) Hofstede states that there is high stability in this feeling of people from certain country over decades. The countries with the highest score are usually not wealthy countries, e.g. Nigeria and Ghana from Africa, Mexico a Colombia from Latin America. (based on Hofstede *et al.* 2010; page 278)

The dimension will not be used in the model because of the following reasons. Firstly the score results are based on only one survey and haven't been supported by other studies yet. Hofstede describes that this dimension is in infancy. The dimension is almost never recognized by "public" as one of the dimensions, usually there are five Hofstede's dimensions mentioned. Secondly it doesn't seem to me that it could make that much difference for the production of people whether they feel "happy and free" or "unhappy and restraint". People usually feel restraint in their jobs, they have to follow the internal rules and the law. Thirdly the basic idea why this dimension should influence the work and production seems to be "whether people feel restraint or free to express themselves". The similar context has the Power distance dimension. Power distance cover whether people feel free to discuss their problems and ideas with the job authorities, so whether they feel restraint by authorities or not. ¹⁴

Relationship between Dimensions

There are some relation tendencies between some of dimensions. These tendencies could be expected to occur in analyzed data. The necessary tests will be executed.

¹⁴By stating this reasoning I have nor interest nor desire to debase the dimension. Reasoning should captures the facts why it is not optimal for to use this sixth dimension as one of the variables of the model.

Individualism vs Power Distance These “two dimensions tend to be negatively correlated”. (Hofstede *et al.* 2010; page 102) Countries where the power distances are large tend to be collectivist and countries where the power distances are small tend to be individualistic¹⁵.(based on Hofstede *et al.* 2010; pages 102-103)

Masculinity vs Uncertainty Avoidance Combination of weak uncertainty avoidance and high masculinity index is strongly correlated with the need for achievement. The need for achievement is one out of three types of motives – achievement, affiliation (associating with others) and power – defined in the book *The Achieving Society* by an American psychological theorist David McClelland (1917-1998).¹⁶ McClelland measured the strength of motives in individual countries by analyzing the children stories. His hypothesis that “the need for achievement in children’s stories would predict a country’s rate of economic development at the time when these children grew up” wasn’t proved. Later Hofstede used his research and found the correlation between UAI, MAS and the need for achievement. (based on Hofstede *et al.* 2010; page 213-215 and the results of McClelland 1976)

3.2.4 Cons Hofstede

In this part some arguments ”contra” Hofstede’s dimensions theory and especially against some difficulties in elaboration of scoring are stated.

There are 76 units examined (for PDI,IDV,MAS,UAI). In most cases these are individual countries. In three cases there are groups of countries Arabic-speaking countries, West African and East African countries. In three cases there is one country divided in two units, Belgium – Flemish (Dutch speaking) and Walloon (French speaking), Switzerland French speaking and German speaking and China – Hong Kong and the rest of China. (countries are listed in Hofstede *et al.* 2010 on page 36)

As the first issue could be seen the fact that the score and especially the final rank is done relatively. *Each country* (resp. unit, described in previous paragraph) *has the same value* – one point. There are countries such as China with 1.343,2 million inhabitants or India with 1.205,1 million inhabitants with

¹⁵More about power distance in First Dimension – Power Distance on the page 18 and about individualism in Second Dimension – Individualism versus Collectivism on the page 19)

¹⁶Basic information about the author from the article Winter 2000

one point value and there are also units such as Belgium Walloon with the population of 3,2 million¹⁷ and even Luxembourg with the population of 0,5 million with the same – one "position" – value. China has 2.600 times more inhabitants than Luxembourg, but the same "value" in Hofstede's scoring. The division of dimension between all people over the word is not is not respected in this way.¹⁸

The second issue is that there are some important data missing, countries from Africa – such as Democratic Republic of the Congo which has 73,6 million inhabitants, and from Asia – such as Burma (Republic of the Union of Myanmar) with almost 54,6 million inhabitants.¹⁹ This issue is caused by the fact that the data are originally gained from IBM company branches. Despite all of that Hofstede is improving and widening his data over years.

The third issue which I see as the biggest problem. The problem is that all the scores of dimensions have been computed according to answers of people from that culture. Inhabitants of one country were responding about their feelings and perceptions about themselves, this could have produced a distortion. If 170 cm's tall boy lives in the Czech Republic, he would say that he is shorter than average but if he lives in Japan he would say the opposite. The same situation would arise with the dimensions. Lets imagine a person living in a country where it is normal to listen and respect your bosses orders. His boss once a month consult something with him. He probably feels that his boss consult often with him, because it is more often than average. But if he is living in a country where it is normal to consult the decisions with the subordinates (say every week) and he is asked only once a month, he would answer that his boss consult with him seldom. The problem is that on the question of "how often does your boss consult with you?", the possible answer wasn't "twice a week", but "often".

Despite this argumentation the cultural dimensions are further examined in this Thesis.

¹⁷Basic information about Walloon from the web page www.everyculture.com

¹⁸Population of China, India and Luxembourg July 2011 estimates from The World Factbook published on the CIA web page

¹⁹Population of the Democratic Republic of the Congo and Burma July 2012 estimates from The World Factbook published on the CIA web page.

3.2.5 Language

Similar languages or language families are connected with similar features of countries. An American linguist and engineer Benjamin Lee Whorf (1897-1941)²⁰ is widely known for his principle that *the language strongly determines the way we are thinking*.

“We are thus introduced to a new principle of relativity, which holds that all observers are not led by the same physical evidence to the same picture of the universe, unless their linguistic backgrounds are similar, or can in some way be calibrated.” (Whorf & Carroll 1956; page 214) According to this principle people with different language background could not be able to understand the situation in the same way.

Hofstede also acknowledges and using the research proves that language is important. Countries with the same languages or language families scored at similar levels in Power Distance dimension and in Uncertainty Avoidance dimension. “European countries in which the native language is Romance (French, Italian, Portuguese, Romanian, Spanish) scored medium to high on the power distance scale. European countries in which the native language is Germanic (Danish, Dutch, English, German, Norwegian, Swedish) scored low.” (Hofstede *et al.* 2010; page 82)

“On uncertainty avoidance we again find the countries with a Romance language together. These heirs of the Roman Empire all score on the strong uncertainty-avoidance side. The Chinese-speaking countries Taiwan, Hong Kong, and Singapore score low on uncertainty avoidance, as do countries with important minorities of Chinese origin: Thailand, Indonesia, the Philippines, and Malaysia.” (Hofstede *et al.* 2010; page 232)

Different Understanding

Honesty and Truth In many cases there are different understandings, in different languages, of the same word. The world could be easily translated, but there could be many interpretations. Let the word “truth” served as an example. Germans see truth as the absolute and honest truth with no exceptions, while Chinese say that there is nothing as absolute truth. (based on Lewis 2005; page 5)

Japanese people are “famous” for their interpretation of honesty. Japanese aren’t honest in the Czech, and Euro-American, point of view. There are two

²⁰Basic information about the author from the web page Encyclopedia of World Biography

terms *honne* and *tatemae* that could approach the term honesty in Japanese language. Honne as a private stance versus *tatemae* as a public stance (based on Davies & Ikeno 2002; page 115). Very clear description is that *tatemae* means “official, public, socially required reality” and *honne* means “informal, personal reality in disregard of social parameters” (BBC web page) In some dictionaries there could be found a view of non-Japanese where the *honne* is described as “true feelings” but *tatemae* with negative emotions as “facade to disguise true feelings” (Japanese Online Dictionary).

The Japanese people doesn't perceive that as any kind of lie, fraud or even hiding the true. They see that as kind of social behavior standards. These are expected manners that every socially literate person should know.²¹ The situation could become complicated when dealing with non Japanese.

Sub-Language Man and woman speak different languages even if both speak English. Whorf uses example of English and Zulu (mostly spoken in South Africa) in his book to show how differences in vocabulary arise. He describe situation where his friend who speaks Zulu could describe green with 39 one word terms, while Whorf still replies with one – green. This situation arises because there were no milestones on their long tracks through savannah grass-land so they had to be able to differentiate between areas through different terms for green. (based on Whorf & Carroll 1956; page 9)

This story present not only the development of language and its dependence on the environment, but also the fact that within one language there are more ”sub-languages”. Men and women languages are also different. Women are usually able to express many more colors than just green – e.g. teal, khaki and pea. This shows that the language is more developed according to areas of interest, where needed a deeper differentiation there exist wider vocabulary. Men and women are different in their areas of interest and thus the language they use different.

Business Language Misunderstanding could be found even in more structured situations. In today's globalized world in the field such as business are

²¹As an example could be chosen the situation from the Davies and Ikeno “When a person is visiting someone's house in Japan and it becomes time for supper, people will often say, 'Won't you dine with us?' But this is not really an invitation; rather it is a subtle hint that it is time to go home. To those from other countries this may sound confusing, but for the Japanese it is a natural way to interact socially. So the correct response to, 'Won't you dine with us?' is 'Thank you very much, but I am not hungry.'” (Davies & Ikeno 2002; page 116)

some blur situations. “To a Swiss, Scandinavian, American or Brit, a contract is a formal document that has been signed and should be adhered to. Signatures give it a sense of finality. But a Japanese businessperson regards a contract as a starting document to be rewritten and modified as circumstances require.” (Lewis 2005; page 5)

Summary of Language Influence

The language determines thinking and acting of people. The language is what influences the culture and culture is what influences the language.

The main aim of Thesis is to study potential effect of culture. Language as a variable doesn't fit the model conception, thus particular language or language families aren't included in the model (but it could be seen as the interest of potential further research).

Chapter 4

Data Analysis

The objective of the data analysis is to show the potential effect of culture of different countries on their production. In the first part of the chapter the data used to test the null hypothesis are specified. Second part is dedicated to the framework of the model (page 36). In the third part the regression results are described (page 38). In the fourth part the required assumptions are tested (page 44). The final part summarizes the main conclusions of data analysis (page 46).

The null hypothesis of testing is that there is no effect of the cultural dimensions on the production. This hypothesis is desired to be rejected.

- H_0 : *no effect of cultural dimensions on production*
- H_1 : *there is an effect of cultural dimensions on production*

4.1 Data

The data set consists of the score of five Hofstede's cultural dimensions, GDP per capita PPP (in current international dollar) and derived data and population growth.

All variables are expressed as numbers. Five cultural dimensions contain numbers varying from around 0 to around 100 (specifically, from 5 to 112). GDP per capita PPP is observed in period 1980-2010, and is expressed in current international dollars. From GDP per capita PPP is derived the Average GDP per capita PPP growth (expressed by number, e.g. growth of 4% is expressed by 0.04) and original Ranking of countries according to GDP per

capita PPP (expressed by natural numbers, from 1 to 63). The Change in population is observed in period 1980-2010 (also expressed as number).

All variables are described in detail in the appendix, all the used data are included there (see Data Set on page I).

The final set of countries was chosen according to availability of the respective data for individual countries. The key issue was to find complete data of GDP per capita PPP during desired period (of about 30 years) for individual countries and to match such set of countries with those that have complete scoring of Hofstede's dimensions. Especially for formerly communist East European countries there weren't available GDP data. The Hofstede's first four dimensions are available for different set of countries that is the last LTO dimension. At the end the suitable countries were chosen and the issue was solved (all specific cases are described within the notes in Appendix A).

The final set of 63 countries consists of 21 countries from Europe, 16 from Asia, 9 from South America, 8 from Africa, 7 from North America and 2 from Oceania. The data set though contains at least 2 countries from each continent. The lack of data from Oceania is caused by the incompleteness of Hofstede's dimensions.

All the relevant data and their specifications are included in the Appendix Data Set on the page I.

4.2 Model Framework

The econometric model that is used to demonstrate the potential influence of cultural dimensions and other variables is the linear regression model. Regression model was chosen as the basic instrument to show the interdependence of variables.

As the method to estimate the unknown parameters of dependent variables is used the Ordinary Least Squares method.

The software used for regression analysis is Gretl, all relevant Gretl outputs are included at enclosed CD.

Model Specification The regression equation used is following:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + \beta_6 X_{6i} + \beta_7 X_{7i} + \varepsilon_i \quad i = (1, \dots, n) \quad (4.1)$$

For better illustration the abbreviations of variables are stated in the following regression equation:

$$AvG = \beta_0 + \beta_1 PDI + \beta_2 IDV + \beta_3 MAS + \beta_4 UAI + \beta_5 LTO + \beta_6 Rank + \beta_7 PopCh + \varepsilon \quad (4.2)$$

There are four models which vary in the number of independent variables used. Main idea of Thesis is to study possible influence of culture on production, hence all models include five Hofstede's dimensions. Based on the findings of production theory the influence of expressions of capital and labor was tested within models.

Variables

Y dependent variable: Average growth of GDP per capita PPP (in current international dollars) over time period

It represents the production of the particular state. It corresponds to the concept of output of production function.

β_0 constant (to be estimated)

It is logically implemented in the model, because country with zero independent variables could still grow in GDP.

$\beta_1 - \beta_7$ coefficients of independent variables (to be estimated)

X_1 independent variable: Power Distance Index

X_2 independent variable: Individualism Index

X_3 independent variable: Masculinity Index

X_4 independent variable: Uncertainty Avoidance Index

X_5 independent variable: Long-Term Orientation Index

X_6 independent variable: GDP per Capita PPP (in current international dollars) Ranking of the country in the beginning of time period

It corresponds to the concept of capital input into production function.

X_7 independent variable: Change of Population of the country over time period (population growth)

It corresponds to the concept of labor input into production function.

ϵ error term

i sequence number of country

n total number of countries, $n=63$

4.3 Regression Results

Table 4.1: Regression Results (1980-2010 Data Set)

| | Ind. Variables | Coef. | Model 1 | Model 2 | Model 3 | Model 4 |
|---|-----------------------|-----------|-------------|---------------|-------------|-------------|
| 0 | Const | β_0 | 0,07056500 | 0,04144610 | 0,08616850 | 0,06103910 |
| | [t-value] | | [5,567]*** | [4,339]*** | [7,442]*** | [6,368]*** |
| 1 | PDI | β_1 | -0,00012551 | -0,00020373 | -0,00005252 | -0,00012759 |
| | [t-value] | | [-1,083] | [-2,234]** | [-0,514] | [-1,439] |
| 2 | IDV | β_2 | -0,00024363 | -0,00001019 | -0,00035725 | -0,00015858 |
| | [t-value] | | [-2,265]** | [-0,119] | [-3,682]*** | [-1,908]* |
| 3 | MAS | β_3 | -0,00009690 | -0,00010202 | -0,00004565 | -0,00006188 |
| | [t-value] | | [-0,889] | [-1,252] | [-0,478] | [-0,741] |
| 4 | UAI | β_4 | -0,00021706 | -0,00013545 | -0,00031217 | -0,00022922 |
| | [t-value] | | [-2,516]** | [-1,728]* | [-3,999]*** | [-2,939]*** |
| 5 | LTO | β_5 | 0,00039764 | 0,00043451 | 0,00031539 | 0,00036243 |
| | [t-value] | | [4,504]*** | [4,637]*** | [3,992]*** | [3,991]*** |
| 6 | RankGDP_1980 | β_6 | — | 0,00053380 | — | 0,00039102 |
| | [t-value] | | — | [3,145]*** | — | [3,319]*** |
| 7 | Δ Pop1980_2010 | β_7 | — | — | -0,01457420 | -0,01102540 |
| | [t-value] | | — | — | [-4,402]*** | [-3,253]*** |
| | Tests | | | | | |
| | R-squared | | 0,330616 | 0,492386 | 0,502689 | 0,579289 |
| | Adj. R-squared | | 0,271898 | 0,437999 | 0,449405 | 0,525744 |
| | Akaike criterion | | -347,9776 | -363,4057 | -364,6975 | -373,2355 |
| | Schwarz crit. | | -335,1188 | -348,4038 | -349,6955 | -356,0905 |
| | Assumptions | | Norm. viol. | Homosc. viol. | OK | OK |

* Significant at 10% level

** Significant at 5% level

*** Significant at 1% level

There are four models tested. According to comparison of models, Model 4 was identified as the best model and its variables are interpreted in detail. All crucial results are summarized in Model Conclusions on the page 46 .

Model 1 is estimating dependent variable by five dimensions and by a constant. Model 2 contains one extra explanatory variable than Model 1 Ranking

GDP per Capita PPP (from the year 1980). Model 3 contains one extra explanatory variable than Model 1 Change of Population (between 1980 and 2010). Model 4 contains all seven the above stated explanatory variables.

The reasoning of indicating the best model are described in following paragraphs. The influences of explanatory variables on the dependent variable are described in part 4.3 on the page 40.

All four models are tested on underlying assumptions on the page 44.

Comparison of Models

Model 1 The five independent variables model exhibit R^2 of 0,33 indicating that 33% of the variance of dependent variable is explained by the independent variables. The coefficient of determination (R^2 and adjusted R^2) don't indicate the perfect fit, but the proportion of about 1/3 of variance of Y explained by explanatory variables is not negligible.

According to Schwarz criterion and also Akaike criterion the Model 1 is the worst of all four models.

Model 2 Model with an extra explanatory variable *GDP Ranking* (6 explanatory variables) exhibits R^2 of 0,49 indicating that almost 1/2 of variance of Y is explained by the model. The adjusted R^2 which penalizes the extra variables used is little lower.

Swarz criterion and also Akaike criterion indicate significant improvement compared with Model 1.

Model 3 Model with an extra explanatory variable *Change in Population* (6 explanatory variables) exhibits R^2 and adjusted R^2 similar to Model 2 indicating that 1/2 of variance of Y is explained by the model.

Swarz criterion and also Akaike criterion indicate significant improvement compared with Model 1, and little improvement compared with Model 2. Population growth together with cultural dimensions explain the change in GDP p.c. PPP better than the original GDP ranking together with cultural dimensions.

Model 4 Model 4 is the best model and its results will be further interpreted. The results of this model will be used to test the possible rejection of the fundamental null hypothesis (H_0 is specified on the page 35).

Model with seven explanatory variables exhibits R^2 of 0,58 and adjusted R^2 0,53 both indicating that more than half of the variance of Y is estimated by the model. This implies the satisfactory level of goodness of the fit.

Swarz criterion and also Akaike criterion indicate large improvement compared with Model 1, and significant improvement compared with Model 2 and Model 3. All seven variables together – *5 cultural dimensions, GDP p.c. PPP Ranking* and *Change in Population* – estimate the real change in GDP per cap. PPP at best, this corresponds with the production function concept.

Variables – Interpretation of Results

Constant The constant captures the fact of the natural growth of GDP p.c. PPP. The constant coefficient exhibit level of significance at 1% level. The coefficient value is 0,06103910 identifying that there is a natural positive growth of GDP p.c. PPP. If all variables exhibit null values, there would be still 6% growth of GDP per capita PPP. Under the constant there is a hidden influence of outside-model factors.

The constant coefficient is significant at 1% level in all four models. The value of coefficient ranges from 0,04 to 0,09 indicating that this “natural growth” fluctuates around 6-7%.

Power Distance Index The power distance index exhibit negative influence on the GDP p.c. PPP growth but without sufficient level of significance. The p-value of 0,156 is not high exhibiting the “16% level of significance”. It is not sufficient but the results could not be probably found in random data. Despite the fact of non sufficient level of significance the negative effect of PDI score on GDP p.c. PPP growth could be observed. High PDI exhibiting in reality as the high dependence of subordinates on bosses’ decisions negatively influences the GDP p.c. PPP growth. The closer cooperation between vertical levels and consultation of problems could lead to higher efficiency in production resulting in higher production. The value of the coefficient is -0,00012759 meaning that 1 point shift of PDI score of the country toward small power distance country would increase the Average Growth of GDP per Capita PPP of about 0,013 percentage points (pp).

PDI is not significant in most of the models, except for Model 2. In all models the coefficient is negative.

Individualism Index The individualism index exhibit negative influence on the GDP p.c. PPP growth. The p-value of 0,062 is exhibiting the 10% level of significance. The coefficient value identifies negative influence of IDV on growth of GDP p.c. PPP. High individualism index which represents the societies with individualistic tendencies where people do care more about themselves and their closest families and they defend their own interest lead to smaller growth in GDP p.c. PPP. The increase of collectivist values in society, such as acting towards interests of group, would lead to higher GDP p.c. PPP growth. The value of the coefficient is -0,000158581 meaning that 1 point shift of IDV score of the country toward collectivist country would increase the Average Growth of GDP per Capita PPP of about 0,016 pp.

The significant level of IDV varies across models a lot, the strongest level of significance is observed in Model 3. In all models the coefficient is negative.

Masculinity Index The masculinity index is not significant, but the predicted influence on GDP p.c. PPP is negative. The p-value of 0,462 is exhibiting really weak significance. The coefficient value identifies negative influence of MAS on growth of GDP p.c. PPP, but as the p-value is so high the information value is really low.

The p-value of MAS is high in all models, so the significance at 10% level is not present in any of them. The lowest p-value of MAS is present in Model 2. In all models the coefficient is negative.

If the MAS variable is excluded from the model, modified model exhibits slightly better Swarz and Akaike criteria, also the adjusted R^2 is slightly better. Despite these findings the MAS variable is left in the model to complete the Hofstede's variables. The aim of this Thesis is to show if there is any influence of the cultural variables so keeping the variable in the model does not contradict that.

Uncertainty Avoidance Index The uncertainty avoidance index exhibit negative influence on the GDP p.c. PPP growth. The p-value of 0,005 is exhibiting the 1% level of significance. The coefficient value identifies negative influence of UAI on growth of GDP p.c. PPP. High uncertainty avoidance index represents situation when people feel threatened by ambiguous or unknown conditions, this leads to smaller GDP p.c. PPP growth. The decrease of such feelings could cause higher willingness of people to accept some risks, people could start up businesses etc.

The value of the coefficient is 0,000229224 meaning that 1 point shift of UAI score of the country toward less uncertainty avoiding country would increase the Average Growth of GDP p.c. PPP of about 0,023 pp.

The significant level of UAI varies across models from 10% level to 1% level. In all models the coefficient is negative.

Long-Term Orientation Index The long-term orientation index exhibit significant positive influence on the GDP p.c. PPP growth. The p-value of 0,004 is exhibiting the 1% level of significance. The coefficient value identifies positive influence of LTO on growth of GDP p.c. PPP. LTO is though the only one of Hofstede's cultural dimension that has positive influence. High long-term orientation index represents countries where people are able to wait for the reward of their actions for longer time, this leads to higher GDP p.c. PPP growth.

Relation between LTO and development of countries was identified by Hofstede's team. Poor countries which are LT oriented improved their situation over years more than those who are ST oriented. Long-term oriented people build their property over years and even over generations, they are able to postpone consumption of some goods when necessary. The value of the coefficient is 0,00036243 meaning that 1 point shift of LTO score of the country toward more long-term oriented country would increase the Average Growth of GDP per Capita PPP of about 0,036 pp. LTO variable exhibits the strongest influence on growth of GGDP p.c. PPP of all dimensions.

The level of significance of LTO stays for all models at 1% level. Coefficient of LTO in all models is positive.

GDP per Capita PPP Ranking The GDP per Capita PPP Ranking exhibits positive influence on the GDP p.c. PPP growth – originally poorer countries exhibit higher increase of GDP p.c. PPP. The p-value of 0,002 is exhibiting the 1% level of significance. The coefficient value identifies positive influence of GDP p.c. PPP Ranking on growth of GDP p.c. PPP. GDP p.c. PPP Ranking variable is structured in the way that the best performing countries have the best ranking i.e. the lowest values. Higher GDP p.c. PPP Ranking value represent poorer (lower GDP per capita PPP country) countries, where the expectations about increase and the possibility of increase of GDP p.c. PPP are high. The value of the coefficient is 0,00039102 meaning that 1 position higher original ranking of country (which exhibit poorer countries according to

others) would increase the Average Growth of GDP per Capita PPP of about 0,039 pp.

Change of Population The Change of Population exhibits negative influence on the GDP per Capita PPP Growth.

The p-value of 0,002 is exhibiting the 1% level of significance. The coefficient value identifies negative influence of population growth on growth of GDP per Capita PPP. High population growth means higher labor factor. If the capital (factor) doesn't increase as much as well as labor (capital), the production per capita probably decreases. This probably mostly occurs in poor countries with high birthrate. The value of the coefficient is -0,01102540 meaning that 1% point increase (value 0,01) of population cause the decrease of the GDP per capita PPP of about 0,011% (value 0,00011).

The level of significance of Change of Population stays for both models (M3, M4) at 1% level. Coefficient of Change of Population is negative in both models.

Estimated Model

The coefficient variables are integrated into Model 4. The insignificant variables are marked by square brackets. The estimated regression is following:

$$\begin{aligned} \text{AvG estimated} = & (+0,061039) + [(-0,000128)\text{PDI}] \\ & + (-0,000159)\text{IDV} + [(-0,000062)\text{MAS}] \\ & + (-0,000229)\text{UAI} + (+0,000362)\text{LTO} \\ & + (+0,000391)\text{Rank} + (-0,0011025)\text{PopCh} \end{aligned}$$

Further Analysis – Different Time Periods

Further analysis of data was executed. The complex data for 31 years were divided into three sets according to decades, all required values of variables were computed. Model 4 was applied to test these data.

In the period 1980-1990 (more precisely 1980-1989) two cultural dimensions exhibit sufficient level of significance. Positive influence of LTO and negative influence of UAI on the GDP per Capita PPP Growth are present. GDP p.c. PPP Ranking exhibits positive influence and Change in Population negative influence, both variables are significant. All significant variables from 1980-

1990 exhibit the same influence as these variables exhibit in 1980-2010 data set.

In the period 1990-2000 (more precisely 1990-1999) two cultural dimension exhibit sufficient level of significance. LTO positive influence and PDI negative influence are present. GDP p.c. PPP Ranking and Change in Population aren't significant. All significant variables from 1990-2000 exhibit the same influence as these variables exhibit in 1980-2010 data set.

In the period 2000-2010 (the period lasts 11 years) two cultural dimensions exhibit sufficient level of significance. IDV negative influence and UAI negative influence are present. GDP p.c. PPP Ranking exhibits positive influence and Change in Population negative influence, both variables are significant. All significant variables from 2000-2010 exhibit the same influence as these variables exhibit in 1980-2010 data set.

Across all the data tested the highest level of significance from cultural dimensions exhibit LTO and UAI estimates.

Differences in influence of dimensions could be caused by changing importance of other out-of-model factors during decades, e.g. natural resources, trends in industries, political situation. The solution could be seen in aggregating data over longer period, which was done originally, the influence of these out-of-model factor is then averaged and mitigated.

4.4 Testing Assumptions

There are four assumptions imposed on the cross-sectional data that could be used in linear regression model.

All four models were tested for following assumptions:

1. Homoscedasticity
2. Normality of Residuals
3. Linearity of Model
4. No Collinearity of Variables

Autocorrelation wasn't tested, because the data are cross-sectional.

Model 1 The assumption of normality of residuals is violated, other assumptions are fulfilled.

(ad 1) The White's test doesn't reject (p-value=0,530) the null hypothesis of the heteroscedasticity being not present. (ad 2) The test for normality of residuals (p-value <0,001) rejects the hypothesis of residuals being normally distributed. (ad 3) Both tests on non-linearity of models don't reject the hypothesis of linear relationship (squares at p-value=0,297 and logs at p-value=0,332). (ad 4) None of the variables exhibit the collinearity problem (values should be <10, reported values <3).

(ad 2)

When executing the normal probability plot of the residuals, the kurtosis could be observed. As the reason could be considered the non-normal distribution of two variables, *IDV* (X_2) and *LTO* (X_5). This non-normality in distribution of two variables is probably caused by the selected set of countries. The possible solution would be to include more observations. As far as I included all possible data, the issue of non-normal distribution of residuals persists.

Model 2 The assumption of homoscedasticity is violated, the robust standard errors are used as correction. Other assumptions are fulfilled.

(ad 1) The White's test rejects (p-value=0,094) the null hypothesis at 10% level of the heteroscedasticity being not present. (ad 2) The test for normality of residuals (p-value=0,287) can't reject the hypothesis of residuals being normally distributed. (ad 3) Both tests on non-linearity of models don't reject the hypothesis of linear relationship (squares at p-value=0,290 and logs at p-value=0,315). (ad 4) None of the variables exhibit the collinearity problem (values should be <10, reported values <3).

Model 3 All assumptions are fulfilled, homoscedasticity and linearity assumptions exhibit boundary values.

(ad 1) The White's test doesn't reject (p-value=0,118) the null hypothesis of the heteroscedasticity being not present. (ad 2) The test for normality of residuals (p-value=0,420) can't reject the hypothesis of residuals being normally distributed. (ad 3) Both tests on non-linearity of models don't reject the hypothesis of linear relationship (squares at p-value=0,110 and logs at p-value=0,398). (ad 4) None of the variables exhibit the collinearity problem (values should be <10, reported values <3).

Model 4 All assumptions are fulfilled, but the homoscedasticity assumptions exhibit partial violation. The robust standard errors are used.

(ad 1) The White's test doesn't reject (p-value=0,176) the null hypothesis of the heteroscedasticity being not present. And the Breusch-Pagan test even rejects (p-value=0,052) the null hypothesis at 10% level of the heteroscedasticity being not present. (ad 2) The test for normality of residuals (p-value=0,492) can't reject the hypothesis of residuals being normally distributed. (ad 3) Both tests on non-linearity of models don't reject the hypothesis of linear relationship (squares at p-value=0,401 and logs at p-value=0,764). (ad 4) None of the variables exhibit the collinearity problem (values should be <10, reported values <4).

4.5 Conclusions of Data Analysis

Model demonstrates significant influence of cultural variables on dependent variable, thus the null hypothesis of no effect of cultural dimensions on production could be rejected.

The best model for testing the potential influence of culture on production corresponds with the production function concept. Except for five cultural variables there are variables that represent labor and capital.

Strong level of significance (1%) of constant indicates that there is the "natural" growth of GDP per capita PPP (in the values of about 6% per year within 1980-2010). The real value of production of average person in average country naturally growth in time.

The Individualism Index exhibits negative influence on GDP p.c. PPP growth on sufficient level of significance. Collectivist values in society lead to higher GDP p.c. PPP growth with sufficient level of significance.

Masculinity Index which was expected to exhibit strong influence, according to Hofstede's findings, reaches the worst level of significance.

Uncertainty Avoidance Index exhibits negative effect on GDP p.c. PPP growth at sufficient level of significance, this was observed also in sub-periods. Decrease in desire to avoid uncertainties (e.g. people have less fear to start up businesses) influences positively GDP p.c. PPP growth.

Long-Term orientation positively influences GDP p.c. PPP growth at strong (1%) level of significance. LTO from cultural dimensions has the biggest abso-

lute effect on the dependent variable. Raise in the long-term orientation index of 1 point, increase the GDP per capita PPP growth of about 0,036 pp.

GDP per Capita PPP Ranking matches the capital concept in PF theory. It exhibits positive influence at strong (1%) level of significance, meaning that originally poorer countries increased their GDP per capita PPP more than the rich ones. Change in Population matches the labor concept in PF theory. It exhibits negative influence at strong (1%) level of significance, meaning that countries with highest population growth don't reach that high increase in GDP p.c. PPP as the countries with smaller population growth. Increasing number of human capital doesn't lead to increase in per capita production, production does not growth as fast as population (could be caused by lack of increase of other production inputs).

Chapter 5

Conclusion

The effect of culture on human capital should not be overlooked. The expectations of influence of culture on production didn't turn out to be false. Model demonstrates significant influence of cultural dimensions on production growth, thus the null hypothesis of no effect of cultural dimensions on production could be rejected.

In the first part of the Thesis the main types of production functions were described aiming to specify the factors that influence production output at most. Factors that were comprehended in most of production functions were *labor* and *capital*. These two factors were used as the input for further investigation.

In the second part the important factors that specify the human capital are described, the special attention is paid to culture. The effect of culture on people is explained using five cultural dimensions (concept of dimensions from Hofstede *et al.* 2010). Each of dimensions takes effect in everyday life. It influences family structure, education, health and health care, relations between men and women, development of religion, choice of occupation, international business, industry specialization of country and many more.

In the third part the test of potential effect of cultural dimensions on production growth was executed. There was the significant effect of Individualism, Uncertainty Avoidance and for Long-Term Orientation dimensions. The biggest affect exhibits UAI and LTO. Decrease in desire to avoid uncertainties influences positively GDP per capita PPP growth. From five cultural dimensions, LTO has the biggest absolute effect on GDP per capita PPP growth. Raise in the long term orientation index of 1 point, increase the GDP per capita PPP growth of about 0,036 pp.

This Thesis offers substantial and interesting input for further analysis. The author sees the suitable “follow-up” of this Thesis in following steps. Firstly searching and testing other factors that influence human capital to form complex set of factors that influences productivity of human capital. Secondly estimating the relation between these variables – if they interact together towards higher production and productivity or not. Third step could be seen in estimating the most suitable production function for the individual firm, and subsequently the aggregated production function for the state. Function should have well defined determinants of total factor productivity. These determinants should include the culture-specifying factor.

The thoughts beyond the scope of the Thesis are to try to improve the economic situation in Africa (and in other ST oriented countries) using the proved effect of LT orientation in poor countries. If the children are explained long-term oriented ideas and they are taught long-term values in an appropriate way, the situation could improve slowly.

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Appendix A

Data Set

A.1 Hofstede's Dimensions

The Hofstede's Dimensions represent five (out of eight) explanatory variables of the model – Power Distance Index (PDI), Individualism Index (IDV), Masculinity Index (MAS), Uncertainty Avoidance Index (UAI) and Long-Term Orientation Index (LTO). The influence of these dimensions on production is observed using the model. The dimensions and their possible influence is widely described in the subsection Dimensions on the page 18.

In the model the dimensions are represented by *independent variables* (X_1, X_2, X_3, X_4, X_5).

Table A.1: Hofstede's Dimensions Scores for Countries Examined

| | Country | PDI | IDV | MAS | UAI | LTO |
|---|-----------|-----|-----|-----|-----|-----|
| 1 | Argentina | 49 | 46 | 56 | 86 | 20 |

| | Country | PDI | IDV | MAS | UAI | LTO |
|----|-------------|-----|-----|-----|-----|-----------------|
| 2 | Australia | 38 | 90 | 61 | 51 | 21 |
| 3 | Austria | 11 | 55 | 79 | 70 | 60 |
| 4 | Bangladesh | 80 | 20 | 55 | 60 | 47 |
| 5 | Belgium** | 65 | 75 | 54 | 94 | 82 |
| 6 | Brazil | 69 | 38 | 49 | 76 | 44 |
| 7 | Bulgaria | 70 | 30 | 40 | 85 | 69 |
| 8 | Canada* | 39 | 80 | 52 | 48 | 23 |
| 9 | Colombia | 67 | 13 | 64 | 80 | 13 |
| 10 | Costa Rica | 35 | 15 | 21 | 86 | 19 ¹ |
| 11 | Denmark | 18 | 74 | 16 | 23 | 35 |
| 12 | Egypt** | 70 | 25 | 45 | 80 | 7 |
| 13 | El Salvador | 66 | 19 | 40 | 94 | 20 |
| 14 | Ethiopia* | 70 | 20 | 65 | 55 | 25 ² |
| 15 | Finland | 33 | 63 | 26 | 59 | 38 |
| 16 | France | 68 | 71 | 43 | 86 | 63 |
| 17 | Germany | 35 | 67 | 66 | 65 | 83 |
| 18 | Ghana* | 80 | 15 | 40 | 65 | 16 ³ |
| 19 | Greece | 60 | 35 | 57 | 112 | 45 |
| 20 | Guatemala | 95 | 6 | 37 | 101 | 19 ⁴ |

¹The score derived from the score of the nearest and most similar country El Salvador (weight = 0,5) and from Mexico (weight = 0,25) and Colombia (weight = 0,25)

²The score common for East Africa (Ethiopia, Kenya, Tanzania, Zambia); source: web page geert-hofstede.com/countries.html

³The score common for West Africa (Ghana, Nigeria, Sierra Leone); source: web page geert-hofstede.com/countries.html

⁴The score derived from the score of the nearest and most similar country El Salvador (weight = 0,5) and from Mexico (weight = 0,25) and Colombia (weight = 0,25)

| | Country | PDI | IDV | MAS | UAI | LTO |
|----|-------------|-----|-----|-----|-----|-----------------|
| 21 | Hungary | 46 | 80 | 88 | 82 | 58 |
| 22 | Chile | 63 | 23 | 28 | 86 | 31 |
| 23 | China** | 80 | 20 | 66 | 30 | 87 |
| 24 | India | 77 | 48 | 56 | 40 | 51 |
| 25 | Indonesia | 78 | 14 | 46 | 48 | 62 |
| 26 | Iran | 58 | 41 | 43 | 59 | 14 |
| 27 | Ireland | 28 | 70 | 68 | 35 | 24 |
| 28 | Israel | 13 | 54 | 47 | 81 | 38 |
| 29 | Italy | 50 | 76 | 70 | 75 | 61 |
| 30 | Japan | 54 | 46 | 95 | 92 | 88 |
| 31 | Luxembourg | 40 | 60 | 50 | 70 | 64 |
| 32 | Malaysia | 104 | 26 | 50 | 36 | 41 |
| 33 | Malta | 56 | 59 | 47 | 96 | 47 |
| 34 | Mexico | 81 | 30 | 69 | 82 | 24 |
| 35 | Morocco | 70 | 46 | 53 | 68 | 14 |
| 36 | Netherlands | 38 | 80 | 14 | 53 | 67 |
| 37 | New Zealand | 22 | 79 | 58 | 49 | 33 |
| 38 | Nigeria* | 80 | 30 | 60 | 55 | 16 ⁵ |
| 39 | Norway | 31 | 69 | 8 | 50 | 35 |
| 40 | Pakistan | 55 | 14 | 50 | 70 | 50 |
| 41 | Panama | 95 | 11 | 44 | 86 | 19 ⁶ |
| 42 | Peru | 64 | 16 | 42 | 87 | 25 |

⁵The score common for West Africa (Ghana, Nigeria, Sierra Leone); source: web page geert-hofstede.com/countries.html

⁶The score derived from the score of the nearest and most similar country El Salvador (weight = 1/2) and from Mexico (weight = 1/4) and Colombia (weight = 1/4)

| | Country | PDI | IDV | MAS | UAI | LTO |
|----|-----------------------|-----|-----|-----|-----|------------------|
| 43 | Philippines | 94 | 32 | 64 | 44 | 27 |
| 44 | Portugal | 63 | 27 | 31 | 104 | 28 |
| 45 | Romania | 90 | 30 | 42 | 90 | 52 |
| 46 | Saudi Arabia** | 95 | 25 | 60 | 80 | 36 |
| 47 | Sierra Leone* | 70 | 20 | 40 | 50 | 16 ⁷ |
| 48 | Singapore | 74 | 20 | 48 | 8 | 72 |
| 49 | South Africa | 49 | 65 | 63 | 49 | 34 |
| 50 | South Korea | 60 | 18 | 39 | 85 | 100 |
| 51 | Spain | 57 | 51 | 42 | 86 | 48 |
| 52 | Suriname | 85 | 47 | 37 | 92 | 25 ⁸ |
| 53 | Sweden | 31 | 71 | 5 | 29 | 53 |
| 54 | Switzerland* | 34 | 68 | 70 | 58 | 40 |
| 55 | Thailand | 64 | 20 | 34 | 64 | 32 |
| 56 | Trinidad and Tobago | 47 | 16 | 58 | 55 | 13 |
| 57 | Turkey | 66 | 37 | 45 | 85 | 46 |
| 58 | United Arab Emirates* | 90 | 25 | 50 | 80 | 36 ⁹ |
| 59 | United Kingdom | 35 | 89 | 66 | 35 | 51 |
| 60 | United States | 40 | 91 | 62 | 46 | 26 |
| 61 | Uruguay | 61 | 36 | 38 | 100 | 26 |
| 62 | Venezuela | 81 | 12 | 73 | 76 | 16 |
| 63 | Zambia* | 60 | 35 | 40 | 50 | 25 ¹⁰ |

⁷The score common for West Africa (Ghana, Nigeria, Sierra Leone); source: web page geert-hofstede.com/countries.html

⁸The score derived from the score of the nearest and most similar countries Brazil (weight = 1/3) and Venezuela (weight = 2/3)

⁹The score derived from the score of the nearest and most similar country Saudi Arabia

¹⁰The score common for East Africa (Ethiopia, Kenya, Tanzania, Zambia); source: web page geert-hofstede.com/countries.html

Source:

* The dimension scores for these countries are from the web page geert-hofstede.com/countries.html

** The PDI, IDV, MAS and UAI scores for these countries are from the web page geert-hofstede.com/countries.html, the LTO score is from the book Hofstede *et al.* 2010

The dimension scores for the rest of the countries are from the book Hofstede *et al.* 2010

A.2 Gross Domestic Product

A.2.1 Gross Domestic Product per Capita Purchasing Power Parity

The data of the GDP per capita PPP in current international dollars serve as the input in computation of the *dependent variable* Y (*GDP per Capita PPP Growth*) and *independent variable* X_6 (*GDP per Capita PPP Ranking*).

“GDP per capita based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP at purchaser’s prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current international dollars.”
(The World Bank web page)

Years 1980-1989

Table A.2: GDP per C. PPP in 1980-1989 (in current int. dollars)

| Country | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
|----------------|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 Argentina | 4 810,45 | 4 887,25 | 4 853,30 | 5 161,25 | 5 390,83 | 5 057,12 | 5 494,71 | 5 734,88 | 5 699,13 | 5 392,52 |
| 2 Australia | 9 164,57 | 10 155,01 | 10 915,71 | 11 113,33 | 12 112,81 | 12 892,71 | 13 495,22 | 13 990,14 | 14 943,75 | 16 057,70 |
| 3 Austria | 10 548,65 | 11 491,33 | 12 419,93 | 13 313,95 | 13 823,23 | 14 588,44 | 15 250,46 | 15 898,90 | 16 872,63 | 18 086,30 |
| 4 Bangladesh | 323,14 | 356,87 | 377,26 | 397,19 | 422,03 | 436,99 | 453,26 | 471,02 | 484,84 | 503,07 |
| 5 Belgium | 10 251,88 | 11 181,70 | 11 936,80 | 12 448,65 | 13 234,95 | 13 860,30 | 14 423,36 | 15 175,78 | 16 389,56 | 17 536,55 |
| 6 Brazil | 3 443,37 | 3 644,38 | 3 891,42 | 3 795,98 | 4 042,25 | 4 392,90 | 4 751,79 | 4 970,07 | 5 042,48 | 5 307,63 |
| 7 Bulgaria | 2 773,30 | 3 171,27 | 3 432,86 | 3 681,86 | 3 940,66 | 4 170,04 | 4 443,85 | 4 843,85 | 5 554,89 | 5 639,98 |
| 8 Canada | 11 030,90 | 12 333,44 | 12 558,47 | 13 276,24 | 14 436,28 | 15 444,08 | 16 009,94 | 16 956,39 | 18 178,75 | 19 019,14 |
| 9 Colombia | 2 528,99 | 2 765,77 | 2 896,91 | 2 992,65 | 3 140,34 | 3 265,67 | 3 460,10 | 3 675,97 | 3 878,73 | 4 079,92 |
| 10 Costa Rica | 3 045,06 | 3 165,91 | 3 028,42 | 3 149,35 | 3 375,54 | 3 419,90 | 3 599,82 | 3 855,49 | 4 034,34 | 4 285,75 |
| 11 Denmark | 9 973,63 | 10 814,72 | 11 908,51 | 12 716,58 | 13 750,99 | 14 735,26 | 15 789,20 | 16 278,65 | 16 808,98 | 17 534,98 |
| 12 Egypt | 1 147,64 | 1 271,99 | 1 448,32 | 1 578,75 | 1 696,48 | 1 819,33 | 1 863,61 | 1 919,69 | 2 043,14 | 2 176,16 |
| 13 El Salvador | 2 087,30 | 2 012,70 | 1 971,73 | 2 052,66 | 2 129,65 | 2 179,49 | 2 204,02 | 2 296,61 | 2 390,72 | 2 471,69 |
| 14 Ethiopia | 294,76 ¹¹ | 313,18 | 325,99 | 355,53 | 346,96 | 307,58 | 333,94 | 379,00 | 381,64 | 381,86 |
| 15 Finland | 8 977,61 | 9 903,02 | 10 766,25 | 11 462,03 | 12 196,74 | 12 930,26 | 13 524,61 | 14 366,21 | 15 593,28 | 16 944,30 |
| 16 France | 9 502,20 | 10 442,59 | 11 286,26 | 11 810,74 | 12 366,46 | 12 875,67 | 13 384,05 | 14 025,18 | 15 102,04 | 16 242,58 |
| 17 Germany | 9 880,78 | 10 847,50 | 11 473,88 | 12 147,09 | 13 003,96 | 13 743,74 | 14 365,87 | 14 971,41 | 16 000,34 | 17 120,45 |
| 18 Ghana | 473,99 | 485,87 | 464,16 | 444,63 | 484,22 | 507,72 | 530,01 | 555,90 | 591,49 | 627,87 |
| 19 Greece | 8 247,79 | 8 801,37 | 9 175,12 | 9 380,44 | 9 879,09 | 10 395,84 | 10 648,03 | 10 676,91 | 11 477,73 | 12 300,72 |
| 20 Guatemala | 1 849,15 | 1 986,02 | 1 982,82 | 1 959,08 | 1 993,40 | 1 993,40 | 1 993,60 | 2 076,35 | 2 181,99 | 2 300,45 |

¹¹The data source: [http://www.indexmundi.com/ethiopia/gdp_per_capita_\(ppp\).html](http://www.indexmundi.com/ethiopia/gdp_per_capita_(ppp).html); original source International Monetary Fund

| Country | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
|----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 21 Hungary | 5 120,51 | 5 760,58 | 6 288,90 | 6 594,83 | 7 038,46 | 7 248,22 | 7 536,88 | 8 085,54 | 8 374,48 | 8 849,57 |
| 22 Chile | 2 338,14 | 2 638,40 | 2 471,24 | 2 432,22 | 2 680,45 | 2 910,32 | 3 089,99 | 3 367,39 | 3 712,38 | 4 228,66 |
| 23 China | 250,16 | 284,17 | 324,11 | 368,30 | 434,47 | 501,32 | 549,39 | 621,05 | 703,87 | 748,75 |
| 24 India | 419,87 | 475,64 | 510,30 | 556,34 | 585,92 | 621,48 | 651,15 | 681,72 | 756,86 | 814,55 |
| 25 Indonesia | 631,62 | 730,37 | 766,13 | 845,05 | 919,93 | 961,08 | 1 020,81 | 1 085,55 | 1 173,01 | 1 304,36 |
| 26 Iran | 3 431,79 | 3 430,64 | 3 960,66 | 4 464,76 | 4 390,53 | 4 448,57 | 3 980,28 | 3 894,50 | 3 648,12 | 3 896,93 |
| 27 Ireland | 6 180,68 | 6 903,42 | 7 420,79 | 7 641,11 | 8 222,19 | 8 720,78 | 8 873,55 | 9 558,66 | 10 449,51 | 11 521,34 |
| 28 Israel | 7 462,28 | 8 461,70 | 8 719,15 | 9 211,09 | 9 634,20 | 9 965,47 | 10 381,93 | 11 200,93 | 11 865,34 | 12 422,07 |
| 29 Italy | 9 218,01 | 10 154,87 | 10 810,13 | 11 364,99 | 12 169,49 | 12 888,33 | 13 552,62 | 14 393,81 | 15 508,30 | 16 628,52 |
| 30 Japan | 8 532,10 | 9 649,97 | 10 512,05 | 11 185,84 | 12 047,35 | 13 121,11 | 13 710,47 | 14 620,06 | 16 137,24 | 17 575,68 |
| 31 Luxembourg | 13 006,53 | 14 105,53 | 15 121,82 | 16 185,56 | 17 814,12 | 18 834,23 | 21 082,99 | 22 412,85 | 24 967,94 | 28 177,13 |
| 32 Malaysia | 2 323,71 | 2 651,58 | 2 905,78 | 3 127,08 | 3 403,68 | 3 373,45 | 3 390,27 | 3 571,60 | 3 945,56 | 4 337,65 |
| 33 Malta | 5 524,51 | 6 196,66 | 6 581,69 | 6 704,96 | 7 020,87 | 7 293,08 | 7 617,49 | 8 106,95 | 9 020,79 | 10 027,88 |
| 34 Mexico | 3 873,50 | 4 507,46 | 4 651,51 | 4 537,13 | 4 782,15 | 4 964,98 | 4 787,11 | 4 916,59 | 5 378,92 | 5 700,45 |
| 35 Morocco | 1 114,67 | 1 154,31 | 1 306,81 | 1 315,33 | 1 387,46 | 1 483,10 | 1 603,98 | 1 573,43 | 1 760,05 | 1 832,11 |
| 36 Netherlands | 9 877,85 | 10 645,70 | 11 103,15 | 11 736,67 | 12 500,58 | 13 153,25 | 13 745,63 | 14 330,69 | 15 237,34 | 16 414,66 |
| 37 New Zealand | 8 558,37 | 9 566,64 | 10 468,72 | 11 038,93 | 11 903,54 | 12 291,01 | 12 807,48 | 13 128,17 | 13 574,53 | 13 971,78 |
| 38 Nigeria | 785,60 | 726,61 | 749,57 | 719,77 | 693,36 | 764,36 | 780,82 | 777,70 | 861,87 | 934,50 |
| 39 Norway | 9 576,31 | 10 599,39 | 11 217,97 | 12 072,62 | 13 226,94 | 14 317,74 | 15 174,68 | 15 823,42 | 16 254,24 | 16 967,89 |
| 40 Pakistan | 584,40 | 666,72 | 728,16 | 780,97 | 822,75 | 881,96 | 920,06 | 975,50 | 1 052,19 | 1 111,25 |
| 41 Panama | 3 131,30 | 3 655,43 | 3 995,29 | 3 880,98 | 4 047,94 | 4 285,99 | 4 444,34 | 4 400,08 | 3 864,13 | 3 989,83 |
| 42 Peru | 2 904,47 | 3 321,53 | 3 419,36 | 3 062,15 | 3 265,84 | 3 381,68 | 3 718,24 | 4 042,64 | 3 737,28 | 3 352,40 |
| 43 Philippines | 1 349,74 | 1 484,66 | 1 587,26 | 1 634,99 | 1 529,43 | 1 421,61 | 1 462,88 | 1 529,11 | 1 645,21 | 1 766,92 |
| 44 Portugal | 5 413,94 | 5 965,22 | 6 424,41 | 6 636,11 | 6 729,97 | 7 110,73 | 7 563,88 | 8 284,73 | 9 222,49 | 10 203,12 |

| | Country | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
|----|----------------------|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 45 | Romania | 3 617,07 ¹² | 3 650,56 | 4 010,00 | 4 408,53 | 4 829,61 | 4 950,43 | 5 159,08 | 5 331,73 | 5 464,10 | 5 317,02 |
| 46 | Saudi Arabia | 16 187,01 | 17 399,58 | 15 399,62 | 13 811,80 | 13 106,93 | 12 260,01 | 12 562,38 | 11 894,42 | 12 810,56 | 12 828,24 |
| 47 | Sierra Leone | 387,69 | 426,90 | 464,53 | 462,54 | 488,06 | 464,46 | 467,64 | 501,38 | 469,21 | 480,21 |
| 48 | Singapore | 7 217,15 | 8 329,56 | 9 064,17 | 10 100,27 | 11 191,54 | 11 441,61 | 11 861,03 | 13 319,00 | 14 927,12 | 16 578,16 |
| 49 | South Africa | 4 183,73 | 4 705,34 | 4 849,79 | 4 823,31 | 5 124,92 | 5 083,71 | 5 066,67 | 5 193,42 | 5 467,93 | 5 681,29 |
| 50 | South Korea | 2 376,44 | 2 736,56 | 3 083,21 | 3 542,89 | 3 983,22 | 4 364,50 | 4 950,78 | 5 654,84 | 6 465,06 | 7 093,87 |
| 51 | Spain | 6 846,75 | 7 418,78 | 7 926,42 | 8 346,30 | 8 778,35 | 9 222,66 | 9 706,12 | 10 518,92 | 11 411,68 | 12 391,36 |
| 52 | Suriname | 3 145,40 | 3 434,94 | 3 565,02 | 3 577,07 | 3 543,95 | 3 556,26 | 3 469,68 | 3 043,68 | 3 358,00 | 3 783,45 |
| 53 | Sweden | 10 583,05 | 11 537,67 | 12 379,60 | 13 096,25 | 14 155,62 | 14 882,76 | 15 614,50 | 16 572,59 | 17 521,72 | 18 566,40 |
| 54 | Switzerland | 13 957,01 | 15 424,94 | 16 056,38 | 16 726,29 | 17 812,50 | 18 947,00 | 19 628,27 | 20 395,61 | 21 632,42 | 23 235,37 |
| 55 | Thailand | 1 060,23 | 1 203,32 | 1 318,78 | 1 419,99 | 1 528,75 | 1 617,70 | 1 712,31 | 1 893,72 | 2 179,90 | 2 496,47 |
| 56 | Trinidad and Tobago | 7 309,76 | 8 217,02 | 8 903,98 | 8 252,57 | 7 938,44 | 7 737,68 | 7 572,01 | 7 381,32 | 7 295,78 | 7 466,13 |
| 57 | Turkey | 2 161,53 | 2 422,80 | 2 600,50 | 2 772,33 | 3 001,33 | 3 156,42 | 3 385,24 | 3 743,95 | 3 885,14 | 3 972,34 |
| 58 | United Arab Emirates | 58 852,10 | 62 683,69 | 58 540,46 | 55 125,07 | 56 609,50 | 53 323,41 | 43 772,22 | 43 876,27 | 41 622,59 | 45 736,99 |
| 59 | United Kingdom | 8 362,21 | 9 031,55 | 9 796,37 | 10 556,17 | 11 229,63 | 11 964,75 | 12 693,89 | 13 633,16 | 14 781,14 | 15 650,12 |
| 60 | United States | 12 179,56 | 13 526,19 | 13 932,68 | 15 000,09 | 16 539,38 | 17 588,81 | 18 427,29 | 19 393,78 | 20 703,15 | 22 039,23 |
| 61 | Uruguay | 3 728,22 | 4 114,11 | 3 913,24 | 3 626,52 | 3 695,86 | 3 839,83 | 4 244,49 | 4 688,65 | 4 892,95 | 5 100,04 |
| 62 | Venezuela | 5 535,64 | 5 825,62 | 5 872,49 | 5 706,21 | 5 839,48 | 5 868,20 | 6 224,93 | 6 470,91 | 6 914,25 | 6 404,88 |
| 63 | Zambia | 731,55 | 822,08 | 820,41 | 809,44 | 810,68 | 822,68 | 821,37 | 842,04 | 899,02 | 897,27 |

Source: The World Bank web page: <http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD> (unless otherwise stated)

¹²The data source: [http://www.indexmundi.com/romania/gdp_per_capita_\(ppp\).html](http://www.indexmundi.com/romania/gdp_per_capita_(ppp).html); original source International Monetary Fund

Years 1990-1999

Table A.3: GDP per Capita PPP in 1990-1999 (in current int. dollars)

| Country | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 Argentina | 5 386,58 | 6 189,74 | 6 980,62 | 7 456,77 | 7 950,10 | 7 805,00 | 8 279,60 | 9 014,43 | 9 382,75 | 9 095,73 |
| 2 Australia | 17 221,75 | 17 754,76 | 18 172,25 | 19 038,05 | 19 965,81 | 20 902,48 | 21 962,03 | 22 960,21 | 24 292,34 | 25 375,38 |
| 3 Austria | 19 435,54 | 20 582,42 | 21 251,01 | 21 637,82 | 22 504,54 | 23 548,28 | 24 396,11 | 25 046,31 | 26 231,28 | 27 186,28 |
| 4 Bangladesh | 539,64 | 563,17 | 590,54 | 617,54 | 642,09 | 675,14 | 704,22 | 741,37 | 775,67 | 809,72 |
| 5 Belgium | 18 730,15 | 19 676,25 | 20 369,05 | 20 535,58 | 21 575,09 | 22 500,77 | 22 845,55 | 23 874,38 | 24 389,80 | 25 355,06 |
| 6 Brazil | 5 181,80 | 5 349,66 | 5 351,19 | 5 635,98 | 5 965,81 | 6 277,75 | 6 427,22 | 6 669,68 | 6 664,48 | 6 679,54 |
| 7 Bulgaria | 5 416,99 | 5 179,09 | 4 956,55 | 5 030,20 | 5 243,71 | 5 543,80 | 4 645,69 | 4 863,96 | 5 470,87 | 5 664,66 |
| 8 Canada | 19 499,26 | 19 500,83 | 19 892,99 | 20 578,65 | 21 807,80 | 22 696,71 | 23 253,09 | 24 406,25 | 25 472,04 | 27 050,52 |
| 9 Colombia | 4 403,17 | 4 567,53 | 4 806,53 | 4 935,27 | 5 232,60 | 5 531,62 | 5 643,24 | 5 845,01 | 5 857,92 | 5 597,32 |
| 10 Costa Rica | 4 505,92 | 4 661,64 | 5 070,76 | 5 433,73 | 5 667,47 | 5 880,04 | 5 887,56 | 6 177,48 | 6 622,74 | 7 099,79 |
| 11 Denmark | 18 475,72 | 19 329,10 | 20 112,42 | 20 467,19 | 21 975,55 | 22 998,96 | 24 070,04 | 25 278,89 | 26 144,04 | 26 921,74 |
| 12 Egypt | 2 338,08 | 2 396,85 | 2 510,24 | 2 595,00 | 2 707,40 | 2 850,81 | 2 995,03 | 3 166,27 | 3 283,60 | 3 474,10 |
| 13 El Salvador | 2 651,97 | 2 797,93 | 3 024,79 | 3 268,06 | 3 486,54 | 3 749,75 | 3 842,39 | 4 049,40 | 4 231,99 | 4 417,34 |
| 14 Ethiopia | 393,79 | 365,51 | 329,44 | 368,29 | 375,30 | 394,98 | 438,60 | 448,05 | 426,70 | 443,22 |
| 15 Finland | 17 610,15 | 17 046,90 | 16 749,17 | 16 896,11 | 17 802,90 | 18 820,39 | 19 276,92 | 20 964,44 | 22 574,62 | 23 613,38 |
| 16 France | 17 225,03 | 17 935,60 | 18 549,87 | 18 750,63 | 19 492,21 | 20 220,55 | 20 755,51 | 21 643,10 | 22 664,33 | 23 541,55 |
| 17 Germany | 18 556,27 | 20 048,85 | 20 758,95 | 20 864,43 | 21 751,80 | 22 509,23 | 23 058,80 | 23 565,65 | 24 184,36 | 24 990,18 |
| 18 Ghana | 655,13 | 693,36 | 714,78 | 744,49 | 763,42 | 792,15 | 822,37 | 852,55 | 884,08 | 914,77 |
| 19 Greece | 12 691,56 | 13 417,47 | 13 680,77 | 13 631,63 | 14 077,41 | 14 558,99 | 15 053,88 | 15 909,20 | 16 362,94 | 16 877,26 |
| 20 Guatemala | 2 406,13 | 2 520,18 | 2 635,98 | 2 735,32 | 2 837,24 | 2 977,74 | 3 049,83 | 3 171,52 | 3 300,58 | 3 398,22 |
| 21 Hungary | 8 956,07 | 8 159,64 | 8 100,62 | 8 240,14 | 8 672,30 | 8 996,61 | 9 299,78 | 9 942,02 | 10 638,82 | 11 059,38 |

| | Country | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|----|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 22 | Chile | 4 519,46 | 5 011,54 | 5 712,37 | 6 194,61 | 6 635,33 | 7 444,85 | 8 035,67 | 8 591,21 | 8 845,74 | 8 790,10 |
| 23 | China | 794,93 | 885,40 | 1 019,84 | 1 174,53 | 1 340,21 | 1 504,43 | 1 666,62 | 1 837,82 | 1 989,82 | 2 153,71 |
| 24 | India | 873,76 | 894,45 | 944,14 | 990,91 | 1 057,73 | 1 142,45 | 1 227,47 | 1 278,37 | 1 352,29 | 1 462,70 |
| 25 | Indonesia | 1 450,49 | 1 606,62 | 1 730,65 | 1 867,35 | 2 018,14 | 2 205,80 | 2 382,29 | 2 507,55 | 2 179,49 | 2 199,61 |
| 26 | Iran | 4 478,29 | 5 101,99 | 5 336,11 | 5 286,32 | 5 295,69 | 5 474,35 | 5 863,03 | 6 064,64 | 6 200,56 | 6 298,88 |
| 27 | Ireland | 12 969,06 | 13 609,37 | 14 300,48 | 14 933,07 | 16 059,52 | 17 880,18 | 19 511,11 | 21 694,80 | 24 004,95 | 25 921,03 |
| 28 | Israel | 13 360,45 | 13 817,17 | 14 625,38 | 15 113,36 | 16 099,86 | 18 897,82 | 19 791,63 | 20 308,01 | 20 899,79 | 21 366,79 |
| 29 | Italy | 17 611,26 | 18 502,32 | 19 167,95 | 19 405,05 | 20 231,42 | 21 238,81 | 21 940,17 | 22 720,11 | 23 881,47 | 24 344,71 |
| 30 | Japan | 19 206,85 | 20 485,05 | 21 090,89 | 21 537,50 | 22 102,48 | 22 859,20 | 23 860,96 | 24 622,16 | 24 335,26 | 24 603,23 |
| 31 | Luxembourg | 30 440,19 | 33 787,94 | 34 755,03 | 36 516,43 | 38 181,22 | 38 980,18 | 40 267,71 | 40 894,29 | 43 272,46 | 49 075,15 |
| 32 | Malaysia | 4 772,01 | 5 260,94 | 5 697,88 | 6 237,48 | 6 777,33 | 7 427,21 | 8 108,84 | 8 652,77 | 7 931,60 | 8 338,18 |
| 33 | Malta | 10 955,32 | 11 916,65 | 12 613,85 | 13 340,80 | 14 255,15 | 15 407,60 | 14 666,95 | 15 584,84 | 16 284,06 | 17 028,99 |
| 34 | Mexico | 6 099,93 | 6 458,91 | 6 727,01 | 6 883,99 | 7 226,60 | 6 800,29 | 7 163,27 | 7 653,47 | 7 990,24 | 8 289,26 |
| 35 | Morocco | 1 940,49 | 2 105,74 | 2 027,66 | 2 017,23 | 2 235,56 | 2 104,59 | 2 368,40 | 2 327,09 | 2 506,07 | 2 522,96 |
| 36 | Netherlands | 17 640,66 | 18 564,53 | 19 184,07 | 19 713,86 | 20 597,63 | 21 573,32 | 22 656,89 | 24 108,55 | 25 482,54 | 26 927,63 |
| 37 | New Zealand | 14 202,83 | 14 387,61 | 14 836,26 | 15 771,33 | 16 855,08 | 17 643,91 | 18 115,59 | 18 754,53 | 18 945,32 | 20 206,66 |
| 38 | Nigeria | 1 023,42 | 1 081,53 | 1 109,26 | 1 131,06 | 1 128,14 | 1 155,69 | 1 198,37 | 1 225,60 | 1 237,05 | 1 239,57 |
| 39 | Norway | 17 901,86 | 19 021,12 | 20 042,88 | 20 928,67 | 22 318,32 | 23 612,23 | 26 065,18 | 27 982,82 | 27 428,57 | 29 800,74 |
| 40 | Pakistan | 1 170,10 | 1 236,55 | 1 324,86 | 1 343,33 | 1 386,49 | 1 451,44 | 1 508,57 | 1 512,54 | 1 532,36 | 1 572,34 |
| 41 | Panama | 4 385,76 | 4 861,01 | 5 261,10 | 5 554,34 | 5 710,66 | 5 825,88 | 5 973,42 | 6 352,86 | 6 778,74 | 7 008,64 |
| 42 | Peru | 3 233,33 | 3 348,22 | 3 339,00 | 3 508,39 | 3 965,59 | 4 329,01 | 4 438,10 | 4 752,11 | 4 708,56 | 4 745,69 |
| 43 | Philippines | 1 842,82 | 1 848,88 | 1 849,89 | 1 886,27 | 1 963,75 | 2 056,30 | 2 165,76 | 2 270,82 | 2 239,55 | 2 292,00 |
| 44 | Portugal | 11 040,34 | 11 949,36 | 12 363,84 | 12 361,40 | 12 714,37 | 13 498,53 | 14 040,36 | 14 928,49 | 15 731,51 | 16 743,92 |
| 45 | Romania | 5 200,56 | 4 724,49 | 4 437,45 | 4 609,54 | 4 897,24 | 5 380,84 | 5 731,78 | 5 510,01 | 5 341,75 | 5 340,51 |
| 46 | Saudi Arabia | 13 942,20 | 15 227,67 | 15 776,59 | 15 679,14 | 15 715,29 | 15 787,42 | 16 350,15 | 16 886,93 | 17 393,74 | 17 228,35 |

| Country | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|-------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 47 Sierra Leone | 508,69 | 536,49 | 445,41 | 465,28 | 469,27 | 443,68 | 474,13 | 400,78 | 398,92 | 365,02 |
| 48 Singapore | 18 224,64 | 19 502,27 | 20 682,47 | 22 973,43 | 25 120,27 | 26 750,14 | 28 133,06 | 30 087,90 | 28 851,23 | 30 840,96 |
| 49 South Africa | 5 759,54 | 5 774,37 | 5 650,85 | 5 723,82 | 5 901,76 | 6 094,02 | 6 326,67 | 6 469,58 | 6 441,17 | 6 530,18 |
| 50 South Korea | 7 960,21 | 8 969,57 | 9 613,50 | 10 325,95 | 11 354,51 | 12 465,17 | 13 481,46 | 14 329,45 | 13 511,97 | 15 046,52 |
| 51 Spain | 13 336,91 | 14 128,97 | 14 550,82 | 14 671,16 | 15 293,81 | 16 004,13 | 16 720,99 | 17 709,81 | 18 898,98 | 19 824,87 |
| 52 Suriname | 3 845,02 | 4 025,71 | 4 045,29 | 3 783,19 | 3 933,29 | 4 014,81 | 4 081,86 | 4 339,69 | 4 408,18 | 4 373,36 |
| 53 Sweden | 19 329,21 | 19 655,44 | 19 763,79 | 19 667,44 | 20 736,63 | 21 885,43 | 22 676,22 | 23 509,24 | 24 428,43 | 25 976,71 |
| 54 Switzerland | 24 765,02 | 25 084,65 | 25 424,15 | 25 698,98 | 26 338,20 | 26 799,17 | 27 475,51 | 28 607,00 | 29 603,84 | 30 123,88 |
| 55 Thailand | 2 840,79 | 3 153,38 | 3 449,32 | 3 786,83 | 4 178,75 | 4 629,97 | 4 939,67 | 4 910,79 | 4 403,89 | 4 611,25 |
| 56 Trinidad and Tobago | 7 817,28 | 8 240,46 | 8 211,58 | 8 204,60 | 8 604,74 | 9 091,88 | 9 561,89 | 9 957,94 | 10 831,94 | 11 424,30 |
| 57 Turkey | 4 430,41 | 4 551,02 | 4 854,76 | 5 271,12 | 5 004,22 | 5 386,70 | 5 796,67 | 6 257,35 | 8 674,99 | 8 258,41 |
| 58 United Arab Emirates | 53 084,74 | 52 428,17 | 52 458,67 | 51 531,64 | 53 405,94 | 55 434,43 | 56 660,80 | 59 190,54 | 57 053,94 | 56 660,18 |
| 59 United Kingdom | 16 333,03 | 16 624,94 | 16 998,68 | 17 715,34 | 18 812,08 | 19 736,25 | 20 958,21 | 22 436,16 | 23 310,77 | 24 253,28 |
| 60 United States | 23 037,94 | 23 443,26 | 24 411,14 | 25 326,74 | 26 577,76 | 27 559,17 | 28 772,36 | 30 281,64 | 31 687,05 | 33 332,14 |
| 61 Uruguay | 5 273,32 | 5 605,78 | 6 133,35 | 6 387,45 | 6 941,14 | 6 949,73 | 7 439,27 | 8 178,67 | 8 621,76 | 8 539,30 |
| 62 Venezuela | 6 914,56 | 7 671,56 | 8 122,08 | 8 140,95 | 7 937,90 | 8 267,35 | 8 225,81 | 8 741,02 | 8 717,50 | 8 159,01 |
| 63 Zambia | 901,75 | 908,04 | 888,59 | 946,24 | 860,49 | 833,91 | 883,60 | 905,04 | 876,14 | 884,72 |

Source: The World Bank web page: <http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD>

Years 2000-2010

Table A.4: GDP per Capita PPP in 2000-2010 (in current int. dollars)

| | Country | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|----|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 | Argentina | 9 121,94 | 8 828,66 | 7 919,16 | 8 720,89 | 9 689,10 | 10 833,41 | 12 023,13 | 13 324,72 | 14 413,08 | 14 562,53 | 15 940,55 |
| 2 | Australia | 26 424,20 | 27 470,28 | 28 900,05 | 29 998,18 | 31 484,50 | 32 719,03 | 34 324,88 | 36 287,97 | 37 289,95 | 39 431,73 | 38 158,26 |
| 3 | Austria | 28 909,25 | 29 024,62 | 30 463,99 | 31 306,26 | 32 845,73 | 33 626,39 | 36 582,97 | 38 073,66 | 39 783,17 | 38 823,67 | 40 007,28 |
| 4 | Bangladesh | 860,34 | 909,73 | 948,63 | 1 002,73 | 1 078,82 | 1 164,60 | 1 265,96 | 1 370,96 | 1 472,46 | 1 556,94 | 1 651,80 |
| 5 | Belgium | 27 654,41 | 28 508,77 | 30 046,38 | 30 282,95 | 31 177,44 | 32 189,35 | 34 237,73 | 35 654,73 | 37 025,90 | 36 717,85 | 37 664,78 |
| 6 | Brazil | 7 016,49 | 7 168,82 | 7 378,28 | 7 521,94 | 8 075,56 | 8 509,43 | 9 035,61 | 9 768,31 | 10 404,96 | 10 388,71 | 11 201,55 |
| 7 | Bulgaria | 6 225,96 | 6 757,66 | 7 579,46 | 8 209,24 | 8 869,86 | 9 809,34 | 11 081,63 | 12 366,17 | 13 915,60 | 13 718,35 | 13 944,33 |
| 8 | Canada | 28 407,36 | 29 272,60 | 29 903,36 | 31 231,05 | 32 780,76 | 35 033,42 | 36 862,95 | 38 349,81 | 38 985,32 | 37 842,29 | 39 049,96 |
| 9 | Colombia | 5 871,86 | 6 006,31 | 6 156,82 | 6 430,50 | 6 856,41 | 7 304,56 | 7 924,43 | 8 587,97 | 8 957,24 | 9 071,34 | 9 410,93 |
| 10 | Costa Rica | 7 218,84 | 7 305,82 | 7 489,77 | 7 986,25 | 8 408,60 | 9 041,54 | 9 984,87 | 10 913,34 | 11 282,18 | 11 118,56 | 11 600,93 |
| 11 | Denmark | 28 822,25 | 29 422,36 | 30 756,73 | 30 426,39 | 32 280,54 | 33 193,24 | 36 046,64 | 37 712,77 | 39 829,58 | 38 291,52 | 40 157,65 |
| 12 | Egypt | 3 673,94 | 3 820,06 | 3 901,25 | 4 034,53 | 4 237,88 | 4 490,62 | 4 863,25 | 5 263,30 | 5 662,98 | 5 886,71 | 6 152,57 |
| 13 | El Salvador | 4 587,41 | 4 751,03 | 4 922,84 | 5 124,79 | 5 348,33 | 5 702,19 | 6 092,26 | 6 481,45 | 6 677,71 | 6 504,60 | 6 634,28 |
| 14 | Ethiopia | 467,79 | 504,83 | 507,69 | 494,69 | 563,75 | 636,07 | 711,16 | 797,51 | 883,45 | 950,60 | 1 034,65 |
| 15 | Finland | 25 674,18 | 26 530,55 | 27 531,35 | 27 615,87 | 29 862,74 | 30 707,95 | 33 140,37 | 36 167,24 | 38 080,47 | 35 693,16 | 36 476,96 |
| 16 | France | 25 171,93 | 26 527,43 | 27 586,80 | 27 193,15 | 28 090,00 | 29 452,67 | 31 315,36 | 33 024,64 | 34 041,01 | 33 545,45 | 34 107,02 |
| 17 | Germany | 25 760,71 | 26 703,94 | 27 443,66 | 28 348,80 | 29 678,84 | 31 114,53 | 33 547,35 | 35 557,27 | 37 119,22 | 36 035,88 | 37 402,30 |
| 18 | Ghana | 946,40 | 982,63 | 1 018,52 | 1 067,69 | 1 131,24 | 1 208,01 | 1 295,03 | 1 384,81 | 1 498,36 | 1 537,71 | 1 640,89 |
| 19 | Greece | 18 248,48 | 19 744,07 | 21 401,59 | 22 497,22 | 23 860,91 | 24 348,40 | 26 803,06 | 27 709,47 | 29 568,49 | 29 381,22 | 28 409,60 |
| 20 | Guatemala | 3 512,92 | 3 588,38 | 3 695,30 | 3 773,27 | 3 902,86 | 4 061,59 | 4 310,47 | 4 600,71 | 4 738,96 | 4 696,95 | 4 768,60 |
| 21 | Hungary | 11 883,58 | 13 393,69 | 14 669,37 | 15 343,55 | 16 187,70 | 16 974,56 | 18 298,77 | 18 933,47 | 20 431,74 | 20 154,45 | 20 545,35 |
| 22 | Chile | 9 264,54 | 9 674,19 | 9 926,82 | 10 453,10 | 11 274,41 | 12 662,92 | 13 703,97 | 14 597,55 | 15 298,45 | 15 356,48 | 16 043,91 |
| 23 | China | 2 366,42 | 2 601,97 | 2 865,58 | 3 198,55 | 3 599,17 | 4 114,57 | 4 760,06 | 5 564,45 | 6 201,64 | 6 809,64 | 7 567,84 |

| | Country | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|----|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------------------|
| 24 | India | 1 527,74 | 1 612,88 | 1 676,02 | 1 818,56 | 1 985,72 | 2 208,59 | 2 454,45 | 2 733,15 | 2 861,12 | 3 086,02 | 3 372,66 |
| 25 | Indonesia | 2 327,00 | 2 434,43 | 2 551,96 | 2 695,66 | 2 875,01 | 3 102,28 | 3 340,09 | 3 615,01 | 3 875,65 | 4 055,65 | 4 311,93 |
| 26 | Iran | 6 655,96 | 6 953,29 | 7 495,63 | 8 095,80 | 8 640,99 | 9 228,24 | 9 965,90 | 10 925,14 | 11 288,65 | 11 479,42 | 11 882,66 ¹³ |
| 27 | Ireland | 28 925,05 | 30 756,42 | 33 272,60 | 34 771,88 | 36 768,96 | 38 896,39 | 42 529,59 | 45 506,08 | 42 741,07 | 39 831,62 | 40 470,15 |
| 28 | Israel | 23 531,81 | 23 452,21 | 23 527,70 | 22 259,54 | 23 573,57 | 23 339,95 | 23 966,58 | 25 558,99 | 25 599,56 | 25 472,17 | 26 525,29 |
| 29 | Italy | 25 757,54 | 27 276,47 | 26 941,53 | 27 271,48 | 27 528,23 | 28 279,87 | 30 399,03 | 32 056,41 | 33 372,09 | 32 246,68 | 31 895,19 |
| 30 | Japan | 25 969,02 | 26 602,31 | 27 241,10 | 27 960,40 | 29 333,02 | 30 441,35 | 31 799,60 | 33 370,03 | 33 589,33 | 32 063,62 | 33 915,85 |
| 31 | Luxembourg | 53 661,85 | 53 895,13 | 57 549,53 | 60 710,73 | 64 956,29 | 68 319,64 | 78 499,87 | 84 524,53 | 89 055,80 | 82 892,27 | 86 132,27 |
| 32 | Malaysia | 9 056,53 | 9 096,25 | 9 523,45 | 10 063,28 | 10 819,10 | 11 544,28 | 12 383,08 | 13 334,64 | 14 050,57 | 13 744,10 | 14 665,63 |
| 33 | Malta | 19 044,31 | 18 244,23 | 19 328,56 | 19 686,28 | 19 940,61 | 21 018,45 | 22 222,99 | 23 526,74 | 25 303,43 | 25 647,17 | 26 334,92 |
| 34 | Mexico | 9 017,43 | 9 087,50 | 9 317,82 | 10 670,36 | 11 296,38 | 12 191,06 | 13 392,40 | 14 053,36 | 14 741,34 | 13 858,70 | 14 563,88 |
| 35 | Morocco | 2 585,70 | 2 809,53 | 2 915,20 | 3 128,57 | 3 333,56 | 3 508,30 | 3 861,08 | 4 038,06 | 4 313,16 | 4 519,64 | 4 691,13 |
| 36 | Netherlands | 29 407,90 | 30 776,53 | 31 939,68 | 31 700,29 | 33 185,05 | 35 104,49 | 38 075,66 | 40 726,51 | 42 914,81 | 41 077,94 | 42 166,04 |
| 37 | New Zealand | 21 091,55 | 22 127,67 | 22 899,19 | 23 536,76 | 24 579,02 | 25 304,94 | 27 106,75 | 28 685,41 | 29 159,37 | 29 313,96 | 30 108,41 |
| 38 | Nigeria | 1 303,43 | 1 341,59 | 1 351,14 | 1 484,71 | 1 647,01 | 1 749,65 | 1 871,03 | 1 999,07 | 2 112,48 | 2 227,87 | 2 369,50 |
| 39 | Norway | 36 136,85 | 37 078,77 | 37 058,81 | 38 263,69 | 42 470,67 | 47 626,28 | 53 849,24 | 55 837,04 | 61 342,10 | 54 688,08 | 57 227,94 |
| 40 | Pakistan | 1 637,00 | 1 672,18 | 1 720,90 | 1 809,43 | 1 962,52 | 2 144,80 | 2 309,02 | 2 466,21 | 2 515,14 | 2 586,14 | 2 675,72 |
| 41 | Panama | 7 214,17 | 7 280,91 | 7 424,84 | 7 757,43 | 8 423,45 | 9 166,56 | 10 093,83 | 11 449,61 | 12 675,67 | 13 008,25 | 14 027,29 |
| 42 | Peru | 4 917,45 | 4 969,34 | 5 233,52 | 5 489,62 | 5 854,01 | 6 386,96 | 7 024,91 | 7 788,56 | 8 649,93 | 8 722,43 | 9 498,61 |
| 43 | Philippines | 2 393,01 | 2 465,32 | 2 543,05 | 2 670,58 | 2 872,22 | 3 050,83 | 3 254,63 | 3 508,70 | 3 672,24 | 3 691,28 | 3 951,67 |
| 44 | Portugal | 17 797,22 | 18 507,37 | 19 146,02 | 19 455,65 | 19 853,62 | 21 368,96 | 22 967,25 | 24 201,00 | 24 938,96 | 24 935,40 | 25 431,60 |
| 45 | Romania | 5 662,58 | 6 416,45 | 7 013,07 | 7 677,97 | 8 730,75 | 9 361,30 | 11 135,86 | 12 688,24 | 14 669,96 | 14 364,69 | 14 531,46 |
| 46 | Saudi Arabia | 18 027,93 | 17 967,24 | 17 616,70 | 18 610,01 | 19 377,96 | 20 405,81 | 21 064,81 | 21 501,71 | 22 326,61 | 22 044,56 | 22 790,47 |

¹³The data source: http://www.indexmundi.com/iran/gdp_per_capita_ppp.html; original source International Monetary Fund

| Country | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 47 Sierra Leone | 376,38 | 437,86 | 541,79 | 575,89 | 608,01 | 646,99 | 693,09 | 738,22 | 777,31 | 792,75 | 823,17 |
| 48 Singapore | 33 767,28 | 33 225,96 | 34 864,16 | 37 782,78 | 41 874,70 | 45 374,24 | 49 373,25 | 53 048,14 | 52 285,76 | 50 769,35 | 57 901,56 |
| 49 South Africa | 6 778,64 | 6 977,67 | 7 250,40 | 7 525,07 | 7 993,96 | 8 596,83 | 9 266,90 | 9 954,79 | 10 427,35 | 10 265,34 | 10 540,24 |
| 50 South Korea | 17 197,15 | 18 151,08 | 19 655,67 | 20 180,01 | 21 624,35 | 22 783,27 | 24 246,50 | 26 101,37 | 26 688,74 | 26 930,55 | 28 797,54 |
| 51 Spain | 21 314,95 | 22 578,44 | 24 068,23 | 24 754,89 | 25 956,54 | 27 392,04 | 30 372,68 | 32 229,63 | 33 157,01 | 32 161,05 | 31 889,18 |
| 52 Suriname | 4 403,73 | 4 642,98 | 4 877,17 | 5 206,54 | 5 742,85 | 6 128,52 | 6 496,31 | 6 954,39 | 7 331,84 | 7 562,72 | 7 891,41 |
| 53 Sweden | 27 956,53 | 28 226,37 | 29 277,91 | 30 419,38 | 32 495,57 | 32 702,98 | 35 704,49 | 38 477,77 | 39 614,97 | 37 337,49 | 39 325,43 |
| 54 Switzerland | 31 736,74 | 32 343,40 | 33 657,81 | 33 568,03 | 34 825,62 | 35 784,01 | 39 526,23 | 43 128,46 | 46 018,45 | 45 103,62 | 46 383,58 |
| 55 Thailand | 4 876,48 | 5 035,80 | 5 327,67 | 5 763,45 | 6 235,58 | 6 674,74 | 7 178,77 | 7 699,99 | 8 010,07 | 7 856,23 | 8 515,86 |
| 56 Trin. and T. | 12 337,68 | 13 084,37 | 14 311,48 | 16 664,64 | 18 422,40 | 20 058,24 | 23 349,09 | 25 079,46 | 26 220,01 | 25 522,58 | 25 713,08 |
| 57 Turkey | 9 263,46 | 8 690,37 | 8 741,44 | 8 861,32 | 10 237,70 | 11 464,73 | 12 961,44 | 13 946,68 | 15 057,64 | 14 452,13 | 15 616,43 |
| 58 UAE | 61 281,93 | 61 208,50 | 61 655,66 | 65 548,93 | 68 649,49 | 66 854,72 | 66 195,45 | 60 642,36 | 55 761,80 | 49 596,89 | 47 006,03 |
| 59 UK | 26 069,56 | 27 570,12 | 28 880,95 | 29 838,18 | 31 752,40 | 32 737,95 | 34 991,89 | 35 735,39 | 35 884,84 | 34 472,65 | 35 686,58 |
| 60 USA | 35 081,92 | 35 912,33 | 36 819,45 | 38 224,74 | 40 292,30 | 42 516,39 | 44 622,64 | 46 349,12 | 46 759,56 | 45 191,94 | 46 701,52 |
| 61 Uruguay | 8 524,52 | 8 363,63 | 7 841,86 | 8 083,71 | 8 731,65 | 9 682,79 | 10 377,37 | 11 344,43 | 12 389,57 | 12 782,33 | 14 030,84 |
| 62 Venezuela | 8 485,03 | 8 807,45 | 8 010,67 | 7 411,65 | 8 857,19 | 9 924,46 | 11 066,94 | 12 180,93 | 12 895,32 | 12 415,56 | 12 178,58 |
| 63 Zambia | 912,68 | 955,84 | 980,56 | 1 028,73 | 1 089,25 | 1 157,59 | 1 238,24 | 1 318,79 | 1 387,23 | 1 451,40 | 1 555,09 |

Source: The World Bank web page: <http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD> (unless otherwise stated)

A.2.2 GDP per Capita PPP Growth

This data were used to express the production of the country. In the model it is represented by *dependent variable (Y)*. It is derived from the total production of whole country – represented by *GDP*. The choice of GDP (nor GNP nor GNI) is because I would like to measure the effect of different cultural characteristics of inhabitants on their production. GNP includes also outputs of

companies owned by the country's inhabitants but located elsewhere, so it includes the production of foreign employees. Another reason is that Hofstede within his work tried to test correlation of some dimensions with GNI, and he was partly successful. None of the studies I was able to find tested the cultural affect on GDP per capita PPP.

The chosen data respect the number of people which participated in production – represented by GDP *per capita*. It is not influenced by different power of currencies in respective countries. The usage of Purchasing Power Parity respects that the production of the same amount and of the same commodities has the same value – represented by GDP per capita PPP.

$gdp_t \dots$ GDP per capita PPP in year t

$g_{t+1} \dots$ growth of GDP per capita PPP between years t and t+1 (in %)

$AvG_{t,t+i} \dots$ average growth of GDP per capita PPP between years t and t+i (in %)

$$g_{t+1} = \frac{gdp_{t+1}}{gdp_t} - 1 \quad (\text{A.1})$$

$$AvG_{t,t+i} = \frac{\sum_{a=1}^{a=i} (g_{t+a})}{i} \quad (\text{A.2})$$

Table A.5: Average Growth GDP per Capita

| | Country | 2010/1980 | 1990/1980 | 2000/1990 | 2010/2000 |
|---|------------|-----------|-----------|-----------|-----------|
| 1 | Argentina | 4,2660% | 1,2415% | 5,5570% | 5,9995% |
| 2 | Australia | 4,8975% | 6,5401% | 4,3783% | 3,7742% |
| 3 | Austria | 4,5714% | 6,3144% | 4,0588% | 3,3411% |
| 4 | Bangladesh | 5,6031% | 5,2837% | 4,7765% | 6,7491% |

| | Country | 2010/1980 | 1990/1980 | 2000/1990 | 2010/2000 |
|----|-------------|-----------|-----------|-----------|-----------|
| 5 | Belgium | 4,4587% | 6,2234% | 3,9963% | 3,1565% |
| 6 | Brazil | 4,0567% | 4,2434% | 3,1017% | 4,8251% |
| 7 | Bulgaria | 5,7563% | 7,0527% | 1,7191% | 8,4970% |
| 8 | Canada | 4,3383% | 5,8999% | 3,8505% | 3,2647% |
| 9 | Colombia | 4,5128% | 5,7153% | 2,9653% | 4,8577% |
| 10 | Costa Rica | 4,6079% | 4,0486% | 4,8583% | 4,9167% |
| 11 | Denmark | 4,7908% | 6,3819% | 4,5598% | 3,4308% |
| 12 | Egypt | 5,7873% | 7,4227% | 4,6285% | 5,3108% |
| 13 | El Salvador | 3,9700% | 2,4691% | 5,6486% | 3,7922% |
| 14 | Ethiopia | 4,5066% | 3,1581% | 1,9740% | 8,3878% |
| 15 | Finland | 4,8574% | 6,9866% | 3,9204% | 3,6653% |
| 16 | France | 4,3801% | 6,1463% | 3,8760% | 3,1179% |
| 17 | Germany | 4,5671% | 6,5170% | 3,3509% | 3,8335% |
| 18 | Ghana | 4,2659% | 3,3757% | 3,7499% | 5,6719% |
| 19 | Greece | 4,2516% | 4,4288% | 3,7215% | 4,6047% |
| 20 | Guatemala | 3,2302% | 2,7067% | 3,8596% | 3,1244% |
| 21 | Hungary | 4,8231% | 5,7955% | 2,9781% | 5,6956% |
| 22 | Chile | 6,7335% | 6,9888% | 7,5210% | 5,6907% |
| 23 | China | 12,0734% | 12,3148% | 11,5530% | 12,3525% |
| 24 | India | 7,2232% | 7,6360% | 5,7612% | 8,2726% |
| 25 | Indonesia | 6,7177% | 8,7181% | 5,0647% | 6,3704% |
| 26 | Iran | 4,3885% | 3,0533% | 4,1168% | 5,9953% |
| 27 | Ireland | 6,5633% | 7,7441% | 8,3852% | 3,5607% |
| 28 | Israel | 4,4039% | 6,0355% | 5,9130% | 1,2630% |
| 29 | Italy | 4,2656% | 6,6972% | 3,8844% | 2,2153% |

| | Country | 2010/1980 | 1990/1980 | 2000/1990 | 2010/2000 |
|----|--------------|-----------|-----------|-----------|-----------|
| 30 | Japan | 4,7685% | 8,4758% | 3,0837% | 2,7460% |
| 31 | Luxembourg | 6,5941% | 8,9010% | 5,9010% | 4,9803% |
| 32 | Malaysia | 6,4318% | 7,5538% | 6,7557% | 4,9860% |
| 33 | Malta | 5,4185% | 7,1401% | 5,7674% | 3,3480% |
| 34 | Mexico | 4,6264% | 4,7838% | 4,0555% | 5,0400% |
| 35 | Morocco | 5,0126% | 5,7913% | 3,0901% | 6,1564% |
| 36 | Netherlands | 4,9891% | 5,9788% | 5,2567% | 3,7319% |
| 37 | New Zealand | 4,3120% | 5,2431% | 4,0528% | 3,6402% |
| 38 | Nigeria | 3,8458% | 2,8765% | 2,4647% | 6,1962% |
| 39 | Norway | 6,2777% | 6,4824% | 7,4156% | 4,9352% |
| 40 | Pakistan | 5,2417% | 7,2216% | 3,4343% | 5,0691% |
| 41 | Panama | 5,2646% | 3,7052% | 5,1385% | 6,9502% |
| 42 | Peru | 4,2209% | 1,4330% | 4,3634% | 6,8662% |
| 43 | Philippines | 3,7173% | 3,3124% | 2,6716% | 5,1679% |
| 44 | Portugal | 5,3357% | 7,4308% | 4,9150% | 3,6613% |
| 45 | Romania | 4,9639% | 3,7925% | 1,0371% | 10,0622% |
| 46 | Saudi Arabia | 1,2757% | -1,2206% | 2,6435% | 2,4042% |
| 47 | Sierra Leone | 2,8648% | 2,8939% | -2,6103% | 8,3108% |
| 48 | Singapore | 7,2982% | 9,7726% | 6,4365% | 5,6853% |
| 49 | South Africa | 3,1756% | 3,3172% | 1,6600% | 4,5495% |
| 50 | South Korea | 8,7745% | 12,8652% | 8,1401% | 5,3182% |
| 51 | Spain | 5,3001% | 6,9052% | 4,8163% | 4,1787% |
| 52 | Suriname | 3,2367% | 2,2664% | 1,4216% | 6,0222% |
| 53 | Sweden | 4,5199% | 6,2183% | 3,7884% | 3,5529% |
| 54 | Switzerland | 4,1246% | 5,9209% | 2,5200% | 3,9329% |

| | Country | 2010/1980 | 1990/1980 | 2000/1990 | 2010/2000 |
|----|----------------------|-----------|-----------|-----------|-----------|
| 55 | Thailand | 7,3156% | 10,4113% | 5,7563% | 5,7792% |
| 56 | Trinidad and Tobago | 4,4387% | 0,8340% | 4,7068% | 7,7752% |
| 57 | Turkey | 7,0971% | 7,4849% | 8,2115% | 5,5947% |
| 58 | United Arab Emirates | -0,5181% | -0,5906% | 1,5024% | -2,4662% |
| 59 | United Kingdom | 4,9899% | 6,9311% | 4,8028% | 3,2358% |
| 60 | United States | 4,6138% | 6,6078% | 4,3001% | 2,9335% |
| 61 | Uruguay | 4,6457% | 3,6939% | 4,9922% | 5,2509% |
| 62 | Venezuela | 2,8648% | 2,3511% | 2,1790% | 4,0642% |
| 63 | Zambia | 2,6312% | 2,1898% | 0,2223% | 5,4816% |

A.2.3 GDP per Capita PPP Ranking

GDP per Capita PPP Ranking (state in current international dollars) is used as one of the explanatory variables. GDP p.c. PPP ranking is used because it represents the original state of the country's production. It captures the fact of different original situation of the states. In brief "it makes difference if you start from zero or already equipped with some production". In the model it is represented by *independent variable* (X_6).

GDP p.c. PPP ranking was created as the ranking of all 63 countries according to their actual GDP per capita PPP in respective year. The most productive country get rank 1, the least productive rank 63. These rankings were executed according to the GDP per capita PPP results in years 1980, 1990 and 2000.

Table A.6: Ranking GDP per Capita PPP

| | Country | RankGDP_1980 | RankGDP_1990 | RankGDP_2000 |
|---|-----------|--------------|--------------|--------------|
| 1 | Argentina | 31 | 35 | 33 |

| | Country | RankGDP_1980 | RankGDP_1990 | RankGDP_2000 |
|----|-------------|--------------|--------------|--------------|
| 2 | Australia | 16 | 18 | 14 |
| 3 | Austria | 8 | 6 | 9 |
| 4 | Bangladesh | 61 | 61 | 61 |
| 5 | Belgium | 9 | 9 | 13 |
| 6 | Brazil | 36 | 38 | 40 |
| 7 | Bulgaria | 42 | 34 | 43 |
| 8 | Canada | 6 | 5 | 11 |
| 9 | Colombia | 43 | 44 | 44 |
| 10 | Costa Rica | 40 | 41 | 38 |
| 11 | Denmark | 10 | 11 | 10 |
| 12 | Egypt | 51 | 51 | 50 |
| 13 | El Salvador | 48 | 49 | 48 |
| 14 | Ethiopia | 62 | 63 | 62 |
| 15 | Finland | 17 | 16 | 19 |
| 16 | France | 14 | 17 | 20 |
| 17 | Germany | 11 | 10 | 17 |
| 18 | Ghana | 58 | 60 | 59 |
| 19 | Greece | 21 | 25 | 25 |
| 20 | Guatemala | 49 | 50 | 51 |
| 21 | Hungary | 30 | 28 | 30 |
| 22 | Chile | 45 | 40 | 31 |
| 23 | China | 63 | 59 | 54 |
| 24 | India | 59 | 58 | 57 |
| 25 | Indonesia | 56 | 54 | 55 |
| 26 | Iran | 37 | 42 | 42 |

| | Country | RankGDP_1980 | RankGDP_1990 | RankGDP_2000 |
|----|--------------|--------------|--------------|--------------|
| 27 | Ireland | 26 | 24 | 8 |
| 28 | Israel | 22 | 22 | 21 |
| 29 | Italy | 15 | 15 | 18 |
| 30 | Japan | 19 | 8 | 16 |
| 31 | Luxembourg | 4 | 2 | 2 |
| 32 | Malaysia | 46 | 39 | 34 |
| 33 | Malta | 28 | 27 | 24 |
| 34 | Mexico | 33 | 32 | 35 |
| 35 | Morocco | 52 | 52 | 52 |
| 36 | Netherlands | 12 | 14 | 7 |
| 37 | New Zealand | 18 | 20 | 23 |
| 38 | Nigeria | 54 | 56 | 58 |
| 39 | Norway | 13 | 13 | 3 |
| 40 | Pakistan | 57 | 55 | 56 |
| 41 | Panama | 39 | 45 | 39 |
| 42 | Peru | 41 | 47 | 46 |
| 43 | Philippines | 50 | 53 | 53 |
| 44 | Portugal | 29 | 26 | 27 |
| 45 | Romania | 35 | 37 | 45 |
| 46 | Saudi Arabia | 2 | 21 | 26 |
| 47 | Sierra Leone | 60 | 62 | 63 |
| 48 | Singapore | 24 | 12 | 5 |
| 49 | South Africa | 32 | 33 | 41 |
| 50 | South Korea | 44 | 29 | 28 |
| 51 | Spain | 25 | 23 | 22 |

| | Country | RankGDP_1980 | RankGDP_1990 | RankGDP_2000 |
|----|----------------------|--------------|--------------|--------------|
| 52 | Suriname | 38 | 46 | 49 |
| 53 | Sweden | 7 | 7 | 12 |
| 54 | Switzerland | 3 | 3 | 6 |
| 55 | Thailand | 53 | 48 | 47 |
| 56 | Trinidad and Tobago | 23 | 30 | 29 |
| 57 | Turkey | 47 | 43 | 32 |
| 58 | United Arab Emirates | 1 | 1 | 1 |
| 59 | United Kingdom | 20 | 19 | 15 |
| 60 | United States | 5 | 4 | 4 |
| 61 | Uruguay | 34 | 36 | 36 |
| 62 | Venezuela | 27 | 31 | 37 |
| 63 | Zambia | 55 | 57 | 60 |

A.2.4 Population Growth

Population Growth

Population Growth represents one of the explanatory variables. Population growth respects the fact that there are different marginal products of labor. Briefly “1 mil. people will highly probably produce different output (even per capita) than 2 mil. people with the same land and capital. In the model it is represented by *independent variable* (X_7).

The percentage population changes are calculated as a percentage change of actual population in countries between the stated years.

$P_t \dots$ population (in a country) in year t

$g_{t,s} \dots$ growth of population between years t and s (in %)

$$g_{t,s} = \frac{P_s}{P_t} - 1 \quad (\text{A.3})$$

Table A.7: Population Growth

| | Country (Gretl Abbreviations) | Pop 2010/1980* ChgPop1980_2010 | Pop 1990/1980* ChgPop1980_1990 | Pop 2000/1990* ChgPop1990_2000 | Pop 2010/2000* ChgPop2000_2010 |
|----|----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| 1 | Argentina | 44,23% | 15,97% | 13,24% | 9,82% |
| 2 | Australia | 52,61% | 16,15% | 12,23% | 17,06% |
| 3 | Austria | 10,86% | 2,09% | 3,90% | 4,51% |
| 4 | Bangladesh | 100,07% | 26,60% | 23,90% | 27,54% |
| 5 | Belgium | 9,96% | 1,22% | 2,86% | 5,61% |
| 6 | Brazil | 59,00% | 22,84% | 16,38% | 11,22% |
| 7 | Bulgaria | -14,50% | -1,62% | -7,55% | -6,00% |
| 8 | Canada | 39,09% | 13,00% | 10,72% | 11,17% |
| 9 | Colombia | 60,71% | 22,99% | 19,52% | 9,32% |
| 10 | Costa Rica | 97,70% | 31,04% | 27,74% | 18,10% |
| 11 | Denmark | 8,14% | 0,33% | 3,84% | 3,80% |
| 12 | Egypt | 79,77% | 26,93% | 20,86% | 17,18% |
| 13 | El Salvador | 35,07% | 11,43% | 22,90% | -1,38% |
| 14 | Ethiopia | 110,04% | 35,69% | 25,63% | 23,21% |
| 15 | Finland | 12,26% | 4,31% | 3,81% | 3,67% |
| 16 | France | 21,47% | 5,30% | 3,81% | 11,12% |
| 17 | Germany | 4,41% | 1,44% | 3,50% | -0,55% |
| 18 | Ghana | 115,29% | 36,96% | 28,35% | 22,48% |

| | Country (Gretl Abbreviations) | Pop 2010/1980* ChgPop1980_2010 | Pop 1990/1980* ChgPop1980_1990 | Pop 2000/1990* ChgPop1990_2000 | Pop 2010/2000* ChgPop2000_2010 |
|----|----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| 19 | Greece | 17,25% | 5,37% | 7,45% | 3,56% |
| 20 | Guatemala | 105,05% | 26,84% | 25,56% | 28,75% |
| 21 | Hungary | -6,48% | -3,11% | -1,57% | -1,93% |
| 22 | Chile | 53,16% | 17,94% | 16,94% | 11,04% |
| 23 | China | 36,48% | 15,69% | 11,23% | 6,06% |
| 24 | India | 72,35% | 23,60% | 19,59% | 16,61% |
| 25 | Indonesia | 57,91% | 20,18% | 15,73% | 13,53% |
| 26 | Iran | 91,90% | 39,05% | 17,03% | 17,93% |
| 27 | Ireland | 31,12% | 3,08% | 8,55% | 17,18% |
| 28 | Israel | 96,04% | 20,17% | 34,96% | 20,88% |
| 29 | Italy | 6,92% | 0,51% | 0,40% | 5,96% |
| 30 | Japan | 9,08% | 5,78% | 2,70% | 0,40% |
| 31 | Luxembourg | 37,63% | 4,66% | 14,69% | 14,66% |
| 32 | Malaysia | 105,67% | 29,66% | 28,87% | 23,09% |
| 33 | Malta | 14,38% | -1,10% | 8,33% | 6,75% |
| 34 | Mexico | 60,42% | 23,17% | 17,71% | 10,65% |
| 35 | Morocco | 64,56% | 24,70% | 17,79% | 12,04% |
| 36 | Netherlands | 17,38% | 5,67% | 6,51% | 4,30% |
| 37 | New Zealand | 40,82% | 10,76% | 11,89% | 13,63% |
| 38 | Nigeria | 122,70% | 32,91% | 32,10% | 26,84% |
| 39 | Norway | 19,69% | 3,68% | 5,88% | 9,03% |
| 40 | Pakistan | 105,80% | 30,51% | 27,88% | 23,31% |
| 41 | Panama | 70,44% | 23,68% | 22,36% | 12,63% |
| 42 | Peru | 70,06% | 25,57% | 19,30% | 13,52% |

| | Country (Gretl Abbreviations) | Pop 2010/1980* ChgPop1980_2010 | Pop 1990/1980* ChgPop1980_1990 | Pop 2000/1990* ChgPop1990_2000 | Pop 2010/2000* ChgPop2000_2010 |
|----|----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| 43 | Philippines | 95,50% | 27,07% | 23,99% | 24,08% |
| 44 | Portugal | 8,92% | 1,33% | 3,33% | 4,02% |
| 45 | Romania | -3,31% | 4,53% | -3,29% | -4,35% |
| 46 | Saudi Arabia | 173,27% | 70,54% | 26,14% | 27,03% |
| 47 | Sierra Leone | 80,37% | 26,05% | 10,56% | 29,43% |
| 48 | Singapore | 106,61% | 26,22% | 31,86% | 24,14% |
| 49 | South Africa | 81,29% | 27,65% | 25,00% | 13,62% |
| 50 | South Korea | 30,56% | 12,45% | 9,66% | 5,88% |
| 51 | Spain | 25,59% | 3,88% | 3,67% | 16,61% |
| 52 | Suriname | -99,85% | 12,81% | 8,00% | 20,73% |
| 53 | Sweden | 12,71% | 3,00% | 3,62% | 5,60% |
| 54 | Switzerland | 23,17% | 6,22% | 7,04% | 8,33% |
| 55 | Thailand | 37,10% | 17,92% | 12,44% | 3,40% |
| 56 | Trinidad and Tobago | 24,24% | 12,33% | 5,72% | 4,62% |
| 57 | Turkey | 63,12% | 26,23% | 20,06% | 7,63% |
| 58 | United Arab Emirates | 351,29% | 69,99% | 83,14% | 44,96% |
| 59 | United Kingdom | 10,14% | 2,19% | 3,79% | 3,85% |
| 60 | United States | 36,42% | 9,86% | 13,06% | 9,83% |
| 61 | Uruguay | 15,73% | 6,59% | 6,29% | 2,16% |
| 62 | Venezuela | 91,42% | 30,87% | 23,09% | 18,83% |
| 63 | Zambia | 118,78% | 38,24% | 27,76% | 23,87% |

Source:

* The source of the population of countries for years 1980-2009 from the web page <http://www.nationmaster.com/graph/peo-pop-people-population;>

the source of the population of countries for year 2010 from the web page
<http://www.worldatlas.com/aatlas/populations/ctypopls.htm>

Appendix B

Content of Enclosed CD

There is a CD enclosed to this thesis which contains following folders:

- Folder 1: The electronic version of the thesis
- Folder 2: Empirical data from Excel
- Folder 3: Gretl source