

The Impact of Prosperity on Economic Development: Evidence from Low and High Prosperity Countries

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ABSTRACT

This thesis attempts to empirically investigate the role of prosperity in economic development in low and high prosperity countries classified according to their prosperity rank in 2014. Panel regression analysis technique was conducted to estimate the relationship between prosperity and economic development in low and high prosperity countries using a sample of 105 countries over the years between 2009 and 2014.

The regression results show a positive relationship between prosperity sub-indices and economic growth. The results also show that Economic Fundamentals, Social Capital and Health have greater effects on economic growth in high prosperity countries whereas the effect of Education, Governance and safety are greater in low prosperity countries.

Keywords: Economic Development, Prosperity, Panel Unit Root, OLS Regression, Granger Causality Test

ÖZ

Bu tez refah ve ekonomik kalkınma arasındaki ilişkiyi belirlemek için 2014 yılında kendi refah sıralamasına göre sınıflandırılmış düşük ve yüksek refah ülkelerinde ekonomik kalkınmadaki refahın rolünü ampirik olarak araştırmaktadır. Panel eşbütünleme teknikleri kullanılarak düşük ve yüksek refah ülkelerindeki refah seviyesi ile ekonomik kalkınma arasındaki ilişkiyi 2009 ve 2014 yılları arasında 105 ülke için tahmin etmektedir.

Ampirik sonuçlar refah alt-endeksleri ve ekonomik büyüme arasında pozitif bir ilişki göstermektedir. Ayrıca, sonuçlar Temel Ekonomik değerler, Sosyal Sermaye ve Sağlık değişkenlerinin Yüksek refah ülkelerinde ekonomik büyüme üzerinde daha büyük etkilere sahip olduğunu göstermektedir. Buna ilaveten, Eğitim, Yönetim ve Güvenlik değişkenlerinin etkisi düşük refah ülkelerinde daha fazla tespit edilmiştir.

Anahtar Kelimeler: Ekonomik Kalkınma, Refah, Panel Eşbütünleme testi, Panel Birim Kök Testi, Granger Nedensellik Testi

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Chapter 1

INTRODUCTION

1.1 Economic development

In strictly economic terms, development has meant achieving sustained rates of growth of income per capita to enable a nation to expand its output at a rate faster than the growth rate of its population. The emphasis has also been on increased output, measured by Gross Domestic Product (GDP) (Todaro, 2009).

The concentration of growth literature, has been broadly on economic development and income growth subjects. The empirical economic development literature has recommended an expansive number of economic and non-economic variables that may impact economic growth (Bleaney & Nishiyama, 2002; Sala-i-Martin, 1997). Per capita real income is the most usually used measure of living standards. The ability of providing a higher standard of living and a superior quality of life is more prominent in economies with rising per capita real incomes.

There is no agreement on “what works” for development and growth, this is the beginning stage for the contributions to this study. A conceivable demonstration of what has worked in the past and what may work later on, is the definitive aim of development research, which still stays elusive (Cohen & eds, 2009). The number of approaches that we can say with assurance influence development are not excessive (Harberger, 2003). Based on Barcelona Development Agenda, for starting sustained growth, there is no specified arrangement of strategies. Even Robert Solow, the

universally adored researcher of growth theory, believes that in real life it difficult to experience a lasting growth rate; and when it happens, its source can be a somewhat secretive even after the fact (Solow, 2007)¹.

1.2 Legatum Prosperity Index

Can GDP define the prosperity of a nation individually? Generally just macroeconomic variables like GDP or GDP per capita is considered to determine a nation's prosperity. But prosperity is not just material wealth accumulation. It also shows how people enjoy their life and expect a better life in the future.

This works for both people and countries. Prosperity is measured only by Prosperity Index in the world, which is calculated based on wellbeing and income. Prosperity Index is multi-dimensional and the most comprehensive mean of measuring global progress. It specifies the process of forming and changing of prosperity around the world. Recently, academics, governments, international businesses and organizations have considered wellbeing indicators as complement to GDP. A country may need to attain higher levels of GDP per capita and promote its citizens wellbeing. The Prosperity Index identify this need.

The Prosperity Index is created by the Legatum Institute, a London-based think tank and educational charity focused on promoting prosperity. They try to create an Index which is methodologically accurate and consistent. To achieve this goal, they have published a full methodology document including all of the needed information for

¹ The most recent endeavors seem to follow a theory based on

*Growth (period t, country i) = Coefficient (period t, country i) *Policy (period t, country i).*

realizing Legatum Prosperity Index as an informative, useful and transparent index. They can examine and identify the specific variables affecting prosperity of a country.

1.3 Aim of this Study

This thesis attempts to provide evidence on the role of prosperity in economic development in low and high prosperity countries classified according to their prosperity rank in 2014. A linear relationship between prosperity sub-indices and the level of economic development is hypothesized based on the literature on economic development and that on our eight independent variables.

Panel regression analysis was conducted to estimate the relationship between prosperity and economic development in low and high prosperity countries using a sample of 105 countries over the years between 2009 and 2014.

1.4 Structure of this Thesis

The rest of this thesis is structured as follows. In chapter 2 according to literature, the relation between each prosperity sub-index and economic growth and its dependence on the level of prosperity are discussed. In Chapter 3 introduces our model and describe the variables, data and data sources. Chapter 4 is used for empirical results; and Finally, Chapter 5 provides concluding statements and policy implications.

1.5 Contribution of this Thesis

To the best of my knowledge, this thesis is the first attempt to investigate whether differences in the Prosperity sub-indices and prosperity ranking across countries are effective on their economic development. This thesis contributes to the literature by exploring relationships between (1) prosperity sub-indices and GDP per capita growth percentage and (2) prosperity sub-indices and percentage GDP growth for low and high prosperity countries. Therefore, our results add a piece of evidence to the existing empirical literature and discuss about the role of prosperity on economic development.

Chapter 2

LITERATURE REVIEW

In this section we review the relationship between different economic and non-economic variables and development in previous studies

2.1 Economic Fundamentals and Economic Development

Granato, Inglehart, & Leblang (1996) used empirical endogenous growth models to find the determinants of economic development. In their model, the dependent variable is per capita output growth. The independent variables are a set of economic variables including investment in human capital, initial levels of wealth, and physical capital investment rates and also non-economic variables like post-materialism and achievement motivation. They found that economic and cultural factors affect economic growth.

2.2 Social Capital and Economic Development

The social capital concept has been used more frequently in recent economic growth studies. Norms and trust in civic collaboration are from essentials of economic growth of countries. Knack & Keefer (1997) got the data of civic norms and trust indicators from World Values Surveys for a sample of 29 countries. They demonstrated social capital affects the economic performance of countries. They used “Hall and Jones” method and 2SLS model in their research. They discovered in the societies with better-educated individuals and with more equal and higher incomes, trust and civic norms are more intense. Their study demonstrates that economic performance of the countries is affected by civic cooperation and trust (Knack & Keefer, 1997). According to this

research, institutional improvements using formal mechanisms are helpful when a society has low interpersonal trust and quick reform is not possible. Group membership doesn't affect trust, but it influences economic activity. Reforms can enhance Economic performance through interpersonal enrichment.

Both individual-level and societal-level evidence recommends that political and economic institutions in a society are not the only elements that affect economic growth; cultural elements are also critical (Granato, Inglehart, & Leblang, 1996).

Guiso, Sapienza and Zingales (2000) examined the relationship between social capital and financial development by undertaking social capital and trust diversities in different cities of Italy. By entering the microeconomic data of households and firms to a model of linear probability with control variables, they demonstrated that use of financial contracts is significantly correlated with the level of social capital. The findings also demonstrate social trust has a negative effect on investment in cash and using informal credit. Social trust has a positive effect on investment in stock and using institutional credit. Firms have more access to credit in this situation. For the individuals with lower education, the trust impact is higher (Sapienza, Guiso, & Zingales, 2000). According to this research, social capital impacts are very prevalent. Social capital has a significant effect on financial development. The impact of trust is less, when the society has more educated individuals or has an efficient court system. The success of developing countries is significantly affected by social capital.

According to Granato, Inglehart, & Leblang (1996) there has been extensive opposition against the idea that economic development is somewhat formed by cultural indicators. First reason is because cultural factors are generally seen as permanent and

diffuse components of a society: the perspective of economic growth is hopeless, if cultural values specify economic development, in the light of the fact that culture is not changed. The second reason behind this resistance is that differences in growth and savings rates are generally explained by standard economic arguments, not by cultural arguments (Granato, Inglehart, & Leblang, 1996).

2.3 Freedom and Economic Development

In recent decades we have seen a considerable increase in political freedom and remarkable economic growth in substantial parts of the world. In addition, with creating a more tolerant social environment for people, rising tolerance of outgroups increasing freedom of choice for more than half of the population and growing gender equality, individuals have experienced unprecedented changes in social norms in rich democracies. The effect of Economic development is found to be significantly positive on individuals' sense of existential security. So they transfer their emphasis from survival values to free choice and self-expression values. Leading them to maximize their life satisfaction and happiness (Inglehart, Foa, Peterson, & Welzel, 2008).

According to human development theory, economic development, democratization and higher social tolerance increase people happiness and freedom. This theory indicates that during the past 25 years, freedom has had positive effect on happiness. Inglehart et al (2008) hypothesized that increasingly tolerant societies, democratization and economic development leads to an increase in sense of freedom and control. They employed the data on 90% of the population of the world in a panel data analysis and demonstrated life satisfaction is more affected by freedom than economic factors. Economic growth has a positive impact on happiness trough increasing freedom and self-expression values.

In many countries, people give the same value to economic security and free choice (Sen, 2001), and believe increasing economic security can increase freedom.

Many societies moved to democracy in 1980 and 1990 decades. It increased free choice in politics, freedom to travel and freedom of expression. Besides, during the previous two decades, low-income countries that contain around 50% of population of the world, approached the highest economic growth rates in history, permitting them to rise up out of poverty of subsistence-level. Studies reveal an increasing free choice sense in countries with relatively high economic growth. When people want to make choices, one of the critical limitations is economic scarcity, in this situation, growing resources can increase freedom of choice. Democratization also has a similar effect on freedom of choice. In societies with increasing levels of democracy, individuals have an increasing sense of free choice (Inglehart et al, 2008).

According to their study, the sense of freedom in a country has been increased by social liberalization, democratization, and economic development. When people have more freedom in their method of living, the level of happiness is higher in the society. The most critical cultural changes are affected by happiness and freedom in the more developed countries. Sen (2001) stated, the important effect of economic development is that it leads to an increase in freedom of choice.

Barro (1996) studied the determinants of economic growth. According to his research, political freedom has a nonlinear relation with growth, but its impact on growth is weak. The net effect of more political freedom on economic growth is theoretically questionable. This impact is positive in lower levels of democracy and negative after a moderate measure of political freedom.

In previous studies, theory and findings about the relationship between economic growth, political freedom and economic freedom are mixed. Xu & Li (2008) tested the hypothesis that the impact of political freedom on boosting economic growth is distinguishable and realized at future stages of economic and social development. They used a sample of 104 countries for a time horizon of 1970 till 2003 and discovered strong support for their hypothesis.

Between different non-economic determinants of income convergence and economic growth, the studies has focused on the effect of political freedom and economic freedom in the literature. In spite of the fact that there are discussions about the use of indices of economic freedom in empirical work, most of findings in the literature demonstrate that growth is promoted by economic freedom (see, for example, De Haan et al. (2006), Wu & Davis (1999)). Of course, views about the relationship between economic development and political freedom vary definitely. For instance, according to Nobel Laureate Amartaya Sen (1999) economic development is the procedure of broadening freedoms that individuals enjoy. Sen (1999) in the book *Development as Freedom* believes that increase in freedom is one of the principal keys of development. Many studies has focused on the effect of political freedom on economic development. Barro (1996, 1999) indicated that the link between expansion of political freedom and economic development isn't theoretically clear.

Haggard (1997) and Clague et al. (1996) pointed out that democratic political regimes can raise economic development better than authoritarian systems. Nelson and Singh (1998) demonstrated that in developing countries democratic regimes and political freedom could decrease the governments' effectiveness in their basic responsibilities and duties, maintaining law, discipline and order, and providing basic services. An

interesting empirical question has been raised in inconclusive theoretical arguments in the literature. The evidence on the link between economic growth and political freedom is not clear. For example, Scully (1988) employed a panel data on 115 market economies to investigate the relationship between economic development and institutional arrangements between 1960 and 1980. He proved that economic growth and efficiency is not significantly affected by institutional framework. He found the societies that are politically open, perform 2.5 times more efficient and grow three times faster than their counterparts. But De Haan and Siermann (1995) indicated that in most panel data studies, the positive relationship between economic development and democracy is not robust. As noted in Wu and Davis (1999) the link between economic growth and political freedom is not robust. According to their research, only economic freedom significantly affects economic growth. Farr et al. (1998) also got similar results in their study.

2.4 Health and Economic Development

A review study conducted by Marmot and Wilkinson (2001) focuses on the relationship between income and health. They point out that economic and social conditions affect health through material circumstances and emotional meanings. In rich countries, psychosocial wellbeing has a negative effect on income inequality and positive effect on measure of population health. So In rich countries, the pattern of health in the society is perfectly affected by psychosocial wellbeing which is explained by social dominance, social relations quality, inequality and autonomy.

Information about population wealth provided by sub-national figures can be used to define the distribution of both poverty and economic performance in all societies. Furthermore, there is a high correlation between welfare of household and different

health factors like life expectancy. Therefore when direct measurement is difficult, we can evaluate the distribution of health indicators using sub-national figures.

Health of population does affect and is affected by poverty, income and economy in different ways. The macro relationship between Gross National Product (GNP) and life expectancy is identified and has been reported in many publications (Marmot and Wilkinson, 2001).

At a smaller scale, there is a substantial link between an adult individual's health and income. Benzeval & Judge (2001) did a review of sixteen studies related to four different countries. They confirm this link and conclude: "All of the studies that include measures of income level find that it is significantly related to health outcomes."

The findings of another study performed in Tanzania reveals that the poorest households have the poorest health status so there is a link between health and poverty status. The same study also indicates that the health status of people is affected by geographic distribution of poverty. On the other hand, increase in the level of poverty can increase the vulnerability of people when they are exposed to diseases (Khan, Hotchkiss, Berruti, & Hutchinson, 2006).

According to Ebener, Murray, Tandon, & Elvidge (2005) nighttime lights is useful to evaluate the effect of international efforts to enhance the economic and therefore health conditions of people.

It is commonly known that the level of health care spending is explained by per capita income and technology (Slade & Anderson, 2001). Helms (1985) employed LSC estimations to show increase in financing health care leads to an increase in short-run income.

2.5 Education and Economic Development

Gylfason (2001) employed the regression analysis to examine the link between natural resources, education and economic development. He used 3 variables of inputs, outcomes and education participation, in his study. He found the share of natural resources in national wealth, has a negative effect on the proportion of public expenditure on education to national income. Share of natural resources also has a negative effect on the expected years of schooling. A robust link exists between secondary school enrolment and annual growth of GNP per capita. A forty percent decrease in secondary school enrolment causes one percent decrease in GNP per capita. According to this research education has a positive effect on economic growth (Gylfason, 2001).

Chen & Feng (2000) examined the determinants of economic development in China. They used the data on 29 municipalities, provinces, and autonomous regions between 1978 -1989. They found economic growth in China is positively affected by international trade and education. They concluded if the government wants to provide financial help to the less developed provinces to achieve maximum growth, funds have to be used in improving health care, establishing schools, and building inter-provincial infrastructure. Their results show the importance of education in boosting economic development.

Barro (1997) finds that if variables like the openness of the economy and education level are controlled, the gap of income per capita between rich and poor countries can reduce until 2.5 percent. Less developed countries need to improve health care provisions, open more schools and produce better students (Chen & Feng, 2000).

2.6 Governance and Economic Development

Brautigam and Knack (2004) studied the effect of aid on African development using regression analysis by considering the impact of huge amounts of aid on African governance. They found a significant and negative relationship between aid levels and governance and a significant and negative relationship between aid levels and tax share of GDP. Their research also revealed that governance improvement can increase GDP per capita. Tax share of GDP and decrease of governance have a positive relationship with political violence. According to this research good governance or government efficiency has a positive and significant effect on economic growth. Political violence and tax share of GDP have negative effect on economic development (Brautigam & Knack, 2004).

2.7 Entrepreneurship and Economic Development

Many economists believe that economic development is affected by entrepreneurial performance. They refer to the impact of absence of entrepreneurial performance on the collapse of communist economies. They also refer to studies by Austrian economists (like Kirzner, 1973) and Schumpeter (1934).

There are different ways in which economic growth is affected by entrepreneurship. Entrepreneurs offer their innovations by introducing new products and techniques to the market (Acs & Audretsch, 1990, 2003). The important role of entrepreneurs in emerging and promotion of industries is not negligible. For example Bill Gates, Henry

Ford, Thomas Edison and Michael Dell are successful American entrepreneurs. Entrepreneurs may raise the competition and increase productivity (Geroski, 1989; Nickel, 1996; Nickel et al., 1997). While presenting varieties of current products and services in the market, entrepreneurs can upgrade our knowledge of what costumers prefer and what is technically suitable. It can make it easier to recognize the dominant design according to the combination of product–market (Audretsch & Keilbach, 2004; Audretsch & Stephan, 1996; Audretsch & Feldman, 1996).

Stel et al (2005) used a sample of 36 countries to investigate if Entrepreneurship influences GDP growth. They also tested if the level of economic development is important on this influence or not. They found economic growth is affected by entrepreneurial activity. This effect depends on economic development stage and per capita income.

Carree and Thurik (1999), prove that economic growth is benefited from activity of small firms in manufacturing industries. For richer EU-countries, this relationship works better than other countries like Spain and Portugal which have lower GDP per capita. This contribution is consistent with the regime shift presented by Audretsch and Thurik (2001). They indicate that there has been a shift from a model of the ‘managed economy’ to the model of the ‘entrepreneurial economy’ in advanced economies.

Chapter 3

OVERVIEW OF LOW AND HIGH PROSPERITY COUNTRIES

3.1 Brief History

In Prosperity Index of 2015 continued ascend of most of economies in Sound East Asia is obvious. In the Economy sub-index, Singapore is moving to 1st place. In the global rankings Indonesia has ascended 21 places during the last seven years to merge as the best performer overall. They did it by unprecedented progress in Entrepreneurship & Opportunity and Economy sub-indices.

The escape of some countries from financial crisis has been confirmed while many developed European economies remain in depression. UK has experienced the highest economic improvement between EU countries after 2013. The most important reason is major improvement in employment.

Table 1 represents year-on-year prosperity rankings for the 20 highest and the 20 lowest prosperity countries between years 2009–2015. Between years 2009-2011, there were 110 countries in Index. These numbers of countries in the Index is expanded to 142 in 2012. These ranking changes over the last seven years should be noticed. Considering that the new added countries in the Index may achieve better ranks, significant decreases happened for the countries with low ranking.

In Figure 1, the unemployment percentage for different countries over the last seven years is represented. We can see a significant decrease of unemployment in UK and US in recent years.

Table 1: Year-On-Year Prosperity Rankings

COUNTRY	COUNTRY RANK							COUNTRY	COUNTRY RANK						
	2009	2010	2011	2012	2013	2014	2015		2009	2010	2011	2012	2013	2014	2015
Norway	1	1	1	1	1	1	1	Iraq	/	/	/	131	130	128	123
Switzerland	8	8	8	9	2	2	2	Sierra Leone	/	/	/	128	129	134	124
Denmark	2	2	2	2	6	4	3	Nigeria	103	106	104	123	123	125	125
New Zealand	3	5	4	5	5	3	4	Ethiopia	108	107	108	133	126	126	126
Sweden	7	6	5	3	4	6	5	Congo, Rep.	/	/	/	120	118	122	127
Canada	6	7	6	6	3	5	6	Zimbabwe	110	110	109	135	124	123	128
Australia	5	4	3	4	7	7	7	Togo	/	/	/	136	137	136	129
Netherlands	11	9	9	8	9	9	8	Pakistan	107	109	107	132	132	127	130
Finland	4	3	7	7	8	8	9	Guinea	/	/	/	127	135	133	131
Ireland	9	11	11	10	12	12	10	Liberia	/	/	/	130	127	131	132
United States	10	10	10	12	11	10	11	Angola	/	/	/	129	133	132	133
Iceland	12	12	12	15	13	11	12	Sudan	106	100	105	125	128	130	134
Luxembourg	/	/	/	11	10	16	13	Yemen	100	105	106	134	136	138	135
Germany	16	15	15	14	14	14	14	Syria	86	83	81	113	122	129	136
United Kingdom	13	13	13	13	16	13	15	Congo (DR)	/	/	/	141	140	140	137
Austria	14	14	14	16	15	15	16	Burundi	/	/	/	137	138	139	138
Singapore	17	17	16	19	18	18	17	Chad	/	/	/	139	142	141	139
Belgium	15	16	17	17	17	17	18	Haiti	/	/	/	138	134	135	140
Japan	19	18	21	22	21	19	19	Afghanistan	/	/	/	140	139	137	141
Hong Kong	21	20	19	18	19	20	20	Central African Rep.	109	108	110	142	141	142	142

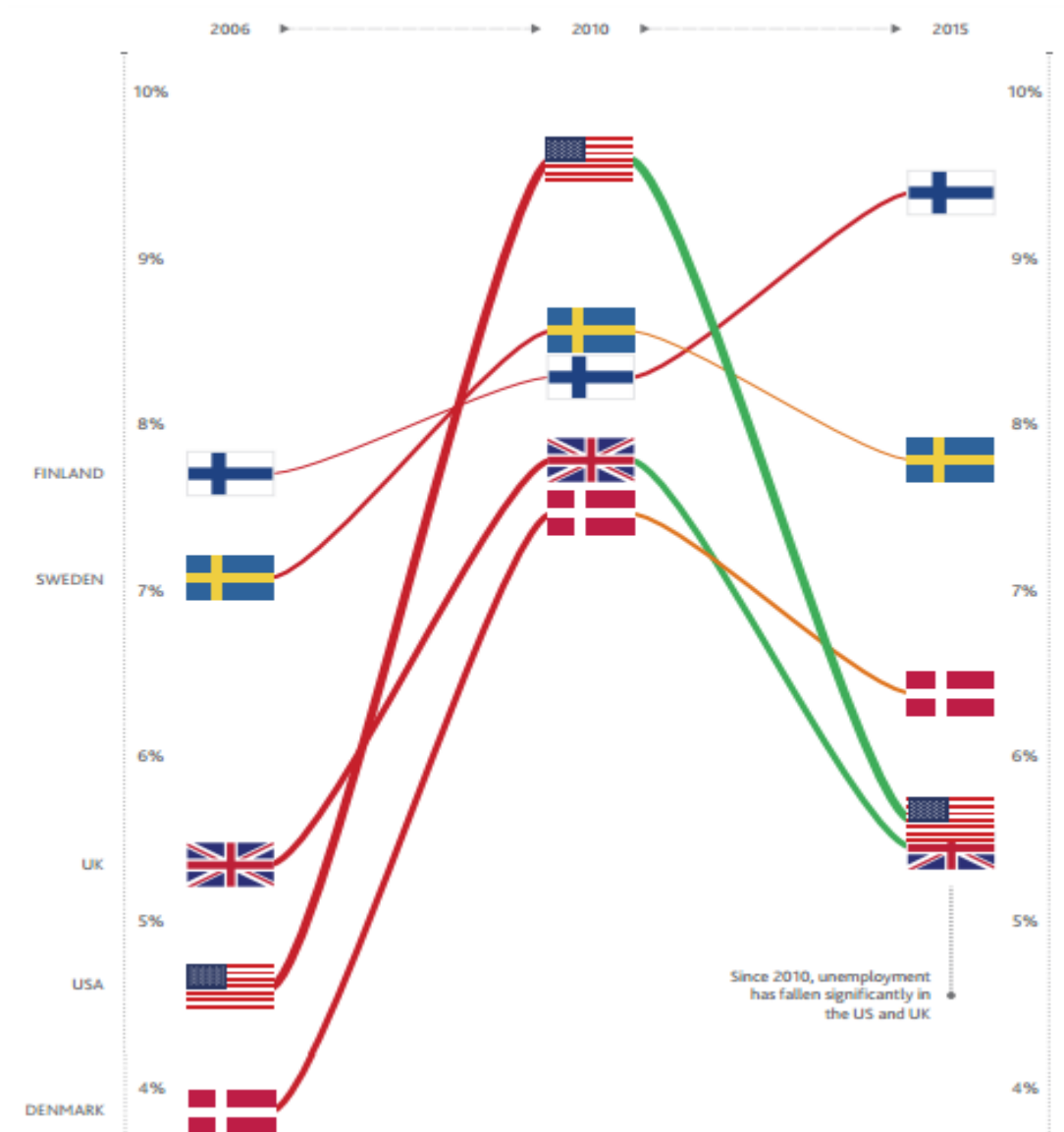


Figure 1: Unemployment (OECD and National Statistical Agencies).

3.2 Tabular and Graphical Properties

Figure 2 illustrates prosperity index ranking 2009-2015. It considers only 110 countries that participated in the prosperity index before 2012.

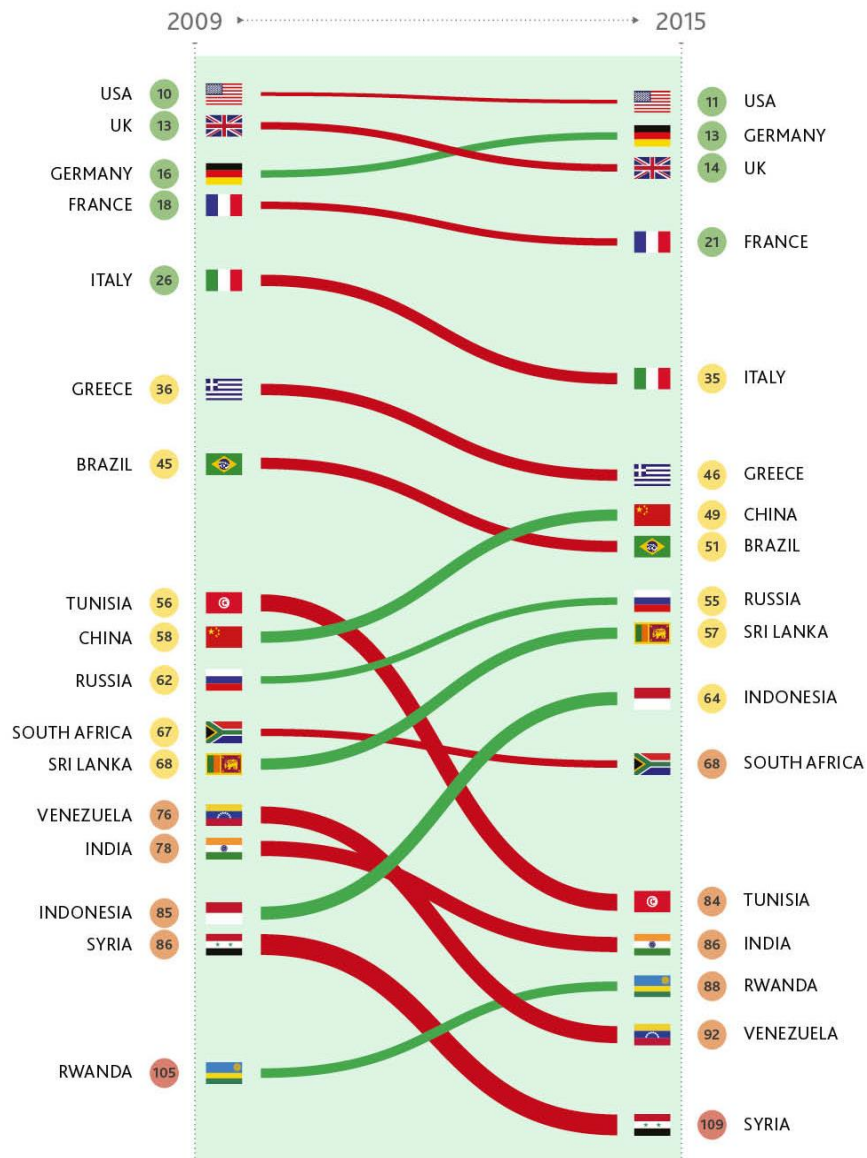
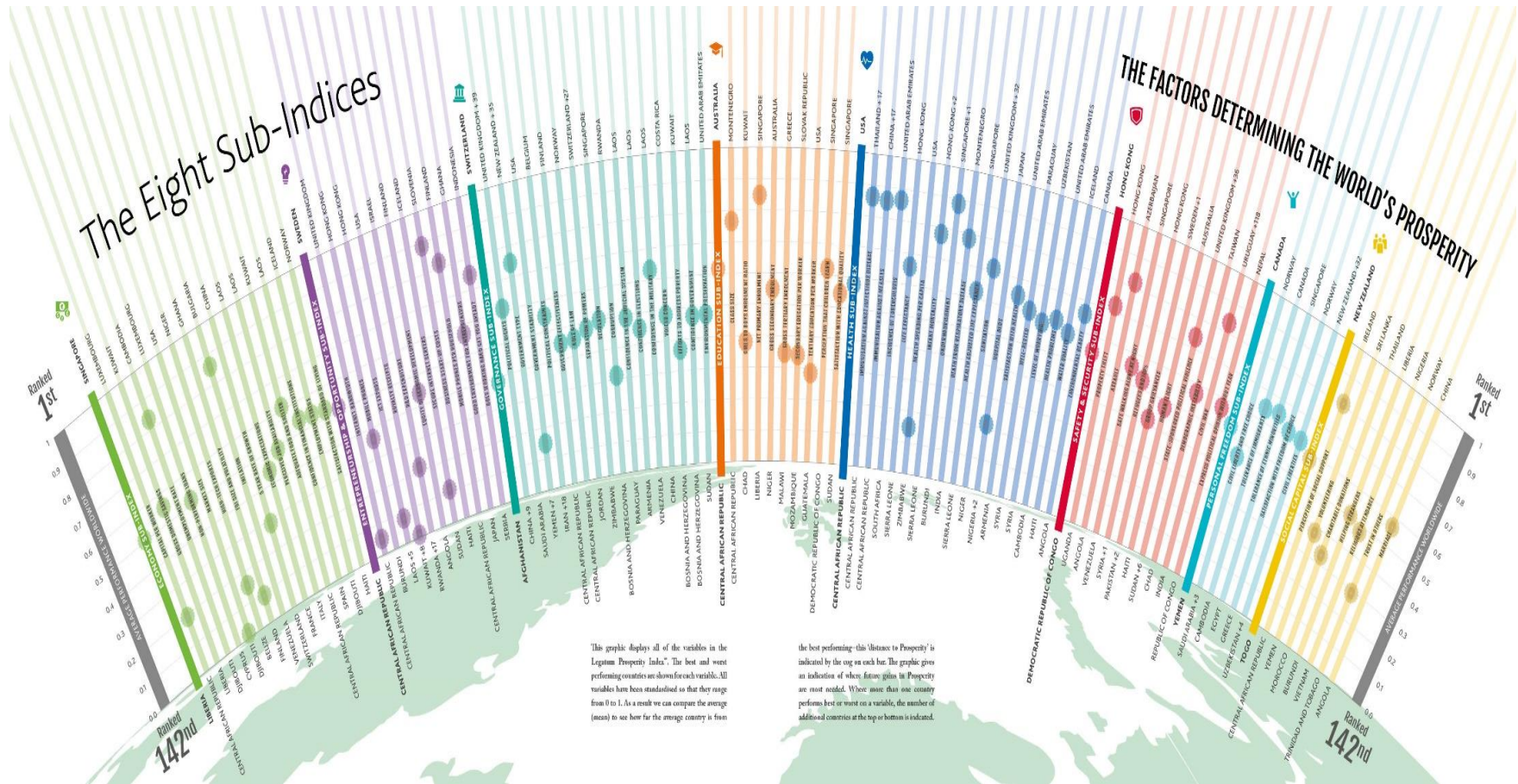


Figure 2: Prosperity index ranking 2009-2015

Figure 3 represents all of the included factors of the Legatum Prosperity Index. All these variables are ranged from 0 to 1. For each variable, the worst and best performing countries are presented. In order to show how average performing country is far from the best performing country, the “distance to prosperity” is presented for each bar by the cog. Using graphical figure, we can illustrate which country requires the future gain in prosperity.



This graphic displays all of the variables in the Legatum Prosperity Index. The best and worst performing countries are shown for each variable. All variables have been standardized so that they range from 0 to 1. As a result we can compare the average (mean) to see how far the average country is from

the best performing (this 'distance to Prosperity' is indicated by the size of each bar). The graphic gives an indication of where, future gains in Prosperity are most needed. Where more than one country performs best or worst on a variable, the number of additional countries at the top or bottom is indicated.

Figure 3: The factors determining the words prosperity

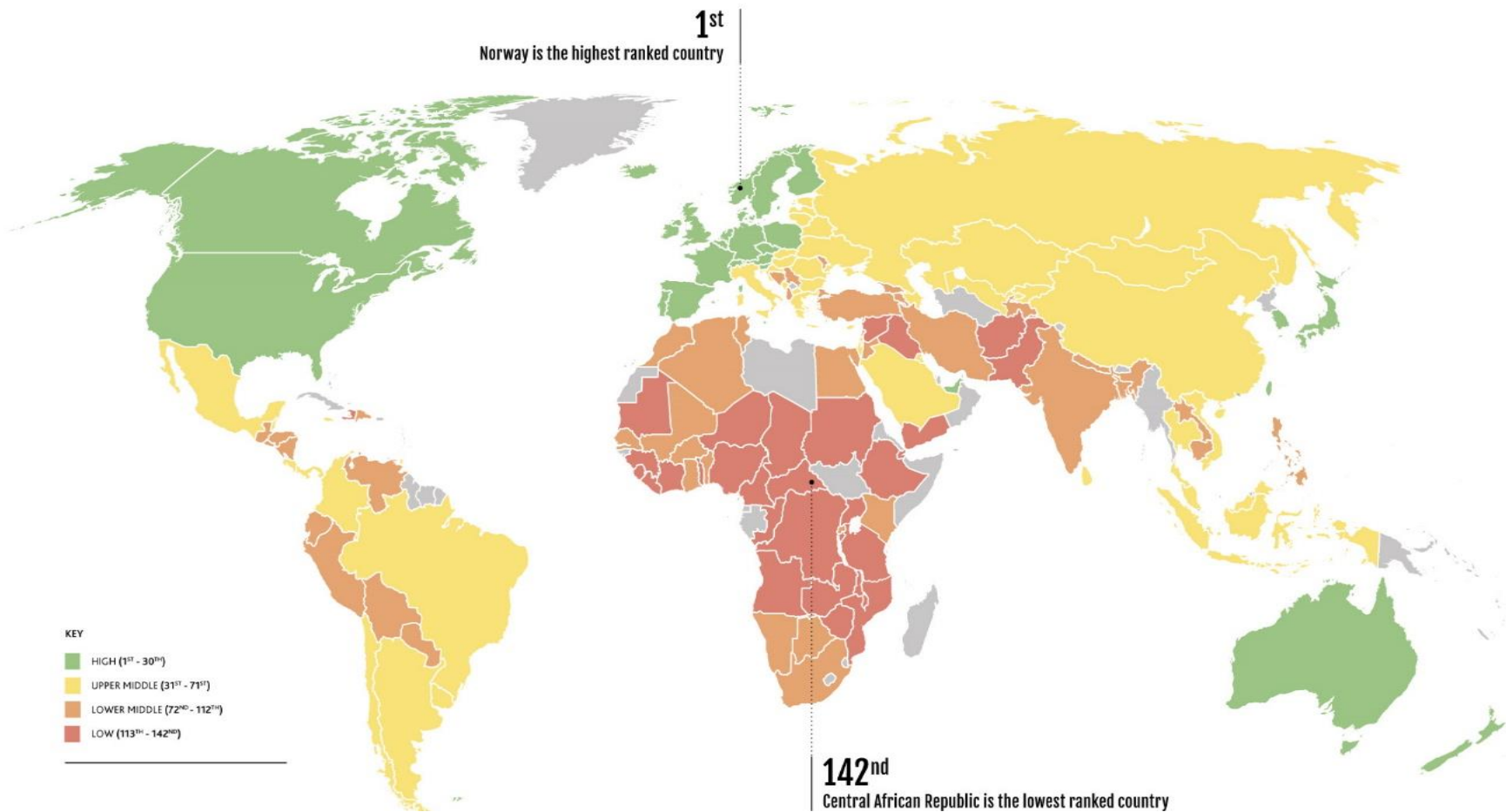


Figure 4: Mapping Prosperity in 2015

Prosperity Index for Britain's performance in 2015 is shown in Figure 5. This figure represents the economic transformation of Britain compared to OECD. The financial crisis happened in 2008 which had a significant side effect on Britain's economy in 2009 as well. The economic transformation from its drop until recent revival is represented in Figure 5. United Kingdom (UK) achieves the best rank (rank 6th) in the European Union (EU) in terms of entrepreneurship and opportunity in 2015. In this year UK has the maximum full-time employment compared to EU members. However, as shown in this figure, in terms of health and education, UK's rank has dropped into the bottom of 30% of the OECD.

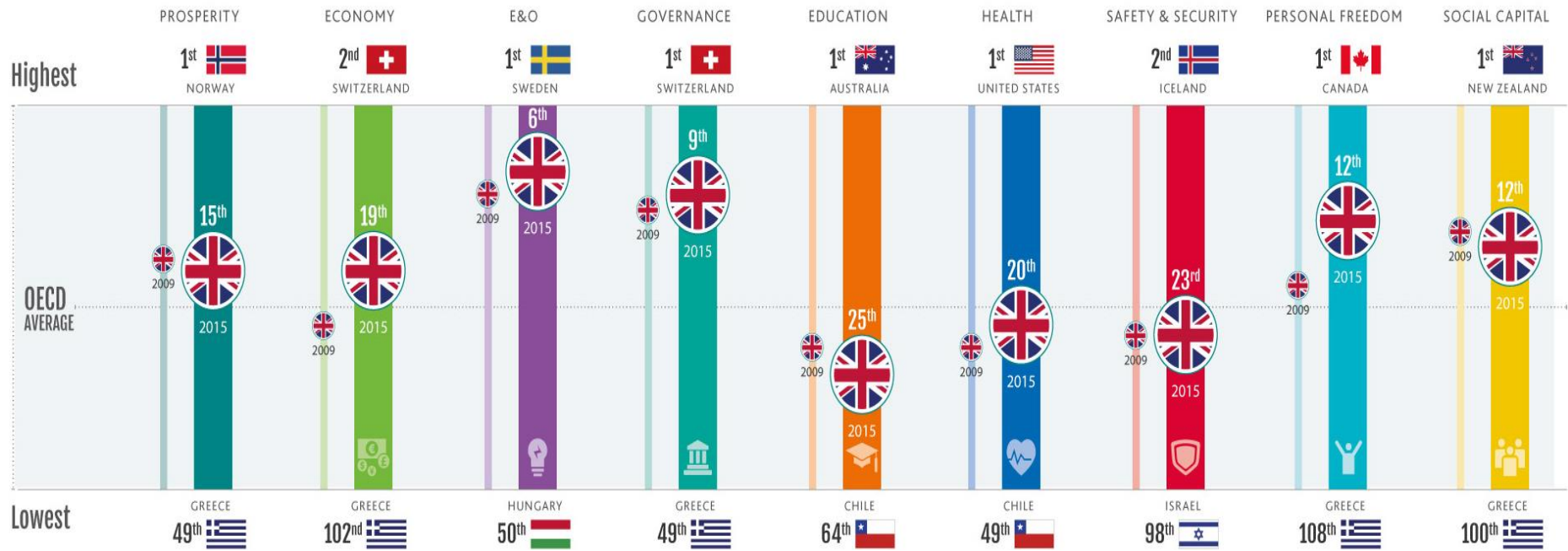


Figure 5: How Britain Compares to the OECD: 2009 to 2015

3.3 General Policies and Issues

Based on prosperity, the 142 countries can be categorized into five regions. Legatum Institute conducts development analysis on these five regions to indicate the major trades. The geographical situation can affect the prosperity development that should be considered same as differences in each country's path.

Americas: In terms of security and safety, The United States rank is out of the top 30 ranks. North and South America are facing unstable political stability, low rate in governance, security and safety problems. Security and safety are vital issues that affect selecting agenda. Therefore, the United States are considered as dangerous place. On the other hand, Canada is known as brand-new 'land of the free'.

Asia-Pacific: Compare to East Asia, Asia-Pacific has more prosperity chance by 2025. In the last seven years, Indonesia has enhanced in prosperity term. Moreover, Singapore reaches the top ranks in Economy term. China's economy impresses the world. Although the Japan economy has fallen from rank 7th to 25th, Singapore reaches the top ranks in Economy term.

Europe: According to various economics and politician in Europe, regards to health, Europe is considered between West and East. East and central of Europe faced more health problems and less healthcare satisfaction. Also, Nordics attempt to reduce unemployment unlike UK which is known as leader in entrepreneurship.

Middle East & North Africa (MENA): Usually Middle Eastern and North Africa are categorized into three, high risk, medium risk and low risk. Recently, some parts of Middle East faced decreases in social indicators because of Islamic State appearance.

North Africa such as Sudan and Niger struggling the same peril as well. Since 2009, Mena has faced the biggest decreasing in security and safety.

Sub-Saharan Africa: South Africa countries are the most prosperous region in Sub-Saharan Africa. Today, West Africa is considered as fast growing prosperity region. Despite of inception, smaller countries such as Togo and Senegal have achieved biggest rise compare to the largest economy countries such as Nigeria. West Africa achieves the important gains in health, economy and social capital from 2014 to 2015.

3.4 Brief Summary

As economies of low prosperity countries grow, a chief concern for many governments is how to ensure that the fruits of growth benefit a majority of the population and contribute to true long term prosperity. Poor infrastructure, weak governance, unfriendly business climates, inadequate healthcare, and safety and security concerns are some of the challenges mentioned that may hinder long term development and prosperity. In health, the last six years have seen positive advancements in some of the low prosperity countries. Life expectancy has started to increase while infant mortality has decreased. All of these emphasizes that prosperity is truly multi-dimensional. Economic recovery after the financial crisis is important, but to secure a better world we need to look beyond GDP.

We need to recognize that freedom of choice and democracy are the building blocks of prosperous societies. We need to recognize that health lays the foundation for human flourishing. We need to understand that education is a cornerstone of individual wellbeing as well as economic growth whereas we need to prioritize opportunity and social capital, without which societies cannot prosper.

Chapter 4

DATA AND METHODOLOGY

4.1 Data and Variables

This study employs annual data on GDP and Prosperity sub-indices for 105 countries with different levels of GDP and prosperity ranks. The panel data set includes the time interval of 6 years (2009–2014). To form our panel data set, the only criterion is the availability of data. We include as many countries as possible based on the required time horizon of data.

Economic development can be measured with two different variables. These are percentage growth in GDP and GDP per capita growth percentage. The data for Percentage growth in GDP and GDP per capita growth percentage has been collected from World Bank's World Development Indicators. According to World Bank the definition of variables is:

- GDP per capita growth (annual %)

Annual percentage growth rate of GDP per capita based on constant local currency. Aggregates are based on constant 2005 U.S. dollars. GDP per capita is gross domestic product divided by midyear population.

- GDP growth (annual %)

Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2005 U.S. dollars. GDP 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

The data for prosperity are collected from LEGATUM institute website². Prosperity sub-indices include:

- 1- Economic Fundamentals- This sub-index which increases income per person and elevate wellbeing, measures performance of countries with four key elements: economic satisfaction, economic expectation, macroeconomics policies and growth foundation.
- 2- Social Capital- The society where people can have support of their family and friends as well as, they can trust one another, individuals are provided with person's wellbeing and the income per person encourages to increase. The social capital sub-index, estimates countries' performance with two criteria: family and community network and social engagement and cohesion.
- 3- Personal Freedom- People with more satisfaction in their lives are the one who has more chance to choose their living course. The freedom sub-index is the progress and performance of nations in encouraging social tolerance and guaranteeing individual freedom.
- 4- Safety & Security- Safety sub-index estimates two scales as personal safety and national security; in accordance with this fact that level of income and wellbeing are directly affected by these scales mentioned above.

² See <http://www.prosperity.com> for more details.

- 5- Health- The high level of wellbeing refers to who benefit from mental and physical health report. In accordance with this fact, the more effective foundation leads to increment in income per person. Health sub-index is based on three criteria: health infrastructure, preventative care and basic health outcomes (both objective and subjective).
- 6- Education- While increase in education level allows people to fulfill their life, the human capital accumulation leads to economic growth. The three criteria estimate the performance of country in education: quality of education, access to education, and human capital.
- 7- Governance- The sub-index of government efficiency presenting that, residents with happier life and more income per capita are those who live under democratic government in comparison to the one who does not. Base on this sub-index performance of a country is measured by three criteria: fair elections and political participation, effective and accountable government, and rule of law.
- 8- Entrepreneurship & Opportunity- This sub-index estimates a country's entrepreneurial environment, its evenness of opportunity and the promotion of innovative activity.

Based on prosperity ranking 2014, we divide our sample of 105 countries to 53 high prosperity and 52 low prosperity countries to verify whether the level of prosperity is important in our result or not.

4.2 Stationarity and Unit Root Test

4.2.1 Why are Tests for Non-stationarity Necessary?

There are a few reasons why the idea of non-stationarity is critical and why treating non-stationary and stationary variables differently is essential. With the end goal of the examination, a stationary series can be characterized as a series with a constant mean and also constant auto-covariance and variances for every given lag. Test of the stationarity for a series is necessary for the following reasons:

- 1- A non-stationary series can emphatically impact its properties and behaviour.
For a non-stationary series, 'shocks' to the system can be persistent over time.
- 2- Employing non-stationary data can create spurious regressions. If two unrelated variables are trending with the time, regressing them on each other can provide high R^2 eventhough this regression can be completely valueless.
- 3- ' t -ratios' are not based on t -distribution, if in the regression variables are not stationary.

4.2.2 Two Types of Non-stationarity

There are two models to identify the non-stationarity, the random walk model with drift:

$$y_t = \mu + y_{t-1} + u_t \quad (1)$$

and the trend-stationary process:

$$y_t = \alpha + \beta t + u_t \quad (2)$$

where u_t is error term in both cases.

4.2.3 Testing For a Unit Root

For the first time, Dickey and Fuller (Fuller, 1976; Dickey & Fuller, 1979) invented a technique to test for the existence of unit root. The basic objective of the test is to examine the null hypothesis that $\varphi = 1$ in

$$y_t = \varphi y_{t-1} + u_t \quad (3)$$

For ease of interpretation and computation

$$\Delta y_t = \psi y_{t-1} + u_t \quad (4)$$

So that a test of $\varphi = 1$ is equivalent to a test of $\psi = 0$ (since $\varphi - 1 = \psi$). They prepared some critical values and test statistics to test the significance of the lagged y . They are defined as

$$\text{test statistic} = \frac{\hat{\psi}}{SE(\hat{\psi})} \quad (5)$$

Table 2: Critical values are calculated based on simulations experiments in Fuller (1976).

Significance level	10%	5%	1%
CV for constant but no trend	-2.57	-2.86	-3.43
CV for constant and trend	-3.12	-3.41	-3.96

The null hypothesis of the test is the existence of unit root in the series. According to Harris and Sollis (2003), the tests suggested by Levin, Lin and Chu (2002), LLC hereafter; Dickey and Fuller (1979); Fisher (1932); and Philips and Perron (1988) have been considered to check for the existence of panel stationarity. Harris and Sollis (2003) have emphasized that all of these tests exhibit unit root problem as the null hypothesis and test against alternatives including stationarity. The unit root tests for a panel employed by Hadri (2000) for heteroscedasticity corrected statistics have also

been implemented in this study to check stationarity. Unlike the others, the test proposed by Hadri (2000) examines the hypothesis whether the panel data series have any random walk problem.

The most popular panel stationarity test is the one by Levin et al. (2005) is represented below:

$$\Delta y_{it} = \alpha_i + \beta_i y_{it-1} + \sum_{j=1}^{p_i} \rho_j \Delta y_{it-j} + e_{it} \quad (6)$$

where Δy_{it} denotes the difference of y_{it} for country i , in time period $t=1, \dots, T$. Because the LLC method is based on the assumption of a homogenous panel, β_i is identical for all countries. We test the null hypothesis $\beta_i = \beta = 0$ for all countries against the alternative $H_1 : \beta_i = \beta > 0$ which assumes that all series are stationary.

The Fisher-type ADF and PP tests are all allowed for individual unit root processes. In Fisher-type tests, “the null hypothesis is that all the panels contain a unit root”.

The advantage of using (3) is that it is simple to calculate, does not require a balanced panel for any unit root test statistic (not just DF-type test). Choi (2001) has constructed another model displayed with (eq. 7) below:

$$Z = \frac{1}{\sqrt{N}} \sum_{i=1}^N \phi^{-1}(\pi_i) \sim N(0,1) \quad (7)$$

where the ϕ^{-1} is inverse of the normal cumulative distribution function. As also highlighted by Harris and Sarris (2003), “all of the previous tests are based on a null hypothesis that the individual series in the panel are jointly non-stationary, against alternatives where some or all of these series are stationary”. Hadri (2000) has proposed a test and simply stated, “the null that the time series for each i are stationary around a deterministic trend, against the alternative hypothesis of a unit root in the

panel data, which is a residual-based LM (Lagrange multiplier) test, where the null hypothesis is that the time series for each cross section member are stationary around a deterministic trend”.

4.3 Regression

4.3.1 Regression Model

One of the most prominent tools that econometricians use is regression analysis. Regression analysis is evaluating and describing the effect of one or more variables on a given variable. In other words, regression analysis tries to explain the movements of a variable with respect to the movements of one or more other variables. Ordinary Least Squares (OLS) is the most familiar approach to fit a line to the data. The most of estimations in econometrics has been based on this method.

4.3.2 Regression versus Correlation

The idea and meaning of correlation is clear for all readers. The amount of linear association between two variables is measured by correlation. When x and y are correlated, actually x and y are treating symmetrically. It doesn't mean that changes in y leads to changes in x or vice versa. Rather, it is expressed that correlation coefficient determines the degree of movements of these two variables.

In regression, the dependent variable (y) and the independent variable(s) (x s) are treated very differently. The y variable is assumed to be random or ‘stochastic’ in some way, i.e. to have a probability distribution. The x variables are, however, assumed to have fixed (‘non-stochastic’) values in repeated samples. Regression as a tool is more flexible and more powerful than correlation.

4.3.3 Estimating the OLS Models

The empirical model is specified as a panel model of per capita income. Per capita income (Y) depends upon the eight sub-indices of Prosperity: Economy (EC), Social Capital (SC), Personal Freedom (F), Safety & Security (S), Health (H), Education (E), Governance (G), and Entrepreneurship & Opportunity (EN). Prosperity Index is the only global measurement of Prosperity based on both income and wellbeing. It is the most comprehensive tool of its kind and is the definitive measure of global progress.

We can show the relationship between these variables by this equation:

$$Y_{it} = C_{it} + \beta_{i1}EC_{it} + \beta_{i2}SC_{it} + \beta_{i3}F_{it} + \beta_{i4}S_{it} + \beta_{i5}H_{it} + \beta_{i6}ED_{it} + \beta_{i7}G_{it} + \beta_{i8}EN_{it} + \varepsilon_{it}$$

Where i denotes the country ($i=1\dots 105$) and t denotes the time period ($t=2009\dots 2014$).

The total sample consists of 105 countries including 52 low prosperity countries and 53 high prosperity countries. The empirical analysis is based on the OLS method and cross-section data. Countries with prosperity rank of 2014 are listed in Appendix A.

4.3.4 Random Effects or Fixed Effects?

Comparing the Fixed Effects and Random Effects estimates can be a test for whether there is correlation between the intercept and the independent variables. In the other words, A central assumption in random effects estimation is the assumption that the random effects are uncorrelated with the explanatory variables, assuming that the idiosyncratic errors and explanatory variables are uncorrelated across all time periods. One common method for testing this assumption is to employ a Hausman (1978) test to compare the fixed and random effects estimates of coefficients. We use Eviews 9 to compute the test under the ideal random effects assumptions.

4.4 Pairwise Granger Causality Test

The evaluation of the significance of variables in a model occurs on the basis of joint tests on all of the lags of a particular variable in an equation, rather than by examination of individual coefficient estimates.

In fact, the tests described above could also be referred to as causality tests. Tests of this form were described by Granger (1969) and a slight variant due to Sims (1972). Causality tests seek to answer simple questions of the type, ‘Do changes in X cause changes in Y?’ The argument follows that if X causes Y, lags of X should be significant in the equation for Y.

If this is the case and not vice versa, it would be said that X ‘Grangercauses’ Y or that there exists unidirectional causality from X to Y. On the other hand, if Y causes X, lags of Y should be significant in the equation for X. If both sets of lags were significant, it would be said that there was ‘bi-directional causality’ or ‘bi-directional feedback’. If X is found to Granger-cause Y, but not vice versa, it would be said that variable X is strongly exogenous (in the equation for Y). If neither set of lags are statistically significant in the equation for the other variable, it would be said that X and Y are independent. Finally, the word ‘causality’ is somewhat of a misnomer, for Granger-causality really means only a correlation between the current value of one variable and the past values of others; it does not mean that movements of one variable cause movements of another.

The precedent model regressions study association, but not causality, among variables. Granger causality tests allow us to overcome the endogeneity problem presented in panel regressions.

Chapter 5

RESULTS

5.1 Descriptive Statistics

Tables 2 and 3 show the Descriptive Statistics for low and high prosperity countries. According to Solow growth model and the idea of convergence in economics, poorer economies' GDP per capita will tend to grow at faster rates than richer economies. We can see the reliability of this hypothesis in table 3 and 4. The mean of economy sub-index for low prosperity countries is -0.58 which is really lower than 1.52 for high prosperity countries. On the other hand, GDP per capita growth rate for low prosperity countries is 2.28 which is higher than 1.20 for high prosperity countries.

5.2 Panel Unit Root Test Results

The panel unit root tests have been employed to study the degree of integration for different variables. The results of panel unit roots for GDP per capita growth (annual %) and GDP growth (annual %) are illustrated in Tables 5 and 6 and indicate that the estimated parameters are significant at 1% confidence interval. The results show our variables are stationary. The unit root test output for other variables are available upon request.

Table 5: Panel unit root test results for 53 high prosperity countries.

variables		Levin, Lin & Chu t-stat	ADF - Fisher Chi-square	ADF - Choi Z-stat	PP - Fisher Chi-square	PP - Choi Z-stat	Hadri Z-stat
GDP per capita growth (annual %)	Statistic	-7.09148	243.988	-7.66177	398.525	-12.6426	1.3351
	Prob.**	0.0000	0.0000	0.0000	0.0000	0.0000	0.0909
GDP growth (annual %)	Statistic	-3.04992	222.229	-6.56166	310.628	-9.45062	0.5093
	Prob.**	0.0011	0.0000	0.0000	0.0000	0.0000	0.3053

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Table 6: Panel unit root test results for 52 low prosperity countries

variables		Levin, Lin & Chu t-stat	ADF - Fisher Chi-square	ADF - Choi Z-stat	PP - Fisher Chi-square	PP - Choi Z-stat	Hadri Z-stat
GDP per capita growth (annual %)	Statistic	-2.35539	201.779	-3.90485	222.029	-5.82313	1.6490
	Prob.**	0.0093	0.0000	0.0000	0.0000	0.0000	0.0495
GDP growth (annual %)	Statistic	-0.66454	154.594	-2.50736	153.128	-2.66618	0.6859
	Prob.**	0.2532	0.0010	0.0061	0.0012	0.0038	0.2464

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

5.3 Correlation Matrix

Correlation matrix Returns the correlation coefficient of each two series. We use the correlation coefficient to determine the relationship between two variables. The equation for the correlation coefficient is:

$$\text{Correl}(X, Y) = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}}$$

The variables with the highest correlation with other variables, have the maximum probability of multicollinearity problem in a regression model. To discover these variables, we calculate the average of absolute value of correlation coefficients of each variable with the other variables. The variables with the higher average, have the higher probability of multicollinearity. We drop them from our regression model and check whether we can find a better estimation or not.

The correlation matrix of our variables is provided in tables 7 and 8. Governance and Entrepreneurship have highest correlation between high prosperity countries. Health and Entrepreneurship have highest correlation between low prosperity countries.

Table 7: Correlation matrix for 53 countries with higher prosperity

	E	EC	F	EN	G	H	S	SC	average
E	1.0000	0.4109	0.5548	0.7344	0.7025	0.5639	0.4842	0.6306	0.5830
EC	0.4109	1.0000	0.4027	0.6611	0.7032	0.6037	0.3910	0.5536	0.5323
F	0.5548	0.4027	1.0000	0.6926	0.7440	0.4669	0.5556	0.6261	0.5775
EN	0.7344	0.6611	0.6926	1.0000	0.8961	0.8420	0.7638	0.6545	0.7492
G	0.7025	0.7032	0.7440	0.8961	1.0000	0.8168	0.7504	0.6892	0.7575
H	0.5639	0.6037	0.4669	0.8420	0.8168	1.0000	0.5001	0.6055	0.6284
S	0.4842	0.3910	0.5556	0.7638	0.7504	0.5001	1.0000	0.5226	0.5668
SC	0.6306	0.5536	0.6261	0.6545	0.6892	0.6055	0.5226	1.0000	0.6117

Table 8: Correlation matrix for 52 countries with lower prosperity

	E	EC	EN	F	G	H	S	SC
E	1.0000	0.4153	0.7554	-0.0092	0.3687	0.8453	0.4815	0.1178
EC	0.4153	1.0000	0.5105	0.1655	0.3760	0.4932	0.2716	0.1049
EN	0.7554	0.5105	1.0000	0.0868	0.4962	0.7765	0.4330	0.1947
F	-0.0092	0.1655	0.0868	1.0000	0.3513	-0.0856	0.2602	0.1997
G	0.3687	0.3760	0.4962	0.3513	1.0000	0.3029	0.4887	0.0268
H	0.8453	0.4932	0.7765	-0.0856	0.3029	1.0000	0.4659	0.1414
S	0.4815	0.2716	0.4330	0.2602	0.4887	0.4659	1.0000	0.0329
SC	0.1178	0.1049	0.1947	0.1997	0.0268	0.1414	0.0329	1.0000

Absolute Values

	E	EC	EN	F	G	H	S	SC	average
E	1.0000	0.4153	0.7554	0.0092	0.3687	0.8453	0.4815	0.1178	0.4276
EC	0.4153	1.0000	0.5105	0.1655	0.3760	0.4932	0.2716	0.1049	0.3338
EN	0.7554	0.5105	1.0000	0.0868	0.4962	0.7765	0.4330	0.1947	0.4647
F	0.0092	0.1655	0.0868	1.0000	0.3513	0.0856	0.2602	0.1997	0.1655
G	0.3687	0.3760	0.4962	0.3513	1.0000	0.3029	0.4887	0.0268	0.3444
H	0.8453	0.4932	0.7765	0.0856	0.3029	1.0000	0.4659	0.1414	0.4444
S	0.4815	0.2716	0.4330	0.2602	0.4887	0.4659	1.0000	0.0329	0.3477
SC	0.1178	0.1049	0.1947	0.1997	0.0268	0.1414	0.0329	1.0000	0.1169

5.4 Panel Regression Results

As we already explained, the following step is to study the relationship between our dependent and independent variables using the OLS estimation method. In this study, the regression results were obtained using the PC version of Eviews 9.

The regressions use data for the 105 countries that participated in prosperity index and at the same time economic growth variables are available for them. These countries are listed in Appendix 1. Based on prosperity rank in 2014, there are 53 countries that we classify as high prosperity countries, and 52 countries that we classify as low prosperity countries.

Using panel annual data, tables 9, 10, 11 and 12 show the regression results based on the models with fixed effects when all the variables are measured in levels. Since the number of countries is much larger than the number of years in our sample, fixed effects models should generally work well. The results of Hausman test also confirm this. The Null Hypothesis of Hausman test for cross-section is “Random Effects model appropriate” which is rejected in all of our 11 models. For example, table 13 shows the result of Hausman test for models 1, 4, 7, 9.

Tables 9 and 11 use “GDP per capita growth (annual %)” as dependent variable. Tables 10 and 12 use “GDP growth (annual %)” as dependent variable.

According to Correlation matrix for 53 countries with higher prosperity in table 5, Entrepreneurship and Governance have the highest correlation with other variables. So in table 9, we drop Governance in model 1, both Entrepreneurship and Governance in model 2 and Entrepreneurship in model 3. With the same reason, in table 10, we drop Governance in model 4, both Entrepreneurship and Governance in model 5 and Entrepreneurship in model 6.

According to Correlation matrix for 52 countries with lower prosperity in table 8, Entrepreneurship and Health have the highest correlation with other variables. So in table 9, we drop Entrepreneurship in model 7, and Health in model 8. With the same reason, in table 10, we drop Entrepreneurship in model 9, both Entrepreneurship and Health in model 10 and Health in model 11.

Table 9: Panel estimation of elasticity of GDP per capita growth (%) for 53 high prosperity countries

Dependent Variable: GDP per capita growth (%)						
	Model 1		Model 2		Model 3	
	Coeff	P-value	Coeff	P-value	Coeff	P-value
Constant	3.2927	***0.0000	-5.7726	***0.0037	-5.0844	**0.0344
Economic Fundamentals	0.5390	**0.0145	1.1507	**0.0177	1.1089	**0.0244
Entrepreneurship	0.8992	***0.0046				
Governance					0.6153	0.6108
Education	0.3865	0.2635	1.3379	0.1088	1.3625	0.1035
Health	1.5478	***0.0000	5.4379	***0.0000	5.4818	***0.0000
Safety & Security	0.1451	0.5188	0.3462	0.6760	0.3719	0.6546
Personal Freedom	-0.0815	0.6138	-0.7727	0.1914	-0.7566	0.2021
Social Capital	0.3953	**0.0190	0.0855	0.8943	0.0642	0.9208
R-squared	0.6802		0.6513		0.6519	
Adjusted R-squared	0.6597		0.5285		0.5266	
F-statistic	23.4790		23.5467		22.4756	
Observations	318		318		318	

Note: *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

Table 10: Panel estimation of elasticity of GDP growth (%) for 53 high prosperity countries

Dependent Variable: GDP growth (%)						
	Model 4		Model 5		Model 6	
	Coeff	P-value	Coeff	P-value	Coeff	P-value
Constant	4.4482	***0.0000	4.5169	***0.0000	4.1917	***0.0000
Economic Fundamentals	0.9686	***0.0000	0.6890	***0.0003	0.8602	***0.0001
Entrepreneurship	0.8651	***0.0049				
Governance					0.3587	0.1369
Education	-0.1159	0.7289	-0.3491	0.2876	-0.2940	0.3724
Health	1.9472	***0.0000	2.2180	***0.0000	2.0629	***0.0000
Safety & Security	0.1863	0.3926	0.0498	0.8068	0.0384	0.8559
Personal Freedom	-0.1275	0.4150	-0.1767	0.2613	-0.1072	0.5124
Social Capital	0.6145	***0.0002	0.5666	***0.0006	0.5945	***0.0003
R-squared	0.7267		0.7142		0.7177	
Adjusted R-squared	0.7081		0.6967		0.6987	
F-statistic	28.2823		29.2843		28.3856	
Observations	318		318		318	

Note: *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

Table 11: Panel estimation of elasticity of GDP per capita growth (%) for 52 low prosperity countries

Dependent Variable: GDP per capita growth (%)				
	Model 7		Model 8	
	Coefficient	P-value	Coefficient	P-value
Constant	1.9319	***0.0000	2.0239	***0.0000
Economic Fundamentals	0.1193	0.5615	0.2079	0.2969
Entrepreneurship			1.0456	***0.0075
Governance	0.2853	0.3223	0.6565	**0.0348
Education	0.5883	**0.0227	0.4409	*0.0550
Health	0.8236	***0.0039		
Safety & Security	0.4639	*0.0583	0.5909	**0.0138
Personal Freedom	0.0159	0.9323	0.0952	0.6030
Social Capital	0.2150	0.2520	0.2675	0.1635
R-squared	0.6551		0.6517	
Adjusted R-squared	0.6212		0.6177	
F-statistic	4.5737		5.5764	
Observations	312		312	

Note: *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

Table 12: Panel estimation of elasticity of GDP growth (%) for 52 low prosperity countries

Dependent Variable: GDP growth (%)						
	Model 9		Model 10		Model 11	
	Coeff	P-value	Coeff	P-value	Coeff	P-value
Constant	3.1064	***0.0000	3.1991	***0.0000	3.2449	***0.0000
Economic Fundamentals	0.0672	0.7543	0.3444	0.1016	0.2037	0.3292
Entrepreneurship					1.5573	***0.0002
Governance	0.5088	*0.0916	0.6030	*0.0512	1.0632	***0.0012
Education	0.5120	*0.0573	0.3495	*0.0516	0.2779	0.2473
Health	1.2476	***0.0000				
Safety & Security	0.4773	*0.0622	0.7229	***0.0049	0.6705	***0.0077
Personal Freedom	-0.0083	0.9661	0.2136	0.2718	0.1134	0.5541
Social Capital	0.1808	0.3563	0.0800	0.6887	0.2572	0.2008
R-squared	0.6088		0.5617		0.6008	
Adjusted R-squared	0.5770		0.5309		0.5687	
F-statistic	6.5747		5.6746		7.5743	
Observations	312		312		312	

Note: *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively

Table 13: Correlated Random Effects - Hausman Test

	Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Model 1	Cross-section random	64.561462	7	0.0000
Model 4	Cross-section random	79.353129	7	0.0000
Model 7	Cross-section random	15.631028	7	0.0287
Model 9	Cross-section random	14.570928	7	0.0419

Tables above show that as we already expected, variables effective on GDP growth (%) are the same as variables effective on GDP per capita growth (%). Tables 8 and 9 present the evidence that in the sample of 53 high prosperity countries, out of eight independent variables, four variables have positive effect on GDP growth (%): Entrepreneurship & Opportunity, Health, Economic Fundamentals and Social Capital.

Positive relationship between Economic Fundamentals and economic growth, is in line with what Granato, J., Inglehart, R., & Leblang, D. (1996) demonstrated in their research. The link between Social Capital and economic growth, is consistent with Knack & Keefer (1997) and in contrast to Granato, J., Inglehart, R., & Leblang, D.,(1996).

Tables 11 and 12 identify that in the sample of 52 low prosperity countries, Entrepreneurship & Opportunity, Health, Safety & Security, Governance and Education have positive effect on GDP growth (%).

Positive relationship between Governance and economic growth, is in line with what Haggard (1997) and Clague et al. (1996) proved in their studies.

Personal freedom doesn't have any significant impact on the dependent variables in any prosperity level. This is in line with Barro, R. J. (1996) and De Haan and Siermann

(1995) and Wu and Davis (1999) and Farr et al. (1998) and in contrast to Sen (1999) and Scully (1988).

Our results show that the level of prosperity is not important in the effect of Entrepreneurship and Health on GDP growth. These two independent variables are significant in GDP growth of all of the countries. This is in line with what Carree and Thurik (1999) and Audretsch and Thurik (2001) and Marmot and Wilkinson (2001), discovered in their studies.

5.5 Granger Causality Test Results

Table 14, 15, 16 and 17 show the results of Granger causality tests for high and low prosperity countries. Estimated findings are according to yearly panel data for the years 2009-2014. In panel causality analysis, the calculated F-statistics for the common coefficient indicates that some estimations are significant and we can reject the null hypothesis of no causality between variables.

5.5.1 Granger Causality between GDP Per Capita Growth (%) and Prosperity

Sub-indices.

Table 14: Granger causality test results for 53 high prosperity countries

Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
GDPPERCAPITAGROWTHPERC does not Granger Cause E	265	3.22760	*0.0736
E does not Granger Cause GDPPERCAPITAGROWTHPERC		20.0302	***1.E-05
GDPPERCAPITAGROWTHPERC does not Granger Cause EC	265	32.0186	***4.E-08
EC does not Granger Cause GDPPERCAPITAGROWTHPERC		15.3165	***0.0001
GDPPERCAPITAGROWTHPERC does not Granger Cause EN	265	7.91418	***0.0053
EN does not Granger Cause GDPPERCAPITAGROWTHPERC		39.0104	***2.E-09
GDPPERCAPITAGROWTHPERC does not Granger Cause F	265	2.47527	0.1169
F does not Granger Cause GDPPERCAPITAGROWTHPERC		28.8911	***2.E-07
GDPPERCAPITAGROWTHPERC does not Granger Cause G	265	8.20209	***0.0045
G does not Granger Cause GDPPERCAPITAGROWTHPERC		24.5626	***1.E-06
H does not Granger Cause GDPPERCAPITAGROWTHPERC	265	70.5901	***3.E-15
GDPPERCAPITAGROWTHPERC does not Granger Cause H		0.62287	0.4307
S does not Granger Cause GDPPERCAPITAGROWTHPERC	265	16.5345	***6.E-05
GDPPERCAPITAGROWTHPERC does not Granger Cause S		0.31711	0.5738
SC does not Granger Cause GDPPERCAPITAGROWTHPERC	265	8.81888	***0.0033
GDPPERCAPITAGROWTHPERC does not Granger Cause SC		2.59329	0.1085

Note: *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

For the sample of 53 high prosperity countries we find out that in 1% significance level, there is a uni-directional causality from Freedom to GDP per capita growth (%), from Health to GDP per capita growth (%), from Safety & Security to GDP per capita growth (%), and from Social Capital to GDP per capita growth (%).

In 1% significance level, there is bi-directional causality between Education, Economic Fundamentals, Entrepreneurship & Opportunity, Governance and GDP per capita growth (%).

Table 15: Granger causality test results for 52 low prosperity countries
Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
GDPPERCAPITAGROWTHPERC does not Granger Cause E E does not Granger Cause GDPPERCAPITAGROWTHPERC	260	4.29186 0.08986	**0.0393 0.7646
GDPPERCAPITAGROWTHPERC does not Granger Cause EC EC does not Granger Cause GDPPERCAPITAGROWTHPERC	260	20.8590 2.98501	***8.E-06 *0.0852
GDPPERCAPITAGROWTHPERC does not Granger Cause EN EN does not Granger Cause GDPPERCAPITAGROWTHPERC	260	2.23253 3.30932	0.1364 *0.0701
GDPPERCAPITAGROWTHPERC does not Granger Cause F F does not Granger Cause GDPPERCAPITAGROWTHPERC	260	2.32474 2.85374	0.1286 *0.0924
GDPPERCAPITAGROWTHPERC does not Granger Cause G G does not Granger Cause GDPPERCAPITAGROWTHPERC	260	11.1742 0.18090	***0.0010 0.6710
H does not Granger Cause GDPPERCAPITAGROWTHPERC GDPPERCAPITAGROWTHPERC does not Granger Cause H	260	2.59869 0.43333	0.1082 0.5109
S does not Granger Cause GDPPERCAPITAGROWTHPERC GDPPERCAPITAGROWTHPERC does not Granger Cause S	260	2.00142 0.83445	0.1584 0.3618
SC does not Granger Cause GDPPERCAPITAGROWTHPERC GDPPERCAPITAGROWTHPERC does not Granger Cause SC	260	1.07278 0.24587	0.3013 0.6204

Note: *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

For the sample of 52 low prosperity countries, in 1% significance level, there is a uni-directional causality from GDP per capita growth (%) to Governance. In 5% significance level, there is a uni-directional causality from GDP per capita growth (%) to Education. In 10% significance level, there is uni-directional causality from Freedom and Entrepreneurship & Opportunity to GDP per capita growth (%).

In 10% significance level, there is bi-directional causality between Economic Fundamentals and GDP per capita growth (%). The summary of the results are illustrated in tables 16 and 17.

Table 16: Summary of Granger causality test results for 53 high prosperity countries

53 high prosperity countries			Significance level
GDP per capita growth (annual %)	↔	Economic Fundamentals	1%
GDP per capita growth (annual %)	↔	Entrepreneurship & Opportunity	1%
GDP per capita growth (annual %)	↔	Governance	1%
GDP per capita growth (annual %)	←	Personal Freedom	1%
GDP per capita growth (annual %)	←	Health	1%
GDP per capita growth (annual %)	←	Safety & Security	1%
GDP per capita growth (annual %)	←	Social Capital	1%
GDP per capita growth (annual %)	↔	Education	10%

Table 17: Summary of Granger causality test results for 52 low prosperity countries

52 low prosperity countries			Significance level
GDP per capita growth (annual %)	→	Governance	1%
GDP per capita growth (annual %)	→	Education	5%
GDP per capita growth (annual %)	↔	Economic Fundamentals	10%
GDP per capita growth (annual %)	←	Entrepreneurship & Opportunity	10%
GDP per capita growth (annual %)	←	Personal Freedom	10%

5.5.2 Granger Causality between GDP Growth (%) and Prosperity Sub-indices

Table 18: Granger causality test results for 53 high prosperity countries
Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
PERCGDPGROWTH does not Granger Cause E E does not Granger Cause PERCGDPGROWTH	265	2.05523 31.4351	0.1529 ***5.E-08
PERCGDPGROWTH does not Granger Cause EC EC does not Granger Cause PERCGDPGROWTH	265	38.8456 6.82999	***2.E-09 ***0.0095
PERCGDPGROWTH does not Granger Cause EN EN does not Granger Cause PERCGDPGROWTH	265	7.69560 37.8860	***0.0059 ***3.E-09
PERCGDPGROWTH does not Granger Cause F F does not Granger Cause PERCGDPGROWTH	265	2.98106 28.3695	*0.0854 ***2.E-07
PERCGDPGROWTH does not Granger Cause G G does not Granger Cause PERCGDPGROWTH	265	6.55393 22.4305	**0.0110 ***4.E-06
PERCGDPGROWTH does not Granger Cause H H does not Granger Cause PERCGDPGROWTH	265	0.31732 81.0308	0.5737 ***5.E-17
PERCGDPGROWTH does not Granger Cause S S does not Granger Cause PERCGDPGROWTH	265	0.52563 19.9503	0.4691 ***1.E-05
PERCGDPGROWTH does not Granger Cause SC SC does not Granger Cause PERCGDPGROWTH	265	3.65988 5.21922	*0.0568 **0.0231

Note: *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

For the sample of 53 high prosperity countries we find out that in 1% significance level, there is a uni-directional causality from Education, Health and Safety & Security to GDP growth (%).

There is bi-directional causality between Economic Fundamentals, Entrepreneurship & Opportunity, Freedom, Governance, Social Capital and GDP growth (%).

Table 19: Granger causality test results for 52 low prosperity countries
Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
PERCGDPGROWTH does not Granger Cause E E does not Granger Cause PERCGDPGROWTH	260	1.66189 3.44753	0.1985 *0.0645
PERCGDPGROWTH does not Granger Cause EC EC does not Granger Cause PERCGDPGROWTH	260	21.0378 5.56388	***7.E-06 **0.0191
PERCGDPGROWTH does not Granger Cause EN EN does not Granger Cause PERCGDPGROWTH	260	1.16219 11.6340	0.2820 ***0.0008
PERCGDPGROWTH does not Granger Cause F F does not Granger Cause PERCGDPGROWTH	260	3.71030 3.22089	*0.0552 *0.0739
PERCGDPGROWTH does not Granger Cause G G does not Granger Cause PERCGDPGROWTH	260	10.0919 0.15741	***0.0017 0.6919
PERCGDPGROWTH does not Granger Cause H H does not Granger Cause PERCGDPGROWTH	260	1.13083 12.7539	0.2886 ***0.0004
PERCGDPGROWTH does not Granger Cause S S does not Granger Cause PERCGDPGROWTH	260	0.10197 3.35219	0.7497 *0.0683
PERCGDPGROWTH does not Granger Cause SC SC does not Granger Cause PERCGDPGROWTH	260	0.26631 0.02860	0.6063 0.8658

Note: *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

For the sample of 52 prosperity countries, in 1% significance level, there is a uni-directional causality from Entrepreneurship & Opportunity to GDP growth (%), GDP growth (%) to Governance and Health to GDP growth (%).

In 10% significance level, there is a uni-directional causality from Safety & Security and also Education to GDP growth (%). In 5% significance level, there is bi-directional causality between Economic Fundamentals and GDP growth (%). In 10% significance level, there is bi-directional causality between Freedom and GDP growth (%). The summary of the results are illustrated in table 20 and 21.

Table 20: Summary of Granger causality test results for 53 high prosperity countries

53 high prosperity countries			Significance level
GDP growth	↔	Economic Fundamentals	1%
GDP growth	↔	Entrepreneurship & Opportunity	1%
GDP growth	←	Education	1%
GDP growth	←	Health	1%
GDP growth	←	Safety & Security	1%
GDP growth	↔	Governance	5%
GDP growth	↔	Personal Freedom	10%
GDP growth	↔	Social Capital	10%

Table 21: Summary of Granger causality test results for 52 low prosperity countries

52 low prosperity countries			Significance level
GDP growth	←	Entrepreneurship & Opportunity	1%
GDP growth	→	Governance	1%
GDP growth	←	Health	1%
GDP growth	↔	Economic Fundamentals	5%
GDP growth	↔	Personal Freedom	10%
GDP growth	←	Education	10%
GDP growth	←	Safety & Security	10%

Chapter 6

CONCLUSION AND RECOMMENDATION

6.1 Concluding Remarks

In this thesis, a linear relationship between prosperity sub-indices and the level of economic development is hypothesized based on the literature on economic development and that on our eight independent variables. This hypothesis is tested using two different approaches across countries based on the data for 105 countries participating in Legatum prosperity index.

The first approach is OLS regression. For both high and low prosperity countries, it finds support for a linear relationship between Entrepreneurship & Opportunity, Health and GDP growth percentage as our metric of economic development.

For high prosperity countries, OLS regression also finds a linear relationship between Economic fundamentals, Social Capital and GDP growth percentage. For low prosperity countries, it also reveals a link between Safety & Security, Education, Governance and GDP growth percentage. Different regression results for high and low prosperity countries, prove that the level of prosperity is important in the effect of prosperity sub-indices on economic development.

The second approach is Granger causality testing. The causal relation between prosperity sub-indices and economic growth has not been studied in literature. Our analysis proves that prosperity is one of the essential factors for any country's

economic development and therefore plays an important role in economy activities. On the other hand higher level of economic development may lead to more prosperity. Hence, the impact of corresponding changes in prosperity on economic growth, deserves more careful studies.

This study focused on the prosperity–economic growth relationship by employing Granger causality test. The results reveal that in both high and low prosperity countries, economic development is correlated with economic fundamentals and entrepreneurship.

6.2 Recommendation and Policy Implications

Our results demonstrate that providing a better place for people starting businesses by creating an entrepreneurial environment and promoting innovative activities, and also investing on health infrastructure and preventative care can help countries to boost their economic development in any level of prosperity.

In high prosperity countries, better macroeconomic policies, foundations for growth, and financial sector efficiency, and also improving community and family networks and social cohesion and engagements has promoted economic development. So we recommend high prosperity countries to continue their policies in these sections.

If low prosperity countries, want to enhance their economic growth, they need to have fair elections and political participation, an effective and accountable government. Providing higher quality of education, and human capital, in addition to better national security and personal safety can also be helpful in raising economic development.

According to Granger causality tests, all countries should attention that any change in economic fundamentals and entrepreneurship environment can be followed by economic growth after one year. Changes in social capital in not important in economic policy decisions of low prosperity countries.

Due to the importance of the relationship between economic growth and prosperity, and the lack of uniformity in empirical findings, however, we caution that governments need to be careful in implementing relevant policies and the policies should be based on strong economic analyses. In this regard, our study represents one step closer to economic truth, but further studies using newer samples and methodologies are clearly needed.

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APPENDIX

Appendix A: List of countries used in this study

For the empirical part of the current thesis we make use of the prosperity database.

According to prosperity ranking 2014 we divide this sample into high and low prosperity countries. These two groups of countries are listed below.

List of 53 high prosperity countries:

	country	prosperity score 2014		country	prosperity score 2014
1	Norway	3.517942	31	Costa Rica	1.1241019
2	Switzerland	3.3163738	32	Slovak Republic	1.0756723
3	New Zealand	3.247941	33	Kuwait	1.0675285
4	Denmark	3.2358832	34	Italy	1.0650525
5	Canada	3.1951404	35	Israel	1.0223191
6	Sweden	3.1946557	36	Hungary	0.92353964
7	Australia	3.111366	37	Panama	0.79648399
8	Finland	3.0155194	38	Lithuania	0.74958068
9	Netherlands	2.9858882	39	Trinidad and Tobago	0.72042036
10	United States	2.8681056	40	Latvia	0.67697883
11	Iceland	2.8280602	41	Malaysia	0.63986236
12	Ireland	2.7889247	42	Saudi Arabia	0.48449472
13	United Kingdom	2.6946917	43	Bulgaria	0.37310401
14	Germany	2.6587446	44	Brazil	0.36377364
15	Austria	2.6291206	45	Croatia	0.35149184
16	Belgium	2.3715603	46	Thailand	0.29308861
17	Singapore	2.3179963	47	Mongolia	0.27393574
18	Japan	2.2541463	48	Belarus	0.25539982
19	Hong Kong SAR, China	2.1521883	49	China	0.24655445
20	France	2.0657423	50	Kazakhstan	0.19430684
21	Slovenia	1.7236786	51	Vietnam	0.18055616
22	Korea, Rep.	1.6734343	52	Uzbekistan	0.12514341
23	Spain	1.668113	53	Belize	0.07936856
24	Portugal	1.5405821			
25	United Arab Emirates	1.4327952			
26	Czech Republic	1.4014547			
27	Uruguay	1.3013871			
28	Poland	1.1705853			
29	Estonia	1.1504327			
30	Chile	1.1493399			

List of 52 low prosperity countries:

	country	prosperity score 2014		country	prosperity score 2014
1	Greece	0.07600947	31	Rwanda	-0.87810624
2	Romania	0.06513596	32	Lebanon	-0.8939988
3	Jamaica	0.04453235	33	India	-1.0286388
4	Sri Lanka	0.03442555	34	Bangladesh	-1.066632
5	Ukraine	0.00598901	35	Honduras	-1.0672559
6	Mexico	-0.05181391	36	Senegal	-1.0927871
7	Colombia	-0.0616554	37	Iran, Islamic Rep.	-1.1038711
8	Philippines	-0.07993528	38	Kenya	-1.3199298
9	Russian Federation	-0.12553315	39	Zambia	-1.3289174
10	Macedonia, FYR	-0.15142897	40	Uganda	-1.4124959
11	Paraguay	-0.17891088	41	Cambodia	-1.434058
12	Indonesia	-0.24239004	42	Mali	-1.4374347
13	Dominican Republic	-0.33829743	43	Cameroon	-1.5612344
14	Ecuador	-0.35047793	44	Egypt, Arab Rep.	-1.5653777
15	Botswana	-0.36734807	45	Tanzania	-1.6142912
16	Nicaragua	-0.38259965	46	Mozambique	-1.8098984
17	Peru	-0.42178908	47	Zimbabwe	-2.0377419
18	South Africa	-0.45227182	48	Nigeria	-2.1405797
19	Jordan	-0.45860299	49	Ethiopia	-2.1641154
20	El Salvador	-0.48914951	50	Pakistan	-2.2408319
21	Morocco	-0.54262674	51	Sudan	-2.4586523
22	Turkey	-0.60374767	52	Central African Republic	-3.2570598
23	Bolivia	-0.63013375			
24	Namibia	-0.63137984			
25	Moldova	-0.67805558			
26	Guatemala	-0.68581122			
27	Tunisia	-0.70879769			
28	Nepal	-0.77357602			
29	Algeria	-0.77792931			
30	Ghana	-0.87031901			