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Münster School of  
Business and Economics

Center for Interdisciplinary Economics  
Discussion Paper

6/2015

**Social Market Economy:  
Towards a Comprehensive Composite Index**

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Center for Interdisciplinary Economics  
Discussion Paper Series

**Center for Interdisciplinary Economics**  
**Discussion Paper**  
**6/2015**

October 2015

ISSN 2191-4419

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**Abstract**

Institutions that potentially have a positive impact on economic performance rarely exist outside of a system of institutions; rather they are embedded in the economic order of a country. It is thus imperative to investigate bundles of performance-enhancing institutions, particularly those bundles that form the basis for economic orders. This paper is based on bundles of institutions that have empirically proven to be prosperity enhancing. It proposes a measurement of this bundle of institutions in the form of a composite index, which is based on 12 different data series. Index data is available for 163 countries between 2005 and 2010 and it allows for comparative analyses using the overall index as well as its three sub-indices, measuring political, economic and societal institutional quality. The index is a step towards a more systematic international comparison of institutional settings. In future research, it can contribute to identifying prosperity enhancing bundles of institutions through regression analysis.

JEL-Codes: H00; O11; O43; P51

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# 1. Introduction

Ever since Lipset formulated his modernization theory in 1959, there has been an intense scholarly debate about the relationship between political structures and the economic performance in economies around the world. While Lipset states that there needs to be a certain level of economic development for democratic structures to arise, other theorists like Rodrik and Wacziarg (2005) claim the opposite to be true. Findings from Acemoglu et al.(2008) or Minier (2001) show that a positive development in income does not necessarily lead to democratization in authoritarian regimes. Alesina et al.(1996) demonstrate that political instability impairs growth, which is true for democracies and non-democracies. Findings from Tridico (2010) even hint at a negative relationship between democracy and prosperity. Recently, von Weizsäcker published an article describing the relationship between democracy and prosperous market economy structures as symbiotic and states that democracies and market economies co-evolve on an actual as well as on a normative level (cf. Weizsäcker, 2014, pp. 13-15). It is obvious that empirical evidence for an immediate connection between political system and economic performance remains vague, but at the same time, anecdotal evidence on the subject shows that democratic systems have been on a considerably higher path of economic growth than non-democracies. Since it is not trivial to establish a direct link between democracy and economic performance, possible transmission mechanisms need to be investigated.

Institutions are one such mechanism. In recent decades, there has been a considerable amount of research on the relationship between institutions and economic development. Researchers like Acemoglu et al. speak out in favor of institutions being the decisive factor for economic prosperity, and cite Western and Eastern Germany as well as North and South Korea as examples, in both cases the area with a market economy thrived while the other stagnated under central planning. They also argue that richer economies can afford or choose better institutions, thus fostering their wealth (cf. Acemoglu, Johnson, and Robinson, 2001, p. 1369). A consistent definition of the term institutions remains elusive in economics research, but many scholars rally behind North's definition of institutions as "the rules of the game in a society or, more formally, [as] humanly devised constraints that shape human interaction. In consequence they structure incentives in human exchange, whether political, social, or economic (Douglass C. North, 1990, p. 3)".

Stylized facts underline the importance of institutions for economic performance. In the aftermath of the recent worldwide economic and financial crisis, Germany's economy performed relatively well compared to other industrialized countries in the western world. Despite suffering stronger negative GDP growth rates than the rest of the OECD countries in 2009, Germany outperformed the OECD average in the years from 2007 to 2012. The OECD total experienced an increasing unemployment, fueled especially by southern European countries like Spain and Greece. In contrast, Germany managed to lower its unemployment rate during that time (cf. OECD, 2014). Surprisingly to some, little macroeconomic growth programs, e.g. of a Keynesian kind in terms of deficit spending, had been put into place during the crisis years. Consequently Germany only saw a moderate increase in its public debt rate compared to the OECD total during the crisis years.

Since there are no miracles in economics, Germany's performance was credited to the supposedly well functioning institutions of Germany's economic order (cf. Van Suntum et al., 2012a, p. 9). The IMF specifically credits Germany's labor market performance during the crisis, among other factors, to collective agreements, which include flexible workweeks and work-time accounts, to subsidies for reduced work-time and to the re-designed welfare and unemployment benefits as part of the German Hartz IV reforms (cf. IMF, 2011, p. 6). Similar to Germany, Sweden fared well during the crisis years. Despite being hit by a sharp drop in GDP growth, the Swedish unemployment rate and the Swedish public debt remained virtually unaffected (cf. OECD, 2014). Through three waves of fundamental institutional reforms between the 1970's and the 1990's, the Swedish "Folkhemmet" welfare state was replaced by market oriented policies, as visible e.g. in the early 1990's when low and stable inflation was awarded priority over full employment. Nonetheless, Sweden maintains a high level of income taxation and an emphasis on social security (cf. Lindvall, 2006, pp. 268-269; Lindvall and Rothstein, 2006, pp. 57-58). It appears that both Germany and Sweden have grown an economic order, in other terms a bundle of political, economic and societal institutions, and accompanying policies that helped them survive the crisis with limited damage to their respective economies.

Since institutions that might have a positive impact on economic performance rarely exist outside of a whole system of institutions, but are rather embedded in the economic order of a country, it is essential to investigate bundles of performance-enhancing institutions rather than analyzing isolated institutions. The paper at hand is based on the



assumption that the interplay of various institutions has a significant effect on the performance of the economy. It proposes an economic order that contains institutions that have proven to enhance economic performance in empirical and theoretical investigations. The purpose of this paper is to introduce a composite index aimed specifically at measuring the proposed economic order as a bundle of economic performance enhancing institutions. The index will be referred to as Social Market Economy Index (SMEI), referencing the social and economic order that was the foundation of German prosperity in the wake of WWII.

There is one other study that presents an index of a similar name but of a different purpose, since it is aimed at specifically measuring the incidence of Social Market Economy. In 2012, Van Suntum et al. published an explorative study in partnership with the Bertelsmann Foundation. The authors categorize Walter Eucken's classic market economy principles into four index dimensions and derive all their 44 single indicators directly from Eucken's principles. Van Suntum et al. analyze eight OECD countries from the mid-nineties until 2011. They use different data series, they mix preexisting data with survey research conducted by themselves, they do not aggregate their index-dimensions into one single index-value in the end, but calculate compound index values for their respective dimensions. They find that Sweden is the country that best fits their model of a social market economy. Theirs in an impressive project that yields interesting findings for OECD countries and they propose to expand it to all EU member countries.

Much criticism regarding indices arises, when the index in question is lacking a sound theoretical foundation the index model is derived from (cf. Ochel and Röhn, 2006, p. 58). This shall be avoided in the paper at hand, albeit the focus of this paper is methodological. On the subject of index construction in general, there is a vast literature. For brevity reasons, an extensive literature review on index construction is omitted. The author found the methodological documentation surrounding the World Bank's World Governance Indicators by Kaufmann et al. (cf. Kaufmann, Kraay, and Zoido, 1999) particularly helpful in the construction of the composite index. Also, studies by Cherchye and Kuosman (2004) on benchmarking sustainable development and by Lopez-Tamayo et al. (2014) on the creation of an composite index measuring the macroeconomic, social and institutional dimensions in 77 countries were relevant to the topic. In addition to that, the "Handbook on Constructing Composite Indicators" by the OECD provided important insights (cf. OECD, 2008). Furthermore, various studies published in Social Indicators Research were of great use to get to know the methodological field of index

construction, particularly a study by Mitra (2013) developing an multidimensional index measuring governance in 48 African countries, a study by Giambona and Vasallo (2014), who develop four sub-indices and a composite index to analyze social inclusion for 27 EU member countries and a study by Smits and Steendijk (2014), who propose an asset based wealth index that covers 97 low and middle income countries.

The remainder of the paper is structured as follows. The proposed model of an economic order will be the focal point of section 2. The economic order will be divided into three different dimensions and each element of the dimensions will be derived from empirical findings in preexisting literature. Section 3 is dedicated to the methodological survey. The data, as well as the techniques used in the construction of the index measuring the economic order, will be presented. First empirical results will be presented and discussed in section 4. Section 5 outlines ideas for further research and concludes.

## 2. The Proposed Model of an Economic Order

The proposed model relies on a bundle of prosperity-enhancing institutions, which are divided into three dimensions referring to the areas of politics, economy and society, referencing the North's definition of institutions. These dimensions are well within the range of possible empirical research based on an institutional economics approach and are susceptible to policy reforms, hinting at the possible practical application of the present research. Since the model at hand is based on the assumption that it is not only the mere existence of an institution that is a determinant for economic prosperity, but its quality, the model investigates the institutional quality in its respective dimensions. Thus, the three dimensions are named Political Institutional Quality (PIQ), Economic Institutional Quality (EIQ) and Societal Institutional Quality (SIQ). It is critical to exclusively analyze causes of prosperity and not mix them unintentionally with effects. Therefore, the theoretical model can only comprise institutions that are clearly institutional causes and not effects. The SMEI will be constructed based on the proposed model. In the following, the three dimensions and their institutions will be described, also taking their meaning for the SMEI into account.

## 2.1. Political Institutional Quality

The existence of political and civil rights, freedom from corruption and reasonable government spending are indicators of a well-functioning and balanced political system, in which political power is not only exercised by the political elite but in which the population can voice its opinion and be heard. The theoretical and empirical relevance of these indicators in the context of prosperity will be proven as follows. As literature is vast, this paper only presents highlights.

One of such is Weingast's analysis of the role of political institutions in the context of prosperity in general. He finds that the results are best if political and economic institutions develop at the same time (cf. Weingast, 1995, p. 25). Zywicki stresses the importance of a stable rule of law <sup>1</sup> for economic prosperity. In his theoretical essay, he concludes that the institutional link between the rule of law and economic growth stems from the prevention of arbitrary government behavior through a rule of law, thus attracting investment, entrepreneurship and long-term capital development (cf. Zywicki, 2003, p. 22). Haggard et al. stand out for their analysis of the development of the literature on the subject, ranging from initial enthusiasm to recent skepticism. They also give an overview of the most important rule of law indicators (cf. Haggard, MacIntyre, and Tiede, 2008, p. 206). Following North et al., it is noteworthy that the existence of a rule of law has different functions with regard to the state of development of a society. While its existence enables a functioning government in less developed societies, it has a restraining function in terms of protection of the citizen against the state in developed societies (cf. Douglass C North, Wallis, and Weingast, 2009, pp. 73, 115). Mahoney compares common law and civil law systems and their respective impact on economic development. He states, referencing Hayek, that these systems reflect different philosophies of government. He finds that common law countries, which offer better property rights protection, grow faster (cf. Mahoney, 2001, p. 523). Besides the rule of law, property rights are a subject of much scholarly discussion in terms of political and civil laws. Empirical results on property rights and prosperity are not controversial. Keefer and Knack show for example that polarization tendencies in a society, be it through income inequalities or ethnic conflict, impair the guarantee of property rights and thus hinder economic growth (cf. Keefer and Knack, 2002, pp. 147-148). Overall, political rights and civil liberties will enter the SMEI as positive arguments.

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<sup>1</sup>For classic definitions of the rule of law, cf. Shklar, 1987.

In the economic literature on corruption the results on the relationship with economic prosperity are ambiguous. Aidt accurately describes the two opposing sides as sanders and greasers<sup>2</sup>, sanders being those who believe that corruption impairs the economy like sand in a wheel by making political economic transactions more difficult, while the greasers believe corruption to be the grease of the economies' wheels by facilitating beneficial trades that would not have taken place otherwise. Aidt finds himself on the sanders-side since he finds that corruption impairs growth (Aidt, 2009, pp. 272, 285). De Vaal and Ebben develop a theoretical model to show that when institutions are considered, corruption will adversely affect growth when political stability and property rights are guaranteed above a certain threshold (cf. De Vaal and Ebben, 2011, p. 120). Mauro asks why corruption persists in countries in which it is widespread when it is obvious that everybody would be better off without it. He argues that if other people steal from the government, the individual will base his decision on the lower marginal product from legal activities and the higher marginal product from corruption, since his chances of getting caught are lower. Thus, he will pursue rent seeking instead of a productive activity (cf. Mauro, 2004, p. 16). Bentzen summarizes econometric shortcomings of past corruption analyses and finds a negative impact of corruption on economic productivity (cf. Bentzen, 2012). Corruption is declared as illegal around the world and thus its continuing existence hints at a weak rule of law. This is a quality that is harmful to growth. Despite the greaser's opinion, corruption will thus be a negative argument in the SMEI, making the control of corruption a positive argument.

The literature on the relationship between government spending and prosperity also yields conflicting results. One of the scholars most immersed in the subject is Barro, who found that government consumption is inversely related with economic growth, while public investment has little effect. The reason for the inverse relationship is that public consumption does not have an effect on private productivity, but reduces savings and growth through government expenditure and taxes (cf. Barro, 1991, pp. 430-432). Plümer and Martin set out to explain the "Barro-effect". They find an inverse u-shaped curve in the relationship between levels of democracy and prosperity, and analyze different regime types. They argue that democratic regimes tend to over-invest in public goods to attract political support. Also, they believe that the higher the level of democracy, the better the quality of government spending will be (cf. Plümer and Martin, 2003, p. 44). Barro's finding that a large public sector tends to impair economic growth

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<sup>2</sup>Cf. Andvig and Moene, 1990 or Blackburn, Bose, and Haque, 2006; Blackburn, Bose, and Haque, 2010 for the "sanders" and cf. Leff, 1964 and Huntington, 1968 for the "greasers".

has been attested in subsequent studies by Engen and Skinner (1992), Grier (1997), Hansso and Henrekson (1994) or De la Fuente (1997). Fölster and Henrekson limit their study to rich countries and find that an increase in the expenditure ratio by 10% leads to a decrease in the economic growth rate by 0.7-0.8 percentage points (cf. Fölster and Henrekson, 2001, p. 1516). Even so, the negative relationship between government spending and economic growth is all but established, since studies by Mendoza et al.(1997) or Easterly and Rebelo (1993) do not observe this relationship at all. Fölster and Henrekson review the literature on the relation between government expenditure and economic growth. They state that the relationship turns negative in countries, in which the government size reaches a certain threshold. Also, they find evidence for Wagner's law, which describes the interrelation between an increase in the level of income and an increase in government scope (cf. Fölster and Henrekson, 2001, p. 1502). In general, OECD statistics show that less than 20% of the GNI is spent on public goods in developed countries, while in developing countries more than half of the GNI is spent on public goods. In developing countries, the provision of public goods might boost the economy, but above a certain threshold, government expenditure could result in the contrary (cf. Fölster and Henrekson, 2001, p. 1503). Therefore, studies on this topic are best conducted with a contextual separation of country groups. Since the database used in the paper at hand is a panel consisting of non-developed and developed countries alike, this is hardly an option. If zero government spending is treated as a benchmark, and thus government spending enters the model as a negative argument, then poor countries that simply cannot afford the provision of public goods will receive artificially high scores. But countries that cannot afford public goods will likely receive low scores for other indicators, thus partly alleviating this concern.

## 2.2. Economic Institutional Quality

A functioning and prosperous economy is determined by competition and independence of businesses from government control, by an entrepreneurial environment, by reasonable monetary policy and by a sustainable government debt in the SMEI.

Thurik summarizes the rather limited literature on the entrepreneurial environment of a country and its consequences for the economic performance. He states that economic growth rates depend on the speed with which national economies embrace en-

trepreneurial energy (cf. Thurik, 2007, p. 16). Van Stel et al. analyze a panel of 44 countries and discover evidence that the relationship between entrepreneurial activity and GDP growth is negative for less developed countries and positive for developed countries. The fact that an individual would be more productive in a bigger firm than in its own little shop is offered as an explanation that is supposed to be true for less developed countries (cf. Van Stel, Carree, and Thurik, 2005, p. 319). Despite these findings, the entrepreneurial environment will be a positive argument in the SMEI, because it is not only limited to actual entrepreneurial activity, but also to the regulations that surround company foundations. If the regulations are entrepreneur-friendly, this means that the government has found the correct balance between regulation and the free market. The indicator of competition and independence of businesses, especially in the financial sector, from government control is closely linked to the indicator for the entrepreneurial environment. Beck et al. analyze data for banks and conclude that financial intermediaries exert a positive influence on GDP growth (cf. Beck, Levine, and Loayza, 2000, pp. 295-296). Furthermore, an extensive study by Lee et al. analyzing the role of big enterprises in economic growth reveals that such businesses contribute significantly to GDP per capita growth, that they contribute to GDP stability, but that an economy should not solely rely on big enterprises to stimulate growth (cf. Lee et al., 2013, p. 576).

The indicator of reasonable monetary policy comprises a multitude of aspects, from price stability to central bank independence. A study by Alesina and Summers explores the relationship of the aforementioned institutions with economic growth. In their empirical study they find that central bank independence reduces the level and variability of inflation but does have a considerable effect on long-term macroeconomic development (cf. Alesina and Summers, 1993, p. 159). Berger et al. extensively review previous research on central bank independence and establish their own model, concluding that the negative relationship between inflation and central bank independence is robust (cf. Berger, De Haan, and Eijffinger, 2001, pp. 25-28). Hayo and Hefeker also work on central bank independence and find it neither necessary nor useful for reducing inflation. They argue that the reason why countries choose their central banks to be independent is rooted in the legal, political and economic system. They propose a two-step model, the first step being the decision on price stability, the second being the institutional implementation via e.g. an independent central bank. Thus, the latter cannot be the cause for the former (cf. Hayo and Hefeker, 2002, pp. 669-670). Since there is no evidence that central bank independence is harmful, and again, the SMEI builds on

limited government and on the promotion of price stability, the indicator will be a positive argument in the SMEI.

### 2.3. Societal Institutional Quality

In the SMEI, the level of societal participation, freedom of the press, health care and environmental sustainability determines the SIQ.

Li and Huang analyze data from China and show that both health care and education have a positive effect on GDP growth. Education is an indicator for societal participation in the SMEI. Even though the authors use different proxies than the SMEI, the basic statement remains true for the SMEI assumptions that health care and education are positive arguments for the SMEI (cf. Li and Huang, 2009, p. 384). A study by Bloom et al., who find a significant effect of health on aggregate output and are able to argue that it is a real worker productivity effect, supports this reasoning (cf. Bloom, Canning, and Sevilla, 2004, p. 11). While there is little literature on the relationship between freedom of the press and prosperity, there is a study hinting at the interrelation between the dimensions of the SMEI. Brunetti and Weder find that a free press is an effective tool to control corruption. They establish that the higher the extent of press freedom, the lower the level of corruption (cf. Brunetti and Weder, 2003, p. 1821). Barro finds in a panel data analysis that male schooling variables are positively related to economic growth and that those of females are not. This suggests that female human capital is not employed well in many countries (cf. Barro, 1999, p. 237). Since basic education is a prerequisite for societal participation, the indicator will be a positive argument in the SMEI. Apart from education, the indicator of societal participation refers to gender equality and thus adds a contemporary note to the SMEI. Malhotra and Schuler reviewed 45 empirical studies on the empowerment of women from different scientific disciplines ranging from sociology to economics. None of the studies focused on the relationship of female participation in society and economic growth and only one focused on development processes (cf. Malhotra, Schuler, and Boender, 2005, p. 81). This research gap demands further analysis in the future, but for now, women's equal participation and thus gender equality will be a positive argument in the SMEI.

It is undisputed that  $CO_2$  emissions need to be reduced on a global scale. Keeping with economic theory on externalities, the optimal level of  $CO_2$  emissions will hardly be zero, but without a doubt, drastic reduction is necessary to limit global warming.

The indicator for environmental sustainability only takes the amount of  $CO_2$  emitted into account and consciously ignores economic factors such as the status of economic development and the status of industrialization. Environmental sustainability is included as a positive argument in the SMEI. Empirical evidence from e.g. Soytaş and Sari implies that the reduction of carbon emission in a country like Turkey does not negatively affect economic growth (cf. Soytaş and Sari, 2009, pp. 1672-1673). While this evidence might only be true for Turkey, it can still be read as a trend statement for countries of a similar level of development. If a reduction of  $CO_2$  emissions is not harmful to growth, it needs to be an integral part of the model of contemporary SME; and even if it were harmful, efforts to reduce emissions and thereby the correction of externalities would still be an integral part of the contemporary model of SME.

Table 1 displays the framework of the proposed model of SME.<sup>3</sup>

<b>Political Institutional Quality</b>	<b>Economic Institutional Quality</b>	<b>Societal Institutional Quality</b>
Political and Civil Rights	Competition and Business Freedom	Societal Participation
Control of Corruption	Entrepreneurial Environment	Health Care
Reasonable Government Spending	Reasonable Monetary Policy	Freedom of the Press
		Environmental Sustainability

Table 1: Model of a Prosperity Enhancing Economic Order.

<sup>3</sup>For brevity reasons, an analysis of the model of SME regarding its construct validity will be neglected at this point.



### 3. Methodological Survey

The SMEI will be constructed as a composite index. It is designed to allow for three levels of analyses. The index can display an aggregate level over all dimensions (SMEI), it can display the aggregate level of the three dimension (PIQ, EIQ and SIQ), and it allows for disaggregate analyses using the different indicators that form the three dimensions.

#### 3.1. Data

##### 3.1.1. Sources

The SMEI is based on a balanced panel that comprises data for 163 countries from 2005 to 2010. Countries with less than 500.000 inhabitants and countries with a disputed status in the international community are excluded from the panel.<sup>4</sup> Table 2 lists the sources for the 13 single indicators that form the SMEI.<sup>5</sup>

<b>Dimension</b>	<b>Indicator</b>	<b>Data Series</b>	<b>Source</b>
PIQ	Political and Civil Rights	Political Rights	Freedom House – Freedom in the World-Index
PIQ	Political and Civil Rights	Civil Liberties	Freedom House – Freedom in the World-Index
PIQ	Control of Corruption	Freedom from Corruption	Heritage Foundation – Index of Economic Freedom
PIQ	Reasonable Government Spending	Government Spending	Heritage Foundation – Index of Economic Freedom
EIQ	Competition and Business Independence	Financial Freedom	Heritage Foundation – Index of Economic Freedom

<sup>4</sup>See appendix A.1 for a detailed list.

<sup>5</sup>See appendix A.2 for a brief description of the data.

<b>Dimension</b>	<b>Indicator</b>	<b>Data Series</b>	<b>Source</b>
EIQ	Entrepreneurial Environment	Business Freedom	Heritage Foundation – Index of Economic Freedom
EIQ	Reasonable Monetary Policy	Monetary Freedom	Heritage Foundation – Index of Economic Freedom
SIQ	Societal Participation	Education Index	UNDP – Human Development Index
SIQ	Societal Participation	Women in Parliament	UN – Millennium Development Goals Database
SIQ	Health Care	Life Expectancy	The World Bank – World Development Indicators
SIQ	Freedom of the Press	Freedom of the Press	Freedom House – Freedom of the Press-Index
SIQ	Environmental Sustainability	CO <sub>2</sub> Emissions	The World Bank – World Development Indicators

Table 2: Composition of the SMEI Data.

### 3.1.2. Imputation of Missing Data

Even though imputation<sup>6</sup> through regression might be an elegant solution for missing imputation, in case of the SMEI, data constraints made this impossible for some data series since occasionally the regression would have been based on predicted values, possibly carrying prediction biases and errors. Also, resorting to different methods of imputation in the panel was not an option, since this could lead to inconsistencies in the dataset.

<sup>6</sup>Since literature on missing data imputation is vast, only the method used for the SMEI will be presented in greater detail. For extensive surveys on the ever-developing literature, see for example Little, Schenker (1995), Little (1997) or Little, Rubin (2002). There is no heuristic that will provide the perfect method of imputation that is applicable in all cases. The appropriate method highly depends on the dataset, on the scale of the data, since some methods of imputation specifically require a metric scale, on the number of missings in relation to size of the dataset and on the country as well as on the indicator for which the data is missing (cf. OECD, 2008, p. 62).

For the SMEI, a variant of an unconditional mean imputation was created. The dataset was grouped according to the 21 macro geographical sub-regions defined by the United Nations Statistics Division. Missing values were then replaced with the sample arithmetic mean of their respective region, thus using the geographic region as a condition for the mean imputation.

Let  $X_q$  be a variable associated with the single indicator  $q$ , with  $q = 1, \dots, Q$ , and  $x_{q,r}$  the observed value of  $x_q$  for country  $c$  in geographic region  $r$ , with  $c_r = 1, \dots, C_r$ , and  $r = 1, \dots, R$ . Let  $nm_{q,r}$  be the number of non-missing values on  $X_q$  in region  $r$ , with regard to time  $t = 1, \dots, T$ . The conditional regional mean  $x_{q,r}^t$  is then given by:

$$x_{q,r}^t = \frac{1}{c_r^{nm}} \sum_{c_r^{nm}=1}^{c_r^{nm}} x_{q,r}^{t,nm}$$

Using the regional mean to impute the missing values, the imputed value becomes a biased estimator, and the sample variance underestimates the true variance, hence underestimating the uncertainty in the SMEI. Despite this limitation, the imputation using the regional mean is a pragmatic choice.

## 3.2. Index Construction

### 3.2.1. Normalization

Since the SMEI uses 12 different data series that run on different scales, the single indicators need to be normalized. Normalization refers in most cases to a simple linear transformation of the raw data. When applied, most normalization procedures fall either in the category of standardization, in which the mean is subtracted from the observation and then divided by the standard deviation, or in the category of ranging, which scales the raw data into an interval by expressing them as relative to some reference values (cf. Ebert and Welsch, 2004, p. 281). Out of the many possible methods of normalization<sup>7</sup>, a variation of the simple linear transformation in terms of ranging was employed for the SMEI, which allows for comparisons across countries and across time. Most other methods of normalization that were experimented with in the creation of the index, such as the min-max-method, only allow for cross-sectional analyses. Even if the min-

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<sup>7</sup>See OECD, 2008, pp. 83-88 for an overview of normalization methods.

max-method is modified to allow also for time-series-analyses, the transformation will collapse when new data points become available, thus limiting the datasets' ability for expansion. There are no such concerns when employing linear transformation. All data were normalized to a scale from 1 to 10, 10 indicating the highest level of institutions related to the prosperity enhancing economic order, in order to avoid the value of 0, which could yield problems with possible further analyses.

Nine of the 12 data series that the SMEI is based on are available as normalized indices. In these cases, only a simple linear transformation was necessary to convert the given index values to the scale from 1 to 10. Table 3 displays the formulas that were used in the transformation process.

<b>Data Series</b>	<b>Formula</b>
Political Rights and Civil Liberties	$x = (-1,5 * PR/CL) + 11,5$
Freedom of the Press	$x = (0,09 * PF) + 1$
All Heritage Data	$x = (0,09 * Her) + 1$
Education	$x = (9 * Edu) + 1$

Table 3: Linear Transformation I.

As for the remaining three data series, life expectancy,  $CO_2$  emissions per capita and women in parliament, a normative contextual assessment had to precede the linear transformation. In general, a linear assignment of values is only applicable to indicators with a natural limit in the foreseeable future as to their manifestation. For each of the three data series, the natural limit had to be determined and a value had to be assigned to this limit. This value would then serve as a point of reference for the linear

transformation. In the case of life expectancy, the normative assessment yields the belief that the higher the average life expectancy in a country, the better the institutional development. The point of reference was set at an average life expectancy of 100 years of age. The oldest documented person who ever lived died in France in 1997 at age 122. Since the average life expectancy across men and women in most industrialized countries is around 80 years of age, using 100 years of age as one reference point and zero years as the other guarantees that the rescaling of the data will be stable for the foreseeable future. In the case of  $CO_2$  emissions per capita, the World Bank Development Indicators showed that Qatar scored highest in 1963 with 100 metric tons of  $CO_2$  per capita. This value has not been reached again by any country. Therefore, this all time high was used as a reference point in the transformation, as well as a level of zero emissions. For the women in parliament-data, a level of 50% is perceived as the normative ideal in terms of gender equality. Thus, 50% is used as one reference point, zero percent as the other. Table 4 displays the formulas that were used in the transformation process.

<b>Data Series</b>	<b>Formula</b>
Life Expectancy	$x = (0,09 * LE) + 1$
$CO_2$ Emissions per Capita	$x = (-0,09 * CO_2) + 10$
Women in Parliament	$x = (0,18 * WP) + 1$

Table 4: Linear Transformation II.

### 3.2.2. Weighting and Aggregation

The SMEI relies on equal weighting, since all 12 single indicators and subsequently all three dimensions are assumed to be of equal value to the overall model of an economic order. It should be stressed that equal weighting does not imply the absence of weights

but deliberately assigns the same weight to all indicators. Aggregation of any index has to take the underlying theoretical framework of the index into account. To that end, in case of the SMEI, linear aggregation and geometric aggregation will be combined.

For the three dimensions of PIQ, EIQ and SIQ linear aggregation in form of the arithmetic mean of their respective single indicators is employed. Four single indicators enter PIQ, three single indicators enter EIQ and five single indicators enter SIQ. This approach follows the approach by van Suntum et al. (cf. Van Suntum et al., 2012b, p. 99). Linear aggregation is possible since all single indicators have the same measurement unit. The arithmetic mean implies constant compensability between the single indicators (cf. OECD, 2008, p. 33). This is justifiable based on the assumption that the indicators in each dimension are nothing but an imperfect signal describing the respective dimension, since it would take many more single indicators to adequately describe the dimensions, for most of which measurement concepts remain elusive as of yet; and it would not be enough to add more formal institutional indicators, also informal institutions would have to be taken into account. Demanding that any dimension will only live up to its potential if a complete enumeration of single formal and informal institutional indicators is accounted for does neither reflect political, nor economic nor societal reality. It is feasible that countries compensate a deficit in one institution with a higher level of another institution.<sup>8</sup>

Let  $x_{i,t}^q$  be a variable associated with the single indicator  $q$ , with  $q_d = 1, \dots, Q_d$  for the respective dimensions  $d$  to which  $q$  is unambiguously assigned, in country  $c$  in dimension  $d$ , with regard to time  $t = 1, \dots, T$  and the observations  $I = 1, \dots, I$ . The arithmetic mean  $x_{i,t}$  is given by:

$$x_{i,t} = \frac{1}{Q_d} \sum_{q_d=1}^{Q_d} x_{i,t}^q$$

The SMEI itself is created through the geometric mean of the three dimensions PIQ, EIQ and SIQ. This method of aggregation follows the method used by the United Nations in the creation of the HDI<sup>9</sup> (cf. UBDP, 2013, p. 2).

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<sup>8</sup>For an overview of issues regarding the sensitivity to the normalization of the indicators in linear aggregation, see work by Herrero for a detailed explanation (cf. Herrero, Martinez, and Villar, 2010, p. 9).

<sup>9</sup>The HDI was proposed in 1990 by the UN in order to compare the developmental state of countries, based on Amartya Sen's (1985) work on functioning and capabilities. Until today, it remains one of the most impactful multidimensional indices (cf. Herrero, Martinez, and Villar, 2010, p. 3).

$$SMEI(PIQ, EIQ, SIQ) = \sqrt[3]{PIQ * EIQ * SIQ}$$

Compared to arithmetic mean aggregation, the geometric mean emphasizes the significance of each dimension, since it does imply limited compensability. Unlike within the dimensions, the abandonment of the implication of compensability is intuitive for the aggregation across SMEI dimensions, since with politics, economy and society, the three dimensions display different subject matters that do complement each other, but cannot replace each other. Thus, the geometric mean convinces through its relative neutrality. Also, it takes the dispersions between the dimensions of SMEI negatively into account since it penalizes the differences in values. To obtain a high position in the ranking that is the result of the SMEI creation, a country has to have high marks in all three dimensions (cf. Herrero, Martinez, and Villar, 2010, p. 22). Furthermore, geometric mean aggregation leads to a ranking that is not sensitive to the normalization (cf. Herrero, Martinez, and Villar, 2010, p. 10).

### 3.3. Limitations

Despite yielding promising empirical results, the SMEI is faced with inherent limitations that can be roughly divided into two groups: data-specific limitations and index construction-specific limitations. As for the data-specific limitations, the proposed economic order is only based on formal institutions, because it is far easier to measure formal quantifiable institutions than informal institutions that are seldom quantifiable. In some cases, raw data was collected in qualitative interview processes. Potential biases based on the interview situation or the limited accuracy of the national statistics in less developed countries are potential sources of inaccuracies. Potential biases also surround the source of the data. For the SMEI, some of the data comes from the Heritage Foundation's Index of Economic Freedom, which is developed in partnership with the Wall Street Journal. It is feasible that these organizations have their own agendas. Also, the imputation of missing data can lead to systematic error. Due to the usage of the regional arithmetic mean to impute the missing values, there is an artificial distortion in the index since the variance will be underestimated and the distribution will be reduced.

As for the index' construction-specific limitations, it is important to bear in mind that the focus of this paper is rather methodological. The proposed methodology was applied to a sample of 163 countries in order to confirm the utility of the proposed composite-index

approach. Thus, the results should be treated as a preliminary screening of the country sample. Recalculating the SMEI using different weighting and aggregation methodology and comparing the respective results shall be part of future research.<sup>10</sup> Also, whenever a multitude of single variables is compressed into a single indicator as it is done in case of the SMEI, there will be a loss of information.<sup>11</sup>

Given the empirical results presented in the following section, the limitations should be considered at all times when analyzing and interpreting the results. Despite the limitations, the SMEI can be employed in comparative country analyses in terms of benchmarking and it will serve as a tool in further analyses on the relationship between institutions and growth.

## 4. Empirical Results

### 4.1. Correlation Analysis

Pairwise correlations between the different dimensions and the single indicators will be briefly discussed in the following in order to provide an overview of the trade-offs and the separation precision between the indicators.

Variables	PIQ	EIQ	SIQ
PIQ	1.000		
EIQ	0.721	1.000	
SIQ	-0.114	0.017	1.000

Table 5: Pairwise Correlations across Dimensions.

Table 5 describes the pairwise correlation between the three dimensions of the SMEI. The highest correlation is found between PIQ and EIQ with a coefficient of 0.721. This could imply that there is an overlap with regard to content between these two dimensions, but it would be premature to interpret his finding based on a simple correlation. The correlation between EIQ and SIQ is also positive but low in comparison but at 0.017. Between the dimensions of PIQ and SIQ, a negative correlation is found.

<sup>10</sup>The literature on weighting and aggregation methods is extensive. For brevity reasons, an overview of alternative methods will be omitted at this point. For an extensive overview, see OECD, 2008, pp. 89-116.

<sup>11</sup>For a more detailed discussion of index construction-specific concerns, see for example Grupp and Mogege, 2004.



Ind.	PR	CL	FC	GS	MF	BF	FF	ED	FP	LE	CO <sub>2</sub>	WP
PR	1.000											
CL	0.941	1.000										
FC	0.570	0.618	1.000									
GS	-0.322	-0.318	-0.467	1.000								
MF	0.383	0.417	0.431	0.032	1.000							
BF	0.511	0.560	0.717	-0.211	0.456	1.000						
FF	0.597	0.651	0.601	-0.223	0.523	0.613	1.000					
ED	0.504	0.554	0.661	-0.499	0.192	0.577	0.479	1.000				
FP	-0.902	-0.930	-0.638	0.337	-0.442	-0.543	-0.643	-0.489	1.000			
LE	0.429	0.463	0.620	-0.339	0.289	0.544	0.385	0.779	-0.411	1.000		
CO <sub>2</sub>	-0.158	-0.187	-0.473	0.222	-0.155	-0.312	-0.300	-0.508	0.209	-0.458	1.000	
WP	0.265	0.277	0.348	-0.298	0.066	0.202	0.172	0.243	-0.267	0.191	0.007	1.000

Table 6: Pairwise Correlations of Indicators.

Table 6 shows the pairwise correlation for the single indicators. Political Rights and Civil Liberties exhibit the highest positive correlation with a coefficient of 0.94. While the indicators belonging to PIQ and EIQ tend in the same direction, government spending being the bigger exception, the results are more ambiguous when it comes to comparing the other dimension pairs. It is striking that  $CO_2$  Emissions negatively correlate with all other indicators. The same is true for Government Spending, which negatively correlates with all other indicators except with Monetary Freedom and  $CO_2$  Emissions. Tables 5 and 6 reveal interesting trade-off patterns, which makes it particularly interesting to bring these different pieces of information together through the construction of a composite index.

## 4.2. Country-Specific Evidence

The panel comprises 978 observations, the SMEI mean is roughly 6.3 and the variance is 0.94. The minimum value found in the panel is 2.04 in North Korea in 2010, the maximum value of 8.37 is achieved by New Zealand in 2006. In the following, some SMEI evidence on particular countries will be presented.<sup>12</sup>

Seen across all countries, it is striking that the Scandinavian countries, as well as the Netherlands, Switzerland, Australia and New Zealand in particular exhibit the highest scores or are among the higher scoring countries in the dimension rankings as well as in the SMEI. This finding applies to all years observed in the panel. Taking the Scandinavian countries of Norway, Sweden, Finland and Denmark into account, it is striking that all of their index values for all years of observation are in the 90% percentile, with Norway's score of 7.50 in 2005 being the only exception. Denmark's mean score is the highest at 8.07 of the Scandinavian countries, Norway's is the lowest at 7.73.

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<sup>12</sup>Detailed summary statistics for the SMEI and for the PIQ, EIQ and SIQ indices can be found in appendix A.3.

Year	NOR	SWE	FIN	DNK
2005	7.504887	7.797451	7.803579	8.033032
2006	7.812195	7.886007	7.931921	7.990913
2007	7.757586	7.868807	8.008778	8.017066
2008	7.692801	7.963817	8.103571	8.141125
2009	7.832833	7.993396	8.075272	8.144502
2010	7.784283	8.041926	7.971504	8.084538

Table 7: SMEI for Scandinavian Countries.

Australia and New Zealand stand out for consistent scoring in the 95% percentile, never scoring below 8.08 in case of Australia and 8.18 in case of New Zealand. Switzerland exhibits an index value 7.89 in 2005 and a value of 8.06 in 2010. Its values peak at 8.07 in 2007 and reach a low in 2007 at 7.89. The Netherlands score lowest at 7.83 in 2005, display a peak in 2009 at 8.17 and score at 8.00 in 2010. Neighboring Germany scores the lowest in 2005 at 7.38 and the highest at 7.73 in 2010 on the scale from 1 to 10. The index values for Germany are all in the 75% percentile, from 2008 even in the 90% percentile.

Year	USA	DEU	AUS	NZL	CHE	NLD
2005	7.76704	7.384145	8.077741	8.177111	7.975428	7.830621
2006	7.852229	7.619403	8.166407	8.374018	7.956234	8.023641
2007	7.76878	7.57994	8.153087	8.287621	7.893986	7.98884
2008	7.778591	7.677757	8.187678	8.297385	8.051319	8.140917
2009	7.782549	7.711086	8.205537	8.260882	8.065597	8.172861
2010	7.621398	7.733093	8.210039	8.26184	8.064352	8.004724

Table 8: SMEI for Top-Ranked Countries.

Poland is also a country worth investigating since it is a country that has been through an enormous institutional transformation process following the end of the Cold War. During the first three years of observations, Poland's index values are descending, from 7.05 in 2005 to 6.80 in 2007 and subsequently ascend to 7.08 in 2010. These values put Poland mostly in the 75% percentile, with the index values for 2007 and 2008 only being part of the 50% percentile. Considering Poland's explicit constitutional commitment to the economic order of a Social Market Economy and thus to a market

oriented-economic order as favored by the index, these values appear to be an indication for the fact that Poland is still in the process of economic transformation, a process that started in the 1990 with the drastic Balcerowicz reforms. All in all, Poland is a promising example of transformation in terms of market economy, especially in comparison with its former Communist peers. Taking Russia as an example, it displays index values between 5.34 in 2005 and 5.50 in 2010, peaking in 2009 at 5.61. Russia does not exceed the 10% percentile. Other former Communist countries, that now are part of the EU, display higher values. Even a relatively poor country like Bulgaria displays values between 7.03 in 2005 and 6.85 in 2010, reaching the lowest value with 6.83 in 2008. For Latvia, a post-USSR economic success story, values between 7.26 in 2005 and 6.88 in 2010 with a peak at 7.27 in 2006 can be observed, and also Estonia, one of Russia's and Latvia's former USSR-peers reaches values between 7.70 and 7.63 between 2005 and 2010, exhibiting the highest index score in 2005. Compared to that, former USSR-member Belarus, sometimes dubbed Europe's last dictatorship, has index values between 4.75 in 2005 and 4.82 between 2005 and 2010, peaking at 5.03 in 2007. The example of the former USSR countries hints at a possible influencing factor of the institutional setting: EU membership comes with a commitment to Social Market Economy in article 3 of the EU Lisbon treaty since 2005, and the EU provides aid that hints at institutional adjustment to its member states, and it would appear that the former USSR countries, that are now EU members do profit from that in terms of their institutional setting.

Year	RUS	EST	POL	LVA	BGR	BLR
2005	5.339581	7.704801	7.052935	7.261899	7.027865	4.752646
2006	5.481284	7.67823	6.969213	7.273593	6.871799	4.847336
2007	5.588609	7.690779	6.809524	7.17497	6.840514	5.033706
2008	5.58573	7.696218	6.93587	7.231074	6.826973	5.00902
2009	5.606346	7.646375	6.94749	7.124255	6.925994	4.775889
2010	5.496047	7.629676	7.07667	6.883592	6.845801	4.818219

Table 9: SMEI for Former Communist Countries.

In this context, it is worthwhile to take Qatar and Saudi Arabia, two oil-exporting countries, into account. Qatar reaches index values between 5.72 in 2005 and 5.91 in 2010 with a low at 5.62 in 2007, and Saudi Arabia displays index values between 5.51 and 5.52 between 2005 and 2010, with a low at 5.26 in 2007. These two oil-exporting countries are much more prosperous than the aforementioned Bulgaria or Latvia, but

they do exhibit a lower level of institutions associated with the proposed model. Another prosperous and often-referenced country is the United States. Its economic philosophy is considerably different from the concept of Social Market Economy, that is aimed at in the EU, traditionally favoring a more market-oriented approach. Similarly to various EU countries, the US exhibits high index values between 7.77 in 2005 and 7.62 in 2010 with a high at 7.85 in 2006, all in the 75% or in the 90% percentile. The assessment of the combined examples reveals the complexity of the relationship between the institutional framework of a country on the one hand and its prosperity on the other. Even if there was a causal relationship, the direction of the causality is all but clear. And, as the example demonstrates, there might be secondary aspects such as a societal consensus aiming at certain institutions or other cultural factors that determine the institutional setting of a country.

Year	SAU	QAT
2005	5.513287	5.716285
2006	5.435277	5.622088
2007	5.260259	5.667074
2008	5.42224	5.714545
2009	5.562388	5.853211
2010	5.516062	5.913311

Table 10: SMEI for Saudi-Arabia and Qatar.

The examples of the emerging countries of Brasil, Russia, India, China and South Africa (BRICS) add to that and expand the former argument to economic growth since the BRICS countries are generally rather characterized by economic growth than by level of prosperity. All of the BRICS countries' peak values are in the 50% percentile. Brasil, China and South Africa exhibit their highest values in 2005, Russia and India peak in 2009. Overall, Brasil displays higher scores in all years of observation than its BRICS-peers, scoring consistently at 6.37 and higher. India is the only other BRICS country to reach an index value of 6, scoring at 6.06 in 2005 and 6.14 in 2009. The other countries score consistently with index values of 5. Again, this underlines the complexity of the relationship between the institutional framework of a country on the one hand and not only economic prosperity but also economic growth on the other. The BRICS countries score relatively low in the SMEI, thus, their economic order differs from the proposed market-oriented model, which was build of posterity and growth-enhancing institutions.

But the BRICS exhibit high growth rates. Again, it is noteworthy that secondary factors or specific subsets of institutions, which growing economies might share should be investigated to determine the nature of the relationship between institutional settings, economic growth and economic prosperity.

Year	BRA	RUS	IND	CHN	CAF
2005	6.70536	5.339581	6.057787	5.641626	5.893142
2006	6.616481	5.481284	5.988159	5.48668	5.863576
2007	6.365852	5.588609	5.990169	5.482893	5.548735
2008	6.382402	5.58573	5.983505	5.577275	5.444179
2009	6.49064	5.606346	6.141702	5.573654	5.351544
2010	6.484074	5.496047	5.952468	5.541054	5.262387

Table 11: SMEI for BRICS Countries.

### 4.3. Country-Ranking Evidence<sup>13</sup>

Even though all countries are treated equally in the panel, it is useful for illustrative purposes to group the countries with their peers in order to facilitate the consideration of results for 163 countries. Also, this approach makes cross-country comparisons more convincing and makes identifying benchmarks in each peer group possible. Therefore, countries are classified into four income groups, in accordance with the World Bank classification. Low-income countries have a GNI per capita of \$1,045 or less, lower-middle income countries have a GNI per capita between \$1,046 and \$4,125, upper-middle income countries have a GNI per capita between \$4,126 and \$12,745 and lastly, high-income countries have a GNI per capita of \$12,746 and above.<sup>14</sup> In the following, only the ranking for 2010 as the most recent year of the study will be taken into account.

When it comes to the SMEI as an aggregate, in the group of the low-income countries, Tanzania is ranked highest in 2010 with a score of 6.35, North Korea is ranked at the bottom with 2.04. Surprisingly at first glance, only six more countries of the low-income group exhibit index values below 5 in 2010 (Zimbabwe with 3.16, Eritrea with 3.64, Somalia with 3.93, Burkina Faso with 4.70, the Democratic Republic of Congo with 4.80, and Chad with 4.88), and even Rwanda as one of the poorest countries in

<sup>13</sup>All corresponding tables of this section can be found in appendix A.5.

<sup>14</sup>See appendix A.4 for the income groupings.

the world has a score of 6.18. This shows that the index favors systems with limited government activity, e.g. enabling countries to get high scores if government spending is low, or for not emitting  $CO_2$ , even when this is not by choice but by lack of production facilities that would emit  $CO_2$ . Rwanda for example has high scores in 2010 when it comes to Government Spending (8.78) and  $CO_2$  Emissions (9.99).

In the group of lower-middle income countries, the three leading countries are Slovenia, which reaches the highest score with 7.02 in 2010, Paraguay with a score of 6.72 and Georgia with a score of 6.69. The scoring of Slovenia as one of the poorest EU members is encouraging and underlines the importance of the EU institutional setting that comes with the membership. Ghana ranks in eighth position with a score of 6.44, making it the African country with the highest level of SME institutions in 2010, underlining Ghana's position in Africa as a relatively economically well-faring and politically stable country. Uzbekistan ranks at the bottom with 4.94. In the group of the upper-middle income countries, the three leading nations are Costa Rica with a score of 7.24 in 2010, Panama with an index value of 7.28 and Mauritius with a score of 7.41. In this group, Cuba ranks at the bottom with a score of 4.20. This income group is dominated by Latin and Southern American countries, which display higher values on average than the many middle-eastern countries, which also make up for a large portion of this income group. Comparing the lower-middle and upper-middle income groups, it is evident that the range of index values becomes slightly larger for the upper-middle income countries, which have values between 4.20 and 7.41 larger, while they are between 4.94 and 7.02 in the other group.

There are a few surprises in the group of high-income countries. In 2010, the leading nations are New Zealand with a score of 8.26, Australia with a score of 8.21 and Denmark with a score of 8.08. Germany comes in at 13<sup>th</sup> position with a score of 7.73. The last place in the ranking is held by Equatorial Guinea with a score of 4.98, second to last by Russia with a score of 5.50 and third to last by Saudi Arabia with 5.52. It is hardly a surprise that the countries at the top of the ranking for the high-income countries have democratic political systems.

Noticeable patterns also emerge from looking at the three dimension of the overall SMEI. Since the available data is vast, only highlight are presented in the following. Firstly, it is striking that in 2010 scores are lowest in the PIQ dimension across all four income groups with a mean of 5.96, the highest scores are achieved in the EIQ dimension with a mean of 6.59. The mean in the SIQ dimension is 6.51. Taking only the group of high

income countries into account, the analysis of the ranking across the three dimensions reveals eye-catching evidence. When it comes to the presence of institutions associated with PIQ, the leading country is Switzerland with a score of 9.08, followed by Chile with a score of 9.07 and Australia with a score of 8.92. Ranked at the bottom are Equatorial Guinea with 3.27, Saudi Arabia with 3.69 and Russia with 4.09. When it comes to the dimensions of EIQ, the latter countries rank 43<sup>th</sup>, 37<sup>th</sup> and 45<sup>th</sup> out of 45 countries respectively, Saudi Arabia being the only country exhibiting a bigger difference in rank compared to the PIQ ranking. Greece, the epicenter of the European debt crisis, ranks 30<sup>th</sup> in the EIQ dimension, with a score of 7.45. The leading countries in this dimension are Denmark with a score of 9.02, New Zealand with a score of 8.89 and Australia with a score of 8.89 as well.

The analysis of the SIQ dimension scores for high income countries reveals a geographical clustering of countries with deficits in the societal institutional quality on the Arabian peninsula, referencing the proposed model . Qatar ranks at the bottom with a score of 5.89, followed by Kuwait at 6.01. Trinidad and Tobago, which interrupts the pattern being located in Caribbean, has a score of 6.02. Oman scores a little bit higher at 6.15. There is no such geographical clustering in the top ranks. Singapore earns the best score at 7.65, profiting from low  $CO_2$  emissions. It is followed by Sweden with a score 7.53 and the Netherlands with 7.38.

#### 4.4. Cluster-Level Evidence<sup>15</sup>

Since the country rankings do only provide little evidence as to the existence of groups of particularly well or poor performing countries, it is useful to include geography as a secondary criterion into the analysis. To that end, the present section is based on the assessment of summary statistics for country clusters. The cluster of developing countries will be compared to six clusters of developing countries, which were built in accordance with the World Bank definition. Comparing the average SMEI values and also the means in the dimensions, it is obvious that the Latin American and Caribbean countries outperform the other developing regions. For the SMEI, their mean value is at 6.45. The second highest mean value is found in developing European and Central Asian countries at 6.17, all other clusters score values in the range between 5.74 (Subsaharan Africa) and 5.91 (South Asia). In comparison, the developed countries display a mean

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<sup>15</sup>The corresponding tables for PIQ, EIQ and SIQ values can be found in appendix A.6.



value of 7.21 in the SMEI. The highest standard deviation and the lowest skewness is observed for East Asian and Pacific developing countries when it comes to the SMEI data.

	<i>Developed countries</i>	<i>Developing countries</i>					
		East Asia and Pacific	Europe and Central Asia	Latin America and the Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa
obs.	270	84	108	126	84	42	258
min.	4.98	2.04	4.42	3.89	4.32	5.41	3.16
max.	8.37	6.78	7.08	7.52	6.46	6.45	7.41
mean	7.21	5.73	6.17	6.45	5.59	5.91	5.74
std. dev.	0.782	1.03	0.70	0.73	0.54	0.28	0.70
skewness	-1.04	-2.55	-0.91	-1.57	-0.50	-0.12	-0.52

Table 12: Summary Statistics of the SMEI Values by Regions.

Also in the three dimensions, the Latin American and Caribbean countries reach higher mean values than the other developing regions while Subsahara African and South Asian countries score the lowest. For the PIQ, Latin American and Caribbean countries score at 6.4 while the other regions score between 5.54 (South Asia) and 4.38 (Middle East and North Africa). The developed countries display a mean PIQ of 7.38. Note that again, PIQ values are low in comparison to SIQ and EIQ values. For the SIQ, developing countries in Europe and Central Asia reach the highest mean value at 6.85, followed by Latin American and Caribbean at 6.69, while the developed countries score at 6.65 and are thus outperformed by the developing regions. For the EIQ, the scoring distance between the developing regions is the lowest. Countries in Europe and Central Asia reach a value of 6.46, followed by Latin American and Caribbean at 6.43 and Middle East and North Africa at 6.13. South Asia exhibits the lowest score at 5.92. All developed countries have a mean value of 7.73.

### 4.5. Joint Analysis with GDP Data

To further analyze the relationship between SMEI and economic richness, correlations in form of scatterplot-graphs can be analyzed. The results from the scatterplot fall in line with the previous results. It is striking that none of the poorest countries achieve the highest SMEI scores and high GDP-countries like Saudi Arabia, Qatar, Kuwait or Singapore are those that under-perform in terms of SMEI. Overall, there appears to be a positive relationship between GDP per capita and the SMEI score, as indicated by the fitted values. It is furthermore noticeable that the relationship with the GDP appears to become weaker when displaying the PIQ in correlation with the GDP, and even more weaker when displaying the EIQ in correlation with the GDP and it appears to be the weakest when displaying the SIQ in correlation with the GDP. This visual evidence supports the initial claim of the paper at hand that institutions should be analyzed separately but in bundles of institutions. It is feasible they have a joint effect since they constitute an economic and social order and interact with one another.

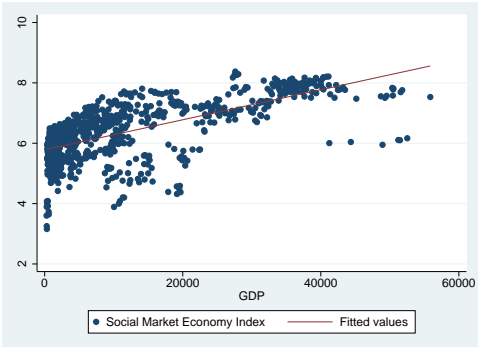


Figure 1: Scatterplot SMEI.

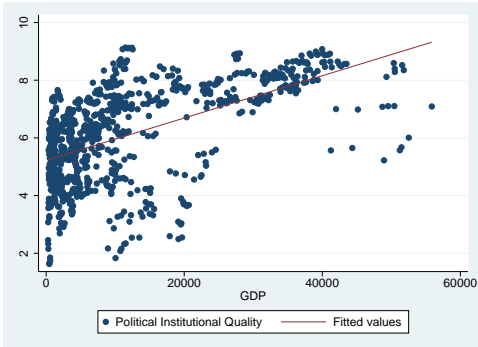


Figure 2: Scatterplot PIQ.

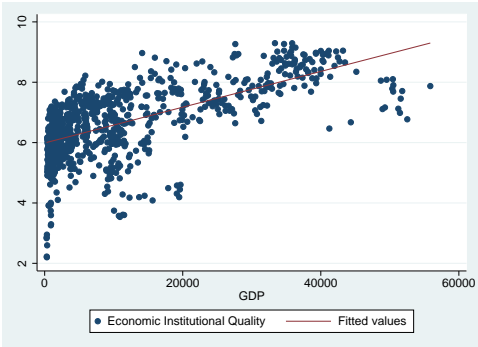


Figure 3: Scatterplot EIQ.



Figure 4: Scatterplot SIQ.

## 5. Further Research and Conclusion

The paper proposes an institution-based model of an economic order and builds a composite index the level of institutions associated with the proposed order. First results indicate that the index is useful and yields the expected empirical results. In the future, different index aggregation methodologies should be applied and results should be compared to test for sensitivity and robustness of the index results. Also, assigning different weights to the single indicators in the index dimensions should be tried, e.g. by weighting with an unobserved components model that implies that all indicators are but imperfect signals of their respective dimension. Another interesting option for future research would be modifying methodology for different groups of countries. Since the focus of this paper was methodological, all empirical results should be treated as preliminary.

The SMEI is designed as a tool that can be used as a variable and that should be tested in relation with indicators of economic performance in regression analyses. Taking the SMEI dimensions into account, it will also be interesting to find which dimension the most economic performance enhancing is. Also, the index might help overcome ideological differences in economic order philosophies if it finds that particular institutional combinations, shared by prosperous, yet ideologically different economic orders are the driving force behind economic development. Already at this point the SMEI allows for comparisons between countries and allows identifying leading countries in the respective income groups in terms of benchmarking.

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## A. Appendix

### A.1. Table of Excluded Countries

Country	Population (2012)	Reason for exclusion
American Samoa	55,128	Number of inhabitants
Andorra	78,360	Number of inhabitants
Antigua and Barbuda	89,069	Number of inhabitants
Aruba	102,384	Number of inhabitants
Barbados	283,221	Number of inhabitants
Bermuda	64,798	Number of inhabitants
Brunei Darussalam	412,238	Number of inhabitants
Cabo Verde	494,401	Number of inhabitants
Cayman Islands	57,570	Number of inhabitants
Channels Islands	161,235	Number of inhabitants
Curacao	152,056	Number of inhabitants
Cyprus (Turkey)	294,906	Number of inhabitants
Dominica	71,684	Number of inhabitants
Faeroe Islands	49,506	Number of inhabitants
French Polynesia	273,814	Number of inhabitants
Guam	162,810	Number of inhabitants
Greenland	56,810	Number of inhabitants
Grenada	105,483	Number of inhabitants
Hong Kong	715,460	Status unclear
Iceland	320,716	Number of inhabitants
Isle of Man	85,284	Number of inhabitants
Kiribati	100,786	Number of inhabitants
Kosovo	1,807,106	Status unclear
Liechtenstein	36,656	Number of inhabitants
Marshall Islands	52,555	Number of inhabitants
Macau	556,783	Number of inhabitants
Maldives	338,442	Number of inhabitants

<b>Country</b>	<b>Population</b>	<b>Reason for exclusion</b>
Monaco	37,579	Number of inhabitants
Micronesia	103,395	Number of inhabitants
Nauru	9,488	Number of inhabitants
North Mariana Islands	53,305	Number of inhabitants
New Caledonia	258,000	Number of inhabitants
Palau	20,754	Number of inhabitants
Puerto Rico	3,651,545	Status unclear
Saint Kitts & Nevis	53,584	Number of inhabitants
Saint Martin (French Part)	30,959	Number of inhabitants
Samoa	188,889	Number of inhabitants
San Marino	31,247	Number of inhabitants
Sao Tome and Principe	188,098	Number of inhabitants
Seychelles	88,303	Number of inhabitants
Sint Maarten	39,088	Number of inhabitants
South Sudan	11,562,695	Status unclear
St. Lucia	180,870	Number of inhabitants
St. Vincent and the Grenadines	109,373	Number of inhabitants
Taiwan	23,367,320	Status unclear
Tonga	104,941	Number of inhabitants
Turks and Caicos Islands	32,427	Number of inhabitants
Tuvalu	9,860	Number of inhabitants
The Bahamas	371,960	Number of inhabitants
USSR	?	No longer existing
Vanuatu	247,262	Number of inhabitants
Virgin Islands	105,275	Number of inhabitants
West Bank & Gaza Strip	4,046,901	Status unclear
Yugoslavia	?	No longer existing

Table A.1: Excluded Countries

## A.2. Data Description

### **Freedom House, Freedom in the World Index**

**Political Rights and Civil Liberties:** The index covers 114 countries and 14 territories. It relies on national and international surveys, scientific studies, studies issued by NGO's and think tanks as well as on expert interviews and on site-visits. With every new publication, there are minor changes in the index in terms of the sample or the methodology. Unfortunately, there is no retroactive adjustment made. In order to create the index, 10 questions regarding Political Rights in the categories Electoral Process, Political Pluralism and Participation and Functioning of Government, and 15 questions on Civil Liberties in the categories Freedom of Expression and Belief, Associational and Organizational Rights, Rule of Law, Personal Autonomy and Individual Rights are analyzed. The questions are adjusted to the political systems of the different countries, e.g. in terms of democracy or monarchy. A value between 0 and 4 is assigned to each subcategory, and the values will be added to form an aggregate value that can reach a maximum of 100 ( $100 = 4 \cdot 10 + 4 \cdot 15$ ). In accordance with the aggregate value, an index value between 1 (high) and 7 (low) is assigned (Freedom House, 2012).

**Freedom of the Press Index:** The index covers 197 countries. It relies on regional visits, expert opinions, studies issued by NGO's, national and international media as well as on government and other reports. In the creation of the index, 23 questions in the categories Legal Environment (max. 30 points), Political Environment (max. 40 points) and Economic Environment (max. 30 points) are analyzed. Not every question has to be answered. The questions just offer orientation as to the assessment of the situation in the various countries. The aggregate index can reach a maximum value of 100 after addition of the category-points. The index values range between 0 (high) and 100 (low). The index values are then labeled Free (0-30 points), Partly Free (31-60 points) and Not Free (61-100 points) (Freedom House, 2014).

### **Heritage Foundation, Index of Economic Freedom<sup>16</sup>**

**Freedom from Corruption:** The index is calculated on a scale from 0 (very corrupt) to 100 (not corrupt) from Transparency International's Corruptions Perceptions Index (CPI). In countries, in which the CPI is not reported, the index is calculated using national indicators. The sources include the Corruptions Perception Index, the Country

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<sup>16</sup>The equations used in the creation of each of the Heritage indices can be found in the document mentioned in the references.

Commerce Index (Economist Intelligence Unit), the Country Commercial Guide (US Department of Commerce), the National Trade Estimate Report on Foreign Trade Barriers (Office of the US Trade Representative). The final index values is determined as a mean of the current value and the two previous values. Due to changes in the CPI methodology, comparability is impaired.

**Financial Freedom:** The index ranges between 0 (low) and 100 (high) and it analyzes five topics: the extent of government regulation of financial services, the degree of state intervention in banks and other financial firms through direct and indirect ownership, the extent of financial and capital market development, government influence on the allocation of credit, and openness to foreign competition Sources include the Staff Country Report (IMF), the Country Commerce and Industry Report Financial Services (Economist Intelligence Unit), the Country Commercial Guide (US Department of Commerce), the National Trade Estimate Report on Foreign Trade Barriers (Office of the US Trade Representative) as well as other national and international studies.

**Government Spending:** The index ranges between 0 (low) and 100 (high). Its methodology treats zero government spending as the benchmark. Underdeveloped countries, particularly those with little government capacity, may receive artificially high scores as a result. However, such governments, which can provide few if any public goods, are likely to receive low scores on some of the other components of economic freedom that measure aspects of government effectiveness. Sources include Organization for Economic Co-operation and Development data, Eurostat data, African Development Bank data, the Staff Country Report (IMF) and the World Economic Outlook Database.

**Business Freedom:** The index ranges between 0 (low) and 100 (high). It is calculated as the arithmetic mean of ten equally weighted factors mostly from the World Bank's Doing Business report. For the six countries that are not covered by the World Bank's Doing Business report, business freedom is scored by analyzing business regulations based on qualitative information from reliable and internationally recognized sources. Overall, sources include Doing Business (World Bank), the Country Commerce and Industry Report Financial Services (Economist Intelligence Unit), the Country Commercial Guide (US Department of Commerce), and official government publications of each country.

**Monetary Freedom:** The index ranges between 0 (low) and 100 (high). Its score is based on two factors, the weighted average inflation rate for the most recent three years

and price controls. The index relies on International Financial Statistics Online (IMF), World Economic Outlook (IMF), Views-Wire (Economist Intelligence Unit), and official government publications of each country as sources (Heritage Foundation, 2014).

### **World Bank, World Development Indicators**

The indicators are based on data obtained from national sources like central banks or governments that publish key performance figures. They are calculated as a sum or weighted mean of single indicators.

**Central government debt:** Debt is defined as the entire stock of direct government fixed-term contractual obligations to others outstanding on a particular date. It includes domestic and foreign liabilities such as currency and money deposits, securities other than shares, and loans. It is the gross amount of government liabilities reduced by the amount of equity and financial derivatives held by the government. Because debt is a stock rather than a flow, it is measured as of a given date, usually the last day of the fiscal year. It is measured as a percentage of the GDP. Sources include the Government Finance Statistics Yearbook and data files (IMF), and the World Bank and OECD GDP estimates.

**Life Expectancy:** Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. The necessary data is derived from male and female life expectancy at birth from sources such as United Nations Population Division's World Population Prospects, the United Nations Statistical Division's Population and Vital Statistics Report, census reports and other statistical publications from national statistical offices, like Eurostat, the Secretariat of the Pacific Community and the U.S. Census Bureau.

**CO<sub>2</sub> Emissions:** Carbon dioxide emissions are those stemming from the burning of fossil fuels and the manufacture of cement. They include carbon dioxide produced during consumption of solid, liquid, and gas fuels and gas flaring. The index measures the emission in metrics tons per capita. It relies on the Carbon Dioxide Information Analysis Center, Environmental Sciences Division, Oak Ridge National Laboratory, Tennessee, United States for data (World Bank, 2014).

### **United Nations Development Programme, Human Development Index**

**Education Index:** The education index within the HDI is calculated using mean years of schooling and expected years of schooling. Mean years of schooling is defined as the average number of years of education received by people ages 25 and older, converted from education attainment levels using official duration of each level. Expected years of schooling is defined as the number of years of schooling that a child of school entrance age can expect to receive if prevailing patterns of age-specific enrollment rates persist throughout the child's life. The main data source is data from the UNESCO (UNDP, 2014).

### **United Nations, Millennium Development Goals Database**

**Women in Parliament:** The indicator measuring the seats held by women in national parliaments is part of the third target of the Millennium Development Goals ("Promote gender equality and empower women"). The proportion of seats held by women in national parliaments is the number of seats held by women members in single or lower chambers of national parliaments, expressed as a percentage of all occupied seats. National parliaments can be bicameral or unicameral. This indicator covers the single chamber in unicameral parliaments and the lower chamber in bicameral parliaments. It does not cover the upper chamber of bicameral parliaments. Seats are usually won by members in general parliamentary elections. Seats may also be filled by nomination, appointment, indirect election, rotation of members and by-election. Seats refer to the number of parliamentary mandates, or the number of members of parliament. The proportion of seats held by women in national parliament is derived by dividing the total number of seats occupied by women by the total number of seats in parliament. There is no weighting or normalizing of statistics. The data used are official statistics received from parliaments (UN, 2014).

### A.3. Summary Statistics

Income class	<i>High</i>	<i>Upper-middle</i>	<i>Lower-middle</i>	<i>Low</i>
GNI/capita (US\$)	$\geq 12,746$	4,126 - 12,745	1,046 - 4,125	$\leq 1,045$
obs.	270	258	246	204
min.	2.04	4.42	3.89	4.98
max.	6.50	7.17	7.52	8.37
mean	5.50	5.96	6.26	7.21
std. dev.	0.82	0.55	0.78	0.78
skewness	-2.25	-0.28	-0.91	-1.04

Table A.1: Summary statistics of the SMEI values by income classes

Income class	<i>High</i>	<i>Upper-middle</i>	<i>Lower-middle</i>	<i>Low</i>
GNI/capita (US\$)	$\geq 12,746$	4,126 - 12,745	1,046 - 4,125	$\leq 1,045$
obs.	270	258	246	204
min.	1.11	2.69	1.83	3.27
max.	7.42	7.66	8.61	9.13
mean	4.99	5.38	5.82	7.38
std. dev.	1.30	1.15	1.54	1.42
skewness	-0.87	-0.19	-0.46	-1.31

Table A.2: Summary statistics of the PIQ values by income classes

Income class	<i>High</i>	<i>Upper-middle</i>	<i>Lower-middle</i>	<i>Low</i>
GNI/capita (US\$)	$\geq 12,746$	4,126 - 12,745	1,046 - 4,125	$\leq 1,045$
obs.	270	258	246	204
min.	1.00	4.10	3.54	5.52
max.	7.36	8.22	8.02	9.30
mean	5.59	6.33	6.45	7.73
std. dev.	1.17	0.68	1.01	0.89
skewness	-2.01	0.10	-0.932	-0.39

Table A.3: Summary statistics of the EIQ values by income classes

Income class	<i>High</i>	<i>Upper-middle</i>	<i>Lower-middle</i>	<i>Low</i>
GNI/capita (US\$)	$\geq 12,746$	4,126 - 12,745	1,046 - 4,125	$\leq 1,045$
obs.	270	258	246	204
min.	4.96	5.02	5.71	5.51
max.	8.13	7.61	8.88	7.65
mean	6.24	6.35	6.74	6.65
std. dev.	0.65	0.54	0.55	0.41
skewness	0.56	-0.10	1.22	-0.01

Table A.4: Summary statistics of the SIQ values by income classes



## A.4. Income Groupings

Source: [http://data.worldbank.org/about/country-and-lending-groups#High\\_income](http://data.worldbank.org/about/country-and-lending-groups#High_income)

For the current 2015 fiscal year, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of \$1,045 or less in 2013; middle-income economies are those with a GNI per capita of more than \$1,045 but less than \$12,746; high-income economies are those with a GNI per capita of \$12,746 or more. Lower-middle-income and upper-middle-income economies are separated at a GNI per capita of \$4,125.

### **Low-income economies (\$1,045 or less); country grouping: 1**

AFG, BGD, BEN, BFA, KHM, CAF, TCD, COD, ERI, ETH, GAM, GIN, GNB, HTI, KEN, LBR, PKR, MDG, MWI, MLI, MOZ, MMR, NPL, NER, RWA, SLE, SOM, TJK, TZA, UGA, ZWE

### **Lower-middle income economies (\$1,046 to \$4,125); country grouping: 2**

ARM, BTN, BOL, CMR, COG, CIV, DJI, EGY, SLV, GEO, GHA, GTM, GUY, HND, IDN, IND, KSV, KGZ, LAO, LSO, MRT, MDA, MNG, MAR, NIC, NGA, PAK, PNG, PRY, PHL, SEN, SLB, LKA, TLS, UKR, VNM, YEM, ZMB

### **Upper-middle income economies (\$4,126 to \$12,745); country grouping: 3**

AGO, ALB, DZA, ARG, AZE, BLR, BLZ, BIH, BWA, BRA, BGR, CHN, COL, CRI, CUB, DOM, ECU, FJI, GAB, HUN, IRN, IRQ, JAM, JOR, KAZ, LBN, LBY, MKD, MYS, MDV, MUS, MEX, MNE, NAM, PAN, PER, ROU, SRB, ZAF, SUR, THA, TUN, TUR, TKM, VEN

### **High-income economies (\$12,746 or more); country grouping: 4**

AUS, AUT, BHS, BHR, BRB, BEL, BRN, CAN, CHL, HRV, CYP, CZE, DNK, EST, GNQ, FIN, FRA, DEU, GRC, IRL, ISR, KOR, KWT, , LTU, LUX, MAC, NLD, NZL, NOR, OMN, POL, PRT, QAT, RUS, SAU, SGP, SVK, SVN, ESP, SWE, CHE, TTO, ARE, GBR, USA, URY

The country codes refer mostly to the World Bank classification.

## A.5. Country Ranking Data

Rank	Countrycode	SMEI	Rank	Countrycode	SMEI
1	TZA	6.35451	18	NER	5.542674
2	MOZ	6.322229	19	AFG	5.517693
3	NPL	6.317253	20	MMR	5.449911
4	UGA	6.306068	21	ETH	5.320225
5	BEN	6.263907	22	GIN	5.319548
6	MDG	6.252521	23	HTI	5.277333
7	KEN	6.2171	24	CAF	5.262387
8	RWA	6.178258	25	BDI	5.083789
9	BGD	6.000041	26	GNB	5.004976
10	MLI	5.898431	27	TCD	4.877889
11	MWI	5.831706	28	COD	4.801124
12	SLE	5.720151	29	BFA	4.703817
13	LBR	5.718352	30	SOM	3.918051
14	KHM	5.687489	31	ERI	3.640912
15	GMB	5.679723	32	ZWE	3.159037
16	COM	5.635725	33	PRK	2.039052
17	TJK	5.609419			

Table A.1: SMEI Lower Income 2010.

Rank	Countrycode	SMEI	Rank	Countrycode	SMEI
1	SLV	7.018881	22	LSO	5.937884
2	PRY	6.719487	23	SLB	5.832379
3	GEO	6.694696	24	BTN	5.771152
4	ARM	6.528826	25	NGA	5.671299
5	IDN	6.512361	26	UKR	5.633437
6	MNG	6.5104	27	EGY	5.611117
7	PHL	6.457926	28	MRT	5.483002
8	GHA	6.435936	29	VNM	5.468159
9	MAR	6.412778	30	PNG	5.459109
10	SEN	6.409431	31	CMR	5.418713
11	MDA	6.398893	32	SWZ	5.376238
12	BOL	6.365331	33	LAO	5.372258
13	HND	6.311775	34	DJI	5.353968
14	ZMB	6.306355	35	TLS	5.263775
15	GTM	6.208586	36	YEM	5.176409
16	KGZ	6.141002	37	SDN	5.165361
17	LKA	6.128881	38	CIV	5.149941
18	GUY	6.11162	39	SYR	5.13779
19	PAK	6.108045	40	COG	5.12073
20	NIC	6.069377	41	UZB	4.937955
21	IND	5.952468			

Table A.2: SMEI Lower-Middle Income 2010.

Rank	Countrycode	SMEI	Rank	Countrycode	SMEI
1	MUS	7.409171	23	SRB	6.427251
2	PAN	7.277132	24	ECU	6.362449
3	CRI	7.244404	25	SUR	6.220333
4	ZAF	7.236342	26	FJI	6.14267
5	MEX	7.21196	27	BIH	6.139406
6	PER	7.173845	28	TUN	6.127906
7	HUN	7.080894	29	LBN	6.078879
8	ALB	6.874803	30	IRQ	6.047273
9	MKD	6.873343	31	KAZ	5.985332
10	BGR	6.845801	32	JOR	5.945649
11	ROU	6.793788	33	GAB	5.80563
12	ARG	6.76824	34	AZE	5.766781
13	NAM	6.744946	35	DZA	5.716667
14	DOM	6.714038	36	CHN	5.541054
15	COL	6.706208	37	AGO	5.31028
16	BWA	6.684313	38	VEN	5.215417
17	TUR	6.682072	39	IRN	5.191261
18	JAM	6.639577	40	BLR	4.818219
19	MYS	6.608167	41	TKM	4.731482
20	MNE	6.559405	42	LBY	4.488587
21	THA	6.512324	43	CUB	4.200963
22	BRA	6.484074			

Table A.3: SMEI Upper-Middle Income 2010.

Rank	Countrycode	SMEI	Rank	Countrycode	SMEI
1	NZL	8.26184	24	CYP	7.379898
2	AUS	8.210039	25	SVK	7.378624
3	DNK	8.084538	26	JPN	7.358095
4	CHE	8.064352	27	PRT	7.326565
5	SWE	8.041926	28	SVN	7.290967
6	NLD	8.004724	29	CZE	7.238302
7	FIN	7.971504	30	ISR	7.17924
8	CAN	7.907112	31	ITA	7.115698
9	ESP	7.825698	32	GRC	7.086618
10	IRL	7.818944	33	POL	7.07667
11	NOR	7.784283	34	HRV	7.044971
12	GBR	7.749138	35	URY	6.911157
13	DEU	7.733093	36	LVA	6.883592
14	BEL	7.699904	37	TTO	6.700308
15	EST	7.629676	38	BHR	6.430414
16	USA	7.621398	39	ARE	6.276784
17	KOR	7.618615	40	KWT	6.003755
18	LUX	7.548005	41	QAT	5.913311
19	CHL	7.531595	42	OMN	5.782167
20	SGP	7.530823	43	SAU	5.516062
21	LTU	7.529016	44	RUS	5.496047
22	AUT	7.510963	45	GNQ	4.98222
23	FRA	7.396427			

Table A.4: SMEI High Income 2010.

<b>Rank</b>	<b>Countrycode</b>	<b>PIQ</b>	<b>Rank</b>	<b>Countrycode</b>	<b>PIQ</b>
1	CHE	9.07525	24	LTU	7.96375
2	CHL	9.0685	25	CYP	7.948
3	AUS	8.91775	26	BEL	7.8175
4	NZL	8.74675	27	PRT	7.70725
5	URY	8.686	28	CZE	7.696
6	LUX	8.68375	29	POL	7.588
7	CAN	8.67475	30	FRA	7.45525
8	IRL	8.623	31	ISR	7.2715
9	USA	8.4475	32	TTO	7.18675
10	NOR	8.398	33	HRV	7.17475
11	EST	8.3845	34	LVA	7.1665
12	NLD	8.3665	35	GRC	7.12525
13	FIN	8.26525	36	SGP	7.08925
14	DEU	8.209	37	ITA	6.907
15	ESP	8.1955	38	KWT	5.566
16	GBR	8.17525	39	ARE	5.27275
17	JPN	8.14225	40	QAT	5.24575
18	DNK	8.0875	41	BHR	5.158
19	SVK	8.07625	42	OMN	4.654
20	KOR	8.07025	43	RUS	4.09375
21	SVN	8.04475	44	SAU	3.69475
22	SWE	7.98175	45	GNQ	3.27025
23	AUT	7.9705			

Table A.5: PIQ High Income 2010

<b>Rank</b>	<b>Countrycode</b>	<b>EIQ</b>	<b>Rank</b>	<b>Countrycode</b>	<b>EIQ</b>
1	DNK	9.016	24	NOR	7.69
2	NZL	8.89	25	AUT	7.687
2	AUS	8.89	26	CZE	7.633
4	SWE	8.65	27	SVK	7.624
5	FIN	8.617	28	PRT	7.606
6	CAN	8.557	29	ITA	7.507
7	IRL	8.554	30	GRC	7.45
8	GBR	8.458	31	ISR	7.438
9	NLD	8.308	32	SVN	7.279
10	CHE	8.275	33	CHL	7.234
11	BEL	8.224	34	POL	7.009
12	USA	8.182	35	TTO	6.949
13	KOR	8.179	36	HRV	6.919
14	FRA	8.08	37	SAU	6.907
15	EST	8.026	38	OMN	6.751
16	LUX	8.02	39	LVA	6.697
17	ESP	8.005	40	QAT	6.688
18	CYP	7.996	41	ARE	6.586
19	LTU	7.984	42	KWT	6.466
20	BHR	7.936	43	GNQ	5.971
21	DEU	7.885	44	URY	5.962
22	SGP	7.873	45	RUS	5.644
23	JPN	7.699			

Table A.6: EIQ High Income 2010

Rank	Countrycode	SIQ	Rank	Countrycode	SIQ
1	SGP	7.652209	24	GRC	6.704412
2	SWE	7.532968	25	KOR	6.699477
3	NLD	7.379021	26	POL	6.663515
4	ESP	7.305206	27	CAN	6.660015
5	NOR	7.30388	28	SVN	6.618675
6	NZL	7.2524	29	EST	6.599969
7	DNK	7.246652	30	SAU	6.576773
8	RUS	7.185266	31	SVK	6.524294
9	DEU	7.144434	32	CHL	6.512487
10	ARE	7.121193	33	BHR	6.495817
11	FIN	7.112278	34	IRL	6.480622
12	BEL	7.100762	35	CZE	6.455796
13	HRV	7.043485	36	USA	6.404958
14	CHE	6.983641	37	URY	6.374417
15	AUS	6.980373	38	JPN	6.355027
16	ITA	6.948591	39	GNQ	6.333454
17	AUT	6.915833	40	CYP	6.324415
18	ISR	6.84156	41	LUX	6.174686
19	LVA	6.796072	42	OMN	6.152866
20	GBR	6.729633	43	TTO	6.02323
21	FRA	6.717262	44	KWT	6.012981
22	LTU	6.712379	45	QAT	5.893704
23	PRT	6.708809			

Table A.7: SIQ High Income 2010



## A.6. Cluster-Level Data

	<i>Developed countries</i>	<i>Developing countries</i>					
		East Asia and Pacific	Europe and Central Asia	Latin America and the Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa
obs.	270	84	108	126	84	42	258
min.	3.27	1.11	2.54	1.83	2.49	4.27	1.63
max.	9.13	7.00	7.84	8.61	5.50	6.91	8.34
mean	7.38	5.07	5.46	6.40	4.38	5.54	5.33
std. dev.	1.42	1.48	1.34	1.28	0.70	0.75	1.35
skewness	-1.31	1.48	1.34	1.28	-0.79	0.14	-0.04

Table A.1: Summary Statistics of the PIQ Values by Regions.

	<i>Developed countries</i>	<i>Developing countries</i>					
		East Asia and Pacific	Europe and Central Asia	Latin America and the Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa
obs.	270	84	108	126	84	42	258
min.	5.52	1.00	4.08	3.54	4.19	4.79	2.2
max.	9.30	7.68	8.08	8.22	7.65	6.98	7.94
mean	7.73	6.02	6.46	6.43	6.13	5.92	5.98
std. dev.	0.89	1.43	0.98	1.03	0.92	0.39	0.93
skewness	-0.39	-2.40	-0.71	-0.80	-0.55	-0.10	-1.39

Table A.2: Summary Statistics of the EIQ Values by Regions.

	<i>Developed countries</i>	<i>Developing countries</i>					
		East Asia and Pacific	Europe and Central Asia	Latin America and the Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa
obs.	270	84	108	126	84	42	258
min.	5.51	5.02	6.02	5.60	5.87	5.62	4.50
max.	7.65	7.80	8.23	8.88	7.74	7.06	8.13
mean	6.65	6.55	6.85	6.69	6.61	6.36	6.12
std. dev.	0.41	0.73	0.45	0.62	0.47	0.41	0.52
skewness	-0.01	-0.50	0.83	1.52	0.36	-0.20	0.75




Table A.3: Summary Statistics of the SIQ Values by Regions.

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