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The Social Market Economy as a Formula for Peace, Prosperity, and Sustainability

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Dissertation

THE SOCIAL MARKET ECONOMY AS A FORMULA FOR PEACE, PROSPERITY AND SUSTAINABILITY

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Abstract

The social market economy was developed in Germany during the interwar period amidst political and economic turmoil. With clear demarcation lines differentiating it from socialism and laissez-faire capitalism, the social market economy became a formula for peace and prosperity for post WWII Germany. Since then, the success of the social market economy has inspired many other countries to adopt its principles. Drawing on evidence from economic history and the history of economic thought, this thesis first reviews the evolution of the fundamental principles that form the foundation of social-market economic thought. Blending the micro-economic utility maximization framework with traditional growth theory, I provide theoretical support that aggregate social welfare is maximized in a stylized social market economy. Despite the presence of extensive qualitative research, no attempts have yet been made to measure social market economic performance empirically or to quantify the effects of social market economic principles on peace and prosperity. Thus, I explore potential indicators to develop a social market economic performance index. I provide empirical evidence that supports the notion that the application of social market economic principles carries a social peace dividend, creates more equal opportunity, promotes ecological sustainability, and generates higher per capita incomes. I use the empirical results to build an interactive web application that allows for the simulation, assessment, and visualization of the economic-performance effects of applying social market economic principles to the economies of 165 countries. Lastly, the interactive web application also allows for modification of the social market economic principles and reports the estimated impact on peace and prosperity in these countries.

Key Words: Social market economy, conflict economics, economic impact study, public policy simulation, conflict, equitable socio-economic development, ecological sustainability, data visualization, data storytelling, web application.

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Chapter 1

Introduction

The social market economy was developed in Germany as a political and economic concept during the inter-war period as an alternative to laissez-faire capitalism, totalitarian socialism, and fascism. Its objective was to combine market freedom with policies to promote equitable socio-economic development and to restore and foster peace in Germany and between Germany and its neighbors. Eventually, the social market economy became a formula for both peace and economic prosperity for Germany after World War II. Since then, social market economic principles were adopted by other countries and became the European Union's guiding economic vision in 2007.

In Germany and Europe, the term *social market economy* is firmly established, but it is less familiar in countries with a tradition of Anglo-Saxon economics education. Reviewing economic history and the history of economic thought allows one to illustrate the evolution of social market economic thought and to carve out its demarcation lines relative to other economic concepts – specifically, socialism and laissez-faire capitalism.

These demarcation lines are amplified by the social market economy's philosophical context. Built upon strong humanistic pillars, the social market economy assumes a human being who is self-interested and self-responsible, yet who also demonstrates an acceptance of "social solidarity." In liberal economics, on the other hand, the human being is assumed to be driven by self-interest and self-responsibility, whereas socialism requires the individual to be aligned in solidarity with the socialist ideal.

Furthermore, the social market economy recognizes that the free market does not necessarily provide equal opportunity justice, thus there is a role for the state to help ensure equal opportunities. In short, in the social market economy the role of the state is that of a "referee state" as opposed to the nightwatchman of liberal economics or the central planner state in socialism. The social market economy thus identifies the order, rules, and economic policy principles in

accordance with its philosophy to create economic wealth and well-being through investments in equal opportunities.

Elements of social market economic thought can be found in philosophical and political thought beyond the European Union, but academic research and evidence of the benefits of social market economic principles is nevertheless scarce. Part of the reason for this is that, although aligned substantially with mainstream neoclassical economics, the contributions of social market economic thought have not typically relied on standard economic methodological presentations.

To improve dialogue between social market economists, mainstream economists and the public, it is therefore necessary to communicate the social market economy's basic idea more effectively. Empirical assessment of the effect of social market economic principles on peaceful and equitable social development is paramount to further support the social market economy's potential as a formula for peace, prosperity, and sustainability. Hence, the objective of this dissertation is to conceptualize the idea of a social market economy within standard economic methodology, identify measures for social market economic principles, empirically assess its effect on peaceful and equitable development, and identify and develop an effective communication channel for the generated insights.

In chapter two, I introduce the principles of the social market economy elaborating on the influence of the history of economic thought and the humanistic pillars, the major feature of social market economic thought that differentiates it from pure laissez faire capitalism and socialism. I then present the policy principles of the social market economy that have the objective of balancing market freedom and equitable socioeconomic development. Near the end of chapter two I provide a summary of the evolution of economic thought related to the concept of a social market economy as background for the presentation of my research problem, which concludes the chapter.

Chapter three uses standard economic methodology to provide a traditional economic conceptualization of the social market economy. Specifically, I incorporate stylized assumptions

about laissez-faire capitalism, socialism and a social market economy into a microeconomic utility maximization framework and blend these into a traditional growth theory model. In doing so, I show that individuals operating under the assumptions of laissez-faire capitalism choose to allocate more time toward work and enjoy higher welfare than individuals operating under the assumptions of socialism. Modelling the social market economic perspective adds that aggregate social welfare is higher when individuals experience equal opportunity. From these emerging results I then derive testable hypotheses in line with the goals of my research problem.

Building on the available literature and theoretical framework, I then develop in chapter four a social market economic performance index to explore the prospects for peace and prosperity arising out of the social market economic principles. I test my hypotheses using the social market economic performance index as an explanatory variable. With the empirical analysis as its backbone, I present a simulation framework to assess the impact of social market economic policy changes, followed by an applied discussion and application of that framework to the country of Lebanon

Lastly, chapter five explores opportunities to translate the simulation framework into an accessible format. The traditional presentation format of academic research results often undermines its purpose of contributing to a more informed public debate. Consequentially, readers are discouraged from interacting with valuable information. At the same time, complex information has been communicated through visualization for centuries to facilitate understanding. I thus develop a data storytelling dashboard design, considering visualization principles, design, user interface, and user experience concepts. Following my design framework, I code an interactive web-based data visualization and simulation tool, conduct a usability testing of the user interface and incorporate the tester's feedback.

In conclusion, by investigating how compliance with social market economic principles impacts peaceful and prosperous socio-economic development and providing a visualization and simulation tool, I hope to provide new insights and opportunities to better understand peaceful

socioeconomic development. These insights may be useful beyond academia and support practitioners in conflict management, peacebuilding, and development, as well as in policy programming and decision-making in humanitarian crisis situations.

Chapter 2

Literature Review

The social market economy was developed as a political and economic concept during the inter-war period as an alternative to pure laissez-faire capitalism, totalitarian socialism and fascism. It served as a formula for peace, prosperity, and sustainability for post-World War II Germany, inspiring many other countries to adopt social market economic principles. This literature review provides the vision of the social market economy (Ger. Leitbild) and summarizes research related to the concept of the social market economy.

Social Market Economy – Definition, Origin, Context, and Schools

Alfred Müller-Armack (1901-1978) introduced the term social market economy first in a chapter heading of his 1946 book *Economic Governance and Market Economy*, but only in 1956, did he define the social market economy distinctly as follows: "The purpose of the social market economy is to combine the principle of freedom in the market with the one of equitable social development" (Müller-Armack, 1956, p. 390). Unlike classical, socialist, neoclassical, or macroeconomics, social market economic thought has no exact date of birth, and the origins of social market economic thought is less associated with one or even a few names original thinkers.

Classical economics is commonly linked to the 1776 publication of *An Inquiry into the Nature and Causes of the Wealth of Nations* by Adam Smith (1723-1790) (Smith, 1776/2007). Karl Marx's (1818-1883) 1867 *Capital* launched socialist economics (Marx, 1867/2004). The 1890 Publication of *Principles of Economics* by Alfred Marshall (1842-1924) can be seen as the birth of neoclassical economics, complementing classical economics with a more formal approach (Marshall, 1890/2009). Lastly, the 1936 publication of *The General Theory of Employment, Interest, and Money* by John Maynard Keynes (1883-1946) is the foundation of modern macroeconomics (Keynes, 1936/2018).

Whereas classical, socialist, neoclassical, and macroeconomic thought originated in the intellectual accomplishments of one or a few persons, social market economic thought evolved as the synthesis of a broad interdisciplinary intellectual movement. This social market economic movement did not try to create a new economic paradigm with clear demarcation lines to other branches of economic thought. Instead, social market economics was concerned with refining existing knowledge about economic thought considering the lessons learned from economic history. Social market economists did not try to reinvent economics philosophically, but to make it work in practice.

The fact that social market economics was more a movement than the work of one or a very few thinkers is also evidenced by the influence of various schools; however, outside German-speaking economic circles, these schools are rather unknown. One reason for this is that social market economics evolved at a time when Germany was in political and economic turmoil after World War I. The focus of social market economic thinkers like Ludwig Erhard or Müller-Armack was accordingly much more on influencing the future political course of Germany and contributing to the informed public debate rather than leaving an academic footprint.

The schools that were most influential in shaping social market economic thought were the School of Freiburg and the School of Cologne. Each school subscribed to different methodologies. The School of Cologne argued more philosophically, the School of Freiburg more politically. The School of Cologne was concerned with questions such as: What is the nature of the human being? What is justice? How does the market meet the ideas of the human being and justice? The School of Cologne is responsible for concepts such as economic and social humanism.

What these concepts mean is best illustrated by some quotes. In 1976, Müller-Armack (1976) wrote, for example, about the role of the competitive order within the greater societal order:

> As much as it is necessary to perceive and protect the market economic order as a coherent whole, it is equally necessary to be aware of the technical and partial

character of the market economic order. It is an extremely useful means of

organization, but nothing more, and it would be a fatal error to assign market

automatisms the task of creating a final social order and expect it to be considerate

of the necessities of statehood and cultural life. (p. 106)

Müller-Armack was influenced by Wilhelm Röpke (1899-1966) who is considered the founder of

economic humanism. Economic humanism states that economic analysis needs to respect the

nature of the human being and society emphasizing the interaction between socio-cultural values

and markets. In his career, Röpke became a staunch opponent of any kind of totalitarian

collectivism. In 1933, he warned against the rise of the Nazis in Germany, noting:

The current world crisis could never have grown to such proportions, nor proved

as stubborn, if it had not been for the many forces at work to undermine the

intellectual and moral foundations of our social system and thereby eventually to

cause the collapse of the economic system indissolubly connected with the social

system as a whole. Notwithstanding all the harshness and imperfections of our

economic system, which cry out for reform, it is a miracle of technology and

organization; but it is condemned to waste away if its three cardinal conditions—

reason, peace, and freedom—are no longer thought desirable by the masses

ruthlessly reaching for power. (Röpke, 1933/69, p. 80)

Röpke (1960) describes the moral foundations of the social system as follows:

Self-discipline, a sense of justice, honesty, fairness, chivalry, moderation, public

spirit, respect for human dignity, firm ethical norms-all of these are things which

people must possess before they go to market and compete with each other. These

are the indispensable supports which preserve both market and competition from

degeneration. Family, church, genuine communities, and tradition are their

sources. It is also necessary that people should grow up in conditions which favor

such moral convictions, conditions of a natural order, conditions promoting co-

operation, respecting tradition, and giving moral support to the individual. (p. 125)

The School of Cologne formed an intellectual symbiosis with the School of Freiburg, but it is the school of Freiburg that is mostly responsible for market theory in Social Market Economics. The School of Freiburg initially focused on assuring that markets stay competitive and preventing the rise of anti-competitive practices. Famous representatives of the School of Freiburg are Walter Eucken (1891-1950) and Franz Böhm (1895-1975). Eucken (1952/2004) notes that "in a functioning market economy, the state is foremost a "guardian of competition" (p. 327). It protects the weak from the destructive forces of competition. Similarly, Franz Böhm (1958), writes:

> If there is no, or not sufficient, competition, the constitutionally desired allocation function of market prices will be undermined. The production of goods and its distribution takes then a socially non-desired turn. But this is not even the worst part. The worst part is that it distorts the idea of social justice of a free market-economic system. (pp. 167-203)

In response to the notion that, in the words of the anarchist philosopher Pierre-Joseph Proudhon (1809-1865), "competition kills competition," the Freiburg School calls for a strong state in the sense of a referee, not in the sense of a player as in socialism. The introduction of a strong state as the guardian of competition is what Alexander Ruestow (1885-1963) calls *neoliberalism*. Ruestow (1932) notes that "the new liberalism, however, which is acceptable today, and which I represent with my friends, calls for a strong state, a state outside the economic system, independent from special interests, which is where the state is supposed to be" (pp. 62-69).

The School of Freiburg initially emphasized the beneficial aspects of competition much narrower than the School of Cologne. The School of Freiburg emphasized more the importance of allocation efficiency, consumer and producer sovereignty, the School of Cologne more humanist aspects such as the nature of the human being and its preferences for freedom, self-responsibility, justice, solidarity, and peace. Both schools, however, cross-fertilized each other substantially. In fact, it is not always easy to assign different social market economic scholars to one school

explicitly. The School of Freiburg ultimately became famous for developing the concepts of *ordoliberalism* and order policy, which describe a set of principles that put the vision of a Social Market Economy into practice. These principles address the organization of the state, politics, the market, and economic policy. Because these principles must not be seen independent from the social, political, cultural, and economic values in society, ordoliberals also speak of an "interdependence of orders," which must harmoniously interact. According to Eucken (1952/2004) "the entire order shall be such, that it allows people a life according to ethical principles" (p 199).

In arriving at its various recommendations for a social market economic order, social market economists engaged excessively with both the history of economic thought and economic history. Thus, to understand social market economic recommendations, it is necessary to first look at the pillars of the history of economic thought and economic history that ultimately shaped social market economics.

Economic History as a Social Market Economic Pillar

The lessons from the history of economic thought influenced social market economic thought substantially. In fact, the literature of social market economic thought often resembles a process in which economic history and the history of economic thought is sieved through with the objective of answering: *What has worked and what has not?* The main historical episodes that shaped social market economic thinking were the era of mercantilism, the industrial revolution, the first globalization wave, and the great depression.

Mercantilism

Although economic activity can be traced back to the era of hunters and gatherers, it was not before the discovery of the New World that economic activity expanded throughout the globe and brought about new challenges and bodies of thought. The discovery of the New World ended

the era of great emperors and initiated the restructuring of the world order. New countries were discovered and colonized, and an imperialist system was established at the expense of the New World (Kishtainy, 2017).

Mercantilism, the economic paradigm of imperialism, was the economic philosophy dominating Europe between the 16th and 18th century. Although mercantilism assumed different forms in different European countries, it was derived from bullionism, an economic theory that defines wealth by the amount of precious metals owned by the head of state. Mercantilists believed that free trade is a zero-sum game. Wealth can only be accumulated within a nationalistic mindset and trade surpluses (Heckscher, 2013).

Famous mercantilists in economic history were Oliver Cromwell (1599-1658) and Jean-Baptiste Colbert (1619-1683). Oliver Cromwell was the mastermind behind England's Navigation Acts (1651-1660), which were supposed to secure England all value added associated with the transportation of goods between England and its colonies. Prior to the Navigation Acts, the Netherlands benefitted substantially from providing shipping services to England. The Navigation Acts accordingly destroyed this economic base and led to hostilities between the two countries, which culminated in a series of so-called Dutch-Anglo Wars (1652-1784).

In France, Jean-Baptiste Colbert suggested three pillars on which mercantilism must rest. These are France's agricultural self-sufficiency, a strong military, and trade coercion. All three pillars were considered interdependent. Agricultural self-sufficient is necessary to preserve economic resilience in times of conflict. Since conflict in a mercantilist world is inevitable, a strong military is essential. Lastly, permanent trade surpluses are best secured if other countries are subdued (Heckscher, 2013; Israel, 1985, Magnusson, 1994).

The imperialist philosophy further legitimized slave trade, colonies, and wars. Yet, mercantilism was not sustainable, neither politically nor economically. The gains from coerced trade were increasingly offset by ever greater expenditures to subdue exploited colonies' striving for independence. Permanent trade surpluses lead to an inflow of money, and the inflow of money

to rising prices. David Hume (1711-1776) called this phenomenon the price-specie flow mechanism, meaning that the more money ("species in the form of gold and silver") flow into a country, the higher prices will be. Then, higher prices in the export surplus country would naturally lead to a reversal of trade flows (Lowry, 2012; Mokyr, 2010; Buchholz, 2007).

Yet, colonial hegemons would not accept a reversal of trade flows. Instead, colonial hegemons tried to pass on these higher prices to the colonies, which naturally only created greater resistance by the colonists against the colonial hegemon. Moreover, the fact that the colonial hegemon passed on ever higher prices to the colonies also created new economic opportunities. These new economic opportunities played an important role in the independence struggle of the North American colonies. Higher prices mandated by England, especially for tea, motivated North American merchant elites to smuggle in tea with the help of other countries. The Netherlands was one such country that could provide tea from its own colonies to North America, and they were happy to do so in exchange for North American exports. The merchant elites in North America made then sure that they always stood under the price umbrella mandated by England, thus allowing them to skim off substantial rents. In England, at the same time, unsold tea was piling up in its warehouses. To destroy the merchant elites' rents from smuggled tea, England decided to send ships full of English tea to Boston and sell it below production costs to regain control over the North American market. Yet, by this time, the North American colonies had already gained enough of a sense of independence that they were not willing to tolerate England's move. The result was the Boston Tea Party of 1773 (Lowry, 2012; Mokyr, 2010; Buchholz, 2007).

For social market economists the lessons from mercantilism are twofold. First, social market economists disagree with the concept of bullionism - that the wealth of a nation can be measured the by riches under control of a country's leader. Instead, social market economists argue that every economic system must serve citizens, not leaders. Secondly, social market economists accept free trade and multilateralism as a positive-sum game, not a zero-sum game.

Industrial Revolution and First Globalization Wave

The societal transition towards Enlightenment brought about democratic values, a loss of power of the Catholic Church, and a redefinition of the role of an individual within the state, from the individual being subordinate to the church and state, towards the state being subordinate to the individual. This free-spirited environment awakened people's natural curiosity after bursting the chains of religious persecution and life-long subordination. Innovations such as the weaving machine, electricity and the light bulb, the steam engine and steam trains, boats and telegraphs enhanced production to never-before-known levels (Mokyr, 2010; Heilbroner, 2011).

Societal Change. The Industrial Revolution, however, also triggered societal changes. On the one hand, job opportunities in the urban centers attracted rural workers. On the other hand, the labor supply grew much faster than the demand for it, continuously decreasing wages, creating a class of impoverished people in urban areas. While this observation was very much in line with classical economic principles (if supply grows faster than demand, prices go down), it also gave a new philosophical movement reason to argue against liberal markets. Karl Marx and Friedrich Engels were at the forefront at this ideological movement, advocating in their *Communist Manifesto* for shared means of production owned by the proletariat and a societal upheaval against the exploitative bourgeoisie (Marx & Engels, 1948/2007; Mokyr, 2010; Heilbroner, 2011; Buchholz, 2007).

While interpreting the events of the industrial revolution as market failure per se is certainly wrong, protecting labor is an important lesson to be learned. Although communism (the ultimate goal of the Marx/Engels philosophy) and socialism (the way towards communism) emphasize the importance of labor rights, doing so by disempowering factor capital and questioning the market system in its entirety has proven not to work, as evidenced by the collapse of the Soviet Union in 1989.

Political Change. In addition to the industrial revolution and the social question, the 19th century also saw unprecedented political change. European nation states began to politically consolidate themselves, often with military confrontations as a byproduct. People's lives were generally characterized by economic hardship. Natural catastrophes added insult to injury. The Americas were also in turmoil and struggling for their political identities.

In 1844, the potato blight hit continental Europe and one year later Ireland. The crop failures led to rising prices, greater impoverishment of the poor and starvation. The potato blight killed around 100,000 in Europe and, depending on the various estimates, between 500,000 to two million in Ireland. In North America, the American Civil war between 1861 and 1865 ended slavery, established a centralized federal government, and laid the foundation for the United States' emergence as a world power. At the same time, most Latin American countries had won their independence from Spain and Portugal and the political maps of Europe and the Americas began to adopt their largely familiar shapes. Many of the newly independent states, however, entered independence with great social tensions and protracted conflict between the descendants of the European settlers and indigenous people. Yet, in an attempt to legitimize their government, the old Latin American elite and new leaders promised in their constitutions inalienable natural rights of liberty, security, property, and equal opportunity (Zadoks, 2008; Ransom, 1998; Bushnell et al, 2019)

Economic hardship in Europe and new opportunities in the Americas led to mass migration from Europe to the United States, but also to Canada, New Zealand, and Australia. Estimates suggest that between 30 and 40 million people emigrated between 1820 and the beginning of World War I from Europe, most of them to the United States. Mass migration led to a shortage of labor that threatened the countries' long-term economic prospects. Policies to improve workers' perspectives were accordingly needed.

In Germany, these policies were a series of social security laws that were introduced by Otto v. Bismarck (1815-1898), Germany's first chancellor. Bismarck introduced various social security legislations during his tenure, specifically insurance protection in case of sickness and invalidity in 1883 and 1884, respectively. Retirement plans followed in 1889 (Hatton & Williamson, 1998; Meerhaeghe, 2006).

Economic Change. The mercantilist philosophy that trade was a zero-sum game was wrong. When two countries agreed to engage in voluntary trade, there is a positive sum, not a zero-sum game. The key to trade as a positive sum game was specialization. The North specialized in capital- and labor-intensive manufactured goods and the South in land-intensive agricultural products. North-South trade relationships between Europe, North America, and Latin America evolved naturally and voluntarily (Collier & Dollar, 2002).

In Europe, trade expansion in manufactures and emigration made labor increasingly scarce. As a result, inequality that prevailed in Germany was successively dismantled through more demand for factor labor and rising wages. Compared to Europe, North America did not witness a similar deterioration of the working class. North America was land abundant and labor scarce, which made it the ideal destination for migrants. The immigrants who arrived were welcomed and had quick access to plenty of economic opportunities. Countries like the United States and Canada therefore developed with high equality of economic opportunities. In Latin America, however, since the 16th century European settlers had replicated the old European feudalist system. As a result, indigenous populations became marginalized landless peasants and European settlers landed aristocracies. The legacy of colonial rule, therefore, were substantial inequalities built around land-intensive production of agricultural products and raw materials (Briggs, 2006; Collier & Dollar, 2002; Bushnell et al, 2019).

When North-South trade expanded and Europe and North America began to produce more manufactures, both factor labor and capital benefitted. In Latin America, and to a similar

extent in Sub Saharan Africa, it was largely the owners of land who benefitted. Europe and North America became accordingly more equal, Latin America and other former colonized areas more unequal (Hatton & Williamson, 1998; Briggs, 2006, Collier & Dollar, 2002).

Anti-Competitive Practices. In addition to societal, political, and economic change, the globalization wave also witnessed the emergence of anti-competitive practices. In the United States, so-called trusts played an important role in reversing competition. With the emergence of trusts, stockholders could exchange their stocks into trust certificates. Trust certificates were tradable like stocks; but as opposed to stockholders, trust certificate holders were silent partners. In principle, trust certificate holders "trusted the trusts" with acting in their best interest, which was to maximize the trusts' profits. Then, in order to maximize profits, trusts acted like monopolies and abused their market power. In the United States, famous families like Rockefeller (Oil), Carnegie (Steel), Vanderbilt (Railroad), and Morgan (Banking) rose to great economic power during in the latter half of the 19th century (Siegler, 2016).

While turning a blind eye on the activities of trusts, cartels, and monopolies may have helped build powerful industries, their adverse effects, especially the increasing abuse of market power, soon dominated, and the United States became one of the first countries to fight trusts. The first milestone in this regard was the 1890 Sherman Antitrust Act, which forbids anti-competitive behaviors like price-fixing. Nevertheless, anti-trust policy was at first a rather toothless tiger, which began to change with Theodore Roosevelt (1858-1919), the United States' twenty-sixth president. Known as the trust buster, he pursued an active anti-trust policy. Political action became necessary in response to increasing popular frustration with trusts' market power (Siegler, 2016).

Lessons Learned. The lessons from the industrial revolution and the first globalization wave for social market economists were at least threefold. First, national and international economic liberalization is not necessarily without socioeconomic hardship, so social safety nets are important safeguards to protect competitive economic orders. Second, economic liberalization without equal opportunity, such as in former European colonies, makes the balancing of market freedom with equitable social development difficult. Third, to maintain a competitive economic order, anti-competitive rules need to be enforced.

The Interwar Period

The interwar period was characterized by economic and political turmoil with very different dynamics around the world. This is particularly true for the developments in the United States and Germany. When the Unites States emerged victoriously from World War I, the country's economy was characterized by great consumer and producer confidence. The process of industrialization was yet to end, and new innovations and products flooded the market, increasing everyone's standard of living. Inspired by this positive spirit, individuals invested heavily in the stock market. People bought stocks and stock prices went up. People also used their stocks as collateral to get loans to buy more stocks, driving up stock prices even more. It was the roaring 1920s. Yet, the real sector could not keep up with the expansions of the stock market, which caused prices to stagnate and even fall, culminating in the 1929 stock market crash, followed by the Great Depression and the first extensive economic downturn. Trust in free markets was shattered, although it can be questioned whether it was markets that span out of control or whether poor market regulations, especially for banks, were responsible for the crash (Olney, 2013).

The Great Depression that followed the 1929 stock market crash, was characterized by a retreat from globalization and the attempt to create more employment through tariffs and currency depreciation. Yet, both made the downturn worse as competitive tariff and depreciation races are a collective "rationality trap." As countries imposed tariffs on each other, they created

more jobs to replace imports but lost jobs in their export industries. No country could create more net jobs, and all countries lost the specialization gains from free trade. Similarly, as countries expanded their money supply to depreciate their currencies, no country could stimulate more exports, but all countries ended up with more inflation (Bierman, 2013).

In contrast to the United States, Germany did not experience the roaring 20s. The fiscal burden of reparation payments imposed by the 1918 Treaty of Versailles went far beyond Germany's economic and fiscal capacities and Germany resorted to printing money, leading to inflation. By 1923 Germany reached hyperinflation and its economy collapsed. Following Germany's economic collapse, the Dawes plan of 1924 provided temporary relief. This initiative, led by the United States, included a reduction of reparation payments, the end of the occupation of Germany's industrial heart (so-called Ruhr area), and loans. The 1929 Young Plan was supposed to continue the Dawes Plan, but the unfolding economic crisis after the stock-market crash prevented it from being put into practice (Bergman, 1930).

Germany's post hyper-inflation recovery was accordingly short-lived, and the specter of economic misery quickly returned. Economic uncertainty, the return of unemployment, and the world resorting to nationalistic policies provided Germany with fertile ground for the rise fascist ideologies. The 1930s were characterized by criticisms of capitalism, the rise of socialism as an alternative to capitalism, and fascism as an alternative to both laissez-faire capitalism and socialism (Ritschl, 2013).

The interwar period reinforced social market economists' strong belief in the importance of multilateralism. Social market economists reject tariffs and currency depreciation for the purpose of stimulating exports and employment as neo-mercantilism. The stock market crash and preceding bubble moreover bolstered the belief that appropriate regulatory rules can prevent economic crises in the first place. Due to its systemic role in an economy, regulatory oversight is particularly important for the banking sector. Eventually, lessons from history have regularly shown that fast credit expansions and asset bubbles cause financial crises.

Social market economists have also adopted an anti-Keynesian position, arguing that prevention is better than cure. Staying within the context of financial crises, social market economists consider restrictive monetary policy to prevent asset bubbles to be more effective than Keynesian stabilization policy to cleaning up a banking crisis. Closely related, the lesson of hyperinflation was that without price stability, no competitive order is possible. In a social market economy, price stability is accordingly the first among many market-constituting principles. Lastly, the social hardship associated with the Great Depression was a strong reminder of the importance of social safety nets.

Humanistic Pillars of a Social Market Economy

Social market economics evolved amidst a great battle of ideas. The Stock Market Crash and Great Depressions led to a questioning of laissez-faire capitalism, to which socialism presented itself as an alternative while fascism presented itself as an alternative to both laissez-faire capitalism and socialism. The social market economy evolved as an alternative to all three. In doing so, social market economic thought is built on a strong humanistic pillar.

The Idea of the Human Being

Derived from social ethics and economic philosophy, a human being can be positioned within a three-dimensional space comprised of self-interest, self-responsibility, and solidarity, or social responsibility. Adam Smith (1776/2007) argued that the pursuit of self-interest is the basis of the wealth of nations when he noted that "it is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own self-interest" (p. 9-10). In other words, self-interested and self-responsible producers of goods and services maximize social welfare, at least if they are embedded in a competitive economic division of labor.

This basic idea is famously formalized in the economic theory of perfect competition. Smith (1776/2007) elaborates further:

> [The rich] neither intends to promote the public interest, nor knows how much he is promoting it. By preferring the support of domestic to that of foreign industry, he intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. (p. 293).

As a moral philosopher, Smith attacked catholic social thought and advanced the physiocratic thinking. Physiocrats already identified feudalism and mercantilism as non-natural social orders and argued that self-interest and self-responsibility are conducive to the promotion of Christian values.

The medieval church, on the other hand, held that the pursuit of self-interest would lead to the contempt for God, which is why earthly stewardship by the Church would be necessary. In the words of St. Augustine (354-430 AD): "If we do possess any things privately which do suffice us, they are not ours, but the goods of the poor, whose stewards we are, except we do challenge to ourselves the property by a damnable usurpation" (quoted in Foxe, 1855, p. 93). Similarly, in his book *City of God*, he lamented how the earthly world differs so much from the heavenly ideal, noting that "[…] two cities have been formed by two loves: the earthly by the love of self, even to the contempt of God; the heavenly by the love of God, even to the contempt of self" (Augustine, 1871, p. 47).

The church was concerned that the free reign of self-interest would lead to a crowding out of the Christian virtues of prudence, justice, fortitude and temperance (cardinal virtues) and love, hope, and faith (theological values) by lives filled with the sins of lust, gluttony, greed, laziness, anger, envy, and vanity. For Smith, a competitive economic order, however, can promote Christian values more effectively than Churchly stewardship. If economic actors are subject to

competition, there is no reason to assume that in competition any individual who abides by Christian virtues could be outperformed by competitors submitting themselves to a life in sins. The cardinal values are all supportive to a company's competitiveness. Prudence is a necessary business skill to weigh the risks and opportunities of economic activity carefully. That no one in a firm's division of labor feels exploited and all receive their rightful compensation is an important component of productivity and in line with the virtue of justice. Fortitude is the skill to stay steady in difficult times and to work harder and longer if necessary. Lastly, temperance is a virtue which prioritizes saving and investment over consumption and therefore promotes capital accumulation. The cardinal values are therefore highly conducive to economic success in a competitive environment. In fact, competition may bring out these values in each individual much better than Churchly stewardship. Adam Smith (1759/2017) describes this idea as follows:

> The behaviour of a private man ought to be marked by perfect modesty and plainness, along with as much casualness as is consistent with the respect due to the people he is with. If he hopes ever to distinguish himself, it will have to be by more important virtues. He'll have to acquire dependents to match the dependents of the great; and because his only access to funds from which to support them will be through the labour of his body and the activity of his mind, he'll have to cultivate these. So, he'll need to acquire superior knowledge in his profession, and to work unusually hard in the exercise of it. He must be patient in labour, resolute in danger, and firm in distress. He'll have to bring these talents into public view by the difficulty and importance of his undertakings, by the good judgment and the severe and unrelenting application with which he pursues them. His behaviour in all ordinary circumstances must be marked by honesty and prudence, generosity and frankness; and he must give priority to activities in which it requires the greatest talents and virtues to act properly, but in which the greatest applause goes to those who can acquit themselves with honour. (p. 30)

The pursuit of self-interest in a competitive environment will then lead to a virtuous division of labor, which is the driving force behind the creation of the wealth of nations. The interaction of countless individual plans is then miraculously coordinated by the invisible hand of competition and will result in a relatively equal development. Smith (1776/2007) writes that "it is the great multiplication of the productions of all the different arts, in consequence of the division of labour, which occasions, in a well-governed society, that universal opulence which extends itself to the lowest ranks of the people" (p. 7).

For classical economists, competition serves the natural order of the individual, which is self-interest, and, as a byproduct, generates the public good of security of supply of basic commodities. Socialists, of course, disagree, arguing that "[t]he production of too many useful things produces too large a useless population" (Marx, 1932/2012, p. 120). In socialist thought, self-interest and self-responsibility lead to a collective rationality trap, which to overcome requires a primacy of solidarity over individuality and change in the conscience of humanity. In his speech to the Second Economic Seminar of Afro-Asian Solidarity in Algiers in 1965, Che Guevara (2003) said:

> Socialism cannot exist without a change in consciousness resulting in a new
> fraternal attitude toward humanity, both at an individual level, within the societies
> where socialism is being built or has been built, and on a world scale, with regard
> to all people's suffering from imperialist oppression. (p. 341)

In social market economics, the human being is not characterized by the predominance of either self-interest, self-responsibility, or solidarity, but their balance. Wilhelm Röpke (1960) describes this balance as follows:

> [T]he market economy is not everything. It must find its place in a higher order of
> things which is not ruled by supply and demand, free prices, and competition. It
> must be firmly contained within an all-embracing order of society in which the
> imperfections and harshness of economic freedom are corrected by law and in

which man is not denied conditions of life appropriate to his nature. Man can

wholly fulfill his nature only by freely becoming part of a community and having a

sense of solidarity with it. Otherwise, he leads a miserable existence and he knows

it. (p. 91)

Thus, in social market economic thought, self-interest and self-responsibility are the basis of social responsibility (solidarity). Figure 1 summarizes how the various ideas in laissez-faire capitalism, socialism, and social market economics can be stylized.

Figure 1

The Idea of the Human Being
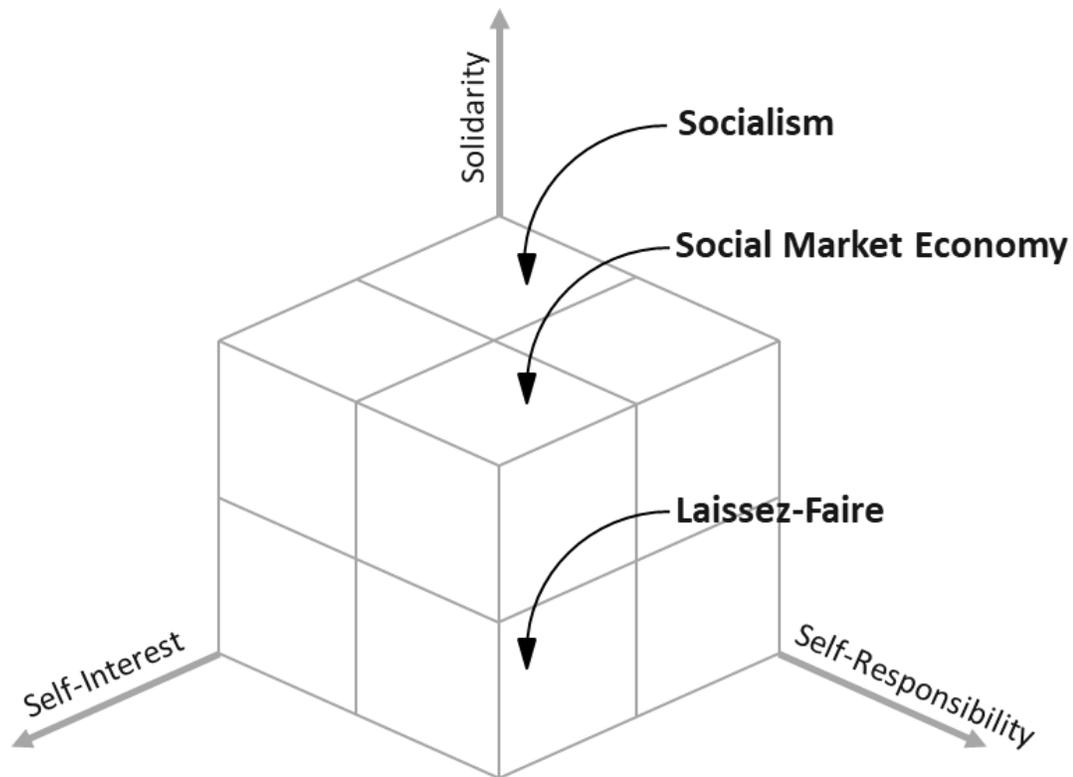
Note. Author's illustration.

With respect to the distinction between self-interest and solidarity, findings from experimental economics support the view of Social Market Economics that people are both self-interested and solidary, as opposed to being only self-interested. So-called ultimatum games generate these results. In an ultimatum game, an experimenter appoints two players, allocator

and recipient. The experimenter gives the allocator an amount to redistribute, let's say $10. The allocator then needs to offer a share to the recipient. The recipient can either reject or accept the share proposed by the allocator. If the recipient accepts the allocator's offer, the two players can keep the money according to the agreed-upon split. Yet, if the recipient rejects the allocator's offer, no player receives anything. This setup of the game is known to both players (Güth et al, 1982).

Laissez-faire theory, assuming all that matters is self-interest, would expect that the allocator offers only one cent, and that the recipient would accept this offer. Offering one cent maximizes the utility of the allocator under the constraint that she needs to share some amount with the recipient. Likewise, why would a purely self-interested individual reject one cent? Socialist theory, based on the assumption of pure solidarity, would predict that the allocator offers exactly half and, of course, that the recipient would accept. Every individual is committed to equal consumption. Social market economics, on the other hand, would hypothesize that the allocator offers more than one cent, but also less than five dollars. The allocator can reasonably expect that a one-cent offer would be rejected because the recipient's increase in income by one cent is offset by their distaste for inequality. On the other hand, because everyone in a social market economy accepts self-interest, the recipient also understands the allocator's desire to walk away with more than what the recipient is offered, unless it is not by too much.

What do the experimental results suggest? Oosterbeek et al (2004) surveyed 75 ultimatum games played in 26 countries. The findings show that the allocators offer on average around 40% of the amount and the average offer rejected is approximately 15%. These results support the Social Market Economic idea of the human nature consisting of self-interest, solidarity, and a desire for equitable socioeconomic development. According to the findings, one could say, as a rule of thumb, that most individuals give the pursuit of self-interest a weight of around 60% and the concern for solidarity a weight of around 40%. Yet, regardless of the exact numbers, what is probably safe to conclude is that people are not completely consumed by any of the two extremes of pure self-interest or exclusive subordination to solidarity.

While the results from ultimatum games are useful to learn more about the nature of the human being with regards to their preferences for self-interest and solidarity, they say nothing about their desire for self-responsibility. For social market economists, however, self-interest, self-responsibility, and solidarity are interrelated. Self-interest is a necessary condition for self-responsibility, and self-responsibility a necessary condition for solidarity.

Imagine a solidarity community of self-interested fishermen, some of whom are rich and some of whom poor. Then, if one poor asks the rich for a fish and another poor asks for a fishing rod, the first reveals a preference for free-riding and the latter for self-responsibility. Because the rich fishermen are not only solidary, but also self-interested, their preference is to help only the poor who wants to learn fishing as well. Eventually, only the poor willing to learn to fish will graduate from the support system of the solidarity community; the one demanding the fish will never. The philosophy of a social market economy is not to create a welfare state through the public redistribution of consumption opportunities, but to create a wealth state through public investments into equal economic opportunities.

The Idea of Justice

Generally, political and economic philosophy are concerned with three concepts of justice: (1) efficiency justice, (2) equal opportunity justice, and (3) distributive justice (Marktanner, 2014; Rawls, 1971/2009).

Efficiency justice means that an individual who contributes more to the pie shall also receive a bigger slice. Someone who works more hours or more productively shall receive a higher pay. Equal opportunity justice implies the absence of structural barriers to the development of economic capabilities. Ideally, a child born into poverty shall have the same opportunities as a child born into an affluent society. Lastly, distributive justice draws on both efficiency justice and equal-opportunity justice. However, due to fundamental differences between socialism and laissez-faire capitalism, two categories of distributive justice need to be distinguished. In

socialism, distributive justice states that, regardless of the contributions to the economy, everyone shall receive the same compensation. Market-based distributive justice, on the other hand, states that any distribution of income is just if it results from equal opportunities.

Like the idea of the human being, laissez-faire capitalism, socialism, and social market economics assess the three justice concepts differently. The differences can be seen by how the three philosophies answer the questions of (1) whether efficiency, equal opportunity, and distributive justice are natural rights of the individual and (2) whether they are natural states of the free market. Table 1 summarizes these answers.

Table 1

The Idea of Justice in Laissez-faire, Socialism, Social Market Economics

Concept of Justice	Natural Right of the Individual			Natural State of the Free Market		
	Laissez Faire	Socialism	SME	Laissez Faire	Socialism	SME
Efficiency	✓	✗	✓	✓	✓	✓
Equal Opportunity	✓	✓	✓	✓	✗	✗
Socialist Redistribution	✗	✓	✗	✗	✗	✗
Market –based Redistribution	✓	✗	✓	✓	✓	✓

Laissez-faire capitalism assumes efficiency, equal-opportunity, and market-based redistributive justice to be both a natural right of the individual and a natural state of the free market. Socialism, on the other hand, assumes equal opportunity and socialist redistributive justice to be a natural right of the individual, which the free market cannot provide, whereas efficiency justice is not considered to be a natural right of the individual, but a natural state of the market. Socialism, however, acknowledges that market-based redistributive justice is the natural state of the free market, although not being a natural right of the individual.

Social market economics agrees with laissez-faire capitalism that efficiency, equal opportunity, and market-based redistributive justice are natural rights of the human being. Yet,

based on historical evidence, social market economists reject the idea that free markets provide individuals with equal opportunity justice. Thus, contrary to laissez-faire and in line with socialist philosophies, social market economics acknowledges that the free market does not provide equal opportunity justice.

The Role of the State

What different assumptions about the role of the state guide Social Market Economics? The answers to the two questions "What is the nature of the human being?" and "What is a just market?" also define the answer to the question of "What is the role of the state". Ludwig von Mises (1881-1873) describes the role of the state in liberalism as follows:

> Liberalism is not anarchism, nor has it anything whatsoever to do with anarchism. The liberal understands quite clearly that without resort to compulsion, the existence of society would be endangered and that behind the rules of conduct whose observance is necessary to assure peaceful human cooperation must stand the threat of force if the whole edifice of society is not to be continually at the mercy of any one of its members. One must be in a position to compel the person who will not respect the lives, health, personal freedom, or private property of others to acquiesce in the rules of life in society. This is the function that the liberal doctrine assigns to the state: the protection of property, liberty, and peace. (v. Mises, 1932/2002, p. 37)

Socialists liked to ridicule this presumably limited role of government in classical liberalism by calling it a "night-watchman" state. In their reasoning, because the free market takes care of efficiency, equal opportunity and market based distributive justice, the only threat to the economy comes from burglars and bandits whose criminal aspirations undermine the security of private property and the freedom of economic activity. The night-watchman is therefore supposed to patrol the streets at night and keep economic actors safe from intruders. Although von Mises

equates the role of the state with limited government, state minimalism must not be interpreted in absolute, but relative terms. State minimalism in absolute terms means that the role of the state should always be kept at an absolute minimum, while state minimalism in relative terms means that the scope of the state needs to be determined in relation to given socioeconomic challenges, especially those affecting peace. The liberal state philosophy in a country with high inequality of access to economic opportunities and therefore high social conflict potential will look very different than in a state with highly equal access to economic opportunities. Karl Schiller (1911-994), a German economist, a Social Democrat, and Germany's Minister of Economic Affairs between 1966 and 1972, once famously said: "As much market as possible, as much state as necessary" (quoted in Egner, 1963, p. 267).

While the night-watchman state is supposed to protect property, the socialist state is concerned with the "abolition of private property" (Marx & Engels, 1948/2007) and class distinctions. Friedrich Engels (1820-1895), referring to the work of Henri de Saint-Simon (1770-1825), an early utopian socialist, holds that politics will become a "science of production," completely absorbed by economics. What will happen is a "conversion of political rule over men into an administration of things and a direction of processes of production —that is to say, the 'abolition of the state'" (Engels, 1880/1918, pp. 62,63). Then,

> [w]hen, in the course of development, class distinctions have disappeared, and all production has been concentrated in the hands of a vast association of the whole nation, the public power will lose its political character. Political power, properly so called, is merely the organised power of one class for oppressing another. If the proletariat during its contest with the bourgeoisie is compelled, by the force of circumstances, to organise itself as a class, if, by means of a revolution, it makes itself the ruling class, and, as such, sweeps away by force the old conditions of production, then it will, along with these conditions, have swept away the conditions for the existence of class antagonisms and of classes generally, and will

thereby have abolished its own supremacy as a class. (Marx & Engels, 1948/2007,

p. 31)

In the ideal world of communism, all individuals are then involved in the decision of everything. In political terms, all citizens participate in the formulation of the production plan and in economic terms, all means of production belong to everyone. Friedrich August von Hayek (1899-1992) described this problem as follows:

The effect of the people's agreeing that there must be central planning, without

agreeing on the ends, will be rather as if a group of people were to commit

themselves to take a journey together without agreeing where they want to go: with

the result that they may all have to make a journey which most of them do not want

at all. (Hayek, 1944/2014, p. 104)

In a Social Market Economy, on the other hand, the role of the state is compared to a referee. Neither are markets considered to work as miraculously in favor of all citizens as laissez-faire supporters may argue, nor are they as disastrous to society's social cohesion and peace as socialists claim they are.

Like most economists, Social Market Economists advocate for a regulatory role that government needs to play in order to keep markets competitive. What separates Social Market Economists from other economists, however, is the fact, that they have come to define government's role for a competitive economic order from a proactive rather than reactive position. Social Market Economists essentially set up an economic framework for Germany's and Europe's "zero hour" after World War II. In the history of economic thought, Social Market Economists had thus a follower advantage. Historical circumstances forced Social Market Economists to define an institutional framework in which the market not only solves countries' scarcity problem, but also prevents market excesses and contributes to peaceful socioeconomic development. The complexity of accumulated historical lessons learned in combination with Germany and Europe approaching a "zero hour" caused Social Market Economists to advocate for a set of rules and

principles that ideally already are in place from the very beginning.

Accordingly, Ludwig Erhard (1897-1977), economist and Germany's first post-World War II Minister for Economics (1949-1963), as well as Germany's second post-World War II chancellor (1963-1966), liked to compare the role of the state in a social market economy to the role of a referee in a game of soccer. Specifically, Erhard (1958) noted:

> I believe that, as the referee is not allowed to take part in the game, so the State must not participate. In a good game of football, it is to be noted that the game follows definite rules; these are decided in advance. What I am aiming at with a market economy policy is - to continue with the same illustration - to lay down the order and the rules of the game. (p. 102)

Social Market Economics is about identifying the order, rules, and economic policy principles of an economy which has the objective of balancing the freedom in the market with equitable socioeconomic development.

Social Market Economists disagree fundamentally with socialists that markets are so flawed that they need to be replaced by a central plan. Instead, they argue that appropriately regulated and institutionally designed markets can assure allocation efficiency and serve as a vehicle of equitable social development, peace, and prosperity. As socialists romanticize, the abolishment of markets leads to equitable social development through socialist redistribution only. However, if cultural revolutions fail to turn individuals driven by self-interest and self-responsibility into individuals characterized by solidarity and a desire to subordinate themselves to a central plan, then ever less production and equality without prosperity is the case. In a socialist society, the production of private goods and services is essentially administered as if it were a public good, which, as is well known in the literature on public goods, tend to be undersupplied. In a socialist economy, everyone essentially needs to answer three questions: (1) What shall be produced? (2) How much are you willing to pay for what is being produced? and

(3) How much does the society have to compensate you for your work? Thus, production and consumption are a public good. Self-interested individuals then want society to produce a lot, pay very little for what is produced, but earn high compensations in the production process. A central planner must plan for an overstated demand for goods and services with overstated production costs and an understated willingness to pay for.

In a competitive market economy, the sum of all goods and services are produced in countless decentralized decisions, coordinated through various markets. The prices for goods and services are the result of demand and supply. These prices are givens for all economic actors. As opposed to collectively produced private goods under socialism, no individual has an incentive to overstate their demand for privately produced private goods. As prices are givens, neither are there any incentives to understate their willingness to pay for private goods and services or their reservation price to supply their labor.

The Economic Principles of a Social Market Economy

The philosophy of a social market economy is not to create a welfare state through the public redistribution of consumption opportunities, but to create a wealth state through public investments into equal economic opportunities. This philosophy assumes a human being that is self-interested and self-responsible, yet also demonstrates a sense of solidarity within the social fabric of a referee state. Social market economics is about identifying the order, rules, and economic policy principles of an economy with the objective of balancing the freedom in the market with equitable socioeconomic development. For Walter Eucken (1952/2004) this requires that certain state-constitutional, state-political, market organizational and market-failure-correcting principles need to be in place.

State-Constitutional Principles

The idea of the nature of the human endowed with predominant impulses of self-interest and self-responsibility does not only call for a competitive market system, but also a political one. Just as self-interested and self-responsible economic actors prefer to decide what to produce, how to produce and what to demand, rather than being told so, self-interested, and self-responsible political actors prefer to be proactive in political decisions. This is only possible in a democratic system in which citizens as principals and can vote on their representatives as agents. The absence of competition for political ideas and the provision of public goods is incompatible with the social market economic idea of the nature of the human being (Eucken, 1952/2004).

A second state constituting principle, which is closely associated with democracy, is subsidiarity. Subsidiarity regulates the division of labor between smaller and larger groups within a society. It states that whatever the individual or the smaller group can do more effectively must not fall under the jurisdiction of a larger group (Eucken, 1952/2004).

The term subsidiarity was popularized by the Catholic Church's social ethical teachings that developed towards the end of the 19th and early 20th century. The Catholic Church's stance towards the relationship between the individual and the state was not always uniform. Medieval Church scholars, for example, were first highly critical of private property rights and decentralized market activities, therefore legitimizing the Catholic Church's predominant role during medieval times. It was argued that it required a strong centralized state for heavenly values to be upheld in earthly societies. Private property rights were the soil on which human vices like vanity, greed, gluttony, pride, and envy would grow (Curran, 1981; Hornsby-Smith, 2006).

The Catholic Church's track record of creating societies in the spirit of biblical values was rather disappointing. After several peasant uprisings in the 16th century and the breakaway of the Protestant movement, the Catholic Church came under political pressure to regain the faith of believers. This pressure increased even more with the industrialization and the emergence of mass poverty among the working class in the 18th and 19th century. This so-called social question rose

popular support for socialist ideas, which promised to address the poor's concern more credibly than the Catholic Church. A socialist revolution for a from womb-to-tomb welfare philosophy promised to provide a better future than Christian moralizing. Structurally, of course, there was not much difference between medieval societies governed by church schoolmen and the socialist societies governed by communist party elite cadres (Alford, 2013).

Eventually, the Catholic Church was forced to work towards an alternative political philosophy that also met poor people's demand for social safety nets, and which was in line with Biblical teachings without having to resort to central planning. This "new" philosophy was the principle of subsidiarity. The principle of subsidiarity combines self-responsibility with a social responsibility of individual wealth. Solidarity originates in individual motivation, as illustrated by the Good Samaritan (Luke 10:25-37), not state-imposed redistribution. Social Market Economists believe that private property carries a social responsibility and that a competitive economic environment promotes this social responsibility. The famous German entrepreneur Robert Bosch (1861-1942) lived this social responsibility and summarized it as follows by saying: "I don't pay high wages because I have a lot of money, but I have a lot of money because I pay good wages" (quoted in Siegel, 2009, p. 43)

The development of Catholic Social Ethics gained momentum as socialism was on the rise. The beginning made Pope Leo XIII in the encyclical Rerum Novarum (1891), in which he emphasized the social responsibility of factor capital and factor labor and opposes the socialist conclusion that factor capital and factor labor would be trapped in an inevitable and non-reconciliatory class struggle. Pope Leo XIII (1891) notes that "each needs the other: capital cannot do without labor, nor labor without capital. Mutual agreement results in the beauty of good order, while perpetual conflict necessarily produces confusion and savage barbarity" (para. 19)

In a next step, Catholic Social Ethics confronted the socialist vision of a central planner state. Pope Pius XI (1931) wrote in his encyclical Quadragesimo Anno:

As history abundantly proves, it is true that on account of changed conditions many

things which were done by small associations in former times cannot be done now save by large associations. Still, that most weighty principle, which cannot be set aside or changed, remains fixed and unshaken in social philosophy: Just as it is gravely wrong to take from individuals what they can accomplish by their own initiative and industry and give it to the community, so also it is an injustice and at the same time a grave evil and disturbance of right order to assign to a greater and higher association what lesser and subordinate organizations can do. For every social activity ought of its very nature to furnish help to the members of the body social, and never destroy and absorb them. (para. 79)

Socialists, of course, also read the Bible and they knew that the centralization of solidarity through central planning and collectivization is contradictory to the Biblical spirit. Atheism has therefore become a necessary condition for the socialist doctrine.

The subsidiarity principle has two central applications. The first refers to the design of social safety nets and mandates help-to-self-help. This means that an entitlement for solidarity is only legitimate after the individuals in need of help exhausted the means to help themselves. In order to support this principle biblically, it might be referred to 2 Thessalonians 3:10, where it says "that is any would not work, neither should he eat." This principle is deeply entrenched in social market economically spirited social safety nets. As opposed to laissez-faire capitalist systems, everyone is mandated to pay into a solidarity fund like health care and unemployment insurance. At the same time, freeriding on social safety nets is supposed to be minimized by, for example, co-pays in health care or the need to provide evidence of actively seeking employment in order to receive unemployment benefits.

A second important political application of subsidiarity is federalism. Already in the Old Testament it is described as an organization principle. In the book of Exodus, Moses found himself overwhelmed with solving judicial conflicts among the Israelites. His father-in-law, Jethro, then advised him to appoint subsidiary judges and to "teach them ordinances and laws, and shalt shew

them the way wherein they must walk, and the work that they must do" and to let them serve as "rulers of thousands, and rulers of hundreds, rulers of fifties, and rulers of tens." Moses abided by Jethro's advice. As a result, "difficult cases they [the newly appointed judges, A.M.] brought to Moses, but the simple ones they decided themselves" (Exodus 18:20-22).

While the term subsidiarity does not appear as such, the idea also shaped the constitution of the United States as documented in the Federalist Papers and Tenth Amendment to the United States Constitution. Alexander Hamilton (1755-1804), for example, wrote in 1788 "that acts of the large society which are not pursuant to its constitutional powers, but which are invasions of the residuary authorities of the smaller societies" will not be part of the "supreme law of the land" (para. 7). Later, Abraham Lincoln (1809-1865) wrote:

> The legitimate object of government is to do for a community of people whatever they need to have done but cannot do at all, or cannot so well do for themselves in their separate and individual capacities. In all that people can do individually well for themselves, government ought not to interfere. (Lincoln, 1954/1907, p. 108)

State-Political Principles

State-political principles are derived from the idea of the referee state. For referees to act independently, they need to be isolated from special interest groups. For Eucken (1952/2004), the first state-political principle indicates therefore that "state policy should focus on the dissolution of lobbying groups and the confinement of their functions" (p. 334). The second state-political principle specifies the primacy of order over discretionary policy. In the words of Eucken (1952/2004) "state economic policy should be aimed at shaping the economic order, not on steering the economic process" (p. 336).

Just as a referee is not supposed to manipulate the outcome of a game, the primacy of order- over discretionary policy limits what government should and should not do. Government is supposed to enforce existing rules of the game and modify them if necessary. More specifically,

the primacy of order over discretionary policy is summarized in three principles: (1) Avoidance of sector interventions like subsidies and price controls, (2) Conduct of social and environmental policy in a market-conform way, meaning that existing market prices must not distorted (like cash transfers in social policy) and new markets are being created when they are missing (like markets for emission certificates in environmental policy), and (3) Moderate use of stabilization policy to smooth out business cycles and prioritization of the precautionary principle through investments in social safety nets that automatically become activated in a business cycle downturn (Eucken, 1952/2004).

Market Organizational Principles

In standard microeconomic theory, perfectly competitive markets are praised for their ability to solve societies' scarcity problem by creating allocation and production efficiency in the long run. The social market economic perspective adds to this the insight that competitively ordered markets based on equal opportunity justice also provide efficiency and market-based redistributive justice. For social market economists, making sure that markets are competitively ordered is therefore a necessary condition as well. Accordingly, social market economists identified several so-called market organizational principles that need to be in place for markets to be competitive (Jarausch & Welsh, 2019a; Eucken, 1952/2004).

The first is a free price system, which assures that aggregate welfare is maximized. Closely related, the second principle is freedom of contract. Freedom of contract maximizes economic actors' choices and assures that the mutual gains from exchange are maximized. Yet, the freedom of contract ends where the freedom of two parties is abused to restrict the freedom of a third party. Free trade is the third principle and simply states that the known welfare benefits from free exchange should not be confined by a country's political borders. The three liberties of free prices, free contract, and free trade require certain institutional prerequisites. The first of these is that economic activity be organized around secure and tradable property rights. Without secure and

tradable property rights, economic actors lack the necessary incentives to use their scarce resources most efficiently. An important component of the security of property rights is private liability. Private liability means that both economic gains and losses from economic activity are private, meaning that economic actors are accountable for potential losses that their economic activity may cause. Private property rights and private liability are guarantors of the prudent use of scarce resources. Lastly, social market economists emphasize the importance of a stable macroeconomic environment. This environment rests on two pillars, both of which aim at providing economic actors with planning security. These two pillars are macroeconomic price stability and a constancy of economic policy. (Eucken, 1952/2004).

Market Failure Correcting Principles

Much more than laissez-faire capitalism, social market economics is concerned with market-failures. Market-failure-correcting principles are therefore an explicit component of its philosophy. Market dynamics that deserve attention are the emergence of an abnormal labor supply function, unequal socio-economic development, the establishment of market power, and externalities. In addressing these market failures, economic policy is then bound by the primacy of order over discretionary policy (Eucken, 1952/2004).

Leitbild – A Summary

In summary, the *guiding vision* of the social market economy is *ordered competition*. For social market economists, ordered competition is most closely aligned with the nature of the human being. In line with classical liberalism, social market economists accept that human beings primarily respond to and follow self-interested motives. Closely related to self-interest is the idea that human beings prefer self-responsibility to dependency on others. Social market economists also acknowledge that self-interested and self-responsible individuals carry an innate social impulse. A predominant preference for self-interest and self-responsibility must not be confused

with disregard for solidarity. For social market economists, only individuals who meet their objectives embedded in self-interest and self-responsibility will contribute to the solidarity community. Individuals deprived of meeting their objectives embedded in self-interest and self-responsibility for the alleged sake of solidarity will ultimately undermine it.

Competitive markets organize production most efficiently and distribute income according to economic performance. Yet, competitive markets that reflect the idea of the human being are not a natural state but require an institutional order. This order begins with the constitution of the state, which should be characterized by the two state-constitutional principles of democracy and subsidiarity. Competitive markets need to be characterized by economic liberties, core principles, and business-environmental conditions. The core economic liberties are free prices, free contracts, and free trade. The core principles guiding competitive economic activity are secure and tradable property rights and private liability. Lastly, price stability and the constancy of economic policy shall characterize the business environment. Competition furthers innovation and technological progress. Both consumer and producer sovereignty are the stewards of economic activity. Yet, competitive market dynamics can also yield results that society does not approve of, thus call for corrective governmental actions. In all economic policy activity, government must then operate in line with the two state-political principles: Isolation from special interest groups and adherence to the primacy of order over discretionary policy.

Areas that legitimize corrective governmental actions in a social market economy are market power (competition policy), abnormal labor supply functions (labor market policy), highly inequitable social development (social policy), and externalities (environmental policy).

Figure 2 summarizes the *Leitbild* of a social market economy graphically.

Figure 2

The Leitbild of a Social Market Economy – Stylized Illustration
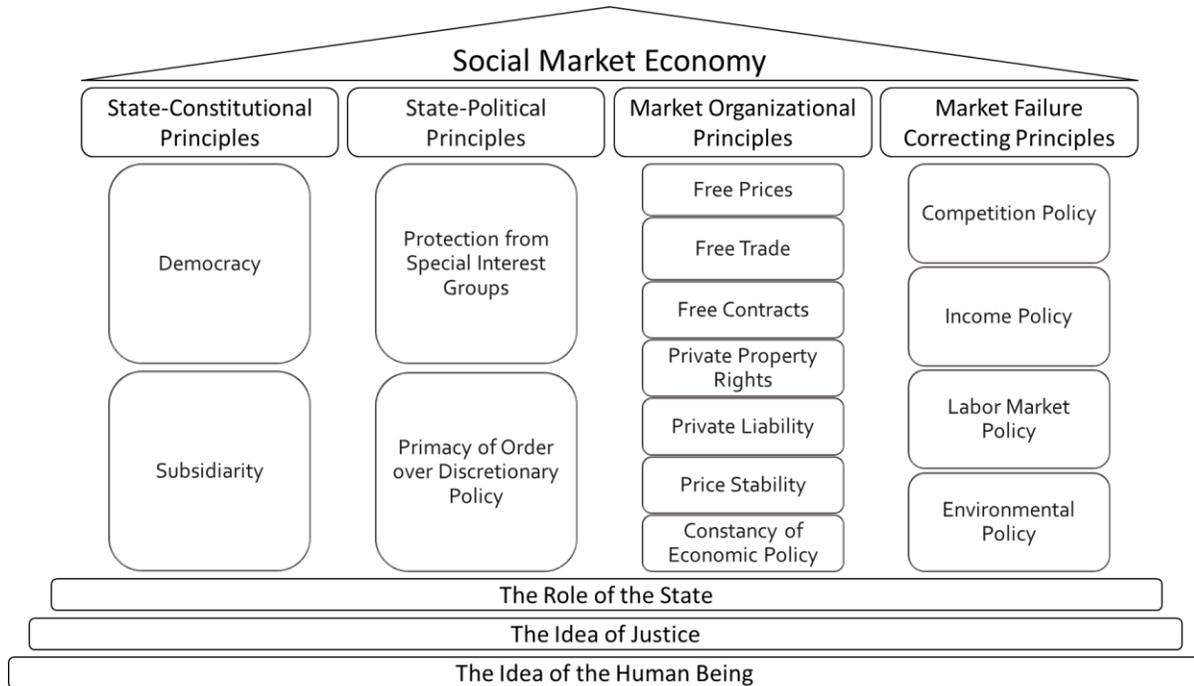
Note. Author's illustration.

Research Related to the Concept of a Social Market Economy

The concept of the social market economy was developed amidst a battle among socialism, capitalism, and fascism, with the objective to combine free markets with equitable socio-economic development and to restore and foster peace in war-torn Germany and between Germany and its European neighbors. Ever since, Germany has remained peaceful. Social market economic principles furthermore were increasingly adopted as part of the intra-European integration process, contributing to peaceful and prosperous development within the region.

Yet, no attempts have been made to measure social market economic performance empirically and to quantify its impact on peace, prosperity, and ecological sustainability. Predominantly qualitative academic research that supports the nexus between comprehensive social market economic principles and peaceful equitable social development accordingly still lacks substantial quantitative support. Research relevant to this dissertation topic is limited to

partial aspects.

One strand of the literature analyzes the relationship between conflict and economic growth. The main theme is that conflict decreases economic growth and hinders economic development, even after the conflict ended (Ray & Esteban, 2017; Serneels & Verpoorten, 2013). Equally important as the relationship between conflict and economic growth, is the relationship between political stability and economic growth. Shabbir et al (2016) investigate this relationship and conclude that "political stability is conducive to growth, as it reduces social unrests, political turmoil, and encourages investment, and thereby economic growth" (p. 689). Similarly, research suggests that policies with regards to economic freedom combined with political stability promote economic expansion (Cebula, 2011; Mohey-Ud-Din & Siddiqui, 2016).

As for the contributions of social safety nets to economic growth and development, Alderman & Yemtsov (2013) review the current body of literature and conclude that social safety spending can be justified for two reasons, its poverty reduction potential, and contributions to economic growth. Recent research on the Middle East shows moreover a connection between governance deficits leading to labor market mismatches, macroeconomic shock vulnerabilities and insufficient social safety nets with the 2010 Arab Uprising (Malik & Awadallah, 2013; LaGraffe, 2012; Ogbonnaya, 2013; Ansani & Daniele, 2012; Saleh et al, 2014; Devarajan & Ianchovichina, 2017). In many parts of the Arab world, the region's socioeconomic vulnerability was already unveiled by the 2007/2008 Food Price Crisis, which many observers consider the true cradle of the uprising (Bush, 2009; Rosenberg, 2011; Sternberg, 2012; Bar-Yam et al, 2015).

Social Market Economics – Theory vs. Reality

The social market economy is commonly associated with Germany's and the European Union's economic model. As for Germany, this even appears as a paradox, because its *basic law* does not even reference the term social market economy. The fact that the European Union's constitution adopted the term social market economy at the climax of the intra-European

integration process in the Treaty of Lisbon in 2007, more than six decades after World War II, is accordingly a particular expression of appreciation for the work and legacy of social market economic thinkers. In its constitution, Article 3, is says:

> The Union shall establish an internal market. It shall work for the sustainable development of Europe based on balanced economic growth and price stability, a highly competitive social market economy, aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment. It shall promote scientific and technological advance. (European Union, 2007, para. 3)

Yet only because a country claims to be a social market economy does not mean that it also lives up to its theoretical ideal.

Observers typically distinguish various phases of social market economic performance after World War II. The period between the end of World War II and 1967 is known as a period of ordoliberal dominance. During this time, Germany passed various laws that strengthened the competitive order of its economy. These laws were limiting anti-competitive behaviors, solidifying central bank independence, and strengthening collective bargaining (Gook, 2018).

In 1966/1967, Germany experienced its first business cycle downturn as the country's post World War II boom levelled out. The economic downturn led to calls for government actions beyond order policy. The ordoliberal paradigm was moreover increasingly difficult to defend under the global Bretton Woods system. The system of fixed exchange rates under Bretton Woods had a Keynesian design, resting on the belief that governmental macro-management can steer economies through troubled waters without rocking the boat. Germany's 1967 *Stability and Growth Bill* opened the door for more discretionary fiscal and monetary stabilization policies (Gray, 2007; Jarausch & Welsh, 2019b). As the moderate use of stabilization policies is one element of the primacy of order over discretionary policy, the stability and growth bill deviated from ordoliberal principles.

The oil price crises of the 1970s made clear that demand stabilization policies were unable to keep unemployment and inflation rates low. Instead, both kept rising (stagflation). The system of Bretton Woods collapsed in 1973 and the Keynesian post World War II order came to an end. International attempts to salvage the broken system of internationally coordinated demand side management after the first oil price shock in 1973 (Arab oil embargo) ended with the second oil price shock in 1979 (Revolution in Iran). Governments realized that they cannot absorb major economic shocks with monetary and fiscal policies. Instead, what would be needed is again a strengthening of the supply side's flexibility (Mitchell, 2010; Eichengreen, 2019; Williamson, 1977).

Beginning with the 1980s, Germany, and most other industrialized nations, adopted again more ordoliberal principles. During the 1980s, Germany increasingly focused on the European integration process, deregulation, privatization, and social security reforms. The period between 1980 and the 2007/2008 financial crisis was a period of continuous growth and rising prosperity (Baldwin & Wyplosz, 2009).

The 2007/2008 Global Financial and Euro Crisis beginning in 2010 ended again the ordoliberal era and led to a return to the launch of massive stabilization programs (Hall, 2012; Heipertz & Verdun, 2005). While social market economists see this return critical, they also emphasize that both crises could have been prevented by adhering more strictly to social market economic principles in the first place. Specifically, the 2007/2008 Global Financial Crisis can be attributed to violating the principle of avoiding sector interventions, namely the promotion of home ownership. The 2010 Euro Crisis, on the other hand, can be attributed to violating the principle of subsidiarity. All European Union member states were not yet better served by a common currency. It is therefore important to acknowledge a major difference between social market economic rhetoric and social market economic policy practice.

The term social market economy is not exclusive to Germany and the European Union. Other countries claimed to be a social market economy, too. One such example were the economic

reforms in Chile under Pinochet, that aimed at a social market economy according to Hernán Büchi, minister of finance at the time (Rojas, 2005; Büchi, 2008). Likewise, Syria officially adopted the concept of a social market economy in 2005 at the Tenth Regional Congress of the Ba'ath Party (Haddad, 2005). Unfortunately, the use of the term social market economy in political rhetoric more often taints the theory than what the theory helps to shape real policy.

Another common misconception is that the social market economy is a German model. Arguing that social market economics is a German model that is only feasible in Germany or the European Union would be as wrong as to say that Anglo-Saxon economics is limited to Anglo-Saxon economies. What would be more correct is to say that social market economics is a philosophy that was assembled in Germany, not made in Germany. Eventually, social market economics rests on many philosophical ideas and historical events outside of Germany. Conversely, elements of social market economic thought can also be found in the philosophical tradition in other parts of the world. For example, a closer look at the political and philosophical thought of tinkers such as the famous Arab Islamic scholar Ibn Khaldun (1332-1406) or the Chinese scholar Confucius (551-479 BC) show substantial overlap with social market economic thought. In other words, only because a country does not refer to its economic model as a social market economy does not mean that its actual state-constitutional, state-political, and economic policy principles are in fact very close to it. The objective of my thesis is to show this by focusing not on rhetoric but actual policies.

Problem Statement

The literature on the concept of the social market economy is rather scattered. One reason for this is the fact that as opposed to socialist and mainstream Anglo-Saxon economics, social market economics was not led by one or a few leading thinkers. Social market economics was rather a movement, whose demarcation lines to socialism and laissez-faire capitalism only evolved slowly over time.

Today, the term social market economy is nevertheless relatively firmly established, especially in Germany and Europe. It is yet a still relatively vague concept in countries with a stronger tradition in Anglo-Saxon economics. Social market economics is generally perceived as part of the humanities, not as part of the sciences. That social market economics is still marginalized in these countries has moreover to do with the fact that social market economics borrows substantially from mainstream neoclassical economics, but its own contributions barely make use of standard economic methodology. For example, social market economics accepts the model of perfect competition in its formal representation, but it fails to make its own case using the same formal language and elegance. Social market economists and mainstream economists often do not speak the same language.

To improve dialogue between social market economists and mainstream economists, it is therefore necessary to communicate the social market economy's basic idea more effectively. The main envisioned contribution of this thesis can therefore be summarized in the following question:

> *How can the idea of a social market economy be conceptualized within standard economic methodology? How can its principles be measured? How can the effect of social market economic principles on peaceful and equitable social development be empirically assessed? And how can the findings be made available to a broader audience beyond academia?*

Chapter 3

Economic Conceptualization of the Idea of a Social Market Economy

How can the idea of a social market economy be conceptualized within standard economic methodology? In this chapter I first suggest incorporating stylized assumptions about laissez-faire capitalism, socialism, and a social market economy into a simple static microeconomic utility maximization framework. I then blend the findings from the static framework with growth theory. My model generates the following finding: All else equal, individuals operating under the assumptions of laissez-faire capitalism choose to allocate more time toward work, less time towards leisure and enjoy higher welfare (utility) than an individual operating under the assumption of socialism. The social market economic perspective adds to this finding that aggregate welfare is maximized when individuals compete on a level playing field.

Basic Assumptions

Following Buchanan (1997), I suggest the following stylized characteristics about socialism, laissez-faire capitalism, and social market economics:

(1) Socialism is characterized by collective production and joint, equal division, consumption based on collectivized means of production.

(2) Laissez-faire capitalism is characterized by individual production and consumption based on private means of production.

(3) Social market economics additionally introduces a role for the state to create equal economic opportunity.

The representative individual under each scenario maximizes a general utility function

$$U_i = F(C_i, L_i) \tag{3.1}$$

where

$i = individual\ i$

$C = Consumption\ Good$

$L = Leisure$

The consumption good C is produced with the exogenous production factor land and the endogenously determined time allocated towards production:

$$C_i = F(\bar{N}_i, (1 - L_i)) \tag{3.2}$$

where

$\bar{N} = Exogenously\ determined\ Plot\ of\ Land$

I also assume that land without labor input leads to a consumption level of zero, which is

$$C_i = F(\bar{N}_i, 0) = 0 \tag{3.3}$$

Every member of society has a certain share of all available land, so that

$$\sum_i \bar{N}_i = 1 \tag{3.4}$$

Moreover, every member of society has only one infinitely divisible time unit available, so that

$$0 \le L_i \le 1 \tag{3.5}$$

These assumptions reduce to a problem of maximizing utility from consumption and leisure subject to an income-leisure constraint as illustrated in Figure 3.

Figure 3

Basic Maximization Problem
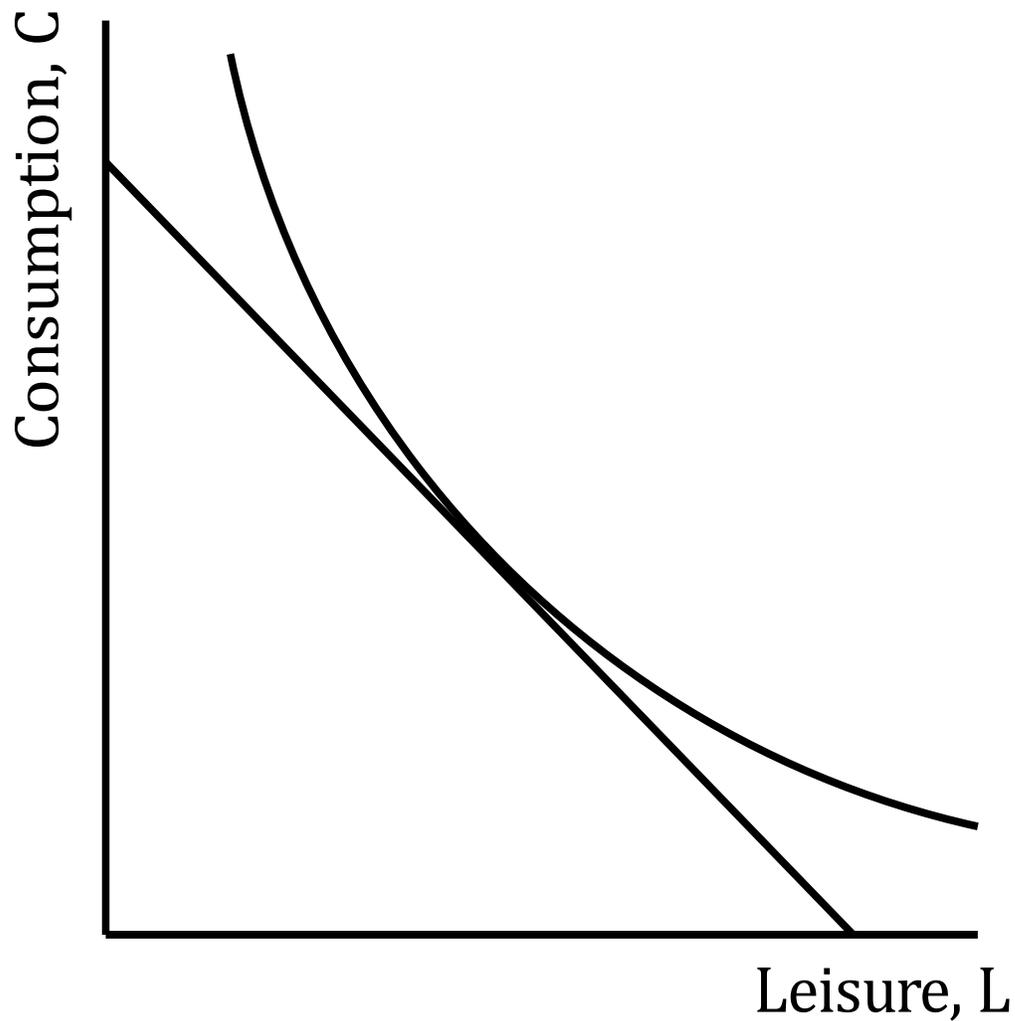
The Utility Function

Depending on the context, microeconomic theory employs various utility functions. Standard workhorse models are

- Perfect substitutes

- Perfect complements, and

- Partial substitutes

utility functions.

Perfect substitutes utility functions imply that an individual is indifferent between consumption and leisure. Since no individual can afford to live without any consumption, a perfect substitutes utility function is inappropriate for my purposes. Perfect complements imply that consumption and leisure need to be consumed at fixed proportions. A fixed proportion utility function in the context of political regime choice implies that a representative individual's leisure-consumption calculus is not affected by political regime transitions, which is theoretically implausible and contradicts observable substitution effects associated with political regime transitions. For example, a transition from a low to a high redistribution economy will plausibly affect the ratio of the optimum consumption-leisure-choice, which a fixed proportion utility function, as the name indicates, would ignore. The most appropriate utility function for my purpose is therefore a partial substitutes utility function, which holds that no individual can live off consumption or leisure exclusively, and that within certain changes trade-offs between consumption and leisure are possible.

The standard partial substitutes utility function is the Cobb-Douglas function:

$$U = C^\alpha L^{1-\alpha}, \text{ with } 0 < \alpha < 1 \tag{3.6}$$

The Cobb-Douglas utility function has many pleasant characteristics. One is its reflection of the standard assumption of positive but diminishing marginal utilities:

$$\frac{\partial U}{\partial C} = \alpha C^{\alpha-1} L^{1-\alpha} > 0 \tag{3.7}$$

$$\frac{\partial U}{\partial L} = (1-\alpha) C^\alpha L^{-\alpha} > 0 \tag{3.8}$$

$$\frac{\partial^2 U}{\partial C^2} = (a-1)\alpha C^{\alpha-2} L^{1-\alpha} < 0 \tag{3.9}$$

$$\frac{\partial^2 U}{\partial L^2} = -a(1-a) C^\alpha L^{-\alpha-1} < 0 \tag{3.10}$$

Another convenient characteristic of the Cobb-Douglas utility function is the fact that the exponents α and $1 - \alpha$ are the utility elasticities of consumption and leisure, which is

$$\frac{\frac{\partial U}{U}}{\frac{\partial C}{C}} = \frac{\partial U}{\partial C}\frac{C}{U} = \frac{\alpha C^{\alpha-1}L^{1-\alpha}C}{C^{\alpha}L^{1-\alpha}} = \alpha \qquad (3.11)$$

$$\frac{\frac{\partial U}{U}}{\frac{\partial L}{L}} = \frac{\partial U}{\partial L}\frac{L}{U} = \frac{(1-\alpha)C^{\alpha}L^{-\alpha}L}{C^{\alpha}L^{1-\alpha}} = 1 - \alpha \qquad (3.12)$$

Thus, a one-percent increase in consumption or leisure increases utility by α percent or $1 - \alpha$ percent, respectively. Lastly, as can be seen from (3.11) and (3.12) the Cobb-Douglas utility function is linearly homogenous, meaning that a one-percent increase of both consumption and leisure increases utility by one percent.

Utility Maximization under Laissez-Faire and Socialism

For simplicity I assume a linear production function so that the budget constraint for an individual under the assumption of laissez-faire can be written as

$$C_i = N_i(1 - L_i) \qquad (3.13)$$

For the socialist scenario, I assume for simplicity a society consisting of only two individuals. The budget constraint for individual one is then

$$C_1 = \frac{N_1(1-L_1)+N_2(1-L_2)}{2}, \text{ with } N_1 + N_2 = 1 \qquad (3.14)$$

The individual who maximizes utility with respect to leisure under the assumption of laissez-faire capitalism then maximizes

$$\max_L U_i = [N_i(1 - L_i)]^{\alpha}L^{1-\alpha} \qquad (3.15)$$

with the optimum leisure choice

$$L^*_{Laissez-Faire} = 1 - \alpha \qquad (3.16)$$

and available consumption of

$$C^*_{Laissez-Faire} = \alpha N_i \qquad (3.17)$$

The individual who maximizes utility with respect to leisure under the assumption of socialism maximizes

$$\max_{L} U_i = \left[\frac{N_1(1-L_1)+N_2(1-L_2)}{2}\right]^{\alpha} L^{1-\alpha} \tag{3.18}$$

with the optimum leisure choice

$$L^*_{Socialism} = \frac{1-\alpha}{1-\alpha/2} \tag{3.19}$$

and available consumption of

$$C^*_{Socialism} = \frac{\alpha N_i}{2-\alpha} \tag{3.20}$$

From the results of (3.15) to (3.18), the optimum utilities can be determined as

$$U^*_{Laissez-Faire} = [N_i(1-L_i)]^{\alpha} L^{1-\alpha} = [\alpha N_i]^{\alpha}[1-\alpha]^{1-\alpha} \tag{3.21}$$

$$U^*_{Socialism} = \left[\frac{N_1(1-L_1)+N_2(1-L_2)}{2}\right]^{\alpha} L^{1-\alpha} = \left[\frac{\alpha N_i}{2-\alpha}\right]^{\alpha} \left[\frac{1-\alpha}{1-\frac{\alpha}{2}}\right]^{1-\alpha} \tag{3.22}$$

Equations (3.21) and (3.22) are not defined for the extreme values of $\alpha = 0$ and $\alpha = 1$ outside the range of $0 < \alpha < 1$ (see equation 3.5).

Table 2 summarizes the results. It can be easily seen that an individual under laissez-faire chooses less leisure and more consumption than an individual under socialism. Less obvious, however, is the result that an individual under the assumptions of laissez-faire capitalism enjoys higher utility.

Table 2

Summary of the Basic Model

Parameter	Laissez-Faire		Socialism
Leisure*	$L^*_{Laissez-Faire} = 1 - \alpha$	<	$L^*_{Socialism} = \dfrac{1-\alpha}{1-\alpha/2}$
Consumption*	$C^*_{Laissez-Faire} = \alpha N_i$	>	$C^*_{Socialism} = \dfrac{\alpha N_i}{2-\alpha}$
Utility*	$U^*_{Laissez-Faire} = [\alpha N_i]^{\alpha}[1-\alpha]^{1-\alpha}$	>	$U^*_{Socialism} = \left[\dfrac{\alpha N_i}{2-\alpha}\right]^{\alpha}\left[\dfrac{1-\alpha}{1-\frac{\alpha}{2}}\right]^{1-\alpha}$

In order to prove that for all α between zero and one $U^*_{Laissez-Faire} > U^*_{Socialism}$, I need to show that

$$[\alpha N_i]^\alpha [1 - \alpha]^{1-\alpha} > \left[\frac{\alpha N_i}{2-\alpha}\right]^\alpha \left[\frac{1-\alpha}{1-\frac{\alpha}{2}}\right]^{1-\alpha} \tag{3.23}$$

Cross-division of (3.23) simplifies to

$$[2-\alpha]^\alpha > \left[\frac{2-\alpha}{2}\right]^{1-\alpha} \tag{3.24}$$

Denoting the left (LHS) and right (RHS) side of inequality (3.24)

$$LHS = [2-\alpha]^\alpha \tag{3.25}$$

$$RHS = \left[\frac{2-\alpha}{2}\right]^{1-\alpha} \tag{3.26}$$

implies that

$$\lim_{\alpha \to 0} LHS = 1 \tag{3.27}$$

$$\lim_{\alpha \to 1} LHS = 1 \tag{3.28}$$

$$\lim_{\alpha \to 0} RHS = 1 \tag{3.29}$$

$$\lim_{\alpha \to 1} RHS = 1 \tag{3.30}$$

Thus, both the left and the right side of inequality (3.24) describe non-linear functions that approach the value one as α approaches each limit of its range.

In order to show that for the range $0 < \alpha < 1$ that the individual under the assumptions of laissez-faire capitalism has always a higher utility than under the assumptions of socialism, the following condition M must hold.

$$M = [2-\alpha]^\alpha - \left[\frac{2-\alpha}{2}\right]^{1-\alpha} > 0 \text{ for all } 0 < \alpha < 1 \tag{3.31}$$

Taking the natural log on both sides simplifies to the condition

$$\alpha \ln(2-\alpha) > (1-\alpha)\ln\left(\frac{2-\alpha}{2}\right) \tag{3.32}$$

Because $\ln(2-\alpha) > 0$ and $(1-\alpha)\ln\left(\frac{2-\alpha}{2}\right) < 0$ for all $0 < \alpha < 1$, the left side of inequality (3.32) is always positive and the right side always negative.

Figure 4 shows this result graphically. On the y-axis I show $U^*_{Laissez-Faire}$ and $U^*_{Socialism}$ and on the x-axis α. For the exogenously determined land available, I assume $N_i = 1$.

Figure 4

Utility Associated with Operating under Assumptions of Laissez-Faire vs. Socialism
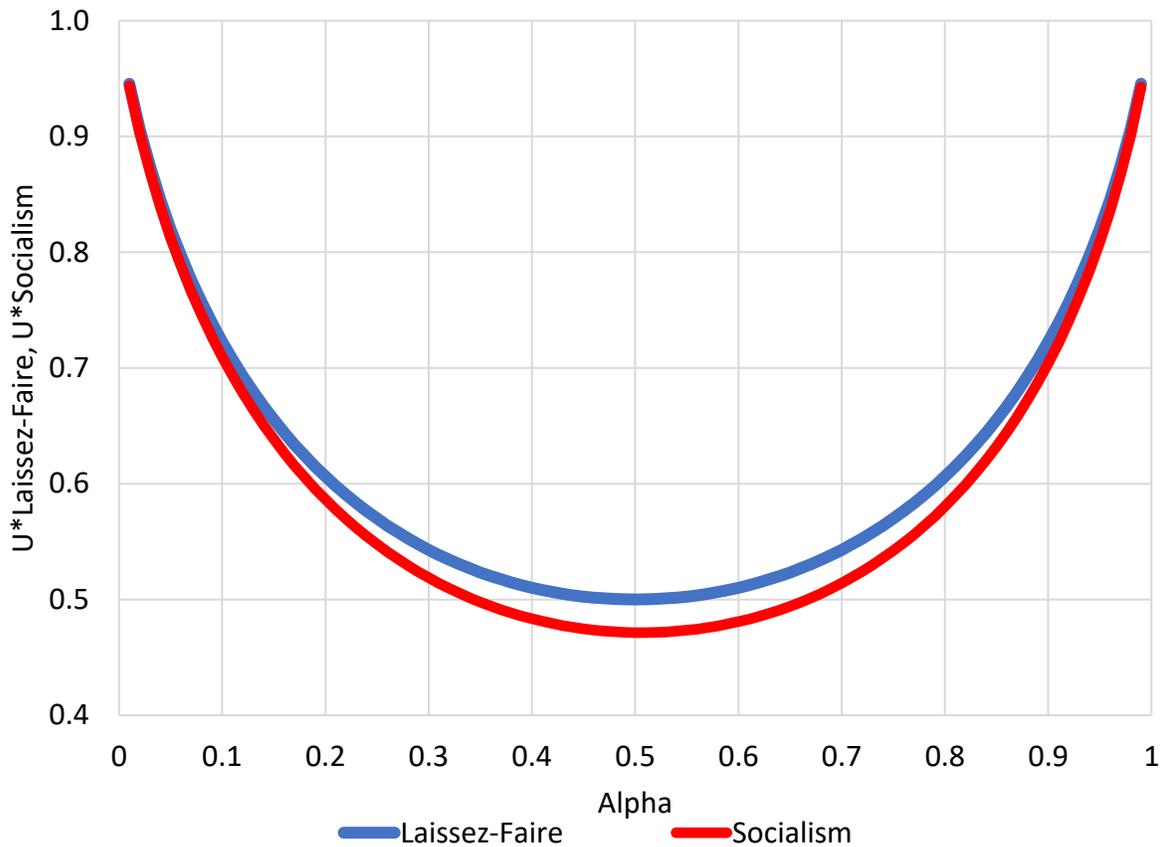
What is an intuitive interpretation for this result? During the prelude to the 1789 French Revolution, the famous physiocrat Francois Quesnay (1694-1774) said that "without that sense of security which property gives, the land would remain uncultivated" (Quesnay, 1888, p. 331). Quesnay implies that private property rights create incentives to produce more. The model shows that this is the case in equilibrium. The reason for this is that the marginal utility per unit of

consumption as a result of a forgone unit of leisure is always greater under the assumption of laissez-faire than under the assumption of socialism. The respective marginal utilities for an individual $i=1$ are

$$\frac{dU}{dL}_{Laissez-Faire} = -\alpha[N_1(1-L_1)]^{\alpha-1}N_1L^{1-\alpha} + (1-\alpha)L^{-\alpha}[N_1(1-L_1)]^{\alpha} \qquad (3.33)$$

$$\frac{dU}{dL}_{Socialism} = -\alpha\left[\frac{N_1(1-L_1)+N_2(1-L_2)}{2}\right]^{\alpha-1}\frac{N_1}{2}L^{1-\alpha} + (1-\alpha)L^{-\alpha}\left[\frac{N_1(1-L_1)+N_2(1-L_2)}{2}\right]^{\alpha} \qquad (3.34)$$

The first term in (3.33) and (3.34) is the reduced marginal utility, or increased marginal opportunity cost, from an extra unit of leisure. The second term is the direct marginal utility associated with an extra unit of leisure. Assuming that under the assumptions of socialism $N_1 = N_2$ and $L_1 = L_2$, (3.34) simplifies to

$$\frac{dU}{dL}_{Socialism} = -\alpha[N_1(1-L_1)]^{\alpha-1}\frac{N_1}{2}L^{1-\alpha} + (1-\alpha)L^{-\alpha}[N_1(1-L_1)]^{\alpha} \qquad (3.35)$$

Comparing the first term of (3.33) and (3.35) shows that the marginal opportunity cost of one marginal unit of leisure through forgone consumption is always twice as high as under the assumptions of laissez-faire. There is no difference in the second term of (3.33) and (3.35), indicating that there is no difference in the marginal effect of leisure alone.

Figure 5 illustrates this for the utility function $U = C^{0.4}L^{0.6}$ and $N_i = 0.5$. The optimum leisure choices are then $L^*_{Laissez-Faire} = 0.6$ and $L^*_{Socalism} = 0.75$ (see also results in Table 2). The black line displays the marginal utility directly attributable to leisure, which is the same under the laissez-faire and socialism assumptions. The blue and red lines are the marginal opportunity cost of forgone consumption under the assumptions of laissez-faire and socialism, respectively. The intersection of the marginal utility of leisure line (black) with the respective marginal opportunity costs of forgone consumption lines illustrate the two different optimum leisure choices ($L^*_{Laissez-Faire} = 0.6$ and $L^*_{Socalism} = 0.75$). Total utility can be visualized as follows. The area under the marginal utility of leisure line (MUL) and above the marginal opportunity costs of forgone consumptions (MOCC) between $0 < Leisure < L^*$ captures the total utility from leisure. The area under the MOCC and above the MUL between $L^* < Leisure < 1$ is the total utility from

consumption. The area shaded in yellow represents the more-utility from leisure under socialism and the green area the more-utility from consumption under laissez faire capitalism. Since the individual under the assumptions of laissez-faire has always a greater overall utility than the individual under the assumptions of socialism, for all $0 < \alpha < 1$ under the assumptions of socialism, the green area must always be greater than the yellow area.

Figure 5

Optimum Leisure Choice under Laissez-Faire and Socialism – Numerical Example
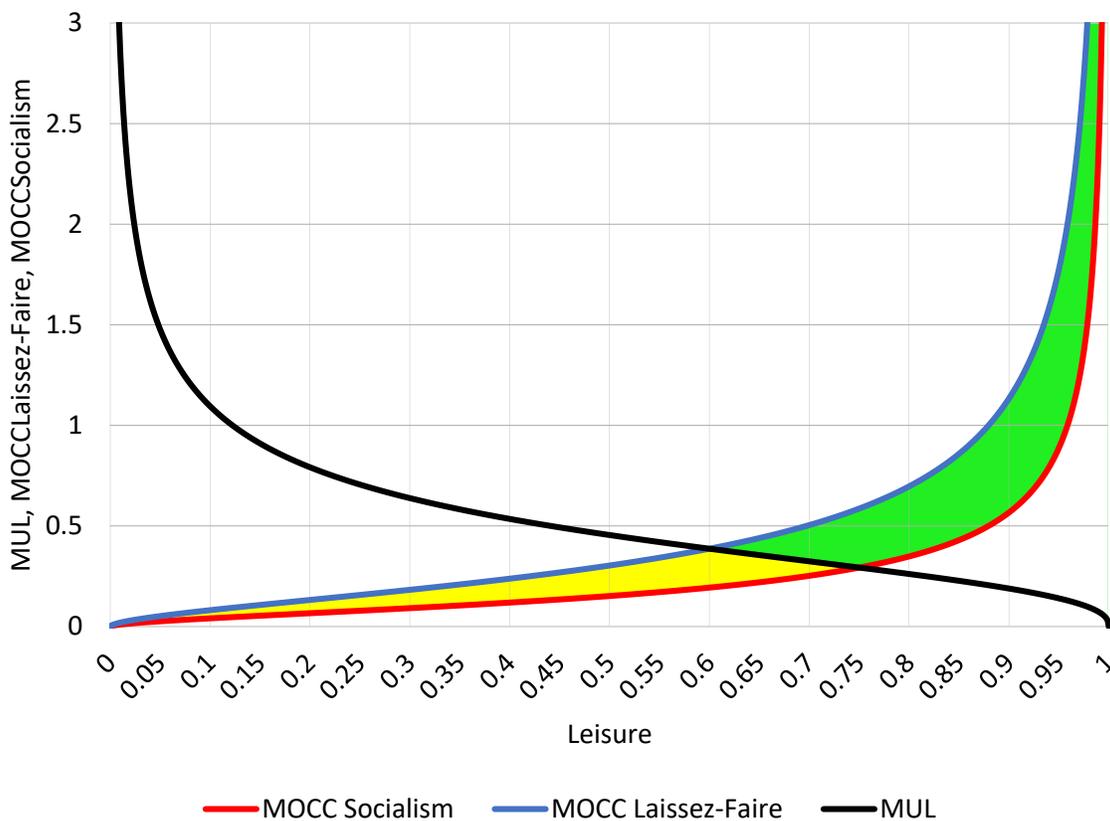
Quesnay's observation rests therefore on greater incentive compatibility. All else constant, the greater marginal utility from every forgone unit of leisure for the purpose of production induces more production. The accumulated utility surplus from more-production under the laissez-faire assumptions can never be made up by accumulating more utility from more leisure under the socialism assumptions.

Balancing Market Freedom with Equitable Development

An important result of this simple model is that the optimum labor choice under laissez-faire and socialism is independent of the land available to the individual. A capitalist farmer with little land will work as many hours as a farmer with a lot of land (see Table 2). A change in the land endowment will change the budget constraint and a farmer with less land will experience less utility than a farmer with more land. My simple model, however, is such that the income effect associated with the change in the land endowment always equals the substitution effect.

How does the social market economy as a philosophy committed to balancing the freedom in the market with equitable social development now enter the model? This simple model so far only lends support in favor of market freedom. The results do not provide any information about the distribution of income. Obviously, the distribution of income in a market system will be more unequal if the primary distribution of land is already highly unequal. From a social market economic perspective, equal opportunities through, for example, a land reform or the development of financial markets allow the smallholder farmers to expand and compete with the large land farmer. The fact that equal opportunity maximizes societies' welfare is easily shown.

Imagine a benevolent dictator who needs to maximize the aggregate welfare function of two individuals under a laissez-faire capitalism with respect to the optimum land distribution. This benevolent dictator will then substitute the optimum consumption and leisure choices under capitalism into the original utility function and maximize the aggregate welfare function

$$\max_{N_1} W = [\alpha N_1]^\alpha (1-\alpha)^{1-\alpha} + [\alpha N_2]^\alpha (1-\alpha)^{1-\alpha} \qquad (3.36)$$

Welfare with respect to land (N) is maximized when

$$N_1 = N_2 \qquad (3.37)$$

Recalling that $N_1 + N_2 = 1$, Figure 6 summarizes the finding that aggregate welfare is maximized when N_1=0.5 for alternative alphas. It also shows that the greater is alpha, the lower is aggregate welfare at N_1=0.5. As alpha increases by one small unit *x*, the optimum leisure choice

decreases by the amount x as well $\left(\frac{dL^*}{d\alpha} = -1\right)$ whereas the optimum consumption choice increases

by N_i $\left(\frac{dC^*}{d\alpha} = N_i\right)$. Thus, intuitively, an increase of alpha always reduces the absolute consumption

opportunities of leisure by more than what the increase in consumption opportunities can offset,

which is why aggregate welfare decreases as alpha increases.

Figure 6

Aggregate Welfare and Equal Opportunity
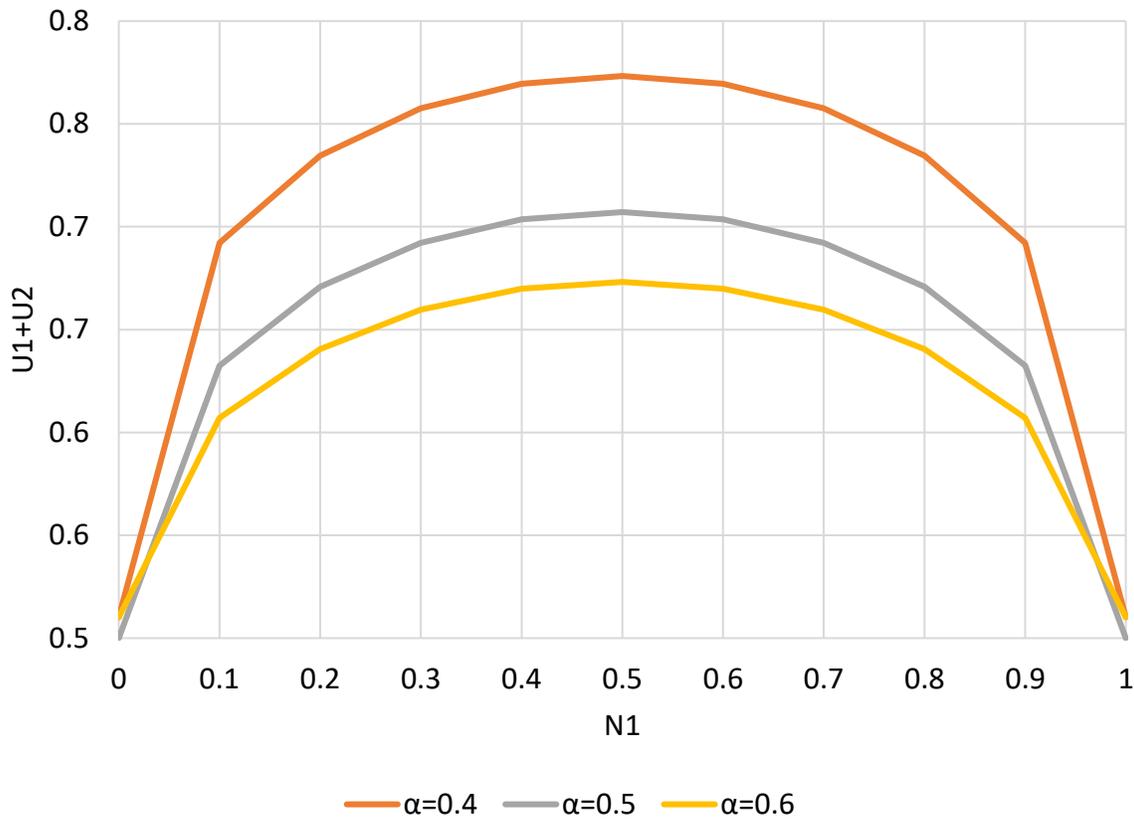
Market Freedom with and without Equitable Development and Growth

So far, I have described my model framework from a static perspective only. My

production function $C_i = (1 - L_i)N_i$ is linear in N. It is a short-run Keynesian production function

in the spirit of Harrod and Domar's growth model. My production function is accordingly not

suited to illustrate economic growth in the long run in the spirit of Solow.

The choice of a production function depends on the specific question. Since social market economics is concerned with balancing the freedom in the market with equitable social development and ultimately equitable socioeconomic growth, I want to explore next the question why equal opportunity also leads to equitable socioeconomic growth.

For this question, I expand the previous analysis for a dynamic component. Specifically, I assume that land can be improved through capital investments. Land will thus be turned into effective land, similarly to the concept of effective labor. This land investment, in turn, depends on savings and savings on output, which in my model is the consumption good. The consumption good can therefore be used as an investment good, just as a beehive can be thought of as capital stock or a source of consumption.

I assume that savings increases with output, the production of consumption goods. Empirically, on average, as income increases, savings increase at positive but diminishing rates. Moreover, because the maximum savings rate is a hundred percent, at least in a simple closed-economy model without opportunities to borrow, a linear relationship is theoretically not plausible. This is because a linear relationship would allow for predicted saving rates of greater than hundred percent as income increases. I therefore model the savings rate *s* as

$$s_{i_t} = 1 - \frac{1}{e^{C_{i_t}}} \tag{3.38}$$

with

$$\lim_{C \to \infty} s_i = 1 \tag{3.39}$$

My simple production function in the optimum derived with respect to time is then

$$\dot{C}_{i_t} = \alpha \dot{N}_{i_t} \tag{3.40}$$

with

$$\dot{N}_{i_t} = s_{i_t} C_{i_{t-1}} = \left(1 - \frac{1}{e^{C_{i_{t-1}}}}\right) C_{i_{t-1}} = \left(1 - \frac{1}{e^{\alpha N_{i_{t-1}}}}\right) \alpha N_{i_{t-1}} \tag{3.41}$$

Substituting (3.41) into (3.40) yields

$$\dot{C}_{i_t} = \alpha \left(1 - \frac{1}{e^{\alpha N_{i_{t-1}}}}\right) \alpha N_{i_{t-1}} \tag{3.42}$$

For the society consisting of two economic actors, a benevolent dictator would choose the initial distribution of land in t=0 such that the increase in aggregate output is maximized. This is

$$\max\left(\dot{C}_{1_{t=1}} + \dot{C}_{2_{t=1}}\right) = \frac{d\left(\dot{C}_{1_{t=1}} + \dot{C}_{2_{t=1}}\right)}{dN_{1_{t=0}}} = 0 \tag{3.43}$$

More specifically, the first order condition can be written as

$$\frac{d\left[\alpha\left(1 - \frac{1}{e^{\alpha N_{1_{t=0}}}}\right)\alpha N_{1_{t=0}} + \alpha\left(1 - \frac{1}{e^{\alpha\left(1 - N_{1_{t=0}}\right)}}\right)a\left(1 - N_{1_{t=0}}\right)\right]}{dN_{1_{t=0}}} = 0 \tag{3.44}$$

which simplifies to

$$(\alpha N_{1_{t=0}} - \alpha + 1)e^{N_{1_{t=0}}} + (\alpha N_{1_{t=0}} - 1)e^{\left(1 - N_{1_{t=0}}\right)} = 0 \tag{3.45}$$

Solving for $N_{1_{t=0}}$ yields again the optimum solution of

$$N_{1_{t=0}} = 0.5 \tag{3.46}$$

Figure 7 to 10 summarize the dynamics associated with the simple growth model for two scenarios. The first scenario is based on equal economic opportunity in t=0, meaning that $N_1 = N_2 = 0.5$. The second is based on unequal economic opportunity in t=0 with $N_1 = 0.99$ and $N_2 = 0.01$. The simulation period is for $0 \leq t \leq 30$.

The results can be summarized as follows. The model projects that output of consumption goods in the economy with initially equal opportunity always exceeds output of consumption goods in the economy with initially unequal economic opportunity (Figure 7). The economy based on equal opportunity grows initially faster than the unequal economy (Figure 8). Yet, as the equal economic economy approaches the maximum savings rate faster than the unequal economy (Figure 9), a window opens after a certain point in which the unequal economy grows faster than the equal one. Lastly, aggregate effective land in the equal economy is also always greater than in the unequal economy (Figure 10). It is important to note, however, that aggregate consumption, savings rates, and effective land will ultimately converge in the long run. This is made possible by the fact that the model does not impose any restrictions on the expansion of effective land, which, of course is unrealistic. Therefore, if one thinks of effective land as, for example, cereal yield which

can only be increased up to a certain limit, the model will cement existing income inequalities once this maximum effective land limit is reached.

Figure 7

Equal Opportunity and Growth of Aggregate Consumption (Output)

C1+C2 (when in t= 0 N1=0.5 and N2=0.5)
C1+C2 (when in t= 0 N1=0.01 and N2=0.99)
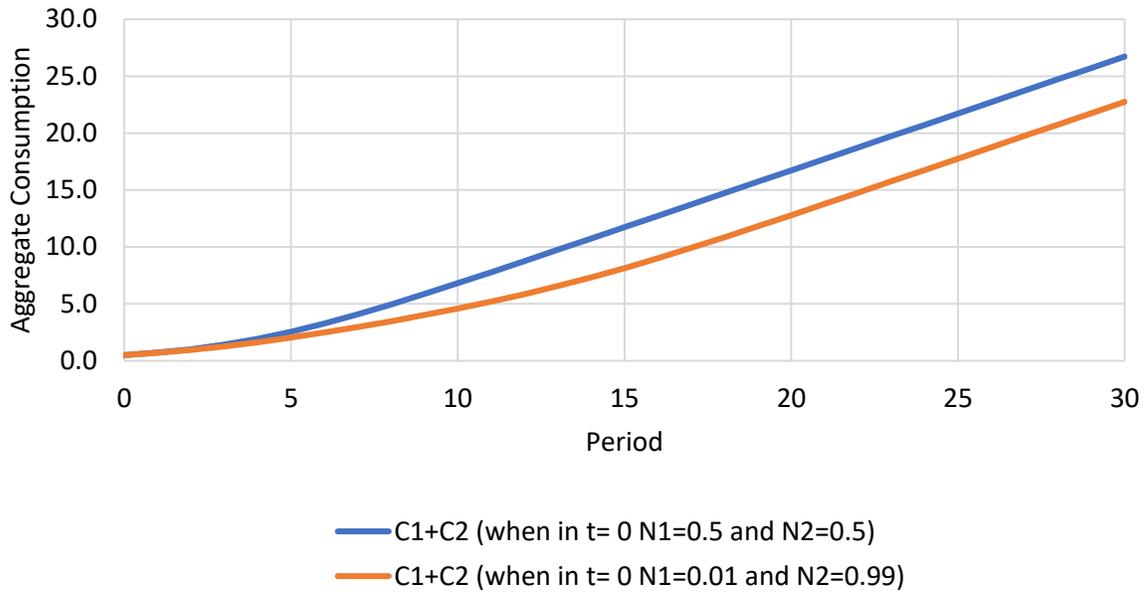
Figure 8

Equal Opportunity and Growth Rates of Aggregate Consumption

Growth Rate (when in t= 0 N1=0.5 and N2=0.5)
Growth Rate (when in t= 0 N1=0.01 and N2=0.99)
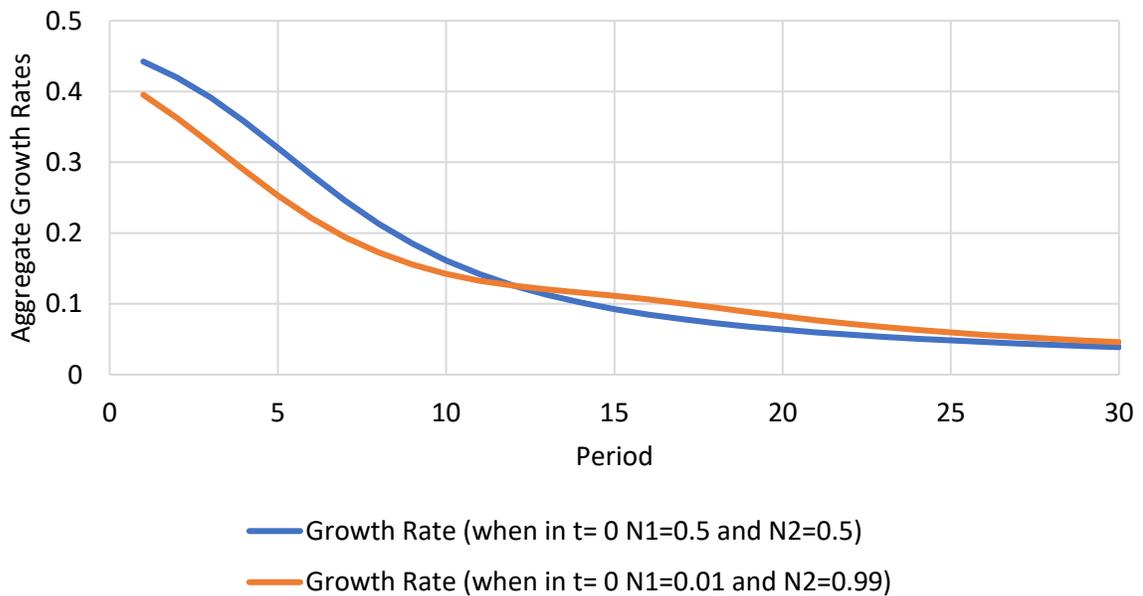
Figure 9

Equal Opportunity and Aggregate Growth of Savings Rates

S1+S2 (when in t= 0 N1=0.5 and N2=0.5)
S1+S2 (when in t= 0 N1=0.01 and N2=0.99)
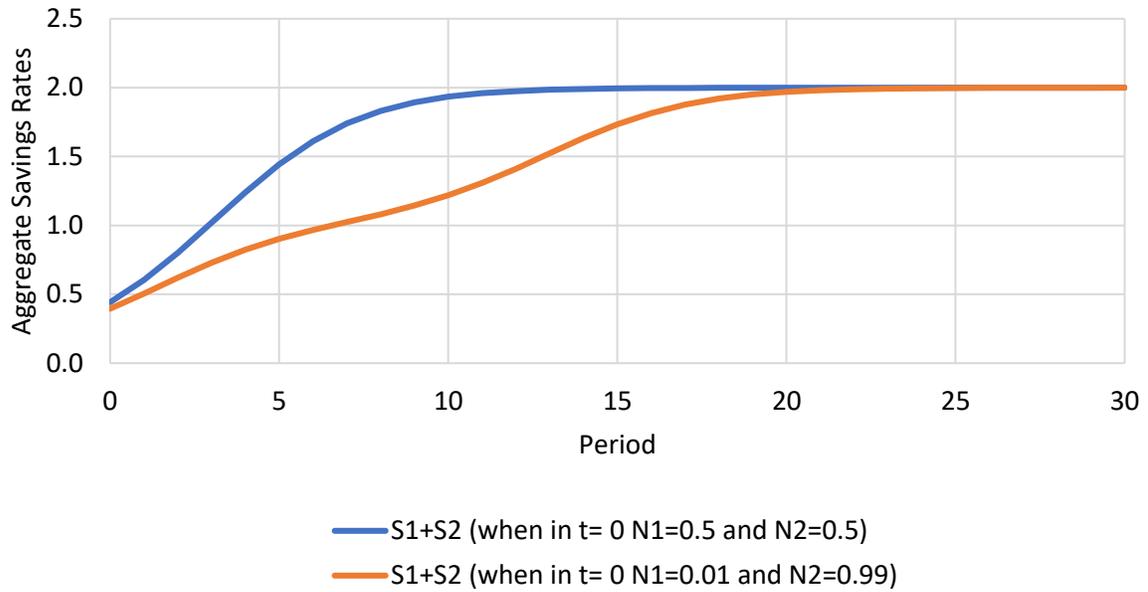
Figure 10

Equal Opportunity and Aggregate Growth of Effective Land

N1+N2 (when in t= 0 N1=0.5 and N2=0.5)
N1+N2 (when in t= 0 N1=0.01 and N2=0.99)
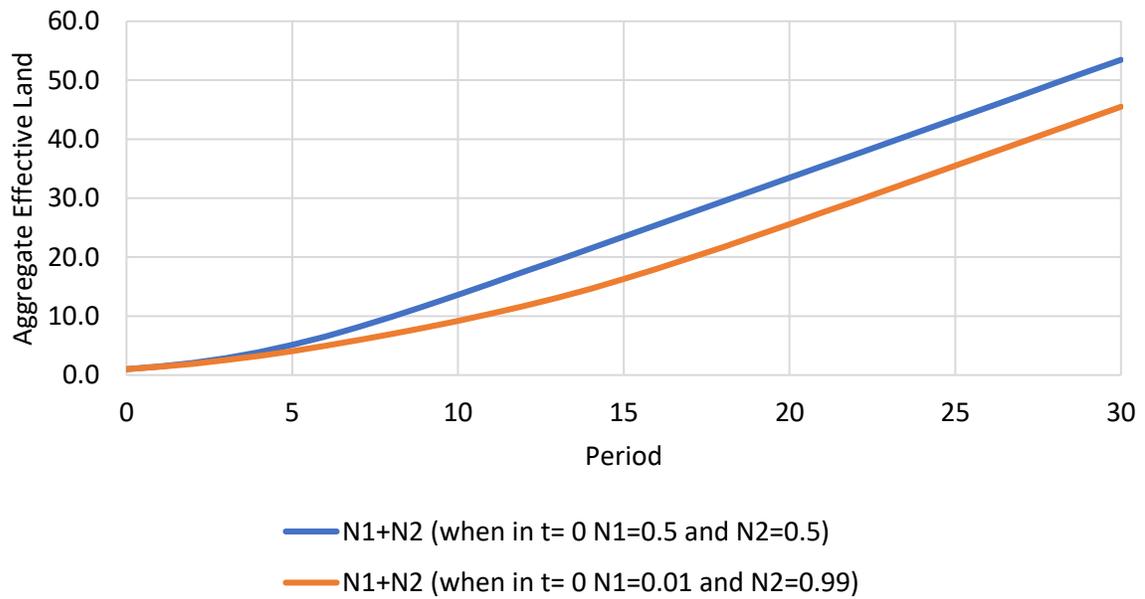
Toward Testable Hypotheses

The model suggests different economic outputs under stylized socialist, laissez-faire capitalist, and social market economic assumptions. These emerging results can then be used to derive the following hypotheses either directly from the model or by closely related plausibility considerations. Directly derived hypotheses are:

(1) Countries with greater social market economic profiles experience

greater economic prosperity.

(2) Social market economic principles prioritize equal opportunities.

Inequality of economic opportunities and income enforces redistribution through the democratic decision process which the rich have an incentive to undermine and the poor to promote, as a result of which personal freedoms will be more under attack than in a society with greater equality of income and economic opportunities. Then it can be indirectly deduced that:

(3) Social market economic principles promote social peace through

the reduction of political polarization associated with

redistributive conflict from inequitable development.

Moreover, interpreting factor land as an ecological resource, the ratio of aggregate income generation to resource use is maximized under the social market economic setting. Conversely, countries with a greater social market economic profile will have more resources available to diversify their economies and protect their natural resources. Thus:

(4) Social market economic principles contribute to the ecologically

sustainable use of resources.

Chapter 4

Empirical Analysis

This dissertation has two main objectives. First, to provide empirical support for the hypothesized positive relationship between compliance with social market economic principles and peaceful and equitable social development. Second, to make the research results available in an interactive web application. This chapter describes the empirical strategy, whose results will feed into the web application.

Data and Methodology

In order to explore the relationship between compliance with social market economic principles and peace, prosperity and ecological sustainability, I first operationalize the concept of a social market economy by identifying appropriate measures for social market economic principles. After constructing a social market economic performance index (SMEX), I empirically test my hypotheses, acknowledging methodological limitations.

Development of a Social Market Economic Performance Index

This dissertation takes advantage of secondary data. Finding available indicators to match social market economic principles was not always easy and some proxies match the idea of social market economics better than others. Judgement calls were therefore often necessary. In making those judgement calls, I regularly needed to trade off best fit against data availability. The selection of variables is therefore imperfect.

A more perfect variable selection process would have been possible only if the data had been surveyed specifically for the purpose of this study. This would have required the summoning of scholars trained in social market economics in as many countries as possible, who then had needed to evaluate a country's performance along the various indicators.

In sum, while I often had wished for better indicators, conducting such a survey for a large sample of countries would have been outside what a single person could have managed financially, organizationally, and logistically. In the end, Table 3 to 6 list the proxy variables that were used to represent the social market economic principles as outlined in the literature review and summarized in Figure 2.

Table 3

Operationalizing the Concept of a Social Market Economy – Proxy Variables for State-

Constitutional Principles

Principle/ SME Input	Proxy Variable	Definition	Source
Democracy	Polity 2	Index between -10 and +10 with negative scores indicating autocracies, scores between 1 and 6 describing anocracies, and scores of 7 and greater identifying democracies.	CSP (2018)
Subsidiarity	Fiscal Decentralization	Composite index of (1) taxation autonomy, (2) intergovernmental transfers, (3) borrowing, and (4) vertical gap.	Ivanyna & Shah (2014)

Table 4

Operationalizing the Concept of a Social Market Economy – Proxy Variables for State-Political

Principles

Principle/ SME Input	Proxy Variable	Definition	Source
Protection from Special Interest Groups	Corruption Perception Index	The CPI scores and ranks countries/territories based on how corrupt a country's public sector is perceived by experts and business executives.	Transparency International (2020)
Primacy of order over discretionary policy	Overall Score	Geometric mean of below 4 indicators	Author's calculation
	Proxy for avoidance of sector interventions: Distortive effects of taxes and subsidies on competition	Response to the survey question "In your country, to what extent do fiscal measures (subsidies, tax breaks, etc.) distort competition?" [1 = distort competition to a great extent; 7 = do not distort competition at all].	WEF (2019)
	Proxy for moderate stabilization policy: Debt Dynamics	Index measuring the change in public debt, weighted by a country's credit rating and debt level in relation to its GDP.	WEF (2019)
	Proxy for market conform social policy: Macroeconomic Environment	Composite measure of (1) government budget balance, (2) gross national savings, (3) inflation, (4) government debt, and (5) country credit rating	WEF (2017)
	Proxy for market conform environmental policy: Adjusted Savings	Adjusted savings: natural resources depletion (% of GNI)	WB (2020)

Table 5

Operationalizing the Concept of a Social Market Economy – Proxy Variables for Market-

Organizational Principles

Principle/ SME Input	Proxy Variable	Definition	Source
Free Prices	Monetary Freedom	Monetary freedom combines a measure of inflation with an assessment of various government activities that distort prices. Price stability without microeconomic intervention is the ideal state for the free market.	Heritage Foundation (2020)
Free Trade	Trade Freedom	Trade freedom is a composite measure of the extent of tariff and nontariff barriers that affect imports and exports of goods and services.	Heritage Foundation (2020)
Free Contracts	Business Freedom	The business freedom component measures the extent to which the regulatory and infrastructure environments constrain the efficient operation of businesses. The quantitative score is derived from an array of factors that affect the ease of starting, operating, and closing a business.	Heritage Foundation (2020)
Private Property Rights	Private property	The property rights component assesses the extent to which a country's legal framework allows individuals to acquire, hold, and utilize private property, secured by clear laws that the government enforces effectively. It provides a quantifiable measure of the degree to which a country's laws protect private property rights and the extent to which those laws are respected. It also assesses the likelihood of state expropriation of private property.	Heritage Foundation (2020)
Private Liability	Efficiency of legal framework in settling disputes	Response to the survey question "In your country, how efficient are the legal and judicial systems for companies in settling disputes?" [1 = extremely inefficient; 7 = extremely efficient].	WEF (2019)
Price Stability	Inflation	Inflation as measured by the annual growth rate of the GDP implicit deflator shows the rate of price changes in the economy. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency.	WB (2020)
Constancy of Economic Policy	Government ensuring policy stability	Response to the survey question "In your country, to what extent does the government ensure a stable policy environment for doing business?" [1 = not at all; 7 = to a great extent].	WEF (2019)

Table 6

Operationalizing the Concept of a Social Market Economy – Proxy Variables for Market-

Failure-Correcting Principles

Principle/ SME Input	Proxy Variable	Definition	Source
Income Policy	Social Protection	Proportion of population covered by at least one social protection benefit, by sex (%).	UNSTAT (2019)
Labor Market Policy	Overall Score	Geometric mean of below two indicators.	Author's calculation
	Cooperation in labor-employer relations	Response to the survey question "In your country, how do you characterize labour-employer relations?" [1 = generally confrontational; 7 = generally cooperative]	WEF (2019)
	Workers' rights	Score adapted from the International Trade Union Confederation (ITUC) Global Rights Index, which measures the level of protection of internationally recognized core labor standards. The scale of this indicator ranges from 0 (no protection) to 100 (high protection)	WEF (2019)
Environmental Policy	Environment-related treaties in force	Total number of ratified environmental treaties (0–29 scale, where 29 is best)	WEF (2019)

In a second step, I construct the SMEX. I first build a cross-sectional data set consisting of the last available observations of the various measures. I use last available observations because my variables stem from multiple sources updated at different times. My units of observations are all countries in the World Bank Development Indicator Database for which data is available. Missing observations is another problem. I estimate missing observations by regressing each missing SMEX input variable against per capita income (y), democracy (Polity 2 Score, p2) and regional dummies. For the estimation, I use simple ordinary least square regressions:

$$SME\ Input\ Variable_i = \beta_0 + \beta_1 \times ln\ (y)_i + \beta_2 \times p2_i + \sum_j \beta_{2+j} \times Regional\ Dummies_i + u_i \quad (4.1)$$

where

$i = country\ i$

$j = count\ of\ regional\ fixed\ effects$

Table 7 lists the variables used for the estimation, their descriptions, transformations, and sources.

Table 7

Estimating Missing Observations - Data Description and Sources

Variable	Abrr.	Description	Transformation	Source
SME Input Variable	-	See Table 3 to Table **6** for details	ln(Adjusted Savings + min) ln(Inflation + min)	See Table 3
Income per capita	Y	Per capita GDP at constant 2015 prices – US Dollars	ln(y)	UNSTAT (2020)
Democracy	p2	Index between -10 and +10 with negative scores indicating autocracies, scores between 1 and 6 describing anocracies, and scores of 7 and greater identifying democracies.	-	CSP (2018)
Regional Dummies	EAP	East Asia and the Pacific	1, if country part of region, 0 otherwise	Author's Definition WB Classification except for WE and EECA
	EECA	Eastern Europe and Central Asia (former socialist countries)		
	LAC	Latin America and the Caribbean		
	MENA	Middle East and North Africa		
	SA	South Asia		
	SSA	Sub-Saharan Africa		
	WE	Western Europe		

My final dataset consists of 165 observations. These are all the countries for which there was at least one observation available for GDP per capita and democracy (Polity 2 score), which I used to estimate missing observations. A third variable that needed at least one available observation to be included in the data set is "inflation." The variable "inflation" is not as easily estimated when unavailable as some of the other variables. Table 8 lists all 165 countries by region.

Table 8

List of 165 Countries included in Final Dataset

East Asia and the Pacific
Australia
Cambodia
China
Fiji
Indonesia
Japan
Korea, Rep.
Lao PDR
Malaysia
Mongolia
Myanmar
New Zealand
Papua New Guinea
Philippines
Singapore
Solomon Islands
Thailand
Timor-Leste
Vietnam

Eastern Europe and Central Asia
Albania
Armenia
Azerbaijan
Belarus
Bosnia and Herzegovina
Bulgaria
Croatia
Czech Republic
Estonia
Georgia
Hungary
Kazakhstan
Kosovo
Kyrgyz Republic
Latvia
Lithuania
Macedonia, FYR
Moldova
Montenegro
Poland
Romania
Russian Federation
Serbia
Slovak Republic
Slovenia
Tajikistan
Turkmenistan
Ukraine
Uzbekistan

Latin America and the Caribbean
Argentina
Bolivia
Brazil
Chile
Colombia
Costa Rica
Cuba
Dominican Republic
Ecuador
El Salvador
Guatemala
Guyana
Haiti
Honduras
Jamaica
Mexico
Nicaragua
Panama
Paraguay
Peru
Suriname
Trinidad and Tobago
Uruguay
Venezuela, RB

Middle East and North Africa
Algeria
Bahrain
Djibouti
Egypt, Arab Rep.
Iran, Islamic Rep.
Iraq
Israel
Jordan
Kuwait
Lebanon
Libya
Morocco
Oman
Qatar
Saudi Arabia
Syrian Arab Republic
Tunisia
United Arab Emirates
Yemen, Rep.

North America
Canada
United States

South Asia
Afghanistan
Bangladesh
Bhutan
India
Nepal
Pakistan
Sri Lanka

Sub-Saharan Africa
Angola
Benin
Botswana
Burkina Faso
Burundi
Cabo Verde
Cameroon
Central African Republic
Chad
Comoros
Congo, Dem. Rep.
Congo, Rep.
Cote d'Ivoire
Equatorial Guinea
Eritrea
Eswatini
Ethiopia
Gabon
Gambia, The
Ghana
Guinea
Guinea-Bissau
Kenya
Lesotho
Liberia
Madagascar
Malawi
Mali
Mauritania
Mauritius
Mozambique
Namibia
Niger
Nigeria
Rwanda
Senegal
Sierra Leone
Somalia
South Africa
South Sudan
Sudan
Tanzania
Togo
Uganda
Zambia
Zimbabwe

Western Europe
Austria
Belgium
Cyprus
Denmark
Finland
France
Germany
Greece
Ireland
Italy
Luxembourg
Netherlands
Norway
Portugal
Spain
Sweden
Switzerland
Turkey
United Kingdom

Before I calculate the SMEX, I fill the missing observations of the input variables with the respective estimates from (4.1). Appendix A Table A1 presents the ordinary least square regression results underlying these estimates.

After obtaining a complete dataset, I scale all input variables between 0 and 100 such that 0 is worst and 100 is best. To comply with the latter, I reverse some of the variables, for example inflation, such that a low value corresponds to high inflation, because high inflation is worse. Considering the data visualization and simulation tool, I further simplify the SME input variables as follows:

- $0 \leq \text{value} \leq 20$ $\rightarrow 10$

- $20 < \text{value} \leq 40$ $\rightarrow 30$

- $40 < \text{value} \leq 60$ $\rightarrow 50$

- $60 < \text{value} \leq 80$ $\rightarrow 70$

- $80 < \text{value} \leq 100$ $\rightarrow 90$

I calculate the SMEX from the 15 resulting SME input variables (see Table 3 to 6) as a weighted average. Since many of the variables are highly correlated, variables that correlate less with all other variables receive a higher weight. I identify weights from a correlation matrix of all variables. The correlation matrix and resulting weights are presented in Appendix A Tables A2 and A3, respectively. The weights w_i are calculated as follows:

$$w_i = \frac{\arg\min S + \arg\max S - c_i}{\sum_{i=0}^{n} (\arg\min S + \arg\max S - c_i)} \tag{4.2}$$

where

$r = correlation\ coefficient$

$i, j = columns, rows\ of\ correlation\ matrix = input\ variable$

$$c_i = \sum_{j=0}^{n} |r_{ij}|$$

$S = \{c_i\}$

After creating the weights, I calculate the SMEX as

$$SMEX_c = \sum_{i=0}^{n} observation_i \times weight_i \qquad (4.3)$$

where

$c = Country$

$i = Input\ variable$

Lastly, I scale the SMEX between 0 and 100 such that 0 corresponds to the country with the lowest

score and 100 corresponds to the country with the highest score.

Testing the Hypotheses

The SMEX serves as the main explanatory variable for peace, prosperity, and ecological

sustainability. Following the conceptualization of my research question, I test for empirical

support that the SMEX will positively influence social peace, equal opportunity, ecological

sustainability, and economic prosperity using various proxy variables as measures of these

outcomes as depicted in Table 9, Table 10, Table 11, and Table 12, respectively.

I natural log-transform the variables whenever it made the variables more normally

distributed. Keeping my ultimate data visualization goal in mind, after compiling the SME output

variables, I again scale these between 0 and 100 such that 0 is worst and 100 is best.

Table 9

Operationalizing the Social Market Economic Output Variable Social Peace

SME Output	Indicator	Definition	Source
Conflict Free Plurality	Global Freedom Index	A country or territory's Freedom in the World status depends on its aggregate Political Rights score, on a scale of 0–40, and its aggregate Civil Liberties score, on a scale of 0–60. The total Political Rights and Civil Liberties scores are equally weighted in this calculation.	Freedom House (2020)

Table 10

Operationalizing the Social Market Economic Output Variable Equal Opportunity

SME Output	Indicator	Definition	Source
Public Health	Infant Mortality	Under-5 mortality rate (probability of dying before the age of 5 per 1,000 livebirths).	IHME (2020)
Gender Equality	Gender Inequality Index	A composite measure reflecting inequality in achievement between women and men in three dimensions: reproductive health, empowerment and the labor market (0-1, where 1 is worst).	UNDP (2019)
Financial Inclusion	Account ownership	Account ownership at a financial institution or with a mobile-money-service provider (% of population ages 15+).	WB (2020)

Table 11

Operationalizing the Social Market Economic Output Variable Ecological Sustainability

SME Output	Indicator	Definition	Source
Future Prospects	Electricity production from renewable sources	Electricity production from renewable sources, excluding hydroelectric, includes geothermal, solar, tides, wind, biomass, and biofuels.	WB (2020)

Table 12

Operationalizing the Social Market Economic Output Variable Economic Prosperity

SME Output	Indicator	Definition	Source
Income per capita	GDP per capita	Per capita GDP at constant 2015 prices – US Dollars	UNSTAT (2020)

Due to the characteristics of the SME output variables, which are truncated between 0 and 100, I employ logistic regressions of the SME output variables social peace, equal opportunity and ecological sustainability against the SMEX variable. Yet, I run a regular ordinary least squares regression of the economic prosperity proxy GDP per capita against the SMEX.

In summary, the following four regression equations are used:

$$p(Social\ Peace+1)_i = \frac{1}{1+e^{-\left(\beta_0+\beta_1\times SMEX_i+\sum_j \beta_{2+j}\times Controls_{ij}+u_i\right)}} \tag{4.4}$$

$$p(Equal\ Opportunity+1)_i = \frac{1}{1+e^{-\left(\gamma_0+\gamma_1\times SMEX_i+\sum_j \gamma_{2+j}\times Controls_{ij}+u_i\right)}} \tag{4.5}$$

$$p(Ecological\ Sustainability+1)_i = \frac{1}{1+e^{-\left(\delta_0+\delta_1\times SMEX_i+\sum_j \delta_{2+j}\times Controls_{ij}+u_i\right)}} \tag{4.6}$$

$$Economic\ Prosperity_i = \varepsilon_0 + \varepsilon_1 \times SMEX_i + \sum_j \varepsilon_{1+j} \times Controls_{ij} + u_i \tag{4.7}$$

where

i = country i

j = numeration for control variables

The main focus of my analysis is, of course, the SMEX variable. Yet, many other factors affect peace, prosperity, and ecological sustainability. Additional potentially important variables that I control for are: (1) Natural resources rents (% GDP), (2) ethnic and religious fractionalization, (3) manufactures and services export share (% GDP), (4) a country's colonial past dummy, (5) years since independence, and (6) income per capita. I also control for (7) regional fixed effects.

Natural resources rents are at the center of the "greed and grievances" literature. Natural resource rents, especially when embedded in lootable resources, increase the financial viability of a rebellion and favor ecologically non-sustainable hit-and-run attacks on them ('greed'). In addition, natural resource rents often facilitate the development of rentier states. Rentier states are particularly vulnerable to conflict, especially when macroeconomic shocks undermine the feasibility of the "authoritarian bargain." Under an authoritarian bargain, citizens give up political participation rights in exchange for a secure provision with basic needs. As soon as macroeconomic shocks jeopardize the secure provision with basic needs, economic frustration ('grievance') might turn into political instability (Collier & Hoeffler, 2004; Collier & Hoeffler, 2005; Marktanner & Merkel, 2019).

Similarly, ethnic fractionalization and religious polarization often provide fertile grounds for rebellions, especially when ethnic and religious demarcation lines overlap with socioeconomic ones ('grievances'). Grievances may then be indicative for a country's level of social peace and equal opportunity (Collier & Hoeffler, 2004; Collier, 2007).

The variable "manufactures and services export share (%GDP)" represents an economic base with plenty of economic opportunities. The more productive and internationally competitive economic opportunities are available, the less grievances and the more opportunities for social mobility exist. Moreover, the less a country relies on the extraction of natural resources, the more ecologically sustainable it operates (Collier & Hoeffler, 2004).

The colonial past variable captures the historical context and importance of shaping a country's development of state policies and thereby its peace and prosperity trajectory. Having been a colony is often associated with higher internal conflict, less equal opportunities, and lower economic prosperity. This conflict is typically analyzed within the so-called colonial dialectic. The colonial dialectic captures a three-phase process, which Henry& Springborg (2010) call thesis, antithesis, and synthesis. The first phase (thesis) describes the fact that during the process of colonization there are winners and losers. The winners are typically urban commercial elites and the losers are rural citizens and peasants. The second phase (antithesis) describes the moment in which the disenfranchised segments of society form a resistance movement against the colonial hegemon and its allies. This resistance was often organized within the military with support from intellectual elites. The third phase (synthesis) describes the period of independence in which the former winners and losers from colonial rule need to overcome their political and ideological cleavages. Many former colonized countries still struggle with completing this third phase (Henry & Springborg, 2010).

Closely related to the conflict potential embedded in the colonial dialectic, I also control for years since independence. I hypothesize that the more years have elapsed since independence, the more successful the country is in completing the third phase of the dialectic. Having been a

hegemon, on the other hand, provided the country with economic prosperity at the expense of their colonies.

Lastly, income controls for the overall level of development in a country. The more developed a country is, the more serves the accomplished level of development as a safeguard against drastic political upheaval. Development, moreover, is often facilitated by the absence of conflict in the first place.

Table 13 summarizes the hypothesized signs of all my variables. Table 14 lists all control variables considered in the analyses. Appendix B Tables B1 and B2 list the summary statistics and correlation matrix of my main variables.

Table 13

Hypothesis Table

IV \ DV	Social Peace	Equal Opportunity	Ecological Sustainability	Economic Prosperity
SMEX	+	+	+	+
Income per capita	+	+	+	+
Ethnic Fractionalization	-	-	-	-
Religious Polarization	-	-	-	-
Manufactures & Services Export Share	+	+	+	+
Natural Resource Rents	-	-	-	-
Colonial Past	-	-	-	-
Years since Independence	+	+	+	+
Former Western Colony	-	-	-	-
Former Western Hegemon	+	+	+	+

Table 14

Control Variables - Data Description and Sources

SME Controls	Indicator	Definition	Transformation	Source
Income per capita	GDP per capita	Per capita GDP at constant 2015 prices – US Dollars.	ln-transformed	UNSTAT (2020)
Ethnic Fractionalization	Historical Index of Ethnic Fractionalization	The ethnic fractionalization index corresponds to the probability that two randomly drawn individuals within a country are not from the same ethnic group.		Drazanova (2019)
Religious Polarization	Religious Polarization Index	Probability of obtaining six people with the same religion in a hypothesized drawing with replacement.	Author's Calculation	Maoz & Henderson (2019)
Manufactures and Services Export Share	Manufactures and Services Export Share	Calculated as a percentage of GDP, using the variables Merchandise exports by the reporting economy (current US$), Manufactures exports (% of merchandise exports), Service exports (BoP, current US$), and GDP (current US$).	Author's Calculation ln-transformed	WB (2020)
Natural Resource Rents	Total natural resources rents (% of GDP)	Total natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents.	ln-transformed	WB (2020)
Colonial Past	Type of Independence = Decolonization	Entity was a dependency ruled by a foreign power before achieving independence. (Note that this includes traditional colonies, protectorates, parts of empires, other entities that were ruled by a foreign power or that were part of an entity that was not in the COW system.)	1, if true, 0 otherwise	Hensel & Mitchell (2007)

Table 14 Ctd.

Control Variables - Data Description and Sources

SME Controls	Indicator	Definition	Transformation	Source
Years since Independence	Date of Independence	The date on which this state became independent -- i.e., acquired control of its own foreign policy, without being ruled by a foreign power.	Year 2020 minus year in which the country became independent	Hensel & Mitchell (2007)
Former Western Colony	Entity from Which Independence Was Gained	COW country code for the state, empire, or other entity from which this state gained independence. This variable is coded as missing where the state did not gain independence from a COW system member (e.g., by unifying local units into a new state).	1, if country gained independence from Western Hegemon (UK, Netherlands, Belgium, France, Spain, Portugal, Germany (Prussia), Austria (-Hungary), Italy (Sardinia), Sweden, Denmark), 0 otherwise	Hensel & Mitchell (2007)
Former Western Hegemon	Former Western Hegemon	UK, Netherlands, Belgium, France, Spain, Portugal, Germany (Prussia), Austria (-Hungary), Italy (Sardinia), Sweden, Denmark	1, if country part of group, 0 otherwise	Hensel & Mitchell (2007)
Regional Dummies	EAP	East Asia and the Pacific	1, if country part of region, 0 otherwise	Author's Definition
	EECA	Eastern Europe and Central Asia (former socialist countries)		WB Classification except for WE and EECA
	LAC	Latin America and the Caribbean		
	MENA	Middle East and North Africa		
	SA	South Asia		
	SSA	Sub-Saharan Africa		
	WE	Western Europe		

Methodological Limitations

My empirical approach is subject to various limitations. The first limitation is that I can only estimate long-run equilibrium relationships. In order to estimate short-run dynamics, panel data would be needed, which is not readily available at this time.

A second limitation is the replacement of missing observations by estimates. Missing observations reduce the probability to correctly reject a null hypothesis (reduces the power of the test) and may lead to omitted variables biases. On the other hand, replacing missing observations by estimates can lead to selection biases. For example, the trend line of a regression of child mortality against income per capita with a sample of high-income countries will be much flatter than the trend line in a heterogenous sample. Then, applying the flat trendline from the high-income sample to predict child mortality in low-income countries will understate the true relationship. In sum, ignoring missing observation and replacing missing observations has substantial downsides.

I still decided to replace missing observations by estimates for two reasons. First, although the missing observations have a regional bias, it does not impact my analyses. In fact, I regressed countries with missing observations against the regional dummies of the five developing areas East Asia and the Pacific, Eastern Europe and Central Asia, Latin America and the Caribbean, Middle East and North Africa, South Asia, and Sub-Saharan Africa so that the reference group are the high-income regions of Western Europe and North America (Appendix C Table C1). Because the coefficients for South Asia and Sub-Saharan Africa were significant, I repeated my preferred Model XIII by adding a dummy indicating a missing observation. Adding the dummy does not impact the coefficients for the SMEX statistically significantly (Appendix C Table C2). Second, I personally believe that any estimated data, even when it is subject to potential biases, is still more informative than no data, especially when the estimation strategy is known.

Multicollinearity is a potential problem as well. Multicollinearity inflates the standard error, thus masking the true significance of the estimated coefficient. Especially in small samples,

multicollinearity can additionally lead to unexpected or flipping signs. When looking at a correlation matrix, I expect that running SMEX together with GDP per capita on the right- hand side may cause such problems. The correlation coefficient between the SMEX and the natural log of GDP per capita is r=0.79.

Endogeneity is a final concern. The social market economy was developed as a model for peace, prosperity, and sustainability. Thus, the decision to establish social market economic principles are simultaneously determined with the decision to move towards greater peace, prosperity, and sustainability. On the other hand, what speaks against obvious simultaneity is the fact that the introduction of social market economic policies occurs instantly, but their socio-economic dividends follow with a natural time-lag. Therefore, to test meaningfully for simultaneity, a panel would be most appropriate. Unfortunately, available data does not allow for the construction of a panel. I still conduct Hausman tests but could not identify a possible simultaneity issue (Appendix C Table C3).

Findings

For each dependent variable I run 13 different models, sequentially adding control variables. I present the regression results in Table 15 (DV: Social Peace), Table 16 (DV: Equal Opportunity), Table 17 (DV: Ecological Sustainability), and Table 18 (DV: Income per Capita). The SMEX index remains significant across all model specification for each dependent variable at, at least, 10%. Furthermore, the coefficients always carry the expected sign.

Table 15

Logistic Regression Results with Social Peace as the Dependent Variables

Variable	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
const	-2.25* (0.75)	-2.11* (0.85)	-2.14* (0.86)	-2.12* (0.86)	-1.9* (0.87)	-1.92* (0.88)	-2.26* (0.92)	-1.97 (1.48)	-2.18* (0.9)	-1.86 (1.46)	-1.87* (0.88)	-1.58 (1.41)	-1.87 (1.49)
SMEX	0.08* (0.01)	0.08* (0.01)	0.08* (0.01)	0.08* (0.01)	0.08* (0.01)	0.08* (0.01)	0.08* (0.01)	0.07* (0.01)	0.08* (0.01)	0.07* (0.01)	0.08* (0.01)	0.08* (0.01)	0.07* (0.01)
Income per capita	-0.14 (0.12)	-0.15 (0.12)	-0.15 (0.12)	-0.15 (0.12)	-0.12 (0.12)	-0.12 (0.13)	-0.1 (0.13)	-0.08 (0.15)	-0.11 (0.13)	-0.09 (0.15)	-0.11 (0.13)	-0.13 (0.15)	-0.11 (0.15)
Ethnic Fractionalization		-0.15 (0.44)	-0.19 (0.46)	-0.16 (0.47)	0.00 (0.48)	0.00 (0.48)	-0.13 (0.49)	-0.51 (0.47)	-0.08 (0.48)	-0.46 (0.47)	0.00 (0.48)	-0.45 (0.46)	-0.47 (0.47)
Religious Polarization			0.12 (0.37)	0.13 (0.38)	0.09 (0.38)	0.09 (0.38)	0.13 (0.38)	0.09 (0.37)	0.09 (0.38)	0.07 (0.38)	0.04 (0.38)	0.2 (0.38)	0.2 (0.38)
Manufactures and Services Export Share				0.02 (0.1)	-0.02 (0.1)	-0.02 (0.1)	0.01 (0.1)	0.04 (0.1)	0.01 (0.1)	0.04 (0.1)	-0.03 (0.1)	0.04 (0.1)	0.04 (0.1)
Natural Resource Rents					-0.18 (0.12)	-0.18 (0.12)	-0.18 (0.12)	-0.03 (0.11)	-0.19 (0.12)	-0.04 (0.11)	-0.18 (0.12)	-0.03 (0.11)	-0.03 (0.12)
Years since Independence						0.00 (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00* (0.00)
Colonial Past							0.31 (0.25)	0.2 (0.26)					0.14 (0.31)
Former Western Colony									0.33 (0.24)	0.18 (0.26)			0.05 (0.31)
Former Western Hegemon											0.48 (0.54)	-0.95 (0.6)	-0.9 (0.61)
EAP								-0.59 (0.89)		-0.6 (0.89)		-0.69 (0.87)	-0.59 (0.89)
EECA								-0.68 (0.91)		-0.68 (0.92)		-0.82 (0.88)	-0.65 (0.92)
LAC								0.66 (0.88)		0.65 (0.88)		0.62 (0.87)	0.7 (0.89)
MENA								-1.01 (0.9)		-1.01 (0.9)		-0.95 (0.9)	-0.91 (0.9)
SA								-0.15 (1.01)		-0.17 (1.01)		-0.23 (0.99)	-0.13 (1.01)
SSA								0.05 (0.92)		0.03 (0.91)		0.01 (0.91)	0.06 (0.91)
WE								1.37 (0.89)		1.38 (0.89)		1.76* (0.92)	1.84* (0.94)
n	151	151	151	151	151	151	151	151	151	151	151	151	151
Adj. R2	0.63	0.63	0.63	0.62	0.63	0.62	0.63	0.7	0.63	0.7	0.62	0.71	0.71
F-Stat	128.85	85.43	63.71	50.65	42.95	36.57	32.29	24.82	32.43	24.79	32.05	25.3	22.09

* p-value ≤0.1

standard errors in parentheses

Table 16

Logistic Regression Results with Equal Opportunity as the Dependent Variables

Variable	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
const	-6.97* (0.58)	-6.29* (0.65)	-6.45* (0.65)	-6.39* (0.66)	-6.37* (0.66)	-6.4* (0.67)	-6.22* (0.68)	-6.62* (1.16)	-6.23* (0.66)	-6.37* (1.13)	-6.39* (0.67)	-6.71* (1.11)	-6.41* (1.14)
SMEX	0.03* (0.01)	0.03* (0.01)	0.03* (0.01)	0.03* (0.01)	0.03* (0.01)	0.03* (0.01)	0.03* (0.01)	0.02* (0.01)	0.03* (0.01)	0.02* (0.01)	0.03* (0.01)	0.02* (0.01)	0.02* (0.01)
Income per capita	0.69* (0.09)	0.65* (0.09)	0.65* (0.09)	0.63* (0.09)	0.64* (0.09)	0.65* (0.1)	0.64* (0.1)	0.65* (0.12)	0.66* (0.09)	0.66* (0.12)	0.65* (0.1)	0.63* (0.12)	0.63* (0.12)
Ethnic Fractionalization		-0.7* (0.33)	-0.83* (0.34)	-0.77* (0.34)	-0.74* (0.36)	-0.74* (0.36)	-0.65* (0.37)	-0.47 (0.39)	-0.62* (0.36)	-0.5 (0.39)	-0.74* (0.36)	-0.47 (0.39)	-0.51 (0.39)
Religious Polarization			0.49* (0.28)	0.51* (0.28)	0.5* (0.28)	0.49* (0.28)	0.46 (0.29)	0.41 (0.32)	0.49* (0.28)	0.44 (0.31)	0.49* (0.29)	0.53* (0.32)	0.59* (0.32)
Manufactures and Services Export Share				0.06 (0.07)	0.05 (0.07)	0.05 (0.07)	0.02 (0.08)	-0.02 (0.08)	-0.01 (0.08)	-0.03 (0.08)	0.05 (0.07)	-0.01 (0.08)	-0.02 (0.08)
Natural Resource Rents					-0.03 (0.09)	-0.03 (0.09)	-0.03 (0.09)	-0.01 (0.1)	-0.02 (0.09)	0.01 (0.1)	-0.03 (0.09)	0.00 (0.1)	0.02 (0.1)
Years since Independence						0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Colonial Past							-0.21 (0.18)	-0.08 (0.2)					0.15 (0.24)
Former Western Colony									-0.42* (0.18)	-0.36* (0.2)			-0.51* (0.24)
Former Western Hegemon											0.06 (0.37)	-0.77* (0.45)	-0.9* (0.45)
EAP								0.75 (0.68)		0.61 (0.67)		0.8 (0.66)	0.63 (0.67)
EECA								0.71 (0.69)		0.43 (0.69)		0.82 (0.66)	0.46 (0.69)
LAC								0.29 (0.67)		0.17 (0.66)		0.38 (0.66)	0.24 (0.66)
MENA								0.35 (0.69)		0.26 (0.68)		0.46 (0.68)	0.36 (0.67)
SA								0.68 (0.76)		0.54 (0.75)		0.76 (0.75)	0.58 (0.75)
SSA								0.26 (0.7)		0.21 (0.69)		0.3 (0.69)	0.23 (0.68)
WE								1.44* (0.67)		1.26* (0.66)		1.89* (0.69)	1.73* (0.69)
n	135	135	135	135	135	135	135	135	135	135	135	135	135
Adj. R2	0.75	0.76	0.76	0.76	0.76	0.76	0.76	0.77	0.77	0.78	0.76	0.78	0.78
F-Stat	206.98	143.21	109.93	87.9	72.74	61.92	54.47	31.28	56.95	32.25	53.77	32.19	29.32

* p-value ≤0.1

standard errors in parentheses

Table 17

Logistic Regression Results with Ecological Sustainability as the Dependent Variables

Variable	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
const	-2.58* (1.45)	-2.24 (1.59)	-2.07 (1.59)	-1.96 (1.58)	-1.4 (1.48)	-0.93 (1.43)	-0.67 (1.45)	-0.22 (2.3)	-0.93 (1.44)	-0.95 (2.28)	-0.85 (1.44)	-1.23 (2.25)	-0.32 (2.32)
SMEX	0.08* (0.01)	0.08* (0.01)	0.08* (0.01)	0.07* (0.01)	0.06* (0.01)	0.05* (0.01)	0.05* (0.01)	0.06* (0.01)	0.05* (0.01)	0.05* (0.01)	0.05* (0.01)	0.05* (0.01)	0.05* (0.01)
Income per capita	-0.31 (0.21)	-0.32 (0.21)	-0.32 (0.21)	-0.37* (0.21)	-0.17 (0.2)	-0.29 (0.2)	-0.29 (0.2)	-0.34 (0.24)	-0.29 (0.2)	-0.3 (0.24)	-0.29 (0.2)	-0.26 (0.24)	-0.31 (0.25)
Ethnic Fractionalization		-0.4 (0.75)	-0.22 (0.77)	0.07 (0.78)	0.92 (0.75)	0.86 (0.73)	1.05 (0.74)	0.36 (0.8)	0.85 (0.74)	0.21 (0.8)	0.87 (0.73)	0.19 (0.8)	0.37 (0.8)
Religious Polarization			-0.69 (0.65)	-0.59 (0.64)	-0.93 (0.6)	-0.68 (0.59)	-0.76 (0.59)	-0.69 (0.65)	-0.68 (0.59)	-0.64 (0.66)	-0.72 (0.59)	-0.78 (0.68)	-0.82 (0.68)
Manufactures and Services Export Share				0.26* (0.15)	0.04 (0.15)	0.08 (0.15)	0.03 (0.15)	0.13 (0.16)	0.08 (0.15)	0.16 (0.16)	0.08 (0.15)	0.16 (0.16)	0.13 (0.16)
Natural Resource Rents					-0.79* (0.18)	-0.72* (0.17)	-0.73* (0.17)	-0.62* (0.19)	-0.72* (0.18)	-0.59* (0.19)	-0.72* (0.18)	-0.61* (0.19)	-0.64* (0.19)
Years since Independence						0.00* (0.00)	0.00* (0.00)	0.00* (0.00)	0.00* (0.00)	0.00* (0.00)	0.00* (0.00)	0.00* (0.00)	0.00* (0.00)
Colonial Past							-0.38 (0.35)	-0.63* (0.38)					-0.73 (0.47)
Former Western Colony									0.03 (0.35)	-0.24 (0.39)			0.23 (0.48)
Former Western Hegemon											0.36 (0.72)	0.7 (0.88)	0.59 (0.89)
EAP								-0.08 (1.3)		0.17 (1.31)		0.3 (1.29)	-0.01 (1.31)
EECA								-0.94 (1.32)		-0.65 (1.35)		-0.45 (1.29)	-0.82 (1.35)
LAC								0.93 (1.28)		1.1 (1.29)		1.15 (1.28)	0.94 (1.29)
MENA								-0.53 (1.31)		-0.49 (1.32)		-0.54 (1.32)	-0.57 (1.32)
SA								-0.94 (1.54)		-0.63 (1.55)		-0.55 (1.54)	-0.92 (1.55)
SSA								0.46 (1.34)		0.56 (1.36)		0.61 (1.35)	0.48 (1.35)
WE								-0.1 (1.28)		0.1 (1.3)		-0.13 (1.36)	-0.32 (1.36)
n	124	124	124	124	124	124	124	124	124	124	124	124	124
Adj. R2	0.36	0.36	0.36	0.37	0.45	0.49	0.49	0.53	0.49	0.52	0.49	0.52	0.53
F-Stat	35.55	23.65	18.04	15.22	17.84	18.11	16.02	10.36	15.71	9.98	15.77	10.02	9.06

* p-value ≤0.1

standard errors in parentheses

Table 18

OLS Regression Results with Income per Capita as the Dependent Variable

Variable	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
const	6.07* (0.17)	6.5* (0.25)	6.47* (0.26)	6.35* (0.26)	5.96* (0.32)	5.9* (0.32)	6.07* (0.34)	6.93* (0.62)	5.96* (0.33)	6.76* (0.62)	5.85* (0.32)	6.53* (0.6)	6.82* (0.62)
SMEX	0.05* (0.00)	0.05* (0.00)	0.05* (0.00)	0.04* (0.00)	0.05* (0.00)	0.04* (0.00)	0.04* (0.00)	0.03* (0.00)	0.04* (0.00)	0.03* (0.00)	0.04* (0.00)	0.03* (0.00)	0.04* (0.00)
Income per capita													
Ethnic Fractionalization		-0.7* (0.3)	-0.68* (0.31)	-0.48 (0.32)	-0.61* (0.32)	-0.59* (0.32)	-0.5 (0.33)	0.16 (0.27)	-0.57* (0.32)	0.1 (0.27)	-0.6* (0.32)	0.12 (0.27)	0.18 (0.27)
Religious Polarization			0.11 (0.26)	0.15 (0.26)	0.18 (0.25)	0.23 (0.25)	0.19 (0.25)	0.76* (0.21)	0.22 (0.25)	0.79* (0.21)	0.25 (0.25)	0.85* (0.21)	0.82* (0.21)
Manufactures and Services Export Share				0.15* (0.06)	0.19* (0.07)	0.2* (0.07)	0.17* (0.07)	0.18* (0.06)	0.19* (0.07)	0.19* (0.06)	0.2* (0.07)	0.19* (0.06)	0.18* (0.06)
Natural Resource Rents					0.17* (0.08)	0.18* (0.08)	0.18* (0.08)	0.13* (0.07)	0.18* (0.08)	0.14* (0.07)	0.18* (0.08)	0.13* (0.07)	0.13* (0.07)
Years since Independence						0.00* (0.00)	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00 (0.00)
Colonial Past							-0.22 (0.17)	-0.25* (0.15)					-0.28 (0.18)
Former Western Colony									-0.1 (0.16)	-0.11 (0.15)			0.01 (0.18)
Former Western Hegemon											-0.24 (0.36)	-0.62* (0.34)	-0.67* (0.34)
EAP								-1.07* (0.51)		-1.01* (0.51)		-0.92* (0.5)	-1.04* (0.51)
EECA								-1.15* (0.52)		-1.06* (0.53)		-0.89* (0.5)	-1.11* (0.52)
LAC								-0.43 (0.51)		-0.37 (0.52)		-0.28 (0.51)	-0.39 (0.51)
MENA								0.04 (0.52)		0.07 (0.53)		0.16 (0.52)	0.11 (0.52)
SA								-1.48* (0.57)		-1.43* (0.57)		-1.32* (0.56)	-1.43* (0.57)
SSA								-1.75* (0.51)		-1.73* (0.51)		-1.66* (0.51)	-1.69* (0.51)
WE								-0.35 (0.51)		-0.29 (0.52)		0.11 (0.54)	-0.01 (0.54)
n	165	154	151	151	151	151	151	151	151	151	151	151	151
Adj. R2	0.62	0.63	0.62	0.63	0.64	0.65	0.65	0.79	0.65	0.79	0.65	0.79	0.79
F-Stat	265.53	129.51	81.92	64.81	54.02	47.12	40.83	41.52	40.26	40.62	40.28	41.62	37.06

* p-value ≤0.1

standard errors in parentheses

Although subsequently adding control variables slightly decreases the coefficient for the SMEX, the adjusted R^2 increases from model specification I to XIII. This can be observed for all four analyses. As for the control variables, their coefficients exhibit unexpected and flipping signs, but are largely not significant. Yet, income per capita and being a former western colony significantly influences equal opportunity across all model specifications. Natural resource rents, on the other hand, significantly decreases ecological sustainability, but increases GDP per capita together with manufactures and services export share.

In the previous analysis, I rescaled the original SMEX values for 165 countries on a scale between 0 and 100 such that 0 corresponds to the country with the lowest score and 100 corresponds to the country with the highest score. The original values ranged between 26.32 and 86.26 (see Figure 11). Rescaling the originally obtained social market economic performance weighted average (SMEWA) distributes the resulting SMEX over a broader scale. Thus, it could be argued that the distributional character has an impact on the results of the analyses. For robustness check purposes, I therefore repeat the analysis using the unscaled original social market economic performance weighted average.

In these regressions, the unscaled SMEWA remains again significant across all model specification for each dependent variable at, at least, 10%. The coefficients also always carry the expected sign too. Moreover, both the SMEX and the SMEWA remain significant when repeating model specification XIII after dropping all missing observations. Similarly, when repeating model specification VI for a random sample with n=100, and dropping all missing observations, the results are as expected. In Appendix B Tables B3 to B8, I present the results for all conducted robustness checks. The data is available in Appendix E Table E1 and E1.

In summary, the empirical analysis supports that applying social market economic principles is associated with a social peace dividend, creates more equal opportunities, promotes ecological sustainability, and generates higher per capita incomes.

Simulation Framework

The SMEX is a composite index of 15 different SME input variables, representing the 15 different social market economic principles. The above empirical analysis helps illustrate the relationship between a country's SMEX and social peace, equal opportunity, ecological sustainability and economic prosperity. Of interest, however, is the change in the dependent variable as a result of potential or actual social market economic adjustments implemented in a specific country.

Hence, changes in the SME input variables will result in a corresponding social market economic performance average:

$$SMEWA_i^* = \sum_{j=0}^{n} observation_{ij}^* \times weight_j \qquad (4.8)$$

where

$* = variable\ after\ change$

$i = Country\ i$

$j = numeration\ for\ input\ variables\ and\ corresponding\ weight$

I then rescale the new social market economic performance weighted average, so it is comparable to the SMEX. The necessity of this step is best illustrated by plotting social market economic performance weighted averages against SMEX. Figure 11 plots the social market economic performance average against the SMEX for all 165 countries available in my dataset.

The relationship between the social market economic performance average and the SMEX can be described by its trendline so that

$$SMEX_i^* = -43.9 + 1.67 \times SMEWA_i^* \qquad (4.9)$$

Where

$* = variable\ after\ change$

$i = Country\ i$

Figure 11

Relationship between Unscaled and Scaled Social Market Economic Performance
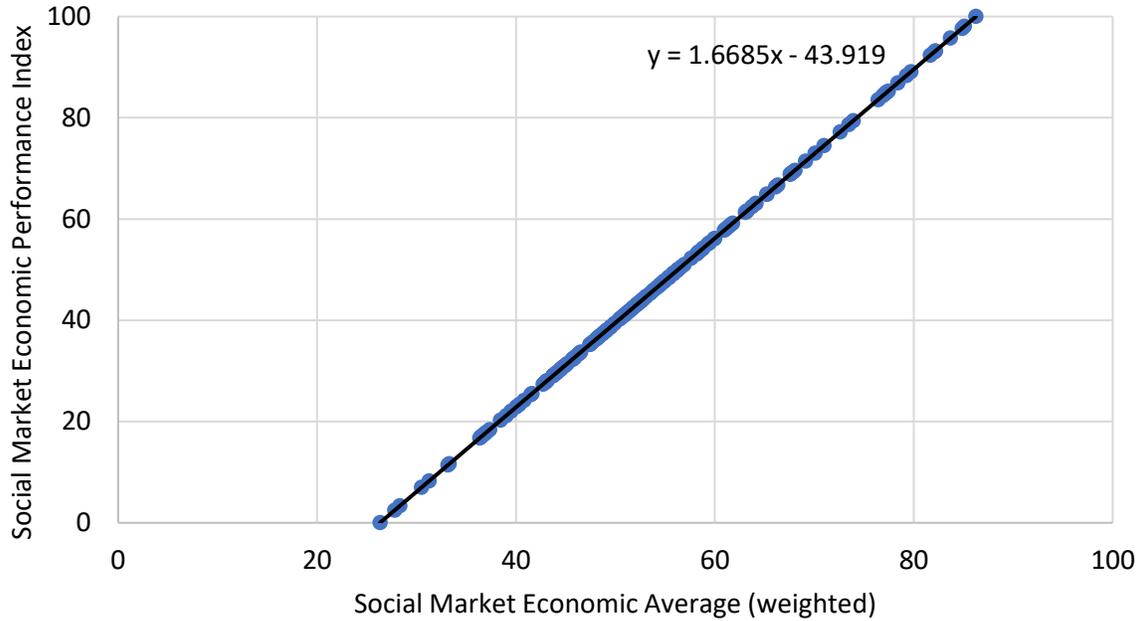
Using the regression coefficients will allow one to estimate the impact of a change in social market economic performance on social peace, equal opportunity, ecological sustainability, and economic prosperity:

$$Social\ Peace_i^* = \frac{101.01}{1+e^{-\left(\beta_0+\beta_1\times SMEX_i^*+\sum_j \beta_{2+j}\times Controls_{ij}+u_i\right)}} - 1 \qquad (4.10)$$

$$Equal\ Opportunity_i^* = \frac{101.01}{1+e^{-\left(\gamma_0+\gamma_1\times SMEX_i^*+\sum_j \gamma_{2+j}\times Controls_{ij}+u_i\right)}} - 1 \qquad (4.11)$$

$$Ecological\ Sustainability_i^* = \frac{101.01}{1+e^{-\left(\delta_0+\delta_1\times SMEX_i^*+\sum_j \delta_{2+j}\times Controls_{ij}+u_i\right)}} - 1 \qquad (4.12)$$

$$Economic\ Prosperity_i^* = \varepsilon_0 + \varepsilon_1 \times SMEX_i^* + \sum_j \varepsilon_{1+j} \times Controls_{ij} + u_i \qquad (4.13)$$

where

$* = variable\ after\ change$

$i = Country\ i$

$j = numeration\ for\ control\ variables$

Applied Discussion – A Case Study of Lebanon

This analysis hypothesizes a positive relationship between the SMEX and the focus variables social peace, equal opportunity, ecological sustainability and economic prosperity. An empirical analysis to test these hypotheses provides support that applying social market economic principles carries a social peace dividend, creates more equal opportunities, promotes ecological sustainability, and generates higher per capita incomes. What are the implications of my findings using above simulation framework?

The SMEX is a composite index of 15 different SME input variables, representing the 15 different social market economic principles. Naturally, each of the 165 countries in my final dataset has an individual overall index, also scaled between 0 and 100, where 0 is worst and 100 is best. Figure 12 illustrates the distribution of the SMEX across all 165 countries, where, for simplicity, I further categorize the SMEX according to the following criteria:

- Very low: $0 <$ value ≤ 20

- Low: $20 <$ value ≤ 40

- Medium: $40 <$ value ≤ 60

- High: $60 <$ value ≤ 80

- Very high: $80 <$ value ≤ 100

Figure 12 reveals that many countries may still benefit from applying social market economic principles. The applied color scale represents the different categories of the SMEX. Here the dark shaded countries have higher SMEX and the lighter shaded countries have a lower SMEX.

Figure 12

Social Market Economic Performance around the World
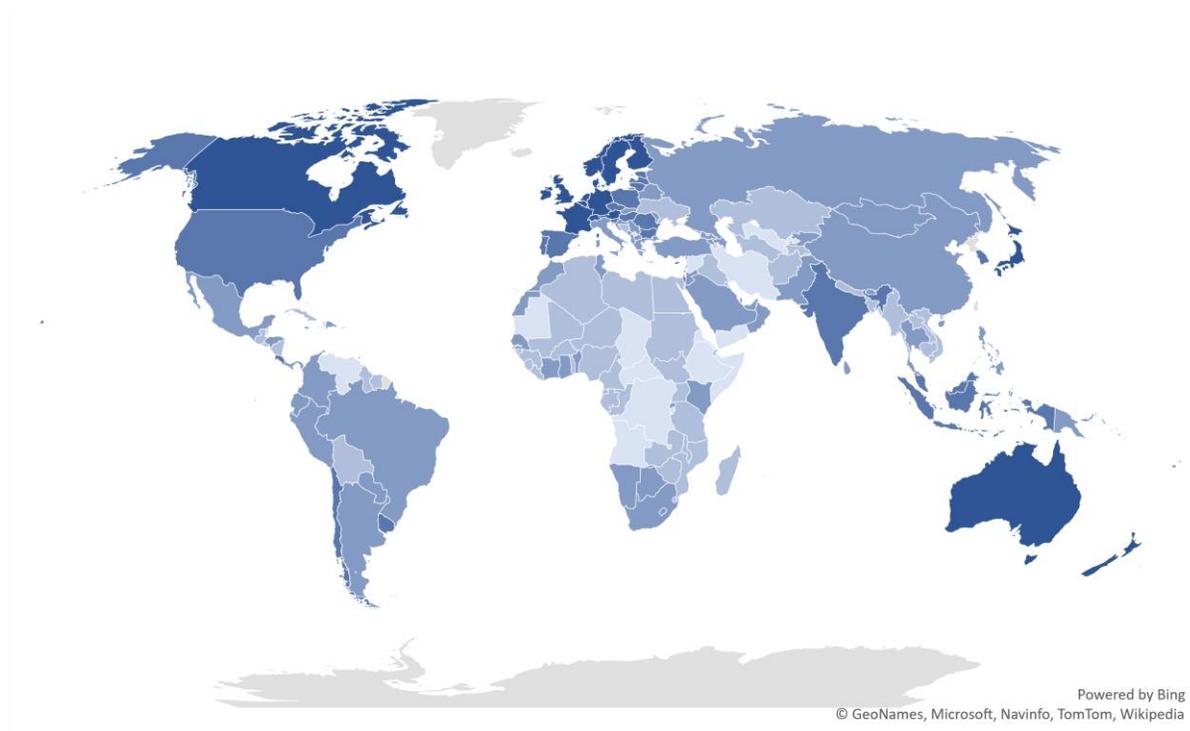
One country with a low SMEX is Lebanon. Despite sharing many characteristics of the Arab world, Lebanon has served as an asylum for diverse religious and ethnic groups and political dissidents. Its heterogenous society today is composed of numerous ethnic, religious, and kinship groups (Barnett et al, 2020). Upon gaining independence in 1943, a system of governance with proportional representation of the three major religious groups was installed. Unresolved differences, however, culminated in a civil war that lasted from 1975 to 1990. Ever since, the country has witnessed civil unrest, accompanied by an economic struggle, partially because of the political stagnation (CFR, 2020).

Figure 13 illustrates Lebanon's current values, categorized following above criteria, for all 15 social market economic input variables. Calculating the social market economic performance from these values, Lebanon falls into the 'low' category.

Figure 13

Social Market Economic Input Variables for Lebanon – actual values (categorized)
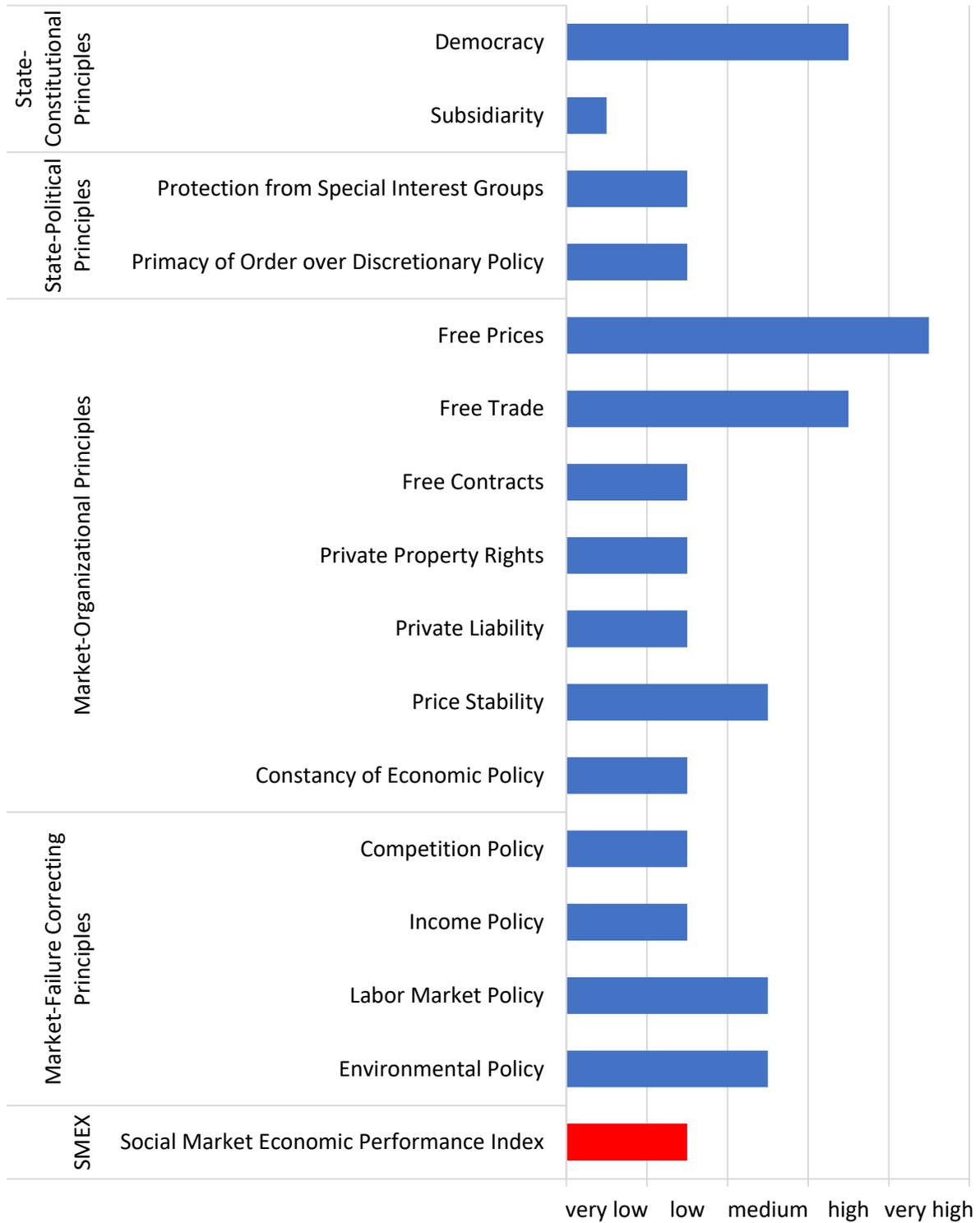
Generally, given a specific SMEX, what would the model predict in terms of social peace, equal opportunity, ecological sustainability, and economic prosperity? In order to calculate the predicted value for each dependent variable and every possible SMEX between 0 and 100, I substitute the average value of all 165 countries for all control variables that are not binary and the respective coefficients from the preferred model XIII into the regression equations:

$$Social\ Peace_i^S = \frac{101.01}{1+e^{-\left(\beta_0+\beta_1\times SMEX_i+\sum_j \beta_{2+j}\times Controls_{ij}+u_i\right)}} - 1 \qquad (4.14)$$

$$Equal\ Opportunity_i^S = \frac{101.01}{1+e^{-\left(\gamma_0+\gamma_1\times SMEX_i+\sum_j \gamma_{2+j}\times Controls_{ij}+u_i\right)}} - 1 \qquad (4.15)$$

$$Ecological\ Sustainability_i^S = \frac{101.01}{1+e^{-\left(\delta_0+\delta_1\times SMEX_i+\sum_j \delta_{2+j}\times Controls_{ij}+u_i\right)}} - 1 \qquad (4.16)$$

$$Economic\ Prosperity_i^S = \varepsilon_0 + \varepsilon_1 \times SMEX_i + \sum_j \varepsilon_{1+j} \times Controls_{ij} + u_i \qquad (4.17)$$

Where

$s = surrogate\ country$

$i = 0, \dots, 100$

$j = \left\{\begin{array}{c} Ethnic\ Fractionalization, Religious\ Polarization, \\ Manufactures\ and\ Services\ Export\ Share, \\ Natural\ Resource\ Rents, Years\ since\ Independence, \\ Income\ per\ capita \end{array}\right\}$

Table 19 lists the used control variables and the respective average values for a surrogate country. Table 20 summarizes the regression coefficients of the preferred Model XIII from the regression results for each dependent variable.

Table 19

Average Values of all 165 Countries for Surrogate Country

Parameter	Average Value of all 165 Countries
Ethnic Fractionalization	0.461
Religious Polarization	0.627
Manufactures and Services Export Share	1.801
Natural Resource Rents	1.556
Years since Independence	133.212
Income per capita	8.520

Table 20

Regression Results for Model Specification XIII per Dependent Variable

DV / IV	Social Peace	Equal Opportunity	Ecological Sustainability	Income per Capita
const	-1.87 (1.49)	-6.41* (1.14)	-0.32 (2.32)	6.82* (0.62)
SMEX	0.07* (0.01)	0.02* (0.01)	0.05* (0.01)	0.04* (0.00)
Income per capita	-0.11 (0.15)	0.63* (0.12)	-0.31 (0.25)	-
Ethnic Fractionalization	-0.47 (0.47)	-0.51 (0.39)	0.37 (0.8)	0.18 (0.27)
Religious Polarization	0.2 (0.38)	0.59* (0.32)	-0.82 (0.68)	0.82* (0.21)
Manufactures and Services Export Share	0.04 (0.1)	-0.02 (0.08)	0.13 (0.16)	0.18* (0.06)
Natural Resource Rents	-0.03 (0.12)	0.02 (0.1)	-0.64* (0.19)	0.13* (0.07)
Years since Independence	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)
Colonial Past	0.14 (0.31)	0.15 (0.24)	-0.73 (0.47)	-0.28 (0.18)
Former Western Colony	0.05 (0.31)	-0.51* (0.24)	0.23 (0.48)	0.01 (0.18)
Former Western Hegemon	-0.9 (0.61)	-0.9* (0.45)	0.59 (0.89)	-0.67* (0.34)
EAP	-0.59 (0.89)	0.63 (0.67)	-0.01 (1.31)	-1.04* (0.51)
EECA	-0.65 (0.92)	0.46 (0.69)	-0.82 (1.35)	-1.11* (0.52)
LAC	0.7 (0.89)	0.24 (0.66)	0.94 (1.29)	-0.39 (0.51)
MENA	-0.91 (0.9)	0.36 (0.67)	-0.57 (1.32)	0.11 (0.52)
SA	-0.13 (1.01)	0.58 (0.75)	-0.92 (1.55)	-1.43* (0.57)
SSA	0.06 (0.91)	0.23 (0.68)	0.48 (1.35)	-1.69* (0.51)
WE	1.84* (0.94)	1.73* (0.69)	-0.32 (1.36)	-0.01 (0.54)
n	151	135	124	151
Adj. R2	0.71	0.78	0.53	0.79
F-Stat	22.09	29.32	9.06	37.06

* p-value ≤0.1

standard errors in parentheses

Thus, given Lebanon's 'low' value of social market economic performance, the model would predict:

- a 'low' level of social peace,

- 'low' to 'medium' level of equal opportunity, and

- 'very low' level of ecological sustainability.

Figure 14, Figure 15, and Figure 16 illustrate the predicted values for the surrogate country and compare Lebanon's actual categorized values accordingly. A comparison of Lebanon to the predicted values of social peace, equal opportunity, ecological sustainability, and economic prosperity for every possible SMEX between 0 and 100 shows that the country's respective level of social peace and equal opportunity is higher than the model would predict. Yet, in terms of ecological sustainability, Lebanon's value is as would be predicted.

Figure 14

Social Peace as predicted by SMEX compared to Lebanon – Categorized Values
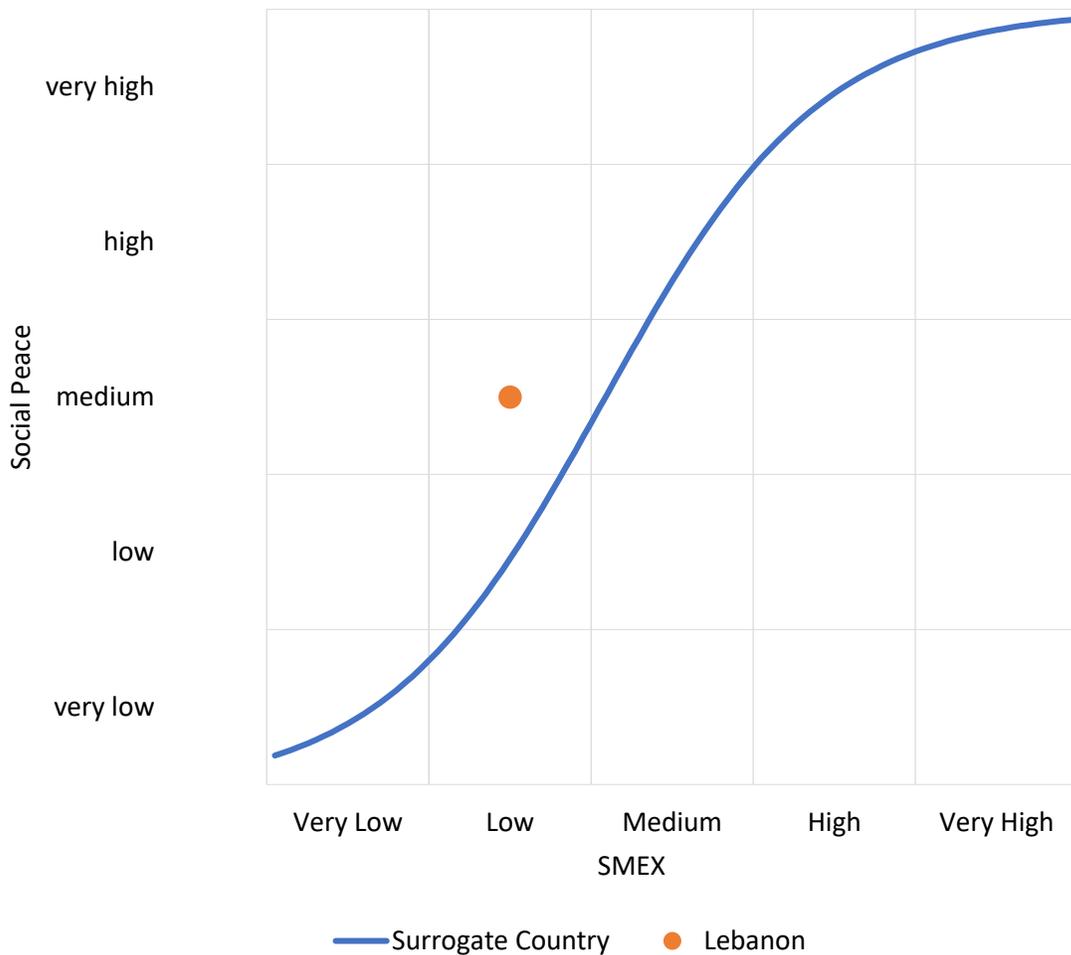
Figure 15

Equal Opportunity as predicted by SMEX compared to Lebanon – Categorized Values
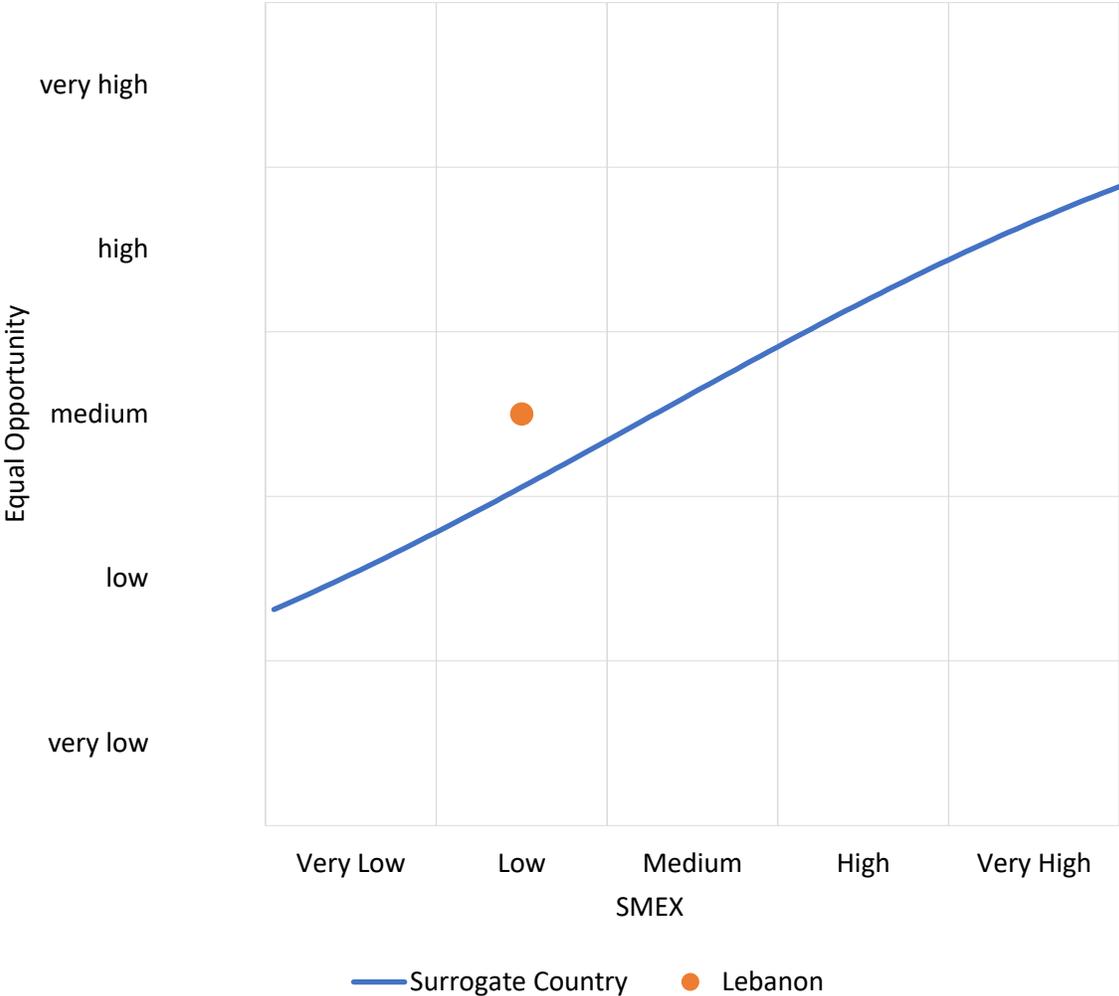
Figure 16

Ecological Sustainability as predicted by SMEX compared to Lebanon – Categorized Values
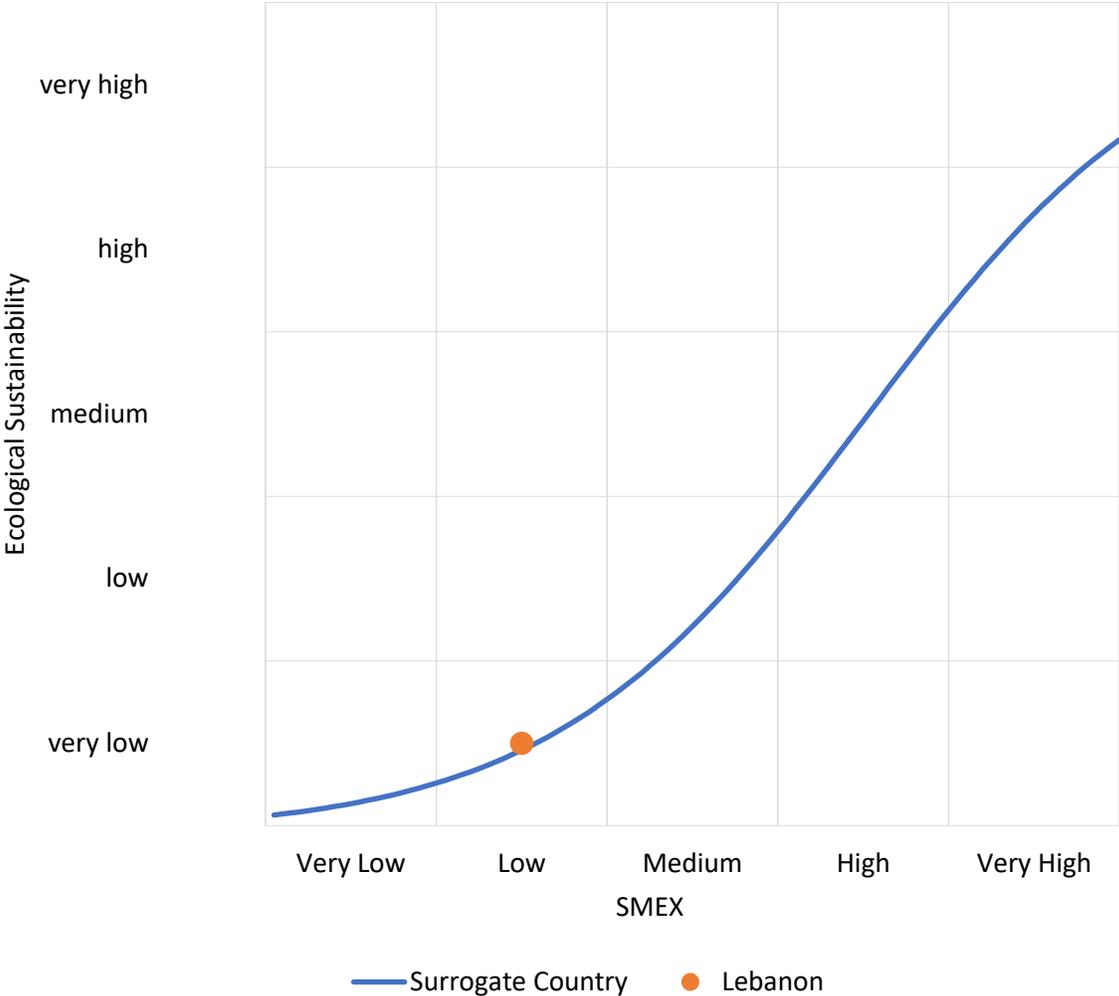
Figure 17 illustrates Lebanon's social market economic performance and the social market economic output variables social peace, equal opportunity, and ecological sustainability.

Figure 17

Social Market Economic Output Variables for Lebanon – Actual Values (Categorized)
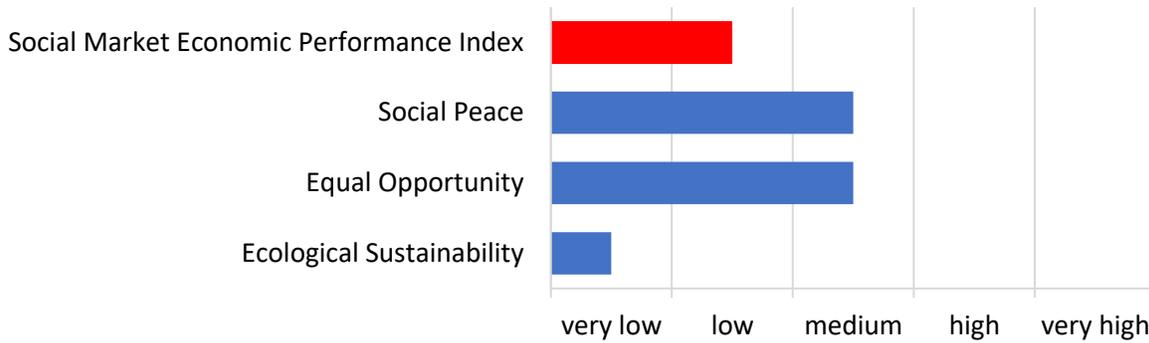
In order to calculate the economic dividend, GDP per capita is not categorized. Lebanon records a GDP per capita of $7,462 (UNSTAT, 2020), as would be predicted by the model given a 'low' SMEX. Figure 18 illustrates the SMEX against GDP, and Lebanon's actual values. For illustrative purposes, however, I natural log-transformed GDP per capita.

Figure 18

GDP per capita as predicted by SMEX compared to Lebanon – Categorized Values
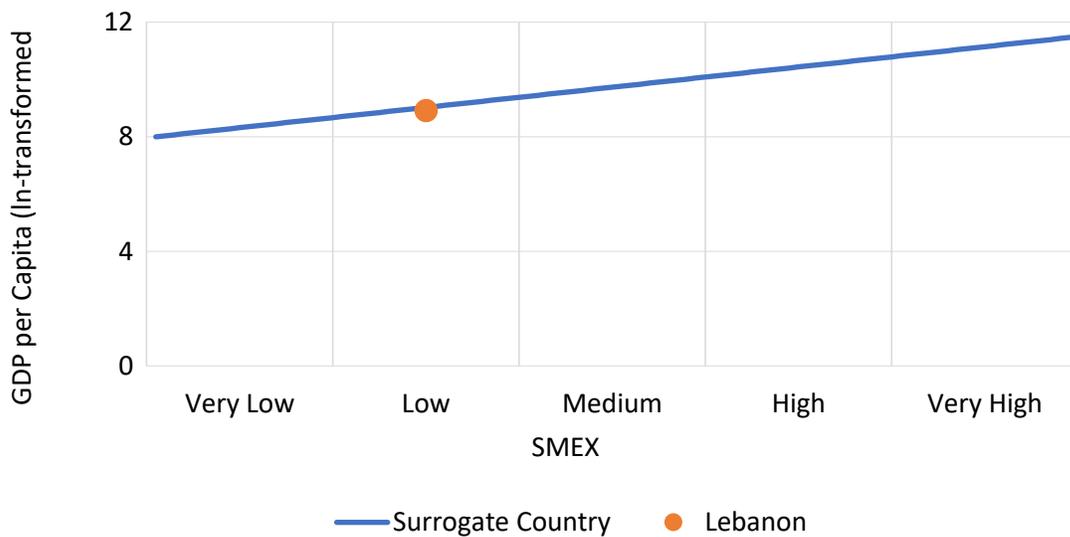
Given my empirical analysis and above graphs, higher social market economic performance carries a social peace dividend, creates more equal opportunities, promotes ecological sustainability, and generates higher per capita incomes. But what would a change in social market economic principles actually mean for the country Lebanon specifically?

Adjusting each social market economic input variable, if possible, by one category to the better, for example from 'low' to 'medium,' and following above simulation framework would yield a 'high' SMEX. Substituting the simulated SMEX and the regression coefficients from Table 20 into (4.10) to (4.12) accordingly, allows one to simulate Lebanon's potential levels of social peace, equal opportunity, and ecological sustainability. With a 'high' social market economic performance, the model would then predict:

- a very high level of social peace,

- high level of equal opportunity, and

- low level of ecological sustainability.

Figure 19 compares Lebanon's categorized actual values to the predicted categorized values after improving social market economic principles.

Figure 19

Social Market Economic Output Variables for Lebanon - actual against potential values (categorized)
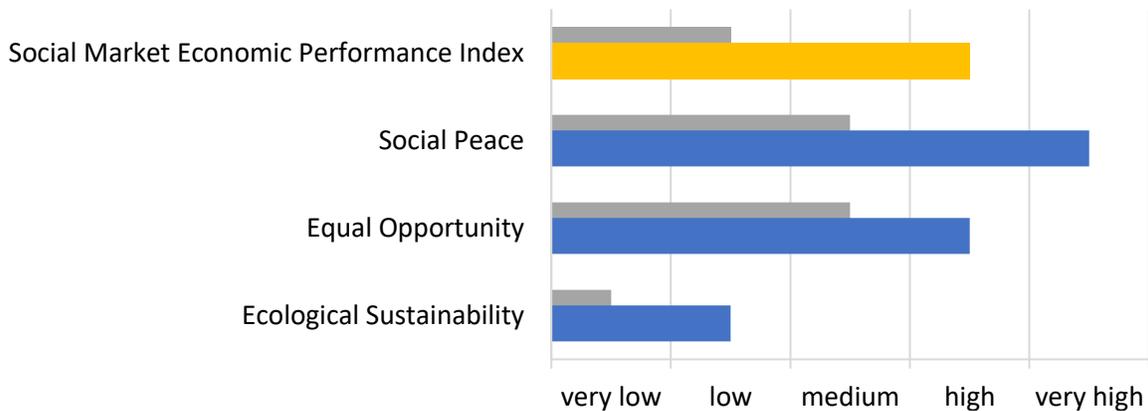
Similarly, substituting the simulated SMEX and the regression coefficients from Table 20 into (4.13) accordingly, predicts a per capita income of $18,009, instead of $7,462, which is illustrated in Figure 20.

Figure 20

Economic Dividend of improving Lebanon's Social Market Economic Performance from 'Low' to 'High'
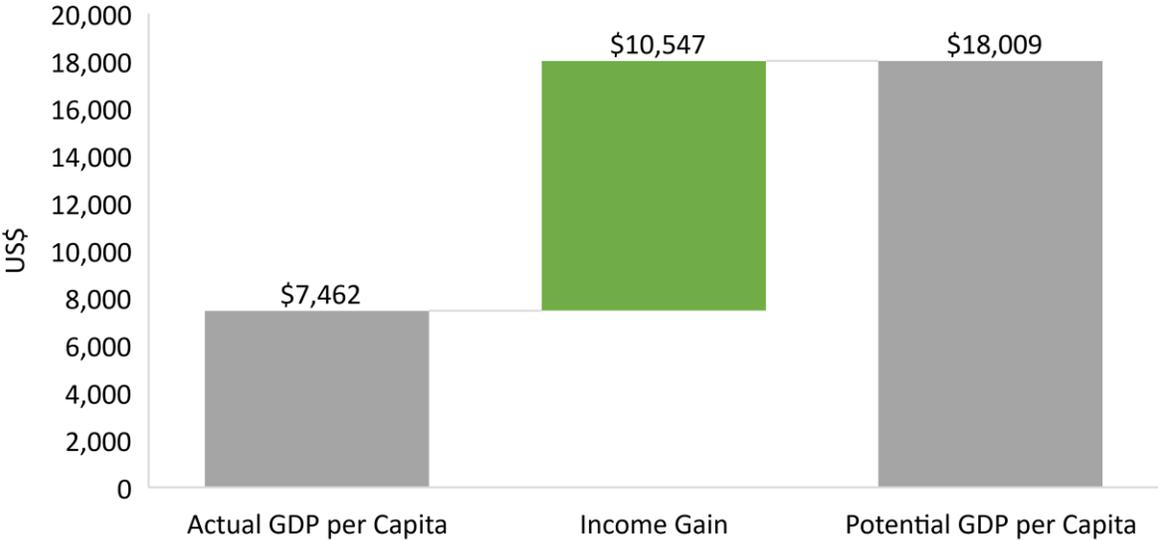
Chapter 5

Developing a Web-based Data Visualization Solution

While a scientific discussion of empirical results is insightful to the research community, it often fails to be accessible to the public. Yet, the academic community has a responsibility to contribute to evidence-based policy and decision making and to a more informed public debate. Since prehistoric times complex information has been communicated through the visualization of data. Especially since Déscartes' two-dimensional coordinate system, data visualization has found its way into explanatory and exploratory analysis of quantitative data (Friendly & Denis, 2001; Friendly, 2008).

It is thus natural to use data visualization for "the representation and presentation of data to facilitate understanding" (Kirk, 2016). Therefore, in this chapter I propose an interactive data storytelling dashboard design as a means of communicating quantitative research results and transfer the simulation framework into a data visualization tool that is useful beyond academia. I further discuss and evaluate different available data visualization tools and data storage options to practically implement a web-based data visualization and simulation solution.

Defining Data Visualization

Data visualization, the graphical representation of information and data, is not a modern phenomenon. One of the earliest examples that resembles modern data visualization to disseminate complex information in an easy format is the Egyptian Turin Papyrus Map. It is considered to be a data visualization because it communicates specific information (the quarry of resources) through geographical illustration (geological distribution of those resources) (Friendly & Denis, 2001). This is but one example of data visualization that existed even before the invention of paper and parchment.

The representation of quantitative data advanced more rapidly during the 17th century

after René Déscartes developed a two-dimensional coordinate system to display and calculate values. This laid the groundwork for William Playfair, who pioneered line graphs, bar graphs and pie charts in the late 1700's to exploit the potential of graphs for the communication of numerical data. With the advent of computing power, John Tukey, Princeton statistics professor realized the power of data visualization as a means for exploring and making sense of quantitative data. With that, he established a new statistical approach of exploratory data analysis. Shortly after, in 1983, Edward Tufte published his book "The Visual Display of Quantitative Information" pointing out effective and less effective ways of displaying data and how to make them intuitively readable and understandable (Friendly & Denis, 2001; Friendly, 2008; Few, 2012; Tufte, 2001; Tukey, 1977).

In the 21st century with continued advances of computer software and the *world wide web*, the popularity of data visualization has exploded and has become familiar to even the non-statistically trained masses. Going even beyond commercial software products, today online open-source visualization libraries make data visualization possibilities available to everyone willing to put in the time and effort to learn the flourishing new techniques.

Communicating Research Results

Traditionally, academic research results are published as articles in journals. Access to those articles, however, is often limited to academia and academic language is, furthermore, subject-specific. Thus, the traditional presentation format of academic research undermines its purpose of contributing to a more informed public debate, and it discourages the reader's interaction with valuable new information. Two data visualization techniques especially lend themselves to reader interaction with research results, namely "dashboards" and "data storytelling."

Dashboards

Providing a definition of a dashboard, Few (2004) writes: "A dashboard is a visual display of the most important information needed to achieve one or more objectives; consolidated and arranged on a single screen so the information can be monitored at a glance" (p. 3). Although a more detailed definition of a dashboard depends largely on its role within a given context, common purposes are to monitor, analyze, and display key performance indicators, metrics, and data points visually; hence, to serve as an open and explanatory information management tool. Generally, three key components are characteristic of a dashboard. First, data or information is the most important element to provide content, which is often done interactively through restricted user sovereignty over information. Secondly, visuals are then used to make the information provided easily accessible to the user. Lastly, the spatial arrangement of visuals and the use of data visualization principles round up the user experience. Preferably, the design of a dashboard finds itself at the intersection of these three key components (Kerzner, 2017; Wexler, Schaffer & Cotgreave, 2017).

Data Storytelling

Simply put, "data storytelling is the art of telling brand stories using data visualization" (Masters, 2018, para. 3). The most common forms of data stories are slide shows or infographics that combine stories and data. As Holland (2019) wrote:

> Stories and data are better together. One makes an emotional connection, and the other earns trust. One paints a picture, the other grounds that picture in reality. It's one thing to say, 'Childhood hunger is a problem in the U.S.' It's another to say, 'One in six children in the U.S. are unsure of where they'll get their next meal from'. (para. 3)

Although the objective of data storytelling is similar to dashboards – making data analyses accessible for laymen in order to influence decision making or action (Rouse, 2015) – its key components differ. In data storytelling, context sets the stage to connect the presented data to a larger goal. Embedding the data further into a narrative acknowledges and defuses the author's bias and provides a tangible story line. Lastly, visualizations present the key information in an easily accessible format (Dykes, 2019).

Methodical Approach

Dashboards commonly provide an expert community with quick access to specific and descriptive data. Data stories, on the other hand, embed prepared data into a detailed narrative, refraining from too scientific and analytical data presentations. In a similar vein, Gans (2018) notes that although research and journalism both study society, journalism is often criticized for dramatizing, oversimplifying, and sensationalizing, whereas research is mostly criticized for the lack of the latter. Bringing together data visualization techniques, visualization principles, design, user interface, and user experience concepts, this section develops a methodical framework to transform research results into an intuitively usable format.

Data Storytelling Dashboard Design

A dashboard is created at the intersection of data, visuals, and layout, whereas data storytelling happens at the intersection of context, narrative, and visualization. Dashboards emphasize the translation of data into visuals with an appropriate layout and data stories emphasize the construction of context and a narrative around the visualization. Recognizing visuals (data storytelling) and visualization (dashboards) as the nexus of both techniques, the combination makes it feasible to simultaneously pursue the following two objectives:

(1) Dashboard Story: Arranging the visuals of the story on a single screen

(2) Interactivity: Allowing the user to decide which turn the story takes

Figure 21 illustrates the consolidation of both visualization techniques.

Figure 21

The Intersection of Dashboard and Data Storytelling components
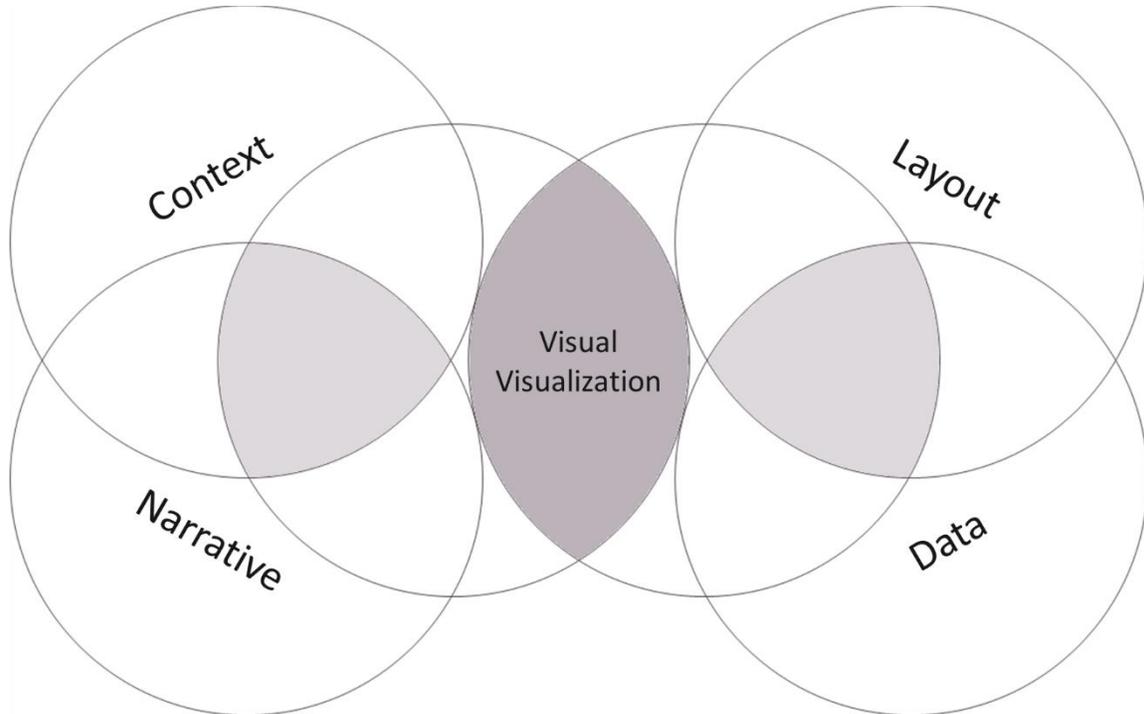
To tell a data story, Nussbaumer (2015) proposes six lessons: the importance of context, effective visuals, simplicity, targeting attention, design concepts, and storytelling. To develop a rigorous and comprehensive methodology for an interactive data storytelling dashboard design, I follow Nussbaumer's (2015) approach, interlace it with dashboard design principles, and refine it with essential visualization principles, design, user interface, and user experience concepts.

The Importance of Context. According to *active audience theory*, information is not received passively. Although not necessarily consciously, the audience is, nevertheless, actively involved in making sense of the information provided within their personal and social context. Audience analysis ensures that the information is prepared in accordance with the audience's interests, level of understanding, attitudes, and beliefs. A clear project objective and story line, however, is a prerequisite to assess the audience's interests, attitudes, and beliefs. Establishing

such audience characteristics involves a clear understanding of what the audience needs to bring to the table and why the audience should care. Thus, audience characteristics determine the context of the data story. To support the established story line with data, exploratory analysis must be conducted up-front.Exploratory analysis processes available data such that the main characteristics and highlights are summarized. Explanatory analysis presents these findings to the audience (Nussbaumer, 2015; Chandler & Munday; 2011; Albers, 2003; Grodin, 2010).

In summary, context is emphasized by addressing the questions of (1) what is communicated to whom, (2) why it's important for the audience to know this, and (3) what data is available to support the story line.

Effective visuals. Having a precise understanding of the data story's context is the prerequisite to show the audience more than simply data. The goal of data visualization and data storytelling is ultimately to interact with the audience. Considering the story aspect of data storytelling and dashboard design, following a universal structure of storytelling enhances interaction, understanding and recollection. Specifically, three story constituents are relevant: starting off with a plot, presenting a twist in the middle, and ending with a call to action. Thus, the identification of the key parameters of the story is essential for the data collection process. Exploratory analysis reveals whether the data supports the punchline of the story. The results are then presented in an explanatory format. Typically, a data story is a series of static visuals, surrounded by short explanations or graphically elaborate infographics. Here, the emphasis lies on interactive data visualizations, more commonly found in dashboards. Yet, the specific type of visual is determined by the structure and nature of the data. For example, a scatter plot is appropriate to visualize a relationship, whereas a column chart generally indicates a comparison. Notably, the more common a visual is, the easier it is for the audience to encode the information (Nussbaumer, 2015; Abela, 2009).

Thus, depending on the characteristics of the available data and the specific purpose of the data story section- comparison, distribution, composition, or relationship – different types of visuals are worth considering.

Captivating Simplicity. Most data analysis software offer on-click data visualization solutions with default lay-outs. Leading data visualization experts, however, recommend to only include what is important and adds essential contributions to the information presented. Thus, unnecessary visual elements should be removed to make the chart cleaner and people more likely to read it, which further helps to direct the audience. Relevant concepts in this regard are the data-to-ink ratio, the signal-to-noise ratio, and Gestalt Principles. Tufte (1983) defines the data-to-ink ratio as the proportion of ink that is used to present actual data compared to the total amount of ink (or pixels) used in the entire display. He further states that a good visual only includes data-ink, with non-data-ink removed where possible. Similarly, Duarte (2013) adapts the signal-to-noise ratio from engineering to describe a good visual. The signal-to-noise ratio compares the level of a desired signal to the background noise.

In summary, the law of diminishing returns applies to designing data visualization, when the objective is to create what is commonly understood as a good visual. Both, the data-to-ink ratio and signal-to-noise ratio, can be enhanced by following Gestalt Principles. Gestalt Principles draw on human perception, the process of recognizing, organizing, and interpreting sensory information. Although Gestalt Principles of Visual Perception have their origins in the early 1900, they are still prominent today. More importantly, Gestalt Principles still define how people interact with and make sense of visual stimuli (Nussbaumer, 2015; Tufte, 1983; Duarte, 2013).

Table 21 lists, explains, and illustrates the Gestalt Principles of particular importance in this study.

Table 21

Description and Illustration of Gestalt Principles of Visual Perception

Gestalt Principle	Description	Example
Proximity (Synonym: Emergence)	Items or forms that appear spatially close are perceived as a group	
Enclosure (Synonym: Common Region)	Items or forms physically enclosed together are perceived as a group	
Continuity	Items and forms are perceived as a group if paths, lines, and curves of a design create a continuous flow of elements.	
Similarity (Synonym: Invariance)	Items or forms similar in color, size, orientation, texture, shape, etc. are perceived as a group	
Closure (Synonym: Reification)	Item or forms are perceived as a single, recognizable shape although parts of a whole are missing	
Common Fate	Items and forms that point into the same direction are perceived as a group	
Symmetry/ Order	A balanced design of items and forms facilitates the perception of an overall picture	

Table 21 Ctd.

Description and Illustration of Gestalt Principles of Visual Perception

Gestalt Principle	Description	Example
Connection	Items and forms that are physically connected are perceived as a group	
Figure/Ground (Synonym: Multi-Stability)	Items or forms are perceived to either stand out in the front (figure) or recede to the back (ground)	
Focal Point	Items or forms capture the audience's attention if they differ in color, size, orientation, texture, shape, etc.	
Praegnanz	Complex shaped items and forms can be simplified into simpler shapes by the human eye	
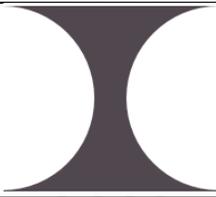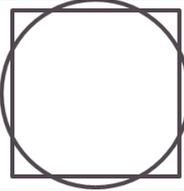
Note. Author's Summary, adapted from Palmer (1999) and Nussbaumer (2015)

Targeting Attention. Gestalt Principles describe how humans create order out of visual stimuli. Human information processing provides further insights to focus the audience's attention. According to Proctor and Vu's (2012) definition of human information processing, "the human can be characterized as an information-processing system, which encodes input, operates on that information, stores and retrieves it from memory, and produces output in terms of actions" (para. 1).

Although human information processing is a complex concept, the multi store model of memory as proposed by Atkinson and Shiffrin is of particular relevance to information visualization and data storytelling dashboard design. Atkinson & Shiffrin (1968) assume that to process information, humans use three stores of memory: the sensory register, short-term

memory, and long-term memory. Sensory stimuli trigger the subconscious accumulation of information from the environment, a process referred to as pre-attentive processing. Pre-attentive processing does not yet attempt to make sense of the impression received. It can be thought of as the compilation of a set of features of the impression received. These impressions of raw information are brief memories of less than 500 milliseconds. It is the sensory register (memory) that allows humans to retain impressions after a sensory stimulus (Atkinson & Shiffrin, 1968).

During pre-attentive processing, human attention is drawn. Impressions that do not draw attention and remain unattended, are lost. Impressions of interest are transferred to the short-term memory. Short-term memory reflects "faculties of the human mind that can hold a limited amount of information in a very accessible state temporarily" (Cowan, 2008, p. 324). It is worth mentioning that the concept of short-term memory, however, is not exhaustive. Baddeley & Hitch (1974) proposed the concept of working memory as a multi-component system in itself, with different systems for different types of information. Regardless of the specifics, working memory includes short-term memory and other processing mechanisms that help to make use of short-term memory. Generally, short-term or working memory processes attended sensory memories. It can hold approximately seven items for up to 30 seconds, which is important for sense-making of information. Although unrehearsed information is lost, rehearsal and maintenance of information in the short-term memory is encoded and passed to the long-term memory from which it can be retrieved later (Atkinson & Shiffrin, 1968; Baddeley & Hitch 1974; Cowan, 2008).

Most of the interaction between the audience and information visualization occurs in sensory and short-term memory. Therefore, data visualizations need to be designed such that they include features that draw attention in a way that enhance clear and accurate thinking. Knowing how people see and process information is key to guide the audience. Pre-attentive attributes significantly determine the effective and efficient transfer of impressions into the short-term memory and support human information processing and sense-making of information. Pre-attentive attributes such as size, color, orientation, position, texture, and shape (SCOPeS) serve

this purpose. Therefore, the purposeful and consistent application of pre-attentive attributes in data and information visualization, and in data storytelling dashboard design specifically, are a noteworthy tool to focus the audience's attention (Nussbaumer, 2015; Dykes, 2019; Palmer, 1999). Figure 22 provides a visualization of how pre-attentive attributes initialize pre-attentive processing.

Furthermore, data storytelling, as well as dashboards, require the use of multiple visuals. Beyond the consideration of Gestalt principles and use of pre-attentive attributes, text-scanning patterns inform the arrangement of visuals capturing individual data story elements. Among other patterns, eye tracking research shows that the F-Pattern is commonly observed on the web. An illustration of the F-Pattern is represented in Figure 23. Since the average user is trying to be most efficient and not willing to read every word, arrangements following the F-pattern increase the absorption of information. Therefore, eye-tracking studies have useful implications for data storytelling dashboard design, whose objective is to provide a data story zipped to the size of a dashboard (Pernice, 2017; Pernice, 2019).

In summary, Gestalt principles help to organize information and pre-attentive attributes focus the audience's attention. Additionally, the arrangement of individual story elements in an F-pattern increases the amount of information absorbed.

Figure 22

Pre-Attentive Attributes and Pre-Attentive Processing
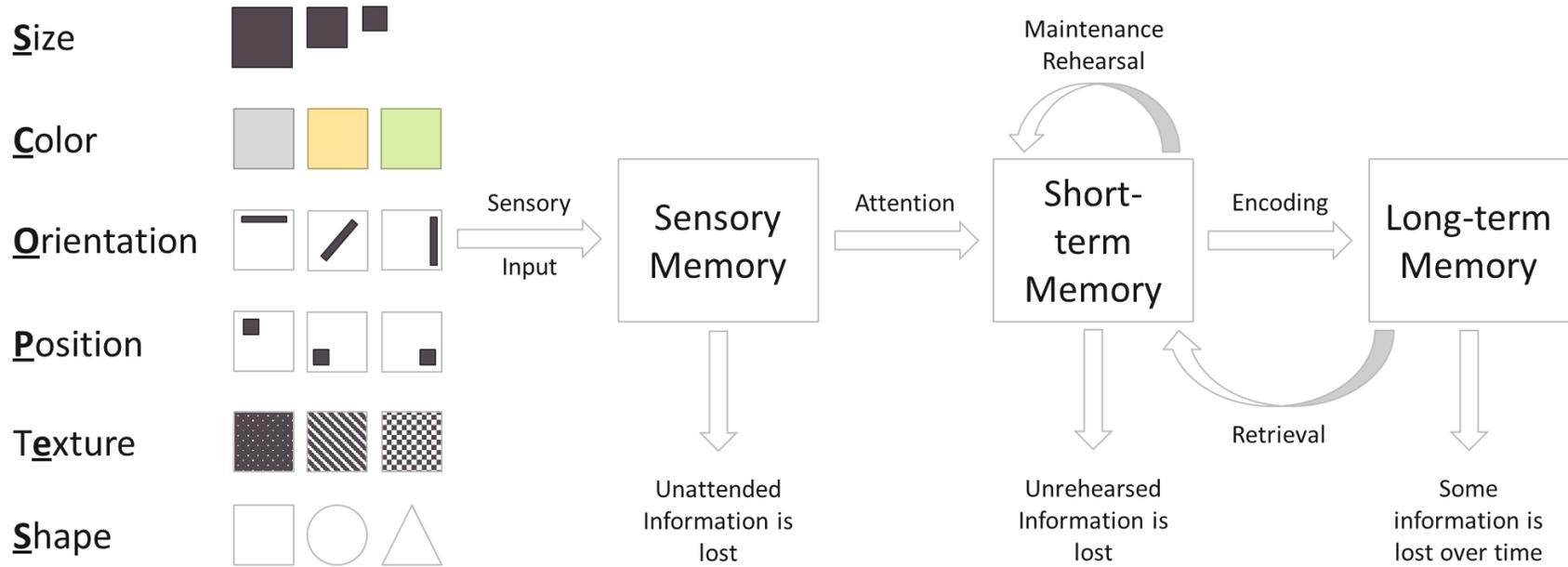
Note. Author's Illustration, adapted from Nussbaumer (2015), Dykes (2019) and Cowan (2008)

Figure 23

Examples of Users' Scan Patterns exhibiting the F-Pattern

Note. Taken from Nielsen, 2006.

Design Concepts. How do tools such as Gestalt Principles, pre-attentive attributes and text-scanning patterns fit into the bigger picture of data storytelling and dashboard design? Form, in terms of effective visuals and visual stimuli, follows function. Well-designed visuals may look beautiful but do not necessarily provoke the desired communication with the audience. The traditional design concepts of affordance, accessibility, aesthetics, and acceptance serve as a starting point to transition from good design to smart design.

Affordances, as described by Nussbaumer (2015), are "aspects inherent to the design that make it obvious how the product is to be used" (p. 128). For example, using a line chart for a categorical comparison is confusing, using a line chart for comparisons over time is intuitive. Lidwell, Holden & Butler (2003) recommend using pre-attentive attributes sparingly, such that at most 10% of the visual design be highlighted. Similarly, following Tufte's data-ink-ratio and Duarte's signal-to-noise ratio, distractions should be eliminated. In other words, elements that take up space but do not add information to the design are distractions and superfluous. Lastly, features such as size and proportion help create a clear and visual hierarchy of information. In accordance with the Figure/Ground Gestalt Principle und through the thoughtful use of pre-attentive attributes, elements can be visually pulled to the foreground or pushed to the background (Tufte, 1983; Lidwell, Holden & Butler 2003; Duarte, 2013).

Designs should be usable by people of different abilities. The concept of accessibility describes the process of creating products that are usable by people with the widest possible range of abilities. It is, however, appropriate to extent this definition by combining it with the concept of universal design. Universal design refers to the process of creating products that are usable by people operating within the widest possible range of situations. Then, accessibility encompasses all people, regardless of disability, skill set or prior knowledge (Steinfeld & Maisel, 2012). A design is accessible when it refrains from overcomplicated presentation and uses text in a thoughtful manner. This can be achieved by leveraging visual affordances, using consistent fonts and sizes and clear language. For example, written explanations clutter the design, distract, and

overcomplicate. Adding catchy titles and "hiding" explanations in tooltips, on the other hand, facilitates encoding on demand (Nussbaumer, 2015).

Several studies have provided support for the notion that more aesthetic designs are perceived as being easier to use. Hence, aesthetics plays an essential role in the success of a data visualization, although a purely scientific use is intended. Generally, following Gestalt Principles feeds into the concept of aesthetics. More specifically, using color, alignment, and white space thoughtfully are design-components that are not even noticed when done well, and are perceived as being aesthetic (Nussbaumer, 2015). Lastly, it is important to acknowledge that change causes discomfort in most people. As Lidwell, Holden & Butler (2003) explain, this is due to the tendency of general audiences to resist the new because of their familiarity with the old. Thus, sticking to common visuals facilitates encoding of presented information and increases acceptance among the audience. Therefore, changes and innovations should be introduced carefully and need to be justified. Table 22 summarizes the concepts of affordance, accessibility, aesthetics, and acceptance.

Table 22

Summarizing the Design Concept Affordance, Accessibility, Aesthetics, Acceptance

Concept	Description	Realization
Affordance	Aspects inherent to the design that make it obvious how the product is to be used.	Highlight sparingly, eliminate distractions, and create a clear visual hierarchy of information.
Accessibility	Process of creating products that are usable by people with the widest possible range of abilities operating withing the widest possible range of situations.	Do not overcomplicate and use text thoughtfully.
Aesthetics	More aesthetics designs are perceived as being easier to use.	Using color, alignment, and white space thoughtfully is not even noticed when done well.
Acceptance	Tendency of general audiences to resist the new because of their familiarity with the old.	Stick to commonly accepted visuals and introduce changes carefully.

Note. Author's Summary, adapted from Nussbaumer (2015)

Tying the Knot - Telling a story. The previous sections focus on the broad context - the development of effective visuals, focusing the audience's attention, and creating a pleasant experience - that feeds into the objective of arranging the visuals of the story on a single screen. In terms of data storytelling, the narrative structure or order still requires mentioning.

On the one hand, the narrative can be ordered chronologically. First, the problem is identified (plot), then the data is presented (twist), and rounded off with a call to action. A narrative structured in reversed order, on the other hand begins with a call to action and backs it up with effective visuals. While the narrative structure refers to the contextual order of the story components, the narrative logic refers to their physical arrangement. Horizontal logic describes the juxtaposition of visuals like in a slideshow. Data storytelling dashboards, however, are arranged in vertical logic, very much like dashboards. All information is provided on one slide or a single screen, such that all given information is self-reinforcing, composing an interplay between words and visuals (Nussbaumer, 2015).

Nussbaumer (2015) writes that "the main character in every story we tell should be the same: our audience. It is by making our audience the protagonist that we can ensure the story is about them" (p. 185). In data storytelling, this aspect is achieved through careful consideration of the context (What? Who? Why?), and effective visuals that focus attention (How?). Dashboards address the same questions but provide an explanatory overview rather than a story accentuated by data visuals. In summary, data stories and dashboards are explanatory and descriptive in nature.

The ultimate objective of data storytelling dashboard design, however, is to assign the audience the role of the storyteller. Therefore, research results need to be prepared such that the audience can conduct small-scale exploratory analyses through interactive components. Thus, interactive data storytelling dashboard design requires specific topics, such that an interplay of visuals and text snippets can be achieved. Furthermore, the data story must be broad enough for the user to decide which turn the story takes. For example, research suggests a negative

relationship between infant mortality and income. The user takes the role of the storyteller if she can visualize this information for a country of her choosing, and explore the potential total lives saved would infant mortality increase by a percentage of the users choosing.

Dashboards emphasize the translation of data into visuals with an appropriate layout, data stories emphasize the construction of context and a narrative around the visualization. Creating a dashboard is challenging. Trying to tell a story within one page limited to visuals and some text is particularly challenging. Yet, combining both data visualization techniques allows for a comprehensive and rigorous solution when translating research results. Adding interactivity in particular allows the user to conduct exploratory analysis and provides her with the opportunity to decide upon the story's twist and ending. Data storytelling should under no circumstances happen at the expense of credibility. A research-based approach always needs to be maintained, especially when telling a data story with research results.

Further Considerations - Think like a developer

Interactive data storytelling dashboard design targets a wide-ranging audience. To provide interactivity and reach the targeted audience, a web-based solution is intuitively appropriate. For interactive storytelling dashboards, user experience design (short UX) is just as relevant as data storytelling guidelines, dashboard design and data visualization principles, and provides valuable insights. Morville (2004) identifies seven facets of UX, as illustrated in Figure 24. Each facet draws on different disciplines to present a comprehensive UX framework.

Figure 24

Morville's User Experience Honeycomb

useful

usable

desirable

valuable

findable

accessible

credible
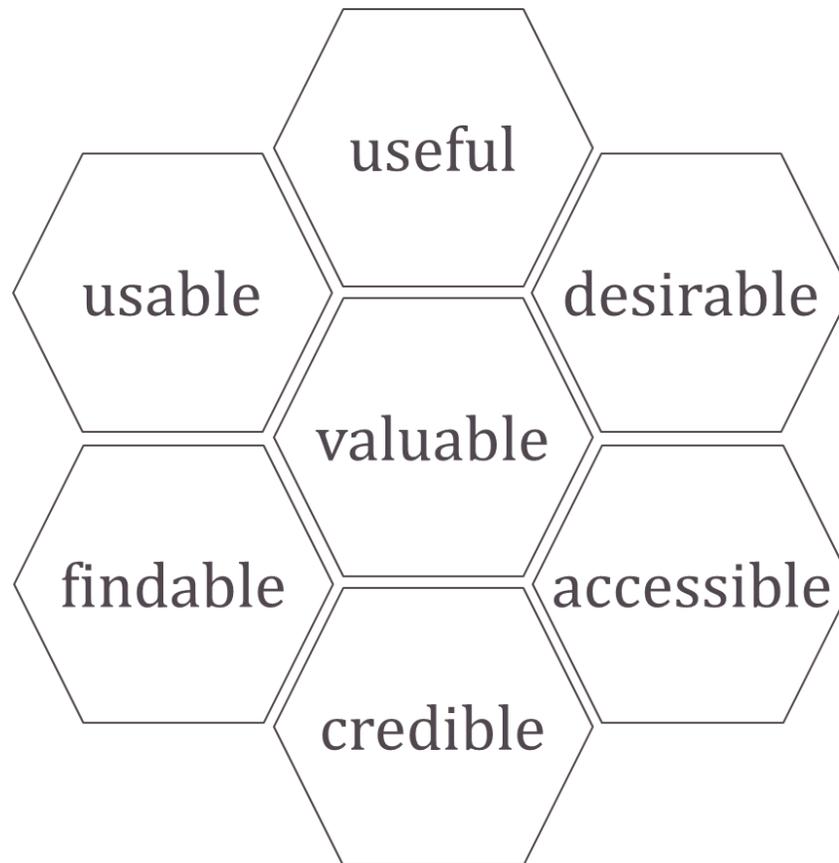
Note. Author's Illustration, adapted from Morville (2004)

The facet of usability in UX has its origins in human computer interaction. With its focus on usability, Human Computer Interaction (short HCI) provides the scientific foundations for the usability facet of user experience. In its early stages, HCI focused on the design of computer technology and human interaction with it. When computers decreased in size and finally became available for less experienced users as well, the need for efficient HCI became increasingly vital. Initially, HCI researchers focused on improving the usability of desktop computers. Since then, HCI has steadily encompassed more fields and all forms of information technology design. Usability refers to the user's ability to arrive on a website, use it easily, and complete the desired tasks. Usability is best understood as ease-of-use (Card, Moran & Newell, 1980; Morville, 2004).

Usefulness describes the need of just enough information in an easily digestible format that users can make informed decisions (Morville, 2004). Although the facet of usefulness states the obvious, it is nevertheless important. Essentially, it emphasizes the law of parsimony and the importance of choosing simpler solutions over more complicated ones.

Desirability refers to the use of design elements to evoke emotion and appreciation. A quote by Bruce Claxton emphasizes the importance of product desirability: "People are seeking out products that are not just simple to use but a joy to use" (Walker, 2003, para. 9). The concept of 'Emotional Design' is dedicated to the user's emotional response to a design. Desirability picks up the notion of emotional design, highlighting its importance for user experience (Morville, 2004; Komninos, 2020).

In the 13th century, Villard de Honnecourt (1200 – 1250), combined the grid system with the golden ratio. The result was a page layout with fixed margins based on fixed ratios. This methodology continues to be popular today; especially because readers are used to it and expect to find everything in its proper place (Soegaard, 2020). Hence, the grid system has been a tried, tested, and trusted methodology for centuries. Grid-based web layouts are the digital equivalent to print layouts, following Honnecourt, that facilitate findability. It allows for the development of navigable web sites with locatable objects, so users can find what they need.

As mentioned before, users of the web have different needs, but also different abilities. Just like it is wrong to deny someone the entry to a building because they are in a wheelchair, it is also not right to prevent someone from using the web because of a visual impairment. Providing accessible sites is already the law in some countries. Taking accessibility into consideration is not only the right thing to do, but also magnifies the size of the potential target group (Morville, 2004; Steinfeld & Maisel, 2012).

Prominence Interpretation Theory suggests that prominent attributes that gain the users attention determine how users judge a site's credibility. A site lacking elements to gain the user's attention (prominence), which would allow her to judge the sites credibility (interpretation), contributes to a negative user experience. Credibility is, therefore, a facet of user experience demanding consideration (Morville, 2004; Fessenden, 2018).

User experience happens at the intersection of technology and society. Thus, human values should be acknowledged and supported by technological design. Different research focuses on values such as privacy, ownership, property, welfare, freedom of bias, universal usability, autonomy, informed consent and trust. Friedman, Kahn & Borning (2008) developed Value-Sensitive Design as an overarching framework that accounts for human values in design work. Value-Sensitive Design, they state, "is a theoretically grounded approach to the design of technology that accounts for human values in a principled and comprehensive manner throughout the design process" (Friedman, Kahn & Borning, 2008, p. 1). Considering design to be the mediator between technology and people, the value that the website delivers to its target audience can be ensured through value-sensitive design.

Table 23 lists and summarizes these facets of user experience and highlights relevant references. The extent to which different facets are prioritized, however, depends on context, content, and users. The required trade-offs, e.g. desirable vs. credible, need to be considered in advance.

Table 23

Describing and Explaining the Facets of User Experience

Facet	Description	Reference
Usability	A user's ability to arrive on a site, use it easily, and complete the desired task.	Human Computer Interaction
Useful Content	Enough information in an easily digestible format that users can make informed decisions.	Law of Parsimony
Desirable Content	Design elements are used to evoke emotion and appreciation.	Emotional Design
Findability	Navigable web sites with locatable objects, so users can find what they need.	Grid-Design
Accessibility	Properly designed and coded websites, so people with disabilities can use them.	Universal Design and Accessibility
Credibility	Trust that a website engenders in users.	Prominence Interpretation Theory
Valuable	Value that the website delivers to its target group.	Value-Sensitive Design, User-Centered Design

Note. Author's Summary, adapted from Morville (2004)

Concluding Framework

A multitude of visualization principles and guidelines already exist. Integrated into visualization techniques, such as dashboards and data stories, they allow for the development of comprehensive visual presentations of information. A web-based solution should consider and pair these with user interface design and user experience principles. In the previous sections I explored different data visualization, user interface, and user experience concepts and incorporated these in Nussbaumer's data storytelling approach. With that, I develop a methodical framework to translate my research results into an interactive data storytelling dashboard. Figure 25 is a stylized illustration of this framework, that will serve to guide the development of my web-based data visualization solution.

Figure 25

Interactive Data Storytelling Dashboard Design Framework

Context	Effective Visuals	Simplicity	Attention	Design Concepts	Tell a story	User Experience
What is communicated to whom?	Key parameters of the story	Gestalt Principles	Pre-attentive Attributes: SCOPeS	Affordance	Reversed Order	Usability
Why is it important for the audience to know?		Data-to-Ink Ratio		Accessibility	Vertical logic	Usefulness
						Desirability
	The nature of data determines the visual		Text-Scanning Patterns: F-Pattern	Aesthetics	Interactivity	Findability
What data is available to support the story line?		Signal-to-Noise Ratio				Accessibility
					Exploratory Analysis	Credibility
				Acceptance		Value

Technical Approach

Most data analysis software provide standard data visualization components. Eventually, "being able to visualize data and tell stories with it is key to turning it into information that can be used to drive better decision making" (Nussbaumer, 2015, p.2). The purpose of this section is to compare different data visualization tools and data storage options for quantitative data and to identify appropriate technologies to develop a web-based data visualization solution.

Data Visualization Tools

Data is increasingly available. At the same time, new computer software and technology have created an increase in opportunities to visualize data. Yet, what is the most appropriate available technology to implement data storytelling dashboard design? By identifying relevant dimensions to categorize different tools, this section narrows down a set of technologies that allow for the implementation of a web-based data visualization solution and concludes with a selection statement.

Tool Availability. Selecting the right tool is an essential step to develop a web-based data storytelling dashboard. Data visualization tools are offered at different levels of expertise, and often require the customer's willingness to pay. Specifically, data visualization technologies span no-coding to coding approaches and commercial to open-source solutions.

Commercial solutions require to be purchased before use and are characterized by full access to all program features. Open-source solutions, on the other hand, are released under a license in which the copyright holder grants the right to use, change, and distribute the program to anyone and for any purpose. Most commercial solutions, however, also offer a free version with limited features. Conversely, most freeware also offers a chargeable upgrade to access more features. The latter two examples fall into the category of shareware.

The development of self-service options through an easily accessible user interface allows to circumvent information technologists and data analysts to access, process, and visualize data. Thus, available data visualization tools now involve self-service data visualization, may provide some coding opportunities, or require extensive coding skills.

A third relevant aspect is the *publishability* of solutions developed using available technologies. To develop a web-based data visualization solution, a web-based distribution needs to be feasible. Although Microsoft Excel offers self-service data visualization solutions, no web-based distribution is possible. Other tools allow for the generation of URL's that provide user access or can be embedded in a website through iframes. Tableau and Microsoft Power BI, on the other hand, allow for the publication on an online accessible user profile, whereas JavaScript API's render within an HTML markup element.

Comparative Analysis. Given this broad spectrum of data visualization tools and technologies, the question for the most appropriate one arises. Preferences for the use of a specific tool, however, are subjective and depend on the available budget for licenses, individual coding skills, and the preferred distribution format.

The extent to which different criteria are prioritized, however, depends on the 'developer'. For example, with a limited budget, commercial solutions, such as SAS Visual Analysis, become inaccessible. Shareware, such as Power BI and Tableau, on the other hand are limited in terms of their publishability, although being available at a low budget. Yet, budget and product licenses today may not be available in the long-term, reducing the longevity of a web-based solution. The limiting factors of budget, distribution format, and desired longevity of a web-based solution can be forced into the background by coding skills. Figure 26 sets a selection of available tools into perspective.

Figure 26

Dimensions of Data Visualization Tools and Classification of Prominent Examples
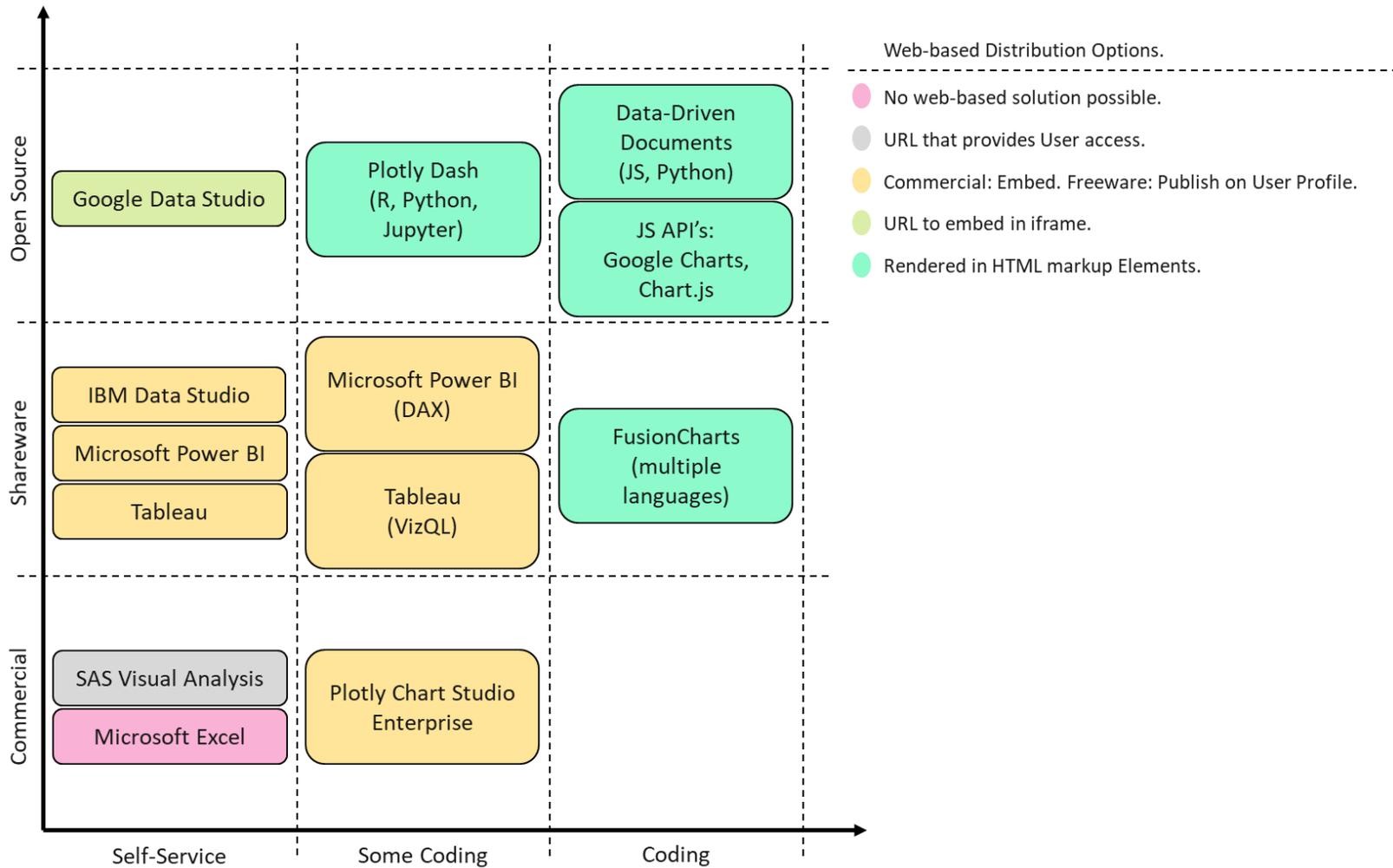
Note. Author's Assessment

Selection Statement. To circumvent budget and longevity limitations, I opt for an open-source solution. Moreover, to obtain a high level of flexibility when implementing the web-based data visualization and simulation tool, I chose a coding approach.

Data Storage Options

Before 2004 a total of 5 exabyte of data were created by humans, an amount which now is created within two days (Zhao, 2013). Taking this fact into consideration, it is reasonable to investigate different ways to store data. Broadly, these options are flat files, NoSQL, and Relational Database Management System (short RDBMS).

The most common file formats used are still comma-separated values (short CSV), JavaScript object notation (short JSON), and Microsoft Excel (short xlxs), all of which fall under the category of flat files. Considering the vast amount of data available and used in research, flat files reach their natural limits. Yet, publicly available data is mostly made available in these common formats. Technological progress in information technologies and data sciences, however, offer considerable alternatives to flat files. RDBMS have been available for a while, but non-relational alternatives have been increasingly introduced in the past few years. Although using these alternatives requires additional skills, the benefit of their use might outweigh the cost.

Focusing on the overarching concepts of Flat Files, RDBMS, and NoSQL, this section examines the opportunities and limitations of different data storage formats and identifies an appropriate format for the web-based data visualization and simulation tool.

Flat File Approach. The flat-file approach to data management, sometimes referred to as flat-file database, usually stores data in plain text files. Common examples for flat files are word documents, excel spreadsheets, CSV, and JSON files. Flat files, however, may differ in the way data is stored and accessed. Flat files can be differentiated into (1) sequential files, (2) indexed sequential files, and (3) direct files. In sequential files, one record is physically stored after the

other, e.g. on a tape. In indexed sequential files, multiple records are stored in blocks within an indexed record, e.g. JSON. As for direct files, an index points directly towards a particular record (Oppel, 2009; Singh 2011).

Storing data in flat files upholds exclusive ownership of the data. Additionally, most data analytics and statistics software can process either native or non-native flat file formats. In contrast, flat file data management is subject to data redundancy. Additionally, flat files require to be structured uniquely to the needs of the primary user, since no multiple usage at a time is possible (Hall, 2012). Figure 27 illustrates the advantages and disadvantages of flat file data management.

Figure 27

Flat-File Data Management
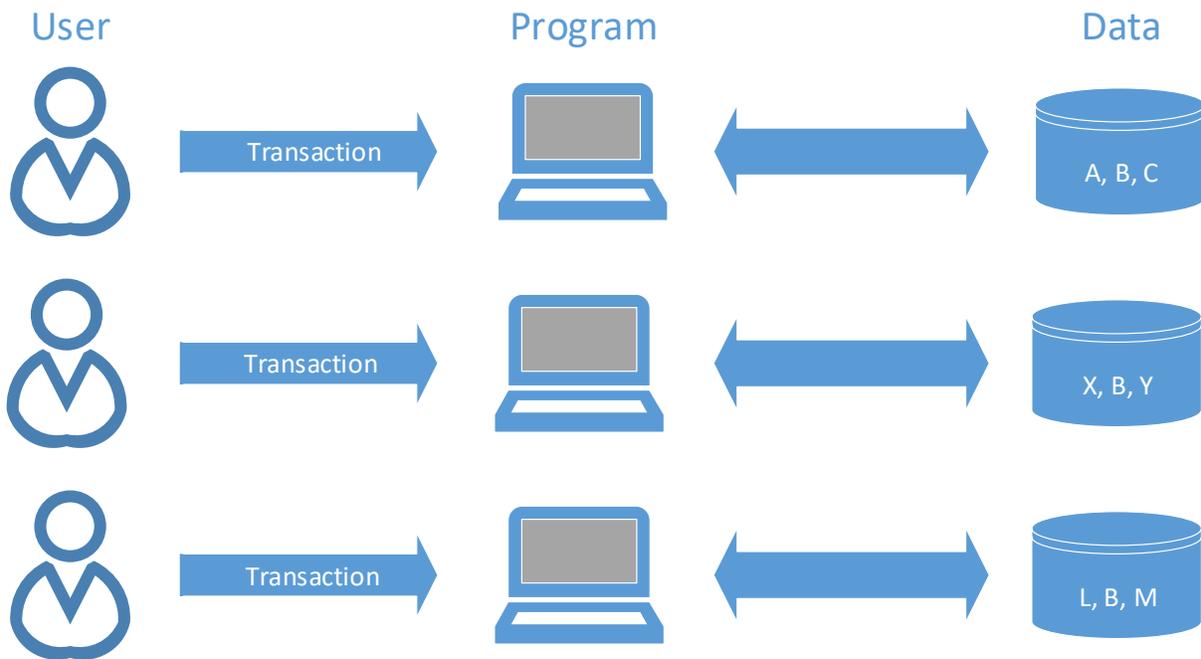
Note. Author's illustration, adapted from Hall (2012)

Each individual user may execute individual transactions while accessing a unique data file, where the letters may represent either a field, record or file. "B" indicates data redundancy, which entails the following data management problems. Duplication of data leads to (1) excessive data storage, (2) complicated data updating, which can be hampered further by (3) inconsistent currency of information. Furthermore, information "L" may only be available in one flat file, obstructing the accessibility of essential data.

RDBMS Approach. RDBMS is a database management system to store structured data. Data is structured, when data redundancy is eliminated through the organization and normalization of data in relations. Specifically, data is stored in relations that are connected by primary-foreign key compliance, in a way that no data is duplicate. This way, data can be viewed in different ways by different users (Kroenke & Auer, 2012). Figure 28 illustrates the general concept of a database.

Figure 28

The Database Concept
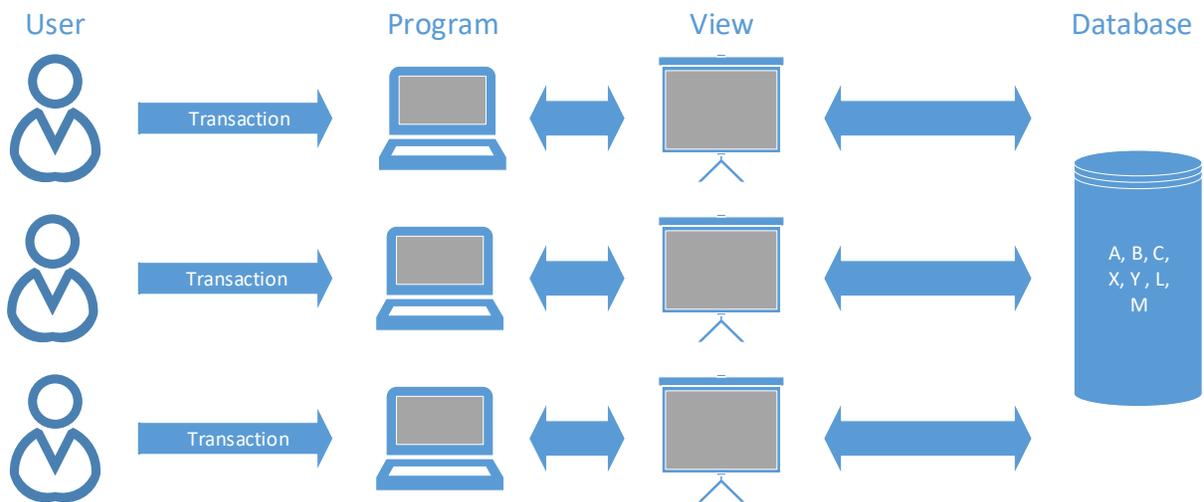
Note. Author's illustration, adapted from Hall (2012)

Views allow individual users the access to predefined data, upholding integrity, yet offering more flexibility than flat files. Since all data is stored in one database, RDBMS provides (1) better backup and recovery procedures, (2) easy data updating and manipulation, and (3) can be accessed by multiple users at the same time. Yet, the implementation of a RDBMS requires skilled human resources (Hall, 2012). Prominent, fee-based examples are Microsoft's SQL Server and Oracle Corporation's Oracle. Yet, open source offers such as MySQL are available as well. Additionally, software providers like Microsoft (Excel, Power BI), Tableau, and StataCorp (Stata), enable users to connect the software to an existing database.

NoSQL Approach. Not all data can be broken down into relations and stored as such. NoSQL, standing for "not only SQL", is a generic term used for anything that does not follow the traditional RDBMS model. Hence, NoSQL databases are modelled in a way other than in relations yet providing mechanisms for storage and retrieval of data. Their capability of storing and retrieving structured, semi-structured, unstructured, and polymorphic data makes NoSQL databases especially useful as compared to RDBMS, which only allows for structured data. NoSQL databases were created to address RDBMS' limitations and meet the needs for data management systems that are scalable, low cost, flexible and available. While NoSQL databases offer advantages storage-wise, their query capabilities are still limited (Vaish, 2013; Sullivan, 2015).

In its basic structure, NoSQL Management Systems do not differ from RDBMS. Yet, NoSQL databases have the capability of representing data models different to RDBMS relations. In a key-value system, values are accessed through a key-value association, where each key is unique. Similarly, in column-based systems columns are expressed as pairs of name and value, associated columns are then grouped in super-columns, and both form a column family. Document-based systems also draw on key value pairs, which are stored in document-like structures such as XML or JSON. Quite different, graph-based systems use graphs to represent a database schema (Indrawan-Santiago, 2012).

In contrast to RDBMS, NoSQL databases individually support different programming languages. Thus, NoSQL is less standardized than RDBMS. Common examples for NoSQL databases are Riak (key-value), MongoDB (document-based), Cassandra (column-based), and Neo4J (graph-based).

Comparative Analysis. Most common ways of storing data are still flat files, followed by RDBMS, and increasingly NoSQL databases. Flat files provide overview-like, intuitively accessible, by most common software readable options for datasets of a limited size. Yet, they do not allow for the use by several users at a time. Additionally, no quickly accessible data connection can be made. Online presentation, interactive in particular, is possible, yet limited to client-side technologies. While for smaller data visualization and simulation projects JSON format may suffice, it is not a very secure solution. Especially when considering copy right restrictions posed by data providers, used data should not be as easily hacked and manipulated as is the case when using client-side technologies.

Yet, data can easily spread out over multiple csv files, which makes data mining and analysis particularly difficult, but also poses challenges to data presentation. Although database solutions require expert knowledge, considering that most providers also offer single integrated development environments and graphical user interfaces (e.g. MySQL Workbench), make them a considerable alternative. RDBMS require structured data and the knowledge of SQL to be implemented and used. Their capability of storing large amounts of data being retrievable by several users at a time is a benefit, nevertheless. Once implemented, maintenance is limited to data updates, as new data becomes available. Furthermore, RDBMS make sub-setting and re-assembling datasets an easy task - provided that SQL is known. Yet, with Data Science and Big Data being on the forefront, SQL becomes an ever more common query language, hand in hand with statistical programming languages.

RDBMS, however, are not an appropriate solution when storing historical data. The handling of historic data can hardly be achieved by eliminating data redundancy, as required by RDBMS. In the case of historical data, a data warehouse/data marts structure building upon RDBMS may provide a feasible solution. A data warehouse, however, has huge implementation costs, money- as well as timewise, and can barely be achieved without professional expertise. In order to address the limitations of RDBSM, NoSQL databases were developed. Their ability of storing semi-structured and even unstructured data and the potential similarity to JSON flat files, turn NoSQL databases into a useful solution. Nonetheless, since NoSQL databases are comparatively new, there is little uniformity among different systems. Hence, working with NoSQL databases requires commitment and expert knowledge.

Table 24 contrasts the data formats by previous knowledge, characteristics of the data source, and preferred data presentation format.

Selection Statement. The scope of this chapter is to provide technical foundations for a web-based data visualization tool. For such a tool, all three approaches – flat file, RDBMS, and NoSQL – are suitable. The primary scope of this dissertation, however, is to develop a method that allows for the translation and simulation of research results. As for this purpose a small client-side web application is an appropriate solution. Given the cross-sectional and small-n nature of my data, relying on JavaScript Object Notation is sufficient.

Although client-side solutions are often accompanied by security and performance issues, these are minor concerns. With regards to potential security concerns, I do not require input of sensitive user data and only use data from publicly available data sources. Lastly, the rather small dataset will not decrease performance significantly.

Table 24

Contrasting Data formats

Data Format		Characteristics
Flat Files		No prior knowledge required
		Data Source
		- Comparatively smaller sample size
		- Structured, semi-structured, and unstructured data
		- No quickly accessible connections between data is needed
		- Only one user at a time
		- Native to standard statistics software
		Presentation
		- Static graphs and tables
		- Small, client-side web applications
RDBMS		SQL required
		Data Source
		- Comparatively larger sample sizes
		- Exclusively structured data
		- Quickly accessible connections between data
		- Multiple users working with the same set of data
		- Connection to statistics software possible
		Presentation
		- Static graphs and tables
		- Large, server-side web applications
NoSQL	Key Value Document-based Column-Based	Expert knowledge required
		Data Source
		- Comparatively larger sample size
		- Structured, semi-structured, unstructured data
		- Quickly accessible connections between data
		- Multiple users working with the same set of data
		- Connection to statistics software possible
		Presentation
		- Static graphs and tables
		- Large, server-side web applications
	Graph-based	Expert knowledge required
		Data Source
		- Big data
		- Structured, semi-structured, unstructured data
		- Formats such as images and videos
		Presentation
		- Large, server-side web applications

Note. Author's Assessment

Practical Implementation

Following the data storytelling dashboard design framework, I code a web-based interactive data visualization and simulation tool using client-side technologies. This section explains the practical implementation of above findings and its transformation into a web-based data visualization and simulation tool. First, I provide the web application's context from which I derive effective visuals. Second, I present a prototype on which I conduct usability testing. Lastly, I use the usability testing results to develop the final web-based interactive data visualization and simulation tool. While I merely present the prototype, I elaborate in detail how the final product incorporates visualization and design principles and meets usability requirements.

The dataset used for the data visualization and simulation tool is provided in Appendix E Table E3. I make the code available in Appendix D.

Context

Today, the world witnesses a renewed polarized politico-economic struggle between laissez-faire capitalism and socialism. Again, the search for a politico-economic order that reconciliates the free market with equitable socio-economic development is underway. Social market economics offered an alternative to laissez-faire capitalism, socialism, and fascism in the past, but even more so today. The use of terms such as "social democracy" and "social capitalism" indicates the public's growing interest in this topic.

Hence, the purpose of translating above simulation framework into an interactive data visualization and simulation tool is to provide answers to questions that can contribute to a more informed public debate, such as:

(1) How does a specific country perform in terms of social market economic principles, social peace, equal opportunity, ecological sustainability, and economic prosperity?

(2) How do changes in specific SME input variables impact social market economic performance as indicated by the SMEX?

(3) How does a change in the SMEX impact a country's social peace, equal opportunity, ecological sustainability and economic prosperity?

Given the omnipresence of this politico-economic struggle around the globe, potential users might broadly be categorized as:

(1) Specialists: social market economists, economists, politicians

(2) Enthusiasts: social scientists, journalists, politicians

(3) Newbies: laymen with an interest in the topic

The purpose of such a visualization and simulation tool is to establish user sovereignty to describe, change, analyze and compare the key parameters in order to generate answers. To support the interpretation of the data, I categorize each variable according to the following criteria:

- Very low: $0 < \text{value} \leq 20$

- Low: $20 < \text{value} \leq 40$

- Medium: $40 < \text{value} \leq 60$

- High: $60 < \text{value} \leq 80$

- Very high: $80 < \text{value} \leq 100$

Instead of continuous values, the visualization and simulation tool shows only these categories helping the user to more easily interpret the data. Some of the SME output proxies have missing observations. I estimate these with regression analysis. As for missing observations among the control variables, I do not estimate the missing observations of the SME output variables in a regression, but fill them with respective regional averages, because there are no other appropriate correlates. Table 25 lists the missing observation treatment for the respective variable.

Table 25

Treatment of Missing Observations per SME Output and Control Variable

	Variable	Missing Observation Treatment
SME Output	Social Peace	Regression Analysis
	Equal Opportunity	Regression Analysis
	Ecological Sustainability	Regression Analysis
Control	Ethnic Fractionalization	Regional Average
	Religious Polarization	Regional Average

Prototype

Using the context and specific questions posed, I first identify most effective visuals and arrange them in a *wireframe*, the visual representation of an interface. The wireframe then serves as a blueprint for a prototype of the interactive data visualization and simulation tool that follows my interactive data storytelling dashboard framework.

The questions the visualization tool aims at answering determine the key parameters of the story. The nature of the key parameters, in turn, determines appropriate visuals. Table 26 illustrates the selection process that narrows down the visuals starting with specific investigatory questions. I follow Abela's (2009) thought-starter and Dykes (2019) to select visuals that are commonly accepted for the identified purpose. After narrowing down a set of appropriate visuals, I arrange them following my data storytelling dashboard design framework. Figure 29 shows the resulting visualization and simulation tool's prototype. I provide an elaborate explanation of the content placement in section *Final Product*.

Table 26

Selection of Effective Visuals by Investigatory Question

Question	Key Parameter	Purpose	Visual
How does a specific country perform in terms of social market economic principles?	Social Market Economic Principles	Description (Comparison)	Horizontal Bar Chart to describe multiple variables across themes.
What is a country's social market economic performance?	SMEX (Index Calculation)	Description	Progress Bar to describe the current SMEX value.
		Comparison	Geo Map to compare the current SMEX on a global scale.
		Relationship	Combo Chart that shows the relationship between SMEX and income as a line graph, marking the selected country as a scatter plot.
How does a specific country perform in terms of social peace?	Social Peace	Description (Comparison)	Column Chart to describe one item across few categories (current SME Output).
		Comparison	Geo Map to compare Social Peace on a global scale.
		Relationship	Combo Chart that shows the relationship between SMEX and Social Peace as a line graph, marking the selected country as a scatter plot.
How does a specific country perform in terms of equal opportunity?	Equal Opportunity	Description (Comparison)	Column Chart to describe one item across few categories (current SME Output).
		Comparison	Geo Map to compare Equal Opportunities on a global scale.
		Relationship	Combo Chart that shows the relationship between SMEX and Equal Opportunity as a line graph, marking the selected country as a scatter plot.

Table 26 Ctd.

Selection of Effective Visuals by Investigatory Question

Question	Key Parameter	Purpose	Visual
How does a specific country perform in terms of ecological sustainability?	Ecological Sustainability	Description (Comparison)	Column Chart to describe one item across few categories (current SME Output).
		Comparison	Geo Map to compare Ecological Sustainability on a global scale.
		Relationship	Combo Chart that shows the relationship between SMEX and Ecological Sustainability as a line graph, marking the selected country as a scatter plot.
How does a specific country perform in terms of economic prosperity?	Economic Prosperity	Description	Single Number to highlight a country's current per capita income.
How do changes in specific SME input variables impact social market economic performance as indicated by the SMEX?	Social Market Economic Principles SMEX (Simulation Framework)	Change	Slider for each principle with the current value as default value.
		Analysis	Progress Bar to describe the potential SMEX value.
How does a change in the SMEX impact a country's economic prosperity?	SMEX Economic Prosperity (Simulation Framework)	Analysis	Single Number to highlight the corresponding income change. Single Number to highlight the potential per capita income.
How does a change in the SMEX impact a country's SME Output?	SMEX SME Output Variables (Simulation Framework)	Analysis	Column Chart to describe one item across few categories (current SME Output).

Figure 29

Wireframe of the Interactive Data Visualization and Simulation Tool before User Testing
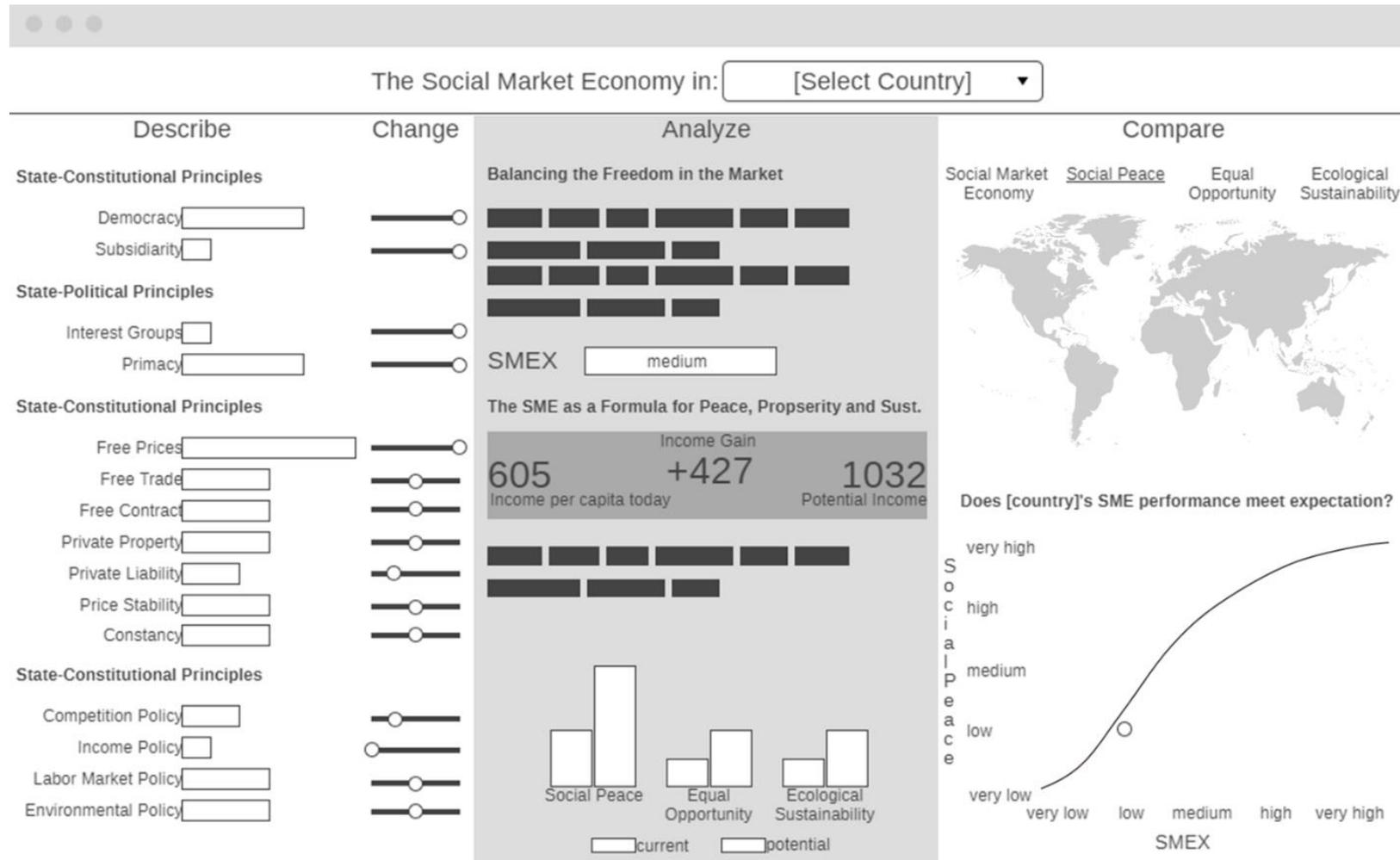
Note. Author's Illustration

Usability Testing

By investigating how compliance with social market economic principles impacts peaceful and prosperous socio-economic development and providing a visualization and simulation tool, I hope to provide new insights and opportunities to better understand peaceful socioeconomic development. These insights may be useful beyond academia, and support practitioners in conflict management, peacebuilding, and development, as well as policy programming and decision-making in humanitarian crisis situations. But does the balanced and purposeful design to communicate research results serve its purpose? This section is dedicated to the testing of the user interface.

Method. Usability testing or user testing intends to assess how well the product is working and to determine its value to the users. Thus, it is an evaluative process that tests the interface, not the user. In this specific context, evaluation refers to the "systematic collection of information about the activities, characteristics and outcomes of programs to make judgments about the program (or processes, products, systems, organizations, personnel, or policies), improve effectiveness, and/or inform decisions about future program development" (UCONN, 2020).

The objective of the interface testing is to uncover problems and discover opportunities with the data visualization and simulation tool. Specifically, I am interested in a reality check:

(1) Is the website intuitively usable?

(2) Does the tool generate valuable results?

For interface testing, all potential combinations of moderated vs. unmoderated and remote vs. in-person are possible. Moderated usability testing is reasonable in evaluating early-stage prototypes or complex interfaces that require personalized directions. For unmoderated usability testing, on the other hand, users are willing to carry out the interaction without further directions (Moran, 2019).

The focus lies on the intuitive utilization of the finalized tool. A moderated approach would anticipate and shape the results of the testing. Conversely, an unmoderated approach reduces user bias as a result of moderator guidance. In a similar vein, remote testing evades the impression of an artificial test setting. It helps to avoid group think and reduces biases, a common concern of an artificial testing environment. Thus, a remote unmoderated approach yields the least biased outcome for this purpose. Although testing tools and software are available, they are also costly. Common among these testing tools is a recording option. The lack thereof prevents to interpret body language, but at the same time, it reduces user bias due to surveillance (Whitenton, 2019; Moran, 2019; Loranger, 2016).

Given the aforementioned constraints, I conduct an informal remote unmoderated usability testing. I recruited eight voluntary users via email, six of which are affiliated with a foundation that promotes the concept of a social market economy and are thus subject-matter experts. All users are given the task to independently explore the visualization and simulation tool and provide written reactions and feedback regarding the testing objectives. While the users are not provided with any specific guidance on how to use the tool, the objectives of the testing were communicated. Figure 30 presents a screenshot of the tested prototype based on the wireframe presented in Figure 29.

Figure 30

Default View of the Data Visualization and Simulation - Prototype
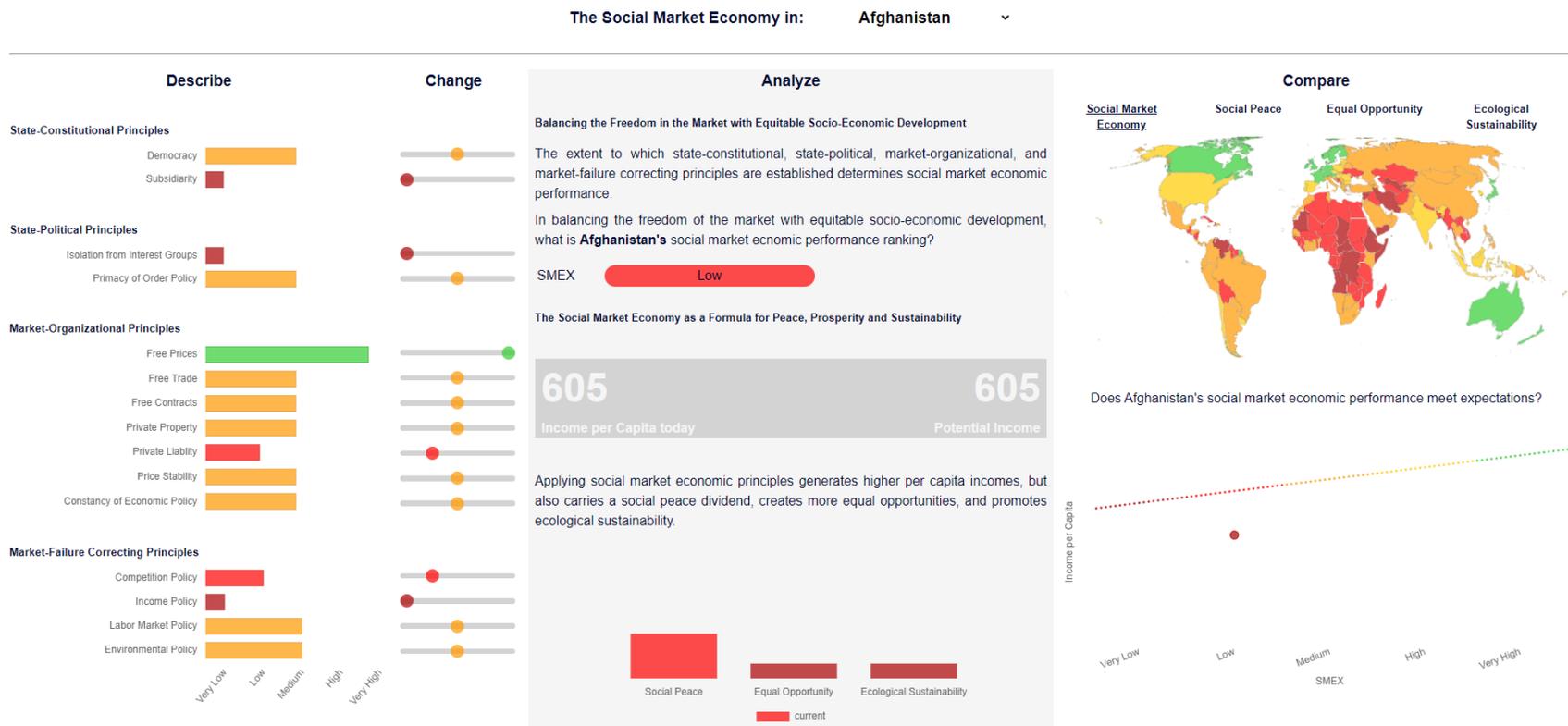
Note. Screenshot of Author's Prototype Web Application

Evaluation. After independently exploring the prototype, the users provided their written feedback with impressions and problems encountered regarding intuitivity and usefulness. I evaluate the intuitivity and usefulness of the prototype by classifying the user problems encountered as minor, serious, and crucial.

Generally, probands expressed a common consensus that the social market economic data visualization and simulation tool generates valuable insights. The opportunity to generate on-demand country profiles and the simulation of the impact of social market economy relevant policy changes were emphasized. One tester, for example, wrote that the "tool is very interesting, has a great potential and gives a good overview on the current state of the various countries worldwide regarding their Social Market Economy Performance." In a similar vein, another tester described the tool as a "very user-friendly way to get a good understanding in terms of a comparison of the differences in the countries all around the world based on the four aspects of Social Market Economy, Social Peace, Equal Opportunity and Ecological Sustainability." Commenting the simulation opportunity, a third tester wrote that "the great thing about your site is that you can experiment with the values and you get an insight into the effects these changes have." Regarding the intuitive use of the prototype, a proband found the tool usable by people knowledgeable in social market economics only. Furthermore, a proband found it difficult to retrace the changes (from actual values to user input) due to the actual values not being displayed by the sliders. Lastly, the link between user input in the social market economic output social peace, equal opportunity and ecological sustainability was unclear. The methodological limitations of the empirical analysis including variable selection and definition were scrutinized, impacting the usefulness of the data visualization and simulation tool. More importantly, however, probands found the connection between the mouse-over supplementary information provided for the *describe*, *analyze*, and *compare* sections and the tool unclear. Lastly, the stability and reliability of the chosen API was questioned, as the charts displayed wrong values when hovering over them.

A qualitative analysis of the feedback is provided in Table 27. For completeness, I also add the count of observations for each user problem. Given the usability testing results, improving the visual display of the social market economic output social peace, equal opportunity, and ecological sustainability and choosing a more stable and reliable visualization API were identified as crucial adjustment. Including the current values in the sliders after user input and changing the textual content of the mouse-over supplementary information also need to be considered.

Table 27

Usability Testing Results

Target	Classification	User Problem	Obs.
Intuitivity	Minor	Limited to experts and enthusiasts	1
	Serious	Slider do not display actual values after user input	1
	Crucial	Connection of SME Output column chart to input not clear	2
Usefulness	Minor	Democracy definition	1
		Variable Selection	1
		Methodological Limitations of Empirical Analysis	1
	Serious	Describe/Analyze/Compare mouse-over information confusing, connection to website content unclear	2
	Crucial	Charts not stable. Values change on mouse-over	1

Implications. Hence, to visually group the social market economic output economic prosperity (income per capita), social peace, equal opportunity, and ecological sustainability, I removed the column chart. Instead, I adapted the visualization of economic prosperity for social peace, equal opportunity, and ecological sustainability. To obviate confusion after user input, the actual country value for each principle is still displayed on the slider track in the color of the slider track. Figure 31 shows the wireframe of my final visualization and simulation tool. Although the purpose of a wireframe is content placement, I add more detail to support below description. As compared to the prototype, I implement a different visualization API that does not exhibit the critiqued characteristics.

Figure 31

Wireframe of the Interactive Data Visualization and Simulation Tool after Usability Testing
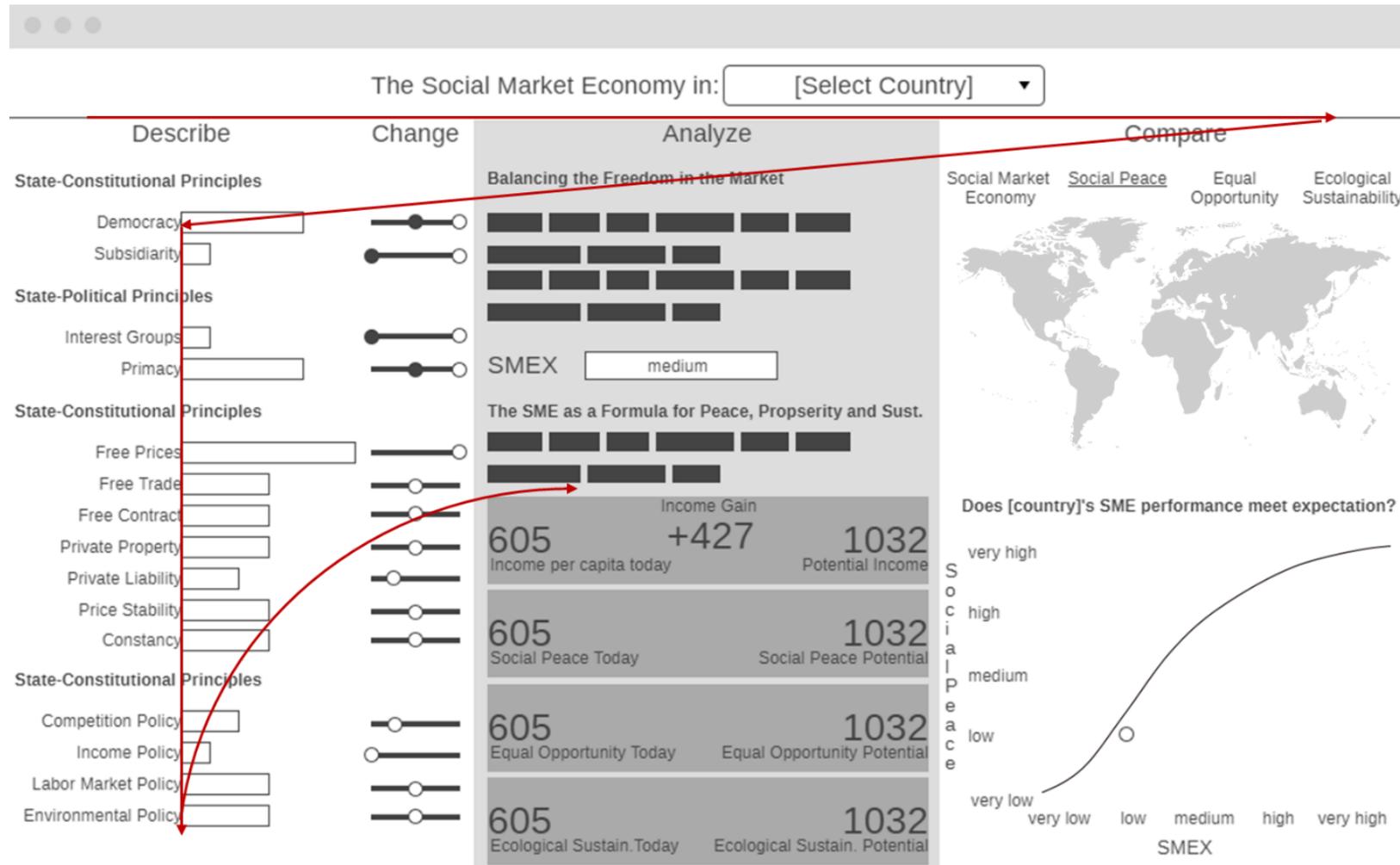
Note. Author's Illustration

Final Product

Implementing the testers' feedback as outlined above yielded the final version of my data visualization and simulation tool. This section is dedicated towards the detailed explanation of the constituent components embedded in the data storytelling dashboard design framework. Figure 32 illustrates the default view of the final version of the data visualization and simulation tool. I make my interactive data visualization and simulation tool available online under the following link: click here to access the 'social market economic performance index' interactive data visualization and simulation tool or type http://almuthmerkel.com/SMEX/.

Simplicity to Focus Attention. In creating the visuals, I keep a high data-to-ink ratio. Specifically, I drop all zero-lines, gridlines, data labels, titles and legends from the graphs. The y- and x-axis labels convey sufficient information to understand the visualized content. Instead, I use the Gestalt Principles of proximity, closure and common fate for the bar to create an impression of completeness. The symmetry of the bar chart further facilitates the perception of a complete graph, although being partitioned into 4 sub-sections through the principle headers. Additionally, in extension to each individual principle bar, I locate a slider for user input. The continuity from bar chart to slider insinuates a link, while the different shape indicates the different purpose. This impression is intensified by the threefold apportionment of the screen, where the bar chart and sliders occupy one third together.

The centerpiece of the visualization and simulation tool is located in the middle column of the screen. It is accentuated following the figure-ground principle by applying a different background color. The background color, furthermore, follows the enclosure principle, creating the perception of coherence of the presented content. Within this section, the SMEX progress bar functions as a focal point. Using yet a darker shade to enclose each of the social market economic output creates a third visual layer according to the figure-ground and focal point principle. Short text snippets create the impression of a short country report.

Figure 32

Default View of the Data Visualization and Simulation – Final Version
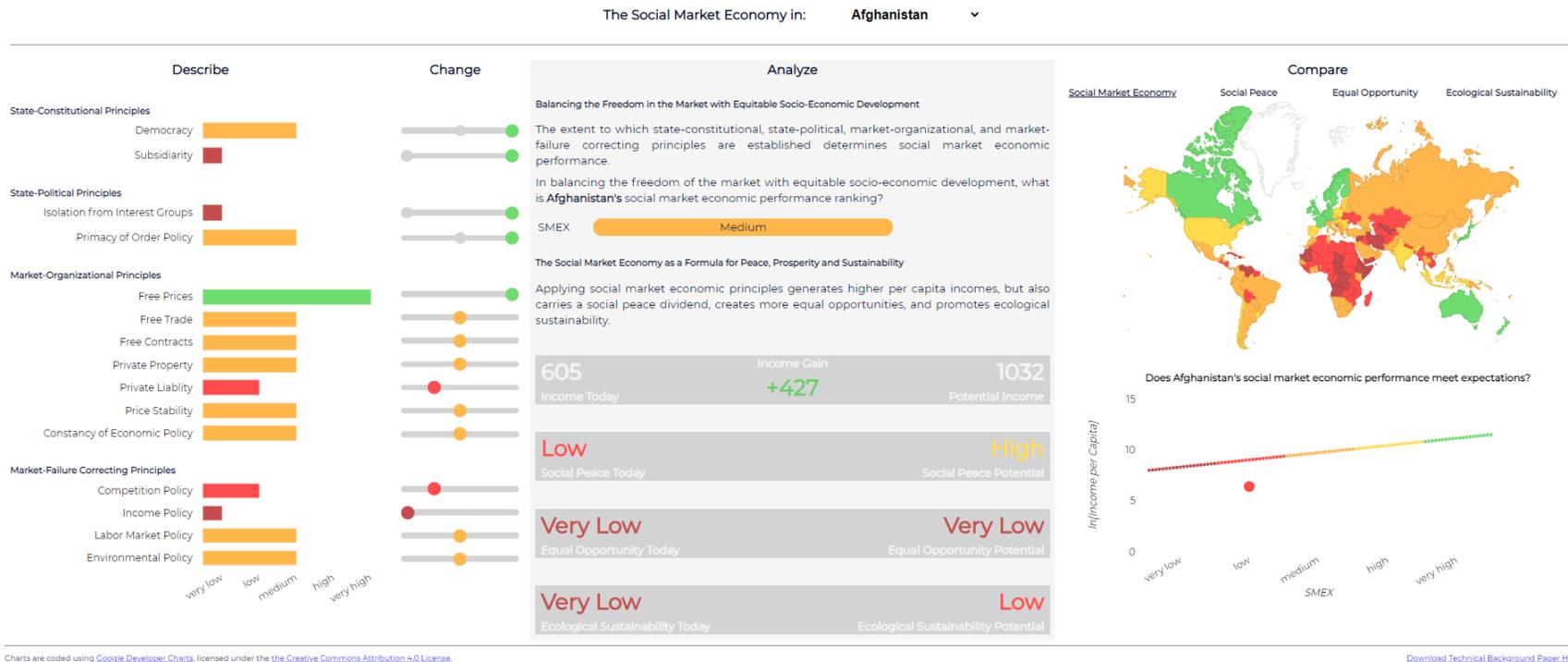
Note. Screenshot of Author's Final Web Application

Based on the user input and the simulation framework the analysis section is updated after user input accordingly. Yet, after changing the slider thumb to initiate the simulation, the current value is still displayed in the same color as the slider track. The progress bar, however, contracts or expands as the SMEX changes. As for the social market economic output, only the SME output potential updates, contrasting the current value of today with the simulated potential value.

The column to the right puts the country's social market economic performance and output into a global context. A geo map allows for the illustration of social market economic performance, social peace, equal opportunity and ecological sustainability around the world, depending on user selection. Located below, a combo chart (line graph and scatter plot) adjusts accordingly. If social market economic performance is selected, the combo chart shows the relationship between SMEX and income per capita for a surrogate (average) country as a line and adds the country's values as a scatter plot dot. Similarly, if another social market economic output variable is selected, the graph shows the relationship between the SMEX and the respective variable, highlighting the country's values as a scatter dot. Thus, the combo chart illustrates whether a selected country meets the performance that would be expected.

Lastly, I use a consistent color scale for the 5 categories in which values are shown following the similarity principle to stimulate the sensory memory. Specifically, whenever a value falls into below category it is colored in the following way:

- Very Low: Dark Red
- Low: Red
- Medium: Orange
- High: Yellow
- Very High: Green

As would be expected, the size of a bar or progress bar adjusts accordingly too. To focus the user's attention on the centerpiece – the analysis section – it occupies the middle third of the tool and differs in background color.

Information on Demand. Although the presented story is about a country's compliance with social market economic principles and respective social peace, equal opportunity, ecological sustainability, and economic prosperity dividends, users may require background information. Three newspaper article style tooltips cover the social market economy, its potential and its impact when hovering over the section headers *Describe/Change*, *Analyze*, and *Compare*. Furthermore, a tooltip providing a short definition of the social market economy, social peace, equal opportunity, and ecological sustainability appears when hovering over the respective section above the geomap.

Lastly, I extend the visuals with tooltips as well. When hovering over a bar of the bar charts, a tooltip summarizes the respective principle, selected country and value category. The slider tooltip encourages the user to change the respective principle's value. Hovering over a specific country of the geomap initiates a tooltip confirming the country, the selected variable and the value category. Similarly, a tooltip words each value pair on the line and scatter dot of the combo chart. Figure 33 shows all available tooltips.

Obviously, user's might also demand technical background information regarding the estimation strategy and simulation framework. Hence, a technical background paper is available for download. Appendix D Technical Background Paper presents the content of the technical background paper.

Figure 33

Default View of the Data Visualization and Simulation – All available Tooltips
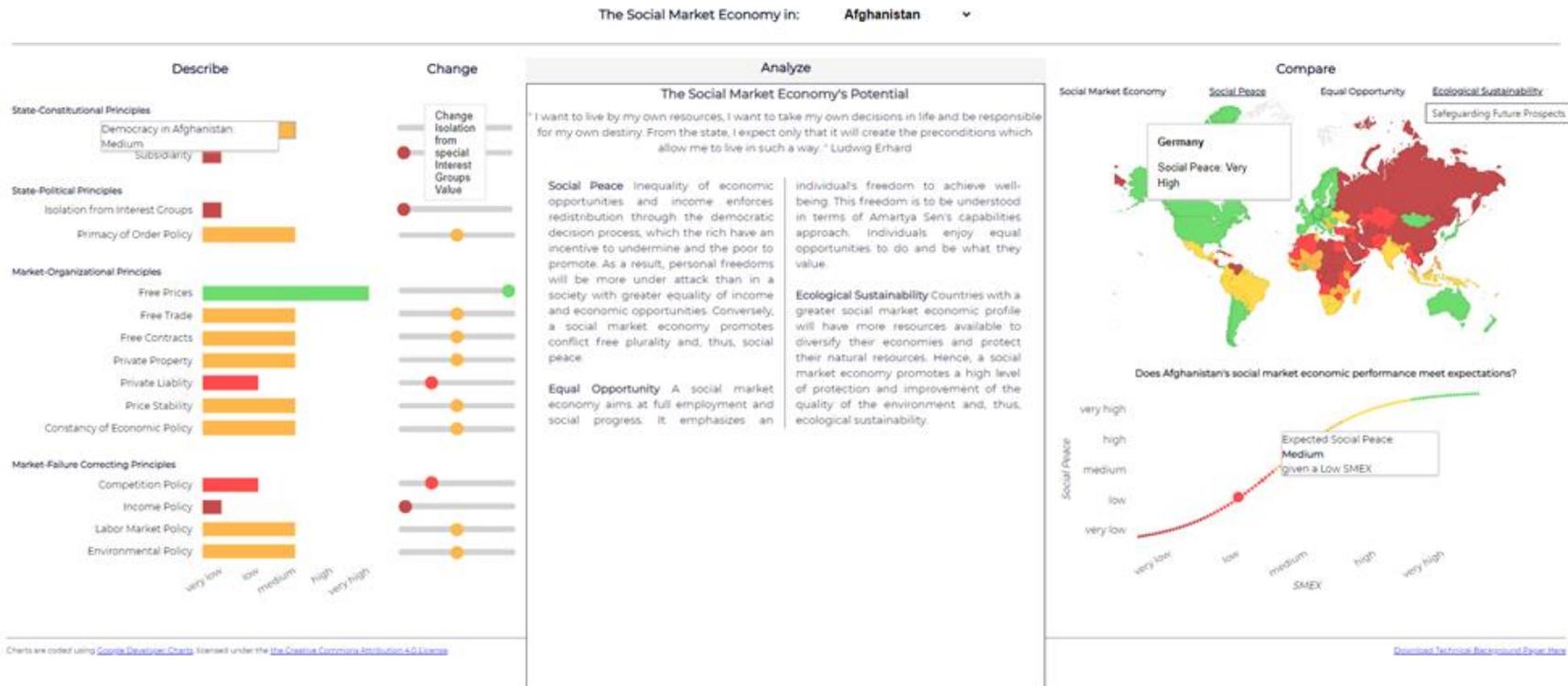
Note. Compilation of Screenshot of Author's Final Web Application to incorporate all available Tooltips.

Tell a Story. Thus, the balanced use of Gestalt Principles, a consistent composition of pre-attentive attributes, providing additional information through tooltips, and further positioning the story components following the F-pattern, guides the user across the tool (indicated by the red arrows in Figure 32). Moreover, the F-pattern establishes the storyline in chronological order, ending in the call for action, the economic dividend. Which is, conversely, emphasized through color and selected visual in a way that it allows the user to follow the story line in reversed order as well, depending on individual intuition. As indicated before, illustrated values depend on the country selected by the user. In order to let the user assume the role of the story teller, more interactive components are incorporated in the visualization and simulation tool. Specifically, by changing the value for individual social market economy principles, the users themselves generate a short country report. Additionally, depending on the users' input, she can decide whether the report looks favorably for a country. This particular part moves the user from the explanatory to the exploratory level.

Addressing Usability. Although design and user experience concepts are especially relevant while developing and coding the tool, Table 28 and 29 describe how the final product reflects these.

Table 28

Implementation of Design Concept

Concept	Implementation
Affordance	Background colors from white, over light grey to grey, as well as a traffic-light type color scale for values create a visual hierarchy. A drop-down menu, sliders and pointers on-hover are standard form controls to indicate user input.
Accessibility	An upstage Grid-Design adjusts the web application depending on the user's screen size and arranges to content such that it is orderly read by screen reading software. Added alt-text provides additional information for screen reading software, but also in case of unsuccessful loading. Text is used sparingly throughout the visualization tool. Yet, on-hover tooltips reveal background information targeted at users unfamiliar with the topic.
Aesthetics	Using standard visuals, following Gestalt Principles, using pre-attentive attributes, moving additional information into tooltips, and respecting the F-pattern the visualization and simulation tool presents a balanced and intuitive design.
Acceptance	Commonly used visuals for the available data, the arrangement of the components in a grid-system and allowing the story to follow the F-pattern are in line with average user habits.

Table 29

Implementation of User Experience Facets

Facet	Implementation
Usability	The visualization and simulation tool is developed as a web-based solution, thereby reaching a broad group of users with diverse backgrounds. Moreover, a drop-down menu, sliders and pointers on-hover are standard form controls to indicate user input. An upstage grid-design adjusts the tool content according to the screen size and supports the ease-of-use.
Useful Content	Commonly used visuals for the available data, balanced use of Gestalt Principles, a consistent composition of pre-attentive attributes, the arrangement of the components in a grid-system and allowing the story to follow the F-pattern are in line with average user habits. Additional background information, however, is available on demand to ensure informed decision making.
Desirable Content	A consistent color scale from dark red to bright green, similar to a traffic-light, triggers a call for action and reassurance, respectively. Exploratory components further allow the users to simulate an outcome according to their choosing.
Findability	Arranging individual components following the F-pattern establishes the storyline in chronological order, ending in the call for action (economic dividend). Which is, conversely, emphasized through color and visual in a way that it allows the user to follow the story line in reversed order as well, depending in individual intuition. Moreover, a drop-down menu, sliders and pointers on-hover are standard form controls to indicate user input.
Accessibility	An upstage Grid-Design adjust the web application depending on the user's screen size and arranges to content such that it orderly read by screen reading software. Added alt-text provides additional information for screen reading software, but also in case of unsuccessful loading. Text is used sparingly throughout the visualization tool. Yet, on-hover tooltips reveal background information targeted at users unfamiliar with the topic.
Credibility	Although the tool allows for user input, it does not require the user to share personal information. The download of a technical background paper establishes trust, credibility, and reproducibility in the presented data and results.
Valuable	The purpose of this visualization and simulation tool is to let the public participate in the academic research process and interact with research results in an intuitively usable and accessible format.

Limitations

Developing an interactive web-based data visualization and simulation tool shows that it is possible to transform research results into an intuitively accessible format. Yet, given the client-side solution, the following limitations still exist.

First, all major browsers execute in-built automatic browser refresh. A refresh of the website, however, sets the tool back to its default values, discarding all user input. Although an update grid-design allows for the display on a small screen (e. g. smartphone), automatic browser refresh is especially an issue on smartphones. Browsers use a lot of random-access memory (short RAM). To conserve system resources, the browser purges contents in intervals, that is often shorter on smartphones.

Second, when using client-side technologies, such as HTML and JavaScript, two important concerns arise: Protecting code from being hacked and protection of proprietary property. Known vulnerabilities are cross-site scripting and cross-site request forgery attacks. In cross-site scripting attacks, attackers manipulate web applications into performing malicious tasks, commonly resulting in identity and data theft. Cross-site request forgery attacks take over a user's identity by hijacking website cookies with the possible consequences of account tampering and data theft. My web-based tool, however, does not require the user to disclose sensitive or personal data, and the data used for the tool is publicly available from their original sources. Thus, the likelihood for my tool being the target for cross-site request forgery attacks is low. Cross-site scripting, on the other hand, may be possible but hampered significantly by the lack of text input opportunities. Since my code is publicly available, proprietary issues and code protection do not pose a limitation to this context.

Third, client-side performance in terms of page load time may be slowed down by unoptimized images, unused code, and unnecessary hypertext transfer protocol (short HTTP) requests. While my web-based tool does not render any images, it renders several graphs, for which I use the according content delivery network (short CDN) services. Coding, however, is an

iterative process. Continuously introduced improvements in HTML and CSS make junks of code superfluous. JavaScript is a well-established programming language as well. Its popularity and development potential are further enhanced by easy-to-incorporate open-source libraries, such as jQuery. Client-side performance in general, but JavaScript execution time in particular, depends on the correct implementation of code. In a similar vein, providing the code in several files increases the number of HTTP requests. Following best practices is essential to optimize client-side performance.

Lastly, I store the data for the data visualization and simulation tool in JSON format. Given the amount of data and its turnaround time – most data providers update their data once a year or even less frequently – JSON is a satisfactory solution. Data updates then require the replacement of the entire data file after a thorough data preparation process. Database usage might reduce the data update cost and automate the data preparation process but would also require a server-side solution for the data visualization and simulation tool.

Chapter 6

Conclusion

The concept of the social market economy suggests that market freedom combined with policies to promote equitable socio-economic development promote both peace and economic prosperity. Yet, the social market economy's own contributions barely make use of standard economic methodology, empirical analysis is limited to qualitative approaches, and academic research is mostly limited to disconnected discussions of the various principles of the social market economy paradigm. The nexus between comprehensive social market economic principles and peaceful and equitable social development still lacks substantial theoretical and quantitative support. To contribute to and improve dialogue around social market economic thought, this dissertation has asked:

> *How can the idea of a social market economy be conceptualized within standard economic methodology? How can its principles be measured? How can the effect of social market economic principles on peaceful and equitable social development be empirically assessed? And how can the findings be made available to a broader audience beyond academia?*

Blending the standard utility maximization framework with traditional growth theory, I proposed a micro-foundation conceptualization of the social market economy. For this purpose, I assumed a utility function in which an individual chooses the optimum amount of leisure and consumption, where consumption is a function of the individual's leisure choice and an exogenously determined productive resource (land). I then stylize assumptions of laissez-faire and socialism as follows: under laissez-faire the individual consumption and production decision is taken by the individual, whereas under socialism each individual produces goods for joint consumption. Individuals operating under the assumptions of laissez-faire capitalism choose to

allocate more time toward work and enjoy higher welfare. Conversely, individuals operating under the assumption of socialism choose to allocate more time toward leisure and enjoy lower welfare. The idea of a social market economy enters this framework through the exogenous allocation of productive economic opportunities. Specifically, it highlights that aggregate welfare is only maximized under equal opportunity, which in the model translates into equal land distribution. The model generates four testable hypotheses:

(5) Countries with greater social market economic profiles experience
    greater economic prosperity.

(6) Social market economic principles prioritize equal opportunities.

(7) Social market economic principles promote social peace through
    the reduction of political polarization associated with redistributive
    conflict from inequitable development.

(8) Social market economic principles contribute to the ecologically
    sustainable use of resources.

To explore the implicit relationships between compliance with social market economic principles and peace, prosperity, and ecological sustainability, I identified proxies for the 15 social market economic principles and constructed a social market economic performance index. My empirical analysis indicates that countries with greater social market economic profiles experience greater economic prosperity, enjoy more equal opportunities, benefit from more social peace, and use resources ecologically more sustainable. These results allowed for the conclusion that compliance with social market economic principles impacts peaceful and prosperous socio-economic development positively.

What exactly are the implications of these results? Using my empirical results, I proposed a simulation framework, which I then apply to the case of Lebanon as an example. Lebanon has a low overall social market economic performance index. With regards to social peace, equal opportunity, ecological sustainability, Lebanon has ratings of medium, medium, and very low,

respectively. Its economic prosperity in terms of per capita income is $7,462 (at constant 2015 prices).

Improving each of the 15 social market economic input variables by one category improves the social market economic performance index from low to high. The implementation of such social market economic adjustments is then estimated to change social peace, equal opportunity, and ecological sustainability to scores of very high, high, and low, respectively, and increases long-run per capita income by $10,547 to $18,009.

Similar simulations can be conducted for other countries. However, when such estimates remain hidden behind abstract econometric coefficients, academic research barely spills over into public debate. Thus, beyond conceptualizing the social market economy from a microeconomic perspective, building a social market economic performance index, and testing hypotheses about its socioeconomic impact, this dissertation's objective has been to improve the dialogue between social market economists, mainstream economists, and the public.

Therefore, I developed a methodical framework to transform research results into an intuitively usable format by bringing together data visualization techniques, visualization principles, design, user interface, and user experience concepts. Following the resulting *data-storytelling-dashboard-design* framework, I coded an interactive client-side data visualization and simulation tool. An informal usability testing helped to customize the tool and confirmed the tool's value. Besides allowing the user to generate specific country profiles, the tool empowers the user to assume the role of the storyteller. Specifically, the user can implement policy changes and immediately generate insights with respect to the impact these changes may have in terms of economic prosperity, social peace, equal opportunity, and ecological sustainability.

Despite methodological and methodical limitations of the data analysis and web application respectively, this dissertation endeavor's contributions are specifically:

- A conceptualization of the social market economy idea using the standard methodology of economics

- An estimate of social market economic performance for 165 countries

- Theoretical and empirical support for the social market economy's contributions to peaceful and equitable social development

- A methodical framework to transform research results into an intuitively usable format

- The implementation of an interactive, country-specific social market economic policy evaluation tool

More generally, this dissertation further stresses the untapped potential of cross-disciplinary approaches to research and the importance of effective communication to conclude the research process. By investigating how compliance with social market economic principles impacts peaceful and prosperous socio-economic development, I hope to provide new insights and opportunities to better understand peaceful socioeconomic development. These insights may be useful beyond academia. With the development of an interactive web-based visualization and simulation tool, I aim at facilitating support for practitioners in conflict management, peacebuilding, and development, as well as policy programming and decision-making in humanitarian crisis situations.

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Appendix A

Development of a Social Market Economic Performance Index

Table A1

OLS Regression Results to Estimate Missing Observations

DV's \ IV's	const	Income per capita	Democracy	EAP	EECA	LAC	MENA	SA	SSA	WE	n	R2	F-Stat
Democracy	-	-	-	-	-	-	-	-	-	-	-	-	-
Subsidiarity	0.04 (0.21)	0.08* (0.02)	0* (0)	-0.3* (0.13)	-0.32* (0.13)	-0.39* (0.13)	-0.51* (0.14)	-0.3* (0.15)	-0.4* (0.14)	-0.26* (0.13)	161	0.51	17.26
Protection from Special Interest Groups	-37.37* (11.5)	10.1* (0.85)	0.69* (0.15)	-8.12 (7.59)	-13.34* (7.43)	-18.19* (7.48)	-13.17* (7.69)	-4.81 (8.44)	-5.58 (7.82)	-4.65 (7.35)	164	0.74	49.67
Primacy of Order Over Discretionary Policy	-	-	-	-	-	-	-	-	-	-	-	-	-
Distortive Effects of Taxes and Subsidies on Competition	1.11 (0.73)	0.31* (0.06)	-0.02 (0.01)	0.27 (0.45)	-0.06 (0.44)	-0.54 (0.44)	0.18 (0.46)	0.36 (0.52)	0.2 (0.46)	0.09 (0.43)	134	0.44	10.61
Debt Dynamics	0.29 (0.95)	0.43* (0.07)	-0.01 (0.01)	1.22* (0.6)	0.92 (0.59)	0.59 (0.59)	0.34 (0.61)	1.2* (0.67)	0.66 (0.62)	0.59 (0.58)	143	0.40	10.01
Macroeconomic Environment	-0.71 (0.75)	0.53* (0.06)	-0.01 (0.01)	0.08 (0.46)	-0.14 (0.45)	-1.33* (0.45)	-0.58 (0.47)	0.17 (0.53)	-0.41 (0.48)	-0.19 (0.44)	134	0.71	33.70
Adjusted Savings	1.99* (1)	-0.09 (0.07)	-0.06* (0.01)	0.32 (0.65)	0.03 (0.64)	0.41 (0.64)	0.25 (0.66)	-0.57 (0.73)	0.62 (0.67)	-0.27 (0.63)	163	0.35	8.98
Free Prices	40.87* (10.35)	2.79* (0.77)	0.51* (0.13)	10.18 (6.73)	7.92 (6.61)	2.92 (6.65)	7.07 (6.83)	8.98 (7.52)	11 (6.95)	5.12 (6.52)	163	0.24	5.37
Free Trade	39.08* (9.87)	3.91* (0.73)	0.22* (0.13)	2.73 (6.41)	7.51 (6.3)	-0.23 (6.34)	-2.36 (6.51)	-1.11 (7.17)	-2.06 (6.63)	2.73 (6.22)	163	0.49	16.66
Free Contracts	15.32 (12.37)	5.78* (0.91)	0.5* (0.16)	2.55 (8.14)	-0.4 (8)	-10.95 (8.05)	-3.29 (8.27)	1.55 (9.08)	-7.04 (8.41)	-2.97 (7.9)	164	0.54	20.04
Private Property Rights	-22.21* (11.82)	9.33* (0.87)	0.64* (0.15)	1.4 (7.79)	-1.01 (7.65)	-16.1* (7.7)	-4.1 (7.91)	1.45 (8.68)	-2.95 (8.04)	-1.22 (7.56)	164	0.72	43.30
Private Liability	0.94 (0.92)	0.39* (0.07)	-0.02 (0.01)	-0.17 (0.57)	-0.92* (0.55)	-1.33* (0.56)	-0.23 (0.58)	-0.05 (0.65)	0.01 (0.59)	-0.45 (0.54)	134	0.46	11.71
Price Stability	-	-	-	-	-	-	-	-	-	-	-	-	-
Constancy of Economic Policy	0.66 (1.02)	0.43* (0.08)	-0.02 (0.02)	-0.15 (0.63)	-0.75 (0.61)	-0.84 (0.62)	-0.42 (0.64)	0.05 (0.72)	0.09 (0.65)	-0.17 (0.6)	134	0.39	8.65
Competition Policy	1.14* (0.66)	0.38* (0.05)	-0.01 (0.01)	-0.41 (0.42)	-0.88* (0.41)	-1.14* (0.41)	-0.9* (0.43)	-0.37 (0.47)	-0.45 (0.43)	-0.3 (0.4)	143	0.59	20.95
Income Policy	-53.1* (24.4)	12.12* (1.94)	1.06* (0.36)	-16.11 (14.06)	11.72 (13.95)	-12.86 (14.06)	-29.68* (14.5)	-27.45* (16.04)	-23.48 (15.16)	5.36 (13.61)	110	0.75	32.95
Labor Market Policy	-	-	-	-	-	-	-	-	-	-	-	-	-
Cooperation in labor-employer relations	3.16* (0.69)	0.19* (0.05)	-0.01 (0.01)	-0.06 (0.42)	-0.4 (0.41)	-0.59 (0.42)	-0.33 (0.43)	-0.28 (0.49)	-0.36 (0.44)	-0.09 (0.4)	134	0.33	6.74
Workers' rights	32.06 (22.91)	2.91 (1.83)	1.15* (0.34)	9.54 (13.37)	13.57 (13.03)	3.52 (13.15)	-5.66 (13.66)	5.95 (15.49)	13.42 (14.07)	12.48 (12.74)	121	0.35	6.73
Environmental Policy	5.86* (3.38)	0.93* (0.26)	0.23* (0.05)	7.4* (2.07)	6.31* (2.02)	6.07* (2.04)	6.71* (2.12)	7.08* (2.39)	8.2* (2.15)	8.7* (1.98)	134	0.46	11.97

* p-value ≤0.1
standard errors in parentheses
components of overall score in italics below overall score

Table A2

Correlation Matrix of SME Input variables to identify Individual Weights for SMEX

Variable	Democracy	Subsidiarity	Protection from Special Interest Groups	Primacy of order over discretionary policy	Free Prices	Free Trade	Free Contracts	Private Property Rights	Private Liability	Price Stability	Constancy of Economic Policy	Competition Policy	Income Policy	Labor Market Policy	Environmental Policy
Democracy	1	0.39	0.44	0.26	0.38	0.34	0.35	0.39	-0.04	0.09	0.03	0.19	0.48	0.32	0.53
Subsidiarity	0.39	1	0.67	0.57	0.25	0.52	0.56	0.61	0.32	0.11	0.34	0.58	0.63	0.43	0.42
Protection from Special Interest Groups	0.44	0.67	1	0.8	0.46	0.65	0.72	0.86	0.62	0.27	0.65	0.8	0.66	0.58	0.54
Primacy of Order over Discretionary Policy	0.26	0.57	0.8	1	0.5	0.63	0.73	0.85	0.66	0.35	0.71	0.78	0.59	0.59	0.43
Free Prices	0.38	0.25	0.46	0.5	1	0.38	0.46	0.56	0.37	0.56	0.46	0.47	0.27	0.39	0.41
Free Trade	0.34	0.52	0.65	0.63	0.38	1	0.65	0.68	0.3	0.2	0.4	0.49	0.63	0.43	0.32
Free Contracts	0.35	0.56	0.72	0.73	0.46	0.65	1	0.83	0.5	0.26	0.56	0.65	0.58	0.48	0.38
Private Property Rights	0.39	0.61	0.86	0.85	0.56	0.68	0.83	1	0.63	0.31	0.69	0.81	0.66	0.62	0.52
Private Liability	-0.04	0.32	0.62	0.66	0.37	0.3	0.5	0.63	1	0.36	0.89	0.77	0.17	0.53	0.27
Price Stability	0.09	0.11	0.27	0.35	0.56	0.2	0.26	0.31	0.36	1	0.39	0.37	0.11	0.26	0.25
Constancy of Economic Policy	0.03	0.34	0.65	0.71	0.46	0.4	0.56	0.69	0.89	0.39	1	0.77	0.26	0.6	0.29
Competition Policy	0.19	0.58	0.8	0.78	0.47	0.49	0.65	0.81	0.77	0.37	0.77	1	0.48	0.6	0.43
Income Policy	0.48	0.63	0.66	0.59	0.27	0.63	0.58	0.66	0.17	0.11	0.26	0.48	1	0.47	0.52
Labor Market Policy	0.32	0.43	0.58	0.59	0.39	0.43	0.48	0.62	0.53	0.26	0.6	0.6	0.47	1	0.46
Environmental Policy	0.53	0.42	0.54	0.43	0.41	0.32	0.38	0.52	0.27	0.25	0.29	0.43	0.52	0.46	1

Table A3

Summed Correlation and Resulting Weights for SMEX Input Variables

Measure	Democracy	Subsidiarity	Protection from Special Interest Groups	Primacy of order over discretionary policy	Free Prices	Free Trade	Free Contracts	Private Property Rights	Private Liability	Price Stability	Constancy of Economic Policy	Competition Policy	Income Policy	Labor Market Policy	Environmental Policy
Summed Correlation (absolute values)	5.23	7.4	9.72	9.46	6.95	7.63	8.69	10.01	7.42	4.9	8.02	9.19	7.51	7.79	6.78
Resulting Weight	0.09	0.07	0.05	0.05	0.07	0.07	0.06	0.05	0.07	0.09	0.06	0.05	0.07	0.07	0.08

Appendix B

Testing the Hypotheses

Table B1

Summary Statistics for SME Output and Control Variables (without dummy variables)

Variable	Mean	Median	Min	Max	SD	IQR	n
Social Peace	55.88	60	1	101	29.51	53	165
Equal Opportunity	57.03	55.34	1	101	27.01	45.81	144
Ecological Sustainability	32.55	26.24	1	101	29.51	54.63	135
Economic Prosperity	8.52	8.46	4.67	11.56	1.44	2.25	165
SMEX	46.92	43.88	0	100	21.72	27.13	165
Ethnic Fractionalization	0.46	0.45	0.02	0.89	0.25	0.47	154
Religious Polarization	0.63	0.69	0.03	1	0.29	0.49	160
Manufactures and Services Export Share	1.8	1.87	0	5.05	1.49	3.12	165
Natural Resource Rents	1.56	1.29	0	4.02	1.14	1.98	165
Years since Independence	133.21	63	9	1077	183.08	103.5	165

Table B2

Correlation Matrix of SME Output and Control Variables

Variable	Social Peace	Equal Opportunity	Ecological Sustainability	Economic Prosperity	SMEX	Ethnic Fractionalization	Religious Polarization	Manufactures and Services Export Share	Natural Resource Rents	Years since Independence
Social Peace	1	0.62	0.64	0.55	0.78	-0.19	0.2	0.57	-0.55	0.26
Equal Opportunity	0.62	1	0.48	0.91	0.82	-0.44	0.21	0.65	-0.51	0.36
Ecological Sustainability	0.64	0.48	1	0.46	0.62	-0.17	0.05	0.48	-0.59	0.37
Economic Prosperity	0.55	0.91	0.46	1	0.79	-0.33	0.15	0.6	-0.41	0.39
SMEX	0.78	0.82	0.62	0.79	1	-0.28	0.22	0.64	-0.55	0.38
Ethnic Fractionalization	-0.19	-0.44	-0.17	-0.33	-0.28	1	0.16	-0.39	0.38	-0.14
Religious Polarization	0.2	0.21	0.05	0.15	0.22	0.16	1	0.06	-0.11	0.03
Manufactures and Services Export Share	0.57	0.65	0.48	0.6	0.64	-0.39	0.06	1	-0.57	0.22
Natural Resource Rents	-0.55	-0.51	-0.59	-0.41	-0.55	0.38	-0.11	-0.57	1	-0.27
Years since Independence	0.26	0.36	0.37	0.39	0.38	-0.14	0.03	0.22	-0.27	1

Table B3

Logistic Regression Results with DV: Social Peace and IV: Social Market Economic Weighted Average

Variable	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
const	-5.92* (0.63)	-5.78* (0.75)	-5.79* (0.76)	-5.74* (0.78)	-5.36* (0.82)	-5.38* (0.83)	-5.67* (0.86)	-5.15* (1.46)	-5.59* (0.84)	-5.05* (1.43)	-5.26* (0.84)	-4.88* (1.4)	-5.13* (1.46)
SMEWA	0.14* (0.01)	0.14* (0.01)	0.14* (0.01)	0.14* (0.01)	0.13* (0.01)	0.13* (0.01)	0.13* (0.01)	0.12* (0.01)	0.13* (0.01)	0.12* (0.01)	0.13* (0.01)	0.13* (0.01)	0.12* (0.01)
Income per capita	-0.14 (0.12)	-0.15 (0.12)	-0.15 (0.12)	-0.15 (0.12)	-0.12 (0.12)	-0.12 (0.13)	-0.1 (0.13)	-0.08 (0.15)	-0.11 (0.13)	-0.09 (0.15)	-0.11 (0.13)	-0.13 (0.15)	-0.11 (0.15)
Ethnic Fractionalization		-0.15 (0.44)	-0.19 (0.46)	-0.16 (0.47)	0.00 (0.48)	0.00 (0.48)	-0.13 (0.49)	-0.51 (0.47)	-0.08 (0.48)	-0.46 (0.47)	0.00 (0.48)	-0.45 (0.46)	-0.47 (0.47)
Religious Polarization			0.12 (0.37)	0.13 (0.38)	0.09 (0.38)	0.09 (0.38)	0.13 (0.38)	0.09 (0.37)	0.09 (0.38)	0.07 (0.38)	0.04 (0.38)	0.2 (0.38)	0.2 (0.38)
Manufactures and Services Export Share				0.02 (0.1)	-0.02 (0.1)	-0.02 (0.1)	0.01 (0.1)	0.04 (0.1)	0.01 (0.1)	0.04 (0.1)	-0.03 (0.1)	0.04 (0.1)	0.04 (0.1)
Natural Resource Rents					-0.18 (0.12)	-0.18 (0.12)	-0.18 (0.12)	-0.03 (0.11)	-0.19 (0.12)	-0.04 (0.11)	-0.18 (0.12)	-0.03 (0.11)	-0.03 (0.12)
Years since Independence						0.00 (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00* (0.00)
Colonial Past							0.31 (0.25)	0.2 (0.26)					0.14 (0.31)
Former Western Colony									0.33 (0.24)	0.18 (0.26)			0.05 (0.31)
Former Western Hegemon											0.48 (0.54)	-0.95 (0.6)	-0.9 (0.61)
EAP								-0.59 (0.89)		-0.6 (0.89)		-0.69 (0.87)	-0.59 (0.89)
EECA								-0.68 (0.91)		-0.68 (0.92)		-0.82 (0.88)	-0.65 (0.92)
LAC								0.66 (0.88)		0.65 (0.88)		0.62 (0.87)	0.7 (0.89)
MENA								-1.01 (0.9)		-1.01 (0.9)		-0.95 (0.9)	-0.91 (0.9)
SA								-0.15 (1.01)		-0.17 (1.01)		-0.23 (0.99)	-0.13 (1.01)
SSA								0.05 (0.92)		0.03 (0.91)		0.01 (0.91)	0.06 (0.91)
WE								1.37 (0.89)		1.38 (0.89)		1.76* (0.92)	1.84* (0.94)
n	151	151	151	151	151	151	151	151	151	151	151	151	151
Adj. R2	0.63	0.63	0.63	0.62	0.63	0.62	0.63	0.7	0.63	0.7	0.62	0.7	0.71
F-Stat	128.85	85.64	63.71	50.65	42.95	36.57	32.29	24.82	32.43	24.8	32.05	25.3	22.1

* p-value ≤0.1

standard errors in parentheses

Table B4

Logistic Regression Results with DV: Equal Opportunity and IV: Social Market Economic Weighted Average

Variable	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
const	-8.31* (0.48)	-7.61* (0.58)	-7.66* (0.57)	-7.54* (0.59)	-7.5* (0.61)	-7.53* (0.62)	-7.38* (0.63)	-7.52* (1.14)	-7.39* (0.61)	-7.3* (1.11)	-7.51* (0.63)	-7.66* (1.09)	-7.4* (1.11)
SMEWA	0.05* (0.01)	0.05* (0.01)	0.05* (0.01)	0.04* (0.01)	0.04* (0.01)	0.04* (0.01)	0.04* (0.01)	0.03* (0.01)	0.04* (0.01)	0.04* (0.01)	0.04* (0.01)	0.04* (0.01)	0.04* (0.01)
Income per capita	0.69* (0.09)	0.65* (0.09)	0.65* (0.09)	0.63* (0.09)	0.64* (0.09)	0.65* (0.1)	0.64* (0.1)	0.65* (0.12)	0.66* (0.09)	0.66*(0.12)	0.65* (0.1)	0.63* (0.12)	0.63* (0.12)
Ethnic Fractionalization		-0.7* (0.33)	-0.83* (0.34)	-0.77* (0.34)	-0.74* (0.36)	-0.74* (0.36)	-0.65* (0.37)	-0.47 (0.39)	-0.62* (0.36)	-0.5 (0.39)	-0.74* (0.36)	-0.47 (0.39)	-0.51 (0.39)
Religious Polarization			0.49* (0.28)	0.51* (0.28)	0.5* (0.28)	0.49* (0.28)	0.46 (0.29)	0.41 (0.32)	0.49* (0.28)	0.44 (0.31)	0.49* (0.29)	0.53* (0.32)	0.59* (0.32)
Manufactures and Services Export Share				0.06 (0.07)	0.05 (0.07)	0.05 (0.07)	0.02 (0.08)	-0.02 (0.08)	-0.01 (0.08)	-0.03 (0.08)	0.05 (0.07)	-0.01 (0.08)	-0.02 (0.08)
Natural Resource Rents					-0.03 (0.09)	-0.03 (0.09)	-0.03 (0.09)	-0.01 (0.1)	-0.02 (0.09)	0.01 (0.1)	-0.03 (0.09)	0.00 (0.1)	0.02 (0.1)
Years since Independence						0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Colonial Past							-0.21 (0.18)	-0.08 (0.2)					0.15 (0.24)
Former Western Colony									-0.42* (0.18)	-0.36* (0.2)			-0.51* (0.24)
Former Western Hegemon											0.06 (0.37)	-0.77* (0.45)	-0.9* (0.45)
EAP								0.75 (0.68)		0.61 (0.67)		0.8 (0.66)	0.63 (0.67)
EECA								0.71 (0.69)		0.43 (0.69)		0.82 (0.66)	0.46 (0.69)
LAC								0.29 (0.67)		0.17 (0.66)		0.38 (0.66)	0.24 (0.66)
MENA								0.35 (0.69)		0.26 (0.68)		0.46 (0.68)	0.36 (0.67)
SA								0.68 (0.76)		0.54 (0.75)		0.76 (0.75)	0.58 (0.75)
SSA								0.26 (0.7)		0.21 (0.69)		0.3 (0.69)	0.23 (0.68)
WE								1.44* (0.67)		1.26* (0.66)		1.89* (0.69)	1.73* (0.69)
n	135	135	135	135	135	135	135	135	135	135	135	135	135
Adj. R2	0.75	0.76	0.76	0.76	0.76	0.76	0.76	0.77	0.77	0.78	0.76	0.78	0.78
F-Stat	206.98	143.21	109.93	87.9	72.74	61.92	54.47	31.28	56.95	32.25	53.77	32.19	29.32

* p-value ≤0.1

standard errors in parentheses

Table B5

Logistic Regression Results with DV: Ecological Sustainability and IV: Social Market Economic Weighted Average

Variable	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
const	-6.02* (1.22)	-5.67* (1.39)	-5.62* (1.39)	-5.18* (1.41)	-3.84* (1.34)	-3.19* (1.31)	-2.98* (1.32)	-2.7 (2.23)	-3.19* (1.31)	-3.34 (2.22)	-3.07* (1.33)	-3.49 (2.2)	-2.71 (2.25)
SMEWA	0.13* (0.02)	0.13* (0.02)	0.13* (0.02)	0.12* (0.02)	0.09* (0.02)	0.09* (0.02)	0.09* (0.02)	0.09* (0.02)	0.09* (0.02)	0.09* (0.02)	0.08* (0.02)	0.09* (0.02)	0.09* (0.02)
Income per capita	-0.31 (0.21)	-0.32 (0.21)	-0.32 (0.21)	-0.37* (0.21)	-0.17 (0.2)	-0.29 (0.2)	-0.29 (0.2)	-0.34 (0.24)	-0.29 (0.2)	-0.3 (0.24)	-0.29 (0.2)	-0.26 (0.24)	-0.31 (0.25)
Ethnic Fractionalization		-0.4 (0.75)	-0.22 (0.77)	0.07 (0.78)	0.92 (0.75)	0.86 (0.73)	1.05 (0.74)	0.36 (0.8)	0.85 (0.74)	0.21 (0.8)	0.87 (0.73)	0.19 (0.8)	0.37 (0.8)
Religious Polarization			-0.69 (0.65)	-0.59 (0.64)	-0.93 (0.6)	-0.68 (0.59)	-0.76 (0.59)	-0.69 (0.65)	-0.68 (0.59)	-0.64 (0.66)	-0.72 (0.59)	-0.78 (0.68)	-0.82 (0.68)
Manufactures and Services Export Share				0.26* (0.15)	0.04 (0.15)	0.08 (0.15)	0.03 (0.15)	0.13 (0.16)	0.08 (0.15)	0.16 (0.16)	0.08 (0.15)	0.16 (0.16)	0.13 (0.16)
Natural Resource Rents					-0.79* (0.18)	-0.72* (0.17)	-0.73* (0.17)	-0.62* (0.19)	-0.72* (0.18)	-0.59* (0.19)	-0.72* (0.18)	-0.61* (0.19)	-0.64* (0.19)
Years since Independence						0.00* (0.00)	0.00* (0.00)	0.00* (0.00)	0.00* (0.00)	0.00* (0.00)	0.00* (0.00)	0.00* (0.00)	0.00* (0.00)
Colonial Past							-0.38 (0.35)	-0.63* (0.38)					-0.73 (0.47)
Former Western Colony									0.03 (0.35)	-0.24 (0.39)			0.23 (0.48)
Former Western Hegemon											0.36 (0.72)	0.7 (0.88)	0.59 (0.89)
EAP								-0.08 (1.3)		0.17 (1.31)		0.3 (1.29)	-0.01 (1.31)
EECA								-0.94 (1.32)		-0.65 (1.35)		-0.45 (1.29)	-0.82 (1.35)
LAC								0.93 (1.28)		1.1 (1.29)		1.15 (1.28)	0.94 (1.29)
MENA								-0.53 (1.31)		-0.49 (1.32)		-0.54 (1.32)	-0.57 (1.32)
SA								-0.94 (1.54)		-0.63 (1.55)		-0.55 (1.54)	-0.92 (1.55)
SSA								0.46 (1.34)		0.56 (1.36)		0.61 (1.35)	0.48 (1.35)
WE								-0.1 (1.28)		0.1 (1.3)		-0.13 (1.36)	-0.32 (1.36)
n	124	124	124	124	124	124	124	124	124	124	124	124	124
Adj. R2	0.36	0.36	0.36	0.37	0.45	0.49	0.49	0.53	0.49	0.52	0.49	0.52	0.53
F-Stat	35.55	23.65	18.04	15.22	17.84	18.11	16.02	10.36	15.71	9.98	15.77	10.02	9.06

* p-value ≤0.1

standard errors in parentheses

Table B6

OLS Regression Results with DV: Income per Capita and IV: Social Market Economic Weighted Average

Variable	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
const	3.78* (0.3)	4.31* (0.38)	4.31* (0.39)	4.45* (0.39)	3.96* (0.45)	4.03* (0.44)	4.18* (0.46)	5.4* (0.7)	4.08* (0.45)	5.23* (0.71)	3.95* (0.46)	5.00* (0.69)	5.27* (0.7)
SMEWA	0.09* (0.01)	0.08* (0.01)	0.08* (0.01)	0.07* (0.01)	0.08* (0.01)	0.07* (0.01)	0.07* (0.01)	0.06* (0.01)	0.07* (0.01)	0.06* (0.01)	0.07* (0.01)	0.06* (0.01)	0.06* (0.01)
Income per capita													
Ethnic Fractionalization		-0.7* (0.3)	-0.68* (0.31)	-0.48 (0.32)	-0.61* (0.32)	-0.59* (0.32)	-0.5 (0.33)	0.16 (0.27)	-0.57* (0.32)	0.1 (0.27)	-0.6* (0.32)	0.12 (0.27)	0.18 (0.27)
Religious Polarization			0.11 (0.26)	0.15 (0.26)	0.18 (0.25)	0.23 (0.25)	0.19 (0.25)	0.76* (0.21)	0.22 (0.25)	0.79* (0.21)	0.25 (0.25)	0.85* (0.21)	0.82* (0.21)
Manufactures and Services Export Share				0.15* (0.06)	0.19* (0.07)	0.2* (0.07)	0.17* (0.07)	0.18* (0.06)	0.19* (0.07)	0.19* (0.06)	0.2* (0.07)	0.19* (0.06)	0.18* (0.06)
Natural Resource Rents					0.17* (0.08)	0.18* (0.08)	0.18* (0.08)	0.13* (0.07)	0.18* (0.08)	0.14* (0.07)	0.18* (0.08)	0.13* (0.07)	0.13* (0.07)
Years since Independence						0.00* (0.00)	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00 (0.00)
Colonial Past							-0.22 (0.17)	-0.25* (0.15)					-0.28 (0.18)
Former Western Colony									-0.1 (0.16)	-0.11 (0.15)			0.01 (0.18)
Former Western Hegemon											-0.24 (0.36)	-0.62* (0.34)	-0.67* (0.34)
EAP								-1.07* (0.51)		-1.01* (0.5)		-0.92* (0.5)	-1.04* (0.51)
EECA								-1.15* (0.52)		-1.06* (0.53)		-0.89* (0.5)	-1.11* (0.52)
LAC								-0.43 (0.51)		-0.37 (0.52)		-0.28 (0.51)	-0.39 (0.51)
MENA								0.04 (0.52)		0.07 (0.53)		0.16 (0.52)	0.11 (0.52)
SA								-1.48* (0.57)		-1.43* (0.57)		-1.32* (0.56)	-1.43* (0.57)
SSA								-1.75* (0.51)		-1.73* (0.51)		-1.66* (0.51)	-1.69* (0.51)
WE								-0.35 (0.51)		-0.29 (0.52)		0.11 (0.54)	-0.01 (0.54)
n	165	154	151	151	151	151	151	151	151	151	151	151	151
Adj. R2	0.89	0.88	0.89	0.87	0.86	0.64	0.85	0.79	0.65	0.79	0.65	0.79	0.79
F-Stat	265.53	129.51	81.92	64.81	54.02	47.12	40.83	41.52	40.26	40.62	40.28	41.62	37.06

* p-value ≤0.1

standard errors in parentheses

Table B7

Regression Results of Model Specification XIII after Dropping all Missing Observations

IV \ DV	Social Peace		Equal Opportunity		Ecological Sustainability		Economic Prosperity	
const	-2.02 (1.71)	-5.09* (1.65)	-6.37* (1.18)	-7.27* (1.14)	-0.2 (2.34)	-2.87 (2.25)	6.54* (0.63)	4.97* (0.72)
SMEX	0.07* (0.01)		0.02* (0.01)		0.06* (0.01)		0.04* (0)	
SMEWA		0.12* (0.02)		0.03* (0.01)		0.1* (0.02)		0.06* (0.01)
Income per capita	0.00 (0.19)	0.00 (0.19)	0.61* (0.13)	0.61* (0.13)	-0.4 (0.26)	-0.4 (0.26)		
Ethnic Fractionalization	-0.85 (0.59)	-0.85 (0.59)	-0.44 (0.41)	-0.44 (0.41)	0.45 (0.81)	0.45 (0.81)	0.15 (0.31)	0.15 (0.31)
Religious Polarization	0.25 (0.51)	0.25 (0.51)	0.93* (0.35)	0.93* (0.35)	-0.96 (0.69)	-0.96 (0.69)	0.87* (0.25)	0.87* (0.25)
Manufactures and Services Export Share	-0.07 (0.12)	-0.07 (0.12)	-0.01 (0.08)	-0.01 (0.08)	0.18 (0.17)	0.18 (0.17)	0.19* (0.06)	0.19* (0.06)
Natural Resource Rents	-0.06 (0.14)	-0.06 (0.14)	0.04 (0.1)	0.04 (0.1)	-0.62* (0.19)	-0.62* (0.19)	0.16* (0.07)	0.16* (0.07)
Years since Independence	0.00* (0.00)	0.00* (0.00)	0.00 (0.00)	0.00 (0.00)	0.00* (0.00)	0.00* (0.00)	0.00 (0.00)	0.00 (0.00)
Colonial Past	0.07 (0.35)	0.07 (0.35)	0.24 (0.24)	0.24 (0.24)	-0.82* (0.48)	-0.82* (0.48)	-0.27 (0.18)	-0.27 (0.18)
Former Western Colony	-0.08 (0.36)	-0.08 (0.36)	-0.59* (0.25)	-0.59* (0.25)	0.47 (0.5)	0.47 (0.5)	0.11 (0.19)	0.11 (0.19)
Former Western Hegemon	-0.91 (0.65)	-0.91 (0.65)	-0.98* (0.45)	-0.98* (0.45)	0.6 (0.89)	0.6 (0.89)	-0.64* (0.34)	-0.64* (0.34)
EAP	-0.89 (0.96)	-0.89 (0.96)	0.62 (0.66)	0.62 (0.66)	0.09 (1.31)	0.09 (1.31)	-0.89* (0.5)	-0.89* (0.5)
EECA	-0.72 (0.99)	-0.72 (0.99)	0.39 (0.68)	0.39 (0.68)	-0.67 (1.35)	-0.67 (1.35)	-1.06* (0.51)	-1.06* (0.51)
LAC	0.55 (0.94)	0.55 (0.94)	0.24 (0.65)	0.24 (0.65)	1.00 (1.29)	1.00 (1.29)	-0.35 (0.5)	-0.35 (0.5)
MENA	-1.16 (0.97)	-1.16 (0.97)	0.35 (0.67)	0.35 (0.67)	-0.38 (1.33)	-0.38 (1.33)	0.15 (0.51)	0.15 (0.51)
SA	-0.21 (1.13)	-0.21 (1.13)	0.65 (0.78)	0.65 (0.78)	-0.76 (1.55)	-0.76 (1.55)	-1.25* (0.58)	-1.25* (0.58)
SSA	0.14 (0.99)	0.14 (0.99)	0.12 (0.68)	0.12 (0.68)	0.58 (1.35)	0.58 (1.35)	-1.45* (0.5)	-1.45* (0.5)
WE	1.69* (1.00)	1.69* (1.00)	1.83* (0.69)	1.83* (0.69)	-0.27 (1.36)	-0.27 (1.36)	0.07 (0.52)	0.07 (0.52)
n	120	120	120	120	120	120	120	120
Adj. R2	0.74	0.74	0.8	0.8	0.6	0.6	0.8	0.8
F-Stat	17.1	17.1	23.68	23.68	8.89	8.89	25.87	25.87

* p-value ≤0.1

standard errors in parentheses

Table B8

Regression Results of Model Specification VI after taking a Random Sample (n=100) and

Dropping all Missing Observations

IV \ DV	Social Peace		Equal Opportunity		Ecological Sustainability		Economic Prosperity	
const	-3.24*	-7.28*	-5.49*	-6.72*	-1.44	-3.96*	6.31*	4.54*
	(1.87)	(1.7)	(1.16)	(1.06)	(1.89)	(1.72)	(0.43)	(0.59)
SMEX	0.09*		0.03*		0.06*		0.04*	
	(0.02)		(0.01)		(0.02)		(0.01)	
SMEWA		0.15*		0.05*		0.1*		0.07*
		(0.03)		(0.02)		(0.03)		(0.01)
Income per capita	-0.07	-0.07	0.57*	0.57*	-0.18	-0.18		
	(0.26)	(0.26)	(0.16)	(0.16)	(0.26)	(0.26)		
Ethnic Fractionalization	-0.2	-0.2	-1.4*	-1.4*	0.79	0.79	-0.71	-0.71
	(0.95)	(0.95)	(0.6)	(0.6)	(0.97)	(0.97)	(0.45)	(0.45)
Religious Polarization	-0.51	-0.51	0.56	0.56	-1.69*	-1.69*	0.33	0.33
	(0.68)	(0.68)	(0.42)	(0.42)	(0.69)	(0.69)	(0.32)	(0.32)
Manufactures and Services Export Share	0.09	0.09	-0.01	-0.01	0.06	0.06	0.1	0.1
	(0.16)	(0.16)	(0.1)	(0.1)	(0.16)	(0.16)	(0.08)	(0.08)
Natural Resource Rents	0.15	0.15	0.05	0.05	-0.72*	-0.72*	0.24*	0.24*
	(0.22)	(0.22)	(0.14)	(0.14)	(0.23)	(0.23)	(0.1)	(0.1)
Years since Independence	0.00	0.00	0.00	0.00	0.00	0.00	0.00*	0.00*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
n	72	72	72	72	72	72	72	72
Adj. R2	0.65	0.65	0.73	0.73	0.56	0.56	0.7	0.7
F-Stat	16.65	16.65	25.27	25.27	11.87	11.87	24.47	24.47

* p-value ≤0.1

standard errors in parentheses

Methodological Limitations

Table C1

Logit Regression Results with DV: Missing Observations Dummy and IV: Regional Dummies

Variable	const	EAP	EECA	LAC	MENA	SA	SSA	n	McFadden R2	Log-Likeli-hood
Missing Observation Dummy	-2.25* (0.74)	1.48* (0.89)	0.42 (0.92)	0.31 (0.97)	-0.64 (1.27)	1.96* (1.07)	2.51* (0.8)	165	0.18	-79.32

Table C2

Regression Results of Model Specification XIII with and without Missing Observation Dummy

IV \\ DV	Social Peace		Equal Opportunity		Ecological Sustainability		Economic Prosperity	
const	-1.87 (1.49)	-1.84 (1.51)	-6.41* (1.14)	-6.24* (1.16)	-0.32 (2.32)	-0.14 (2.33)	6.82* (0.62)	6.9* (0.62)
SMEX	0.07* (0.01)	0.07* (0.01)	0.02* (0.01)	0.02* (0.01)	0.05* (0.01)	0.06* (0.01)	0.04* (0.00)	0.03* (0.00)
Income per capita	-0.11 (0.15)	-0.12 (0.15)	0.63* (0.12)	0.61* (0.12)	-0.31 (0.25)	-0.36 (0.25)	-	-
Ethnic Fractionalization	-0.47 (0.47)	-0.48 (0.47)	-0.51 (0.39)	-0.51 (0.39)	0.37 (0.8)	0.39 (0.81)	0.18 (0.27)	0.17 (0.27)
Religious Polarization	0.2 (0.38)	0.2 (0.39)	0.59* (0.32)	0.59* (0.32)	-0.82 (0.68)	-0.88 (0.68)	0.82* (0.21)	0.81* (0.21)
Manufactures and Services Export Share	0.04 (0.1)	0.04 (0.1)	-0.02 (0.08)	-0.02 (0.08)	0.13 (0.16)	0.16 (0.16)	0.18* (0.06)	0.18* (0.06)
Natural Resource Rents	-0.03 (0.12)	-0.03 (0.12)	0.02 (0.1)	0.02 (0.1)	-0.64* (0.19)	-0.64* (0.19)	0.13* (0.07)	0.12* (0.07)
Years since Independence	0.00* (0.00)	0.00* (0.00)	0.00 (0.00)	0.00 (0.00)	0.00* (0.00)	0.00* (0.00)	0.00 (0.00)	0.00 (0.00)
Colonial Past	0.14 (0.31)	0.14 (0.31)	0.15 (0.24)	0.16 (0.24)	-0.73 (0.47)	-0.75 (0.47)	-0.28 (0.18)	-0.26 (0.18)
Former Western Colony	0.05 (0.31)	0.05 (0.31)	-0.51* (0.24)	-0.49* (0.24)	0.23 (0.48)	0.3 (0.49)	0.01 (0.18)	0.01 (0.18)
Former Western Hegemon	-0.9 (0.61)	-0.89 (0.61)	-0.9* (0.45)	-0.89* (0.45)	0.59 (0.89)	0.58 (0.89)	-0.67* (0.34)	-0.64* (0.34)
EAP	-0.59 (0.89)	-0.59 (0.9)	0.63 (0.67)	0.63 (0.67)	-0.01 (1.31)	0.01 (1.31)	-1.04* (0.51)	-1.02* (0.51)
EECA	-0.65 (0.92)	-0.65 (0.93)	0.46 (0.69)	0.44 (0.69)	-0.82 (1.35)	-0.81 (1.35)	-1.11* (0.52)	-1.12* (0.52)
LAC	0.7 (0.89)	0.7 (0.89)	0.24 (0.66)	0.21 (0.66)	0.94 (1.29)	0.97 (1.29)	-0.39 (0.51)	-0.41 (0.51)
MENA	-0.91 (0.9)	-0.92 (0.91)	0.36 (0.67)	0.33 (0.68)	-0.57 (1.32)	-0.48 (1.33)	0.11 (0.52)	0.07 (0.52)
SA	-0.13 (1.01)	-0.13 (1.01)	0.58 (0.75)	0.62 (0.75)	-0.92 (1.55)	-0.88 (1.55)	-1.43* (0.57)	-1.41* (0.57)
SSA	0.06 (0.91)	0.07 (0.92)	0.23 (0.68)	0.26 (0.68)	0.48 (1.35)	0.46 (1.35)	-1.69* (0.51)	-1.66* (0.51)
WE	1.84* (0.94)	1.84* (0.94)	1.73* (0.69)	1.74* (0.69)	-0.32 (1.36)	-0.33 (1.36)	-0.01 (0.54)	0.00 (0.54)
Missing Observation Dummy	-	-0.04 (0.28)	-	-0.25 (0.28)	-	0.82 (0.93)	-	-0.18 (0.16)
n	151	151	135	135	124	124	151	151
Adj. R2	0.71	0.7	0.78	0.78	0.53	0.53	0.65	0.65
F-Stat	22.09	20.71	29.32	27.68	9.06	8.58	37.06	35.01

* p-value ≤0.1

standard errors in parentheses

Table C3

Hausman Test Results of Model Specification XIII

IV \ DV	SMEX	Social Peace	SMEX	Equal Opportunity	SMEX	Ecological Sustainability	SMEX	Economic Prosperity
const	-5.1* (1.14)	-2.02 (3.21)	-5.07* (1.23)	-8.36* (2.52)	-5.32* (1.31)	-4.55 (5.05)	57.57* (12.5)	6.77 (4.77)
SMEX	-	0.07 (0.06)	-	-0.02 (0.05)	-	-0.03 (0.09)	-	0.04 (0.09)
Residual	-	0.00 (0.06)	-	0.04 (0.05)	-	0.08 (0.09)	-	0.00 (0.09)
Income per capita	0.53* (0.09)	-0.08 (0.66)	0.54* (0.1)	1.08* (0.53)	0.55* (0.11)	0.6 (0.99)	-	-
Ethnic Fractionalization	-0.2 (0.37)	-0.49 (0.53)	-0.35 (0.43)	-0.78 (0.49)	-0.35 (0.47)	-0.15 (0.97)	2.32 (5.85)	0.17 (0.37)
Religious Polarization	0.11 (0.3)	0.21 (0.4)	0.15 (0.35)	0.7* (0.34)	0.12 (0.4)	-0.69 (0.69)	11.3* (4.42)	0.81 (1.06)
Manufactures and Services Export Share	0.07 (0.08)	0.05 (0.13)	0.05 (0.09)	0.01 (0.09)	0.1 (0.09)	0.28 (0.23)	4.29* (1.14)	0.18 (0.39)
Natural Resource Rents	-0.12 (0.09)	-0.04 (0.2)	-0.12 (0.1)	-0.09 (0.16)	-0.1 (0.11)	-0.84* (0.29)	-3.22* (1.39)	0.13 (0.3)
Years since Independence	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)
Colonial Past	0.33 (0.24)	0.15 (0.47)	0.33 (0.26)	0.4 (0.37)	0.32 (0.27)	-0.26 (0.68)	0.16 (3.79)	-0.28 (0.18)
Former Western Colony	0.2 (0.24)	0.06 (0.38)	0.15 (0.27)	-0.4 (0.27)	0.23 (0.28)	0.59 (0.61)	4.12 (3.85)	0.00 (0.43)
Former Western Hegemon	0.53 (0.47)	-0.88 (0.71)	0.5 1(0.49)	-0.66 (0.52)	0.53 (0.51)	1.11 (1.05)	5.4 (7.42)	-0.67 (0.5)
EAP	0.25 (0.7)	-0.58 (0.93)	0.19 (0.74)	0.78 (0.69)	0.28 (0.76)	0.43 (1.39)	-17.84 (10.83)	-1.03 (1.23)
EECA	0.3 (0.73)	-0.64 (0.97)	0.28 (0.76)	0.64 (0.72)	0.31 (0.79)	-0.42 (1.41)	-22.96* (11.16)	-1.09 (1.67)
LAC	-0.46 (0.69)	0.67 (1.07)	-0.46 (0.72)	-0.15 (0.8)	-0.43 (0.75)	0.17 (1.52)	-27.61* (10.74)	-0.37 (2.1)
MENA	-0.61 (0.7)	-0.96 (1.2)	-0.65 (0.74)	-0.2 (0.93)	-0.58 (0.76)	-1.59 (1.71)	-27.78* (10.98)	0.13 (2.12)
SA	0.28 (0.79)	-0.12 (1.04)	0.27 (0.83)	0.74 (0.77)	0.39 (0.91)	-0.45 (1.63)	-32.16* (11.94)	-1.4 (2.53)
SSA	0.2 (0.72)	0.07 (0.93)	0.23 (0.76)	0.38 (0.7)	0.26 (0.79)	0.8 (1.39)	-35.04* (10.52)	-1.66 (2.79)
WE	0.35 (0.74)	1.86* (0.99)	0.3 (0.77)	1.93* (0.73)	0.3 (0.8)	0.04 (1.42)	-5.96 (11.66)	-
n	151	151	135	135	124	124	151	151
Adj. R2	0.64	0.74	0.63	0.81	0.63	0.6	0.62	0.82
F-Stat	14.65	20.7	12.52	27.67	11.27	8.6	14.64	37.06

* p-value ≤0.1

standard errors in parentheses

The code files are further available for download at/ or type: https://github.com/schbaeddzle/SMEX.git

HTML Markup (index.html)

```
<!DOCTYPE html>
<html>

<head>
    <title>SMEX</title>
    <meta charset="UTF-8">
    <meta name="description" content="The Social Market Economy as a Formula for Peace, Prosperity, and Sustainability">
    <meta name="keywords"
        content="social market economics, economic impact studies, public policy simulation, policy programming, country-risk assessments, country analytics, Consulting">
    <meta name="author" content="visualnomics">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <link rel="stylesheet" href="stylesheet.css">
    <script type="text/javascript" src="https://www.gstatic.com/charts/loader.js"></script>
    <script type="text/javascript" src="https://ajax.googleapis.com/ajax/libs/jquery/3.3.1/jquery.min.js"></script>
    <script type="text/javascript" src="https://code.jquery.com/ui/1.12.1/jquery-ui.js"></script>
</head>
```

```
<body>

    <div style='display:block'>

        <h3 class='show' style="color: red; text-align: center">Note: Due to a small screen the functionality
is

            limited.</h3>

        <div class="row">

            <div class="am-12-12" style='text-align: center'>

                <label    for='countrySelect'>The    Social    Market    Economy    in:    </label><select
id="countrySelect"></select>

                <hr>

            </div>

        </div>

        <div class='row'>

            <div class='am-12-4 am-4-2 am-3-3'>


                <div class='wrapper'>

                    <h3 class='show'>Describe & Change</h3>

                    <div class='drop'>

                        <h3 id='describe' style='width:74%; display: inline-block'>Describe</h3>

                        <h3 style='width:24%; display: inline-block'>Change</h3>

                    </div>

                    <div class='tooltip'>

                        <h3>The Social Market Economy</h3>

                        <p>

                            The philosophy of a social market economy is not to create a welfare state through
the

                            public redistribution of consumption opportunities,
```
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opportunities.

responsible,

state.

long and

lessons

many scholars

the need to

the need for a

of

to put the

but to create a wealth state through public investments into equal economic

This philosophy assumes a human being that is self-interested and self-

yet also demonstrates a sense of solidarity within the social fabric of a referee

Social market economics is about identifying the order, rules, and economic policy
principles of an economy with the objective of balancing
the freedom in the market with equitable socioeconomic development.

Social market economics was a movement of many scholars. The list of pioneers is

combines thinkers from various schools of thought, all of which focus on different

learned from history.
Wilhelm Roepke, Alfred Mueller-Armack, and Walter Eucken are only three out of

that contributed to the movement of a social market economy.
Wilhelm Roepke, for example, was an agent of economic humanism. He emphasized

respect the nature of man and society in economic analysis.
Alfred Mueller-Armack, a representative of the School of Cologne, established

market economic order regulates by principles.
Lastly, Walter Eucken, a scholar of the School of Freiburg, developed the concepts

order-liberalism and order policy, which describes a set of principles that aim

vision of a social market economy into practice.

```
            </p>
        </div>
    </div>
    <div class='row' style='margin-top: 0;'>
        <h5>State-Constitutional Principles</h5>
        <div class='am-12-9 drop'>
            <div id='const' style='width: 100%; height: 6.5vh;' aria-label="State-Constitutional
Principles"
                role="Bar Chart">
                No Browser Support.
                <br>This Graph illustrates the selected country's ranking for the two
                State-Constitutional Principles Democracy and Subsidiarity.
            </div>
        </div>
        <div class='am-12-3'
            style='height: 6.5vh; display: flex; flex-direction: column; justify-content: space-
around; '>
            <label for='democracy' class='fix'>Democracy</label>
            <div class='inpt_cont'>
                <div class='lay1'>
                    <input name='uival' title='Change Democracy Value' type="range" min="10"
max="90"
                        step="20" id="democracy">
                </div>
                <div class='lay2'>
                    <input name='actval' title='Actual Democracy Value' type="range" min="10"
max="90"
                        step="20" disabled>
```

```html
                    </div>
                </div>

                <label for='subsidiarity' class='fix'>Subsidiarity</label>
                <div class='inpt_cont'>
                    <div class='lay1'>
                        <input name='uival' title='Change Subsidiarity Value' type="range" min="10"
max="90"
                            step="20" id="subsidiarity">
                    </div>
                    <div class='lay2'>
                        <input name='actval' title='Actual Subsidiarity Value' type="range" min="10"
max="90"
                            step="20" disabled>
                    </div>
                </div>
            </div>
        </div>
        <div class='row'>
            <h5>State-Political Principles</h5>
            <div class='am-12-9 drop'>
                <div id='pol' style='width: 100%; height: 6.5vh;' aria-label="State-Political
Principles"
                    role="Bar Chart">
                    No Browser Support.
                    <br>This Graph illustrates the selected country's ranking for the two State-
Political
                    Principles Isolation from special interest groups and Primacy of order over
```

```
                        discretionary policy.
                    </div>
                </div>
                <div class='am-12-3'
                    style='height: 6.5vh; display: flex; flex-direction: column; justify-content: space-
around;'>

                    <label for='intgroup' class='fix'>Isolation from Interest Groups</label>
                    <div class='inpt_cont'>
                        <div class='lay1'>
                            <input  name='uival'  title='Change  Isolation  from  special  Interest  Groups
Value'

                                type="range" min="10" max="90" step="20" id="intgroup">
                        </div>
                        <div class='lay2'>
                            <input  name='actval'  title='Actual  Isolation  from  special  Interest  Groups
Value'

                                type="range" min="10" max="90" step="20" disabled>
                        </div>
                    </div>

                    <label for='primacy' class='fix'>Primacy of Order Policy</label>
                    <div class='inpt_cont'>
                        <div class='lay1'>
                            <input name='uival' title='Change Primacy of Order over Descretionary Policy
Value'

                                type="range" min="10" max="90" step="20" id="primacy">
                        </div>
                        <div class='lay2'>
```

```html
                                <input name='actval' title='Actual Primacy of Order over Descretionary Policy
Value'
                                    type="range" min="10" max="90" step="20" disabled>
                            </div>
                        </div>
                    </div>
                    <div class='row'>
                        <h5>Market-Organizational Principles</h5>
                        <div class='am-12-9 drop'>
                            <div id='org' style='width: 100%; height: 21vh;' aria-label="Market-Organizational
Principles"
                                role="Bar Chart">
                                No Browser Support.
                                <br>This Graph illustrates the selected country's ranking for the seven
                                Market-Organizational Principles
                                free prices, free trade, free contracts, private property, private liability,
price
                                stability, constancy of economic policy.
                            </div>
                        </div>
                        <div class='am-12-3'
                            style='height: 21vh; display: flex; flex-direction: column; justify-content: space-
around;'>
                            <label for='freeprice' class='fix'>Free Prices</label>
                            <div class='inpt_cont'>
                                <div class='lay1'>
```
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```
                                            <input name='uival' title='Change Free Price Value' type="range" min="10"
    max="90"

                            step="20" id="freeprice">
                    </div>
                    <div class='lay2'>
                        <input name='actval' title='Actual Free Price Value' type="range" min="10"
    max="90"

                            step="20" disabled>
                    </div>
                </div>


                <label for='freetrade' class='fix'>Free Trade</label>
                <div class='inpt_cont'>
                    <div class='lay1'>
                        <input name='uival' title='Change Free Trade Value' type="range" min="10"
    max="90"

                            step="20" id="freetrade">
                    </div>
                    <div class='lay2'>
                        <input name='actval' title='Actual Free Trade Value' type="range" min="10"
    max="90"

                            step="20" disabled>
                    </div>
                </div>


                <label for='freecontr' class='fix'>Free Contracts</label>
                <div class='inpt_cont'>
                    <div class='lay1'>
```

```
                                    <input name='uival' title='Change Free Contract Value' type="range" min="10"
max="90"
                                        step="20" id="freecontr">
                                </div>
                                <div class='lay2'>
                                    <input name='actval' title='Actual Free Contract Value' type="range" min="10"
max="90"
                                        step="20" disabled>
                                </div>
                            </div>

                            <label for='privprop' class='fix'>Private Property Rights</label>
                            <div class='inpt_cont'>
                                <div class='lay1'>
                                    <input name='uival' title='Change Private Property Rights Value' type="range"
min="10"
                                        max="90" step="20" id="privprop">
                                </div>
                                <div class='lay2'>
                                    <input    name='actval'    title='Actual    Private    Property    Rights    Value'
type="range" min="10"
                                        max="90" step="20" disabled>
                                </div>
                            </div>

                            <label for='privliab' class='fix'>Private Liability</label>
                            <div class='inpt_cont'>
                                <div class='lay1'>
```

```
                                    <input name='uival' title='Change Private Liability Value' type="range"
min="10"
                                        max="90" step="20" id="privliab">
                            </div>
                            <div class='lay2'>
                                <input name='actval' title='Actual Private Liability Value' type="range"
min="10"
                                        max="90" step="20" disabled>
                            </div>
                        </div>


                        <label for='lnprice' class='fix'>Price Stability</label>
                        <div class='inpt_cont'>
                            <div class='lay1'>
                                <input name='uival' title='Change Price Stability Value' type="range"
min="10" max="90"
                                        step="20" id="lnprice">
                            </div>
                            <div class='lay2'>
                                <input name='actval' title='Actual Price Stability Value' type="range"
min="10" max="90"
                                        step="20" disabled>
                            </div>
                        </div>


                        <label for='consteconpol' class='fix'>Constancy of Economic Policy</label>
                        <div class='inpt_cont'>
                            <div class='lay1'>
```

```
                                <input  name='uival'  title='Change  Constancy  of  Economic  Policy  Value'
type="range"
                                    min="10" max="90" step="20" id="consteconpol">
                        </div>
                        <div class='lay2'>
                            <input  name='actval'  title='Actual  Constancy  of  Economic  Policy  Value'
type="range"
                                    min="10" max="90" step="20" disabled>
                        </div>
                    </div>

                </div>
            </div>
            <div class='row'>
                <h5>Market-Failure Correcting Principles</h5>
                <div class='am-12-9 drop'>
                    <div id='fail' style='width: 100%; height: 16.5vh;'
                        aria-label="Market-Failure Correcting Principles" role="Bar Chart">
                        No Browser Support.
                        <br>This Graph illustrates the selected country's ranking for the four Market-
Failure
                        Correcting Principles
                        competition, income, labor market, and environmental policy.

                    </div>
                </div>
                <div class='am-12-3'
```

```
                            style='height: 12vh; display: flex; flex-direction: column; justify-content: space-
around;'>
                            <label for='comppol' class='fix'>Competition Policy</label>
                            <div class='inpt_cont'>
                                <div class='lay1'>
                                    <input  name='uival'  title='Change  Competition  Policy  Value'  type="range"
min="10"
                                        max="90" step="20" id="comppol">
                                </div>
                                <div class='lay2'>
                                    <input  name='actval'  title='Actual  Competition  Policy  Value'  type="range"
min="10"
                                        max="90" step="20" disabled>
                                </div>
                            </div>

                            <label for='ypol' class='fix'>Income Policy</label>
                            <div class='inpt_cont'>
                                <div class='lay1'>
                                    <input name='uival' title='Change Income Policy Value' type="range" min="10"
max="90"
                                        step="20" id="ypol">
                                </div>
                                <div class='lay2'>
                                    <input name='actval' title='Actual Income Policy Value' type="range" min="10"
max="90"
                                        step="20" disabled>
                                </div>
```

```
                    </div>

                    <label for='lpol' class='fix'>Labor Market Policy</label>
                    <div class='inpt_cont'>
                        <div class='lay1'>
                            <input name='uival' title='Change Labor Market Policy Value' type="range"
min="10"
                                max="90" step="20" id="lpol">
                        </div>
                        <div class='lay2'>
                            <input name='actval' title='Actual Labor Market Policy Value' type="range"
min="10"
                                max="90" step="20" disabled>
                        </div>
                    </div>

                    <label for='envpol' class='fix'>Environmental Policy</label>
                    <div class='inpt_cont'>
                        <div class='lay1'>
                            <input name='uival' title='Change Environmental Policy Value' type="range"
min="10"
                                max="90" step="20" id="envpol">
                        </div>
                        <div class='lay2'>
                            <input name='actval' title='Actual Environmental Policy Value' type="range"
min="10"
                                max="90" step="20" disabled>
                        </div>
```

```
                    </div>

                </div>
            </div>

        </div>

        <div class='am-12-4 am-4-2 am-3-3' style='background-color: #F5F5F5'>

            <div class='wrapper'>
                <h3>Analyze</h3>
                <div class='tooltip'>
                    <h3>The Social Market Economy's Potential</h3>
                    <q>
                        I want to live by my own resources, I want to take my own decisions in life and
be
                        responsible for
                        my own destiny. From the state, I expect only that it will create the preconditions
which
                        allow me
                        to live in such a way.
                    </q>
                    Ludwig Erhard
                    <p>
                        <b>Social Peace</b>
                        Inequality of economic opportunities and income enforces redistribution through
the
```

the poor to

democratic decision process, which the rich have an incentive to undermine and

promote.

As a result, personal freedoms will be more under attack than in a society with

greater

equality of income and economic opportunities.

Conversely, a social market economy promotes conflict free plurality and, thus,

social

peace.

Equal Opportunity
A social market economy aims at full employment and social progress. It emphasizes

an

individual's freedom to achieve well-being.
This freedom is to be understood in terms of Amartya Sen's capabilities approach.
Individuals enjoy equal opportunities to do and be what they value.

Ecological Sustainability
Countries with a greater social market economic profile will have more resources

available

to diversify their economies and protect their natural resources.
Hence, a social market economy promotes a high level of protection and improvement

of the

quality of the environment and, thus, ecological sustainability.
        </p>
      </div>
    </div>

```html
<h5>Balancing the Freedom in the Market with Equitable Socio-Economic Development</h5>
<p align="justify" style='margin-bottom: 0;'>
    The extent to which state-constitutional, state-political, market-organizational, and market-failure
    correcting principles
    are established determines social market economic performance.
</p>
<p align="justify" id='balance' style='margin-top: 0.5em;'></p>
<table id='outputtable'>
    <tr>
        <td>SMEX</td>
        <td id="SMEXsim"></td>
    </tr>
</table>

<h5>The Social Market Economy as a Formula for Peace, Prosperity and Sustainability</h5>
<p align="justify">
    Applying social market economic principles generates higher per capita incomes, but also carries a
    social peace dividend, creates more equal opportunities, and promotes ecological sustainability.
</p>

<div class='row' id="income">
    <div class='am-12-4' align='left'>
        <h1 id='y'></h1>
```

```
            <h6>Income Today</h6>
        </div>
        <div class='am-12-4' align='center'>
            <h6 id='ytext'></h6>
            <h1 id='simy'></h1>
        </div>
        <div class='am-12-4' align='right'>
            <h1 id='ynew'></h1>
            <h6>Potential Income</h6>
        </div>
</div>


<div class='row' id="peace">
        <div class='am-12-6' align='left'>
            <h1 id='sp'></h1>
            <h6>Social Peace Today</h6>
        </div>
        <div class='am-12-6' align='right'>
            <h1 id='spnew'></h1>
            <h6>Social Peace Potential</h6>
        </div>
</div>


<div class='row' id="equal">
        <div class='am-12-6' align='left'>
            <h1 id='eo'></h1>
```

```
                  <h6>Equal Opportunity Today</h6>
              </div>
              <div class='am-12-6' align='right'>
                  <h1 id='eonew'></h1>
                  <h6>Equal Opportunity Potential</h6>
              </div>
          </div>


          <div class='row' id="eco">
              <div class='am-12-6' align='left'>
                  <h1 id='es'></h1>
                  <h6>Ecological Sustainability Today</h6>
              </div>
              <div class='am-12-6' align='right'>
                  <h1 id='esnew'></h1>
                  <h6>Ecological Sustainability Potential</h6>
              </div>
          </div>
      </div>


      <div class='am-12-4 am-4-4 am-3-3'>
          <div class='wrapper'>
              <h3>Compare</h3>
              <div class='tooltip large'>
                  <h3>The Social Market Economy's Impact</h3>
                  <p>
```

the

with policies

lived up

Union's

economic

reduction of

development

sustainable use of

The social market economy was developed as a political and economic concept during

inter-war period as an alternative to laissez-faire

capitalism and totalitarianism in socialism and fascism.

The concept of the social market economy suggests that market freedom combined

to promote equitable socio-economic development

fosters both peace and economic prosperity. Germany's post World War II experience

to this promise. In 2007, the social market economy also became the European

guiding economic vision.

• Countries with greater social market economic profiles experience greater

prosperity

• Social market economic principles prioritize equal opportunities

• Social market economic principles promote social peace through the

political polarization associated with redistributive conflict from inequitable

• Social market economic principles contribute to the ecologically

resources •

                         </p>
                   </div>

```html
            </div>

            <div class="measure measure-active" id="SMEX" title='Correcting the Fallibility of the
Market'>Social Market Economy</div>
            <div class="measure" id="GFX" title='Upholding Conflict Free Plurality'>Social Peace</div>
            <div     class="measure"     id="EQX"     title='Assuring     Individual     Capabilities'>Equal
Opportunity</div>
            <div     class="measure"     id="ESX"     title='Safeguarding     Future     Prospects'>Ecological
Sustainability</div>


            <div id="map" style='width: 100%;'
            aria-label="Global comparison of Social Market Economy, Social Peace, Equal Opportunity,
Ecological Sustainability performance"
            role="Geo Map">

            <p>

              No browser support.

              <br>This graph illustrates Social Market Economy, Social Peace, Equal Opportunity,
Ecological

              Sustainability performance globally.

            </p>
            </div>


            <div id="scatter"
            aria-label="Relationship of Social Market Economy and Income, Social Peace, Equal
Opportunity, Ecological Sustainability performance"
            role="Combo Chart">

            <p>

              No browser support.
```

```
                              <br>This graph compares a country's position within the overall relationship between
Social

                              Market Economy and Income, Social Peace, Equal Opportunity, Ecological Sustainability

                              performance.

                    </p>

                </div>

            </div>

        </div>

    <hr>

    <footer>

        Charts  are  coded  using  <a href='https://developers.google.com/chart'>Google Developer Charts</a>,
licensed under

        the  <a  href='https://creativecommons.org/licenses/by/4.0/'>the  Creative  Commons  Attribution  4.0
License</a>.

        <a href="Technical Background Paper.pdf" download style='float: right;'>Download Technical Background
Paper

            Here</a>

    </footer>


    <script src="data.js"></script>

    <script src="asset.js"></script>

    <script>

        $(window).resize(function (e) {

            describe();

            drawMap();

            drawScatter();

            window.onload(false);
```

```
            });
    </script>
</body>


</html>
```

Cascading Stylesheet (stylesheet.css)

```css
/*the Grid*/
*{
  box-sizing: border-box;
}

.row{
  margin-top: 10px;
}

.row::after{
  content: "";
  clear: both;
  display: block;
}

[class*="am-"]{
  float: left;
  padding: 0 0.5em 0 0.5em;
}

/* Grid View 12 Columns*/
.am-12-1 {width: 8.33%;}
.am-12-2 {width: 16.66%;}
.am-12-3 {width: 25%;}
.am-12-4 {width: 33.33%;}
.am-12-5 {width: 41.66%;}
.am-12-6 {width: 50%;}
.am-12-7 {width: 58.33%;}
.am-12-8 {width: 66.66%;}
.am-12-9 {width: 75%;}
.am-12-10 {width: 83.33%;}
.am-12-11 {width: 91.66%;}
.am-12-12 {width: 100%;}

html{
  font-family: 'Montserrat', sans-serif;
  font-size: 10pt;
  color: #02072f;
  line-height: 1.5;
}

.measure{
  display: inline-block;
  width: 24%;
  text-align: center;
  vertical-align: top;
  margin: 0 0 0 0;
  font-size: .83em;
  font-weight: bold;
}

.measure:hover, .measure-active{
  text-decoration: underline;
  cursor: pointer;
}

h1{
  margin: 0 0 0 0;
  font-size: 2em;
  padding: 0 0 0 0;
}

h3{
  text-align: center;
  margin: 0 0 0.5em 0;
}

h4{
  padding: 0 ;
  margin: 0;
}
```

```css
h5{
  text-align: left;
  margin: 2em 0 0 0;
}

h6{
  margin: 0 0 0 0;
  font-size: 1em;
  padding: 0 0 0 0;
}

label{
  display: inline;
  font-size: 1.2em;
  margin-left: 0;
  margin-right: 0;
  font-weight: bold;
}

select{
  font-size: 1.2em;
  margin-top: 0.83em;
  margin-bottom: 0.83em;
  margin-left: 0;
  margin-right: 0;
  font-weight: bold;
  height: 2em;
  text-align-last: center;
  border: none;
}

select:hover{
  cursor: pointer;
}

div.google-visualization-tooltip {
  pointer-events: none;
}

#map:hover{
  cursor: pointer;
}

td:first-child{
  width: 5em;
  text-align: left;
}

td:last-child{
  border-radius: 15px;
  text-align: center;
}

footer{
  font-size: 0.7em;
  margin-bottom: 0;
}

.vl, .l, .m, .h, .vh {
  margin: 0 0 0 0;
  -webkit-appearance: none;
  width: 100%;
  overflow: visible;
  height: 0.5em;
  background: lightgrey;
  border-radius: 10px;
}

.vl::-webkit-slider-thumb {
  -webkit-appearance: none;
  appearance: none;
  width: 1.2em;
  height: 1.2em;
  border-radius: 50%;
  background: #c54c4c;
  cursor: pointer;
}
```

```css
.l::-webkit-slider-thumb {
  -webkit-appearance: none;
  appearance: none;
  width: 1.2em;
  height: 1.2em;
  border-radius: 50%;
  background: #ff4c4c;
  cursor: pointer;
}

.m::-webkit-slider-thumb {
  -webkit-appearance: none;
  appearance: none;
  width: 1.2em;
  height: 1.2em;
  border-radius: 50%;
  background: #ffb74c;
  cursor: pointer;
}

.h::-webkit-slider-thumb {
  -webkit-appearance: none;
  appearance: none;
  width: 1.2em;
  height: 1.2em;
```

```css
  border-radius: 50%;
  background: #ffdb4c;
  cursor: pointer;
}

.vh::-webkit-slider-thumb {
  -webkit-appearance: none;
  appearance: none;
  width: 1.2em;
  height: 1.2em;
  border-radius: 50%;
  background:#6fdc6f;
  cursor: pointer;
}

input:disabled::-webkit-slider-thumb {
  -webkit-appearance: none;
  appearance: none;
  width: 1em;
  height: 1em;
  border-radius: 50%;
  background:lightgrey;
  cursor: context-menu;
}
```

```css
input{
  outline: none;
}

.inpt_cont{
  position:relative;
}

.lay1{
  transform: translate(0,-50%);
  position:absolute;
  top: -50%;
  width: 100%;
  z-index: 2;
}

.lay2{
  transform: translate(0,-50%);
  position:absolute;
  width: 100%;
  z-index: 1;
}

#income, #peace, #equal, #eco{
  background-color:lightgrey;
```

```css
  color:  #F5F5F5;
  margin: 2.5em 0 .5em 0;
}


.show{
  display: none;
}


.fix{
  display:none;
}


.drop{
  display: block;
}


.wrapper:hover{
  cursor: pointer;
}


.tooltip{
  position: absolute;
  visibility: hidden;
  width: 33%;
  height: 84vh;
  background-color: white;
  border: 1px solid #36415A;
  color: #36415A;
  text-align: center;
  margin: 0 -1em 0 -0.5em;
  padding: 0 -1em 0 0;
  z-index: 1;
  opacity: 0;
  transition: opacity 1s;
  overflow-y: scroll;
  overflow-x: hidden;
}


.wrapper:hover .tooltip {
  visibility: visible;
  opacity: 1;
  cursor: pointer;
  z-index: 3;
}


.tooltip p{
  text-align: justify;
  margin: 2em 2em 2em 2em;
  column-count: 2;
  column-gap: 2em;
  column-rule-style: solid;
  column-rule-width: 1px;
  column-rule-color: grey;
}


input:hover:after {
  content: attr(title);
  background: #fff;
  padding: 5px 12px;
  border: solid 1px #ddd;
  position: absolute;
  bottom: 100%;
  left: 50%;
  transform: translateX(-50%);
}


.measure:hover:after{
  content: attr(title);
  background: #fff;
  padding: 5px 12px;
  /*border: solid 1px #ddd;*/
  position: absolute;
  bottom: 100%;
  left: 100%;
  transform: translateX(-50%);

}
```

```css
::-webkit-scrollbar       {width:
0.2em;}

::-webkit-scrollbar-track
{background: white;}

::-webkit-scrollbar-thumb
{background: #acb0b5;}




/*Small Screens*/

@media only screen and (max-width:
1500px) {

  #bar{

    margin-left: 0;

    width: 100%;

  }


  #income, #peace, #equal, #eco{

    background-color:lightgrey;
color:  #F5F5F5;

    margin: 1.5em 0 0 0;

  }


  p{

    font-family:      'Montserrat',
sans-serif;

    color: #02072f;

    line-height: 1.5em;

    font-size: 0.8em;
```

```css
  }


  h1{

    font-size: 1.5em;

  }


  h3{

    font-size: 1em;

  }


  h6{

    font-size: 0.8em;

  }


  .vl, .l, .m, .h, .vh {

    margin: 0 0 0.75em 0;

    -webkit-appearance: none;

    width: 100%;

    overflow: visible;

    height: 0.5em;

    background: lightgrey;

    border-radius: 10px;

  }

}


/*Tablets*/
```

```css
@media only screen and (max-width:
1000px) {

  .am-4-1 {width: 25%;}

  .am-4-2 {width: 50%;}

  .am-4-3 {width: 75%;}

  .am-4-4 {width: 100%;}


  .tooltip{

    width: 49%;

    height: 75vh;

  }


  .large{

    width: 98%;

  }

}


/*Small Tablets*/

@media only screen and (max-width:
800px) {

  .am-3-1 {width: 33.33%;}

  .am-3-2 {width: 66.66%;}

  .am-3-3 {width: 100%;}


  .tooltip{

    width: 98%;

  }
```

```
}


  /*Phones*/

@media only screen and (max-width:
500px) {

  [class*="am-"] {width: 100%;}


  body{
    overscroll-behavior-y:
contain;
  }


  .drop{
    display: none
  }


  .fix{
    display: inline-block;

    width: 50%;

    font-size: 0.8em;

    font-weight: normal;

    text-align: right;

    padding-right: 0.5em;
```

```
  }


  .inpt_cont{
    display: inline-block;

    position: relative;

    width: 50%;
  }


  .lay1{
    transform:      translate(100%,-
85%);

    position:absolute;

    width: 100%;

    z-index: 2;
  }


  .lay2{
    transform:      translate(100%,-
85%);

    position:absolute;

    width: 100%;

    z-index: 1;
  }
```

```
  .show{
    display: inline-block;

  }


  .vl, .l, .m, .h, .vh {
    margin: 0 0 1em 0;

    -webkit-appearance: none;

    width: 100%;

    overflow: visible;

    height: 0.5em;

    background: lightgrey;

    border-radius: 10px;

  }


  .wrapper:hover{
    cursor: auto;

  }


  .tooltip{
    display: none;

  }

}
```

JavaScript (asset.js)

```javascript
window.onload = describe;


$('.measure').click(function () {
    var current = document.getElementsByClassName("measure-active");
    current[0].className = current[0].className.replace(" measure-active", "");
    this.className += " measure-active";
    drawMap();
    drawScatter();
});


$.each(data, function (key, value) {
    var option = $(`<option>${value['Country']}</option>`);
    $('#countrySelect').append(option);
});


$('#countrySelect').on('change', describe);
$('#countrySelect').on('change', drawScatter);
$('input').on('change', calcSMEX);
$('#SMEXsim').on('DOMSubtreeModified', simulate);


//conversion function
function colorfy(input) {
    if (input <= 20) { return '#c54c4c' }
    else if (input <= 40) { return '#ff4c4c' }
```

```
        else if (input <= 60) { return '#ffb74c' }
        else if (input <= 80) { return '#ffdb4c' }
        else { return '#6fdc6f' }
};


function classify(input) {
        if (input <= 20) { return 'vl' }
        else if (input <= 40) { return 'l' }
        else if (input <= 60) { return 'm' }
        else if (input <= 80) { return 'h' }
        else { return 'vh' }
};


function numfy(input) {
        if (input === 'Very Low') { return 10 }
        else if (input === 'Low') { return 30 }
        else if (input === 'Medium') { return 50 }
        else if (input === 'High') { return 70 }
        else { return 90 }
};


function cat(input) {
        if (input <= 20) { return 'Very Low' }
        else if (input <= 40) { return 'Low' }
        else if (input <= 60) { return 'Medium' }
        else if (input <= 80) { return 'High' }
```

```
    else { return 'Very High' }
};


function catfy(input) {
    if (input <= 20) { return 10 }
    else if (input <= 40) { return 30 }
    else if (input <= 60) { return 50 }
    else if (input <= 80) { return 70 }
    else { return 90 }
};


function tick(input) {
    if (input === 10) { return 'Very Low' }
    else if (input === 30) { return 'Low' }
    else if (input === 50) { return 'Medium' }
    else if (input === 70) { return 'High' }
    else if (input === 90) { return 'Very High' }
    else { return '' }
};


function width(input) {
    if (input <= 20) { return '40%' }
    else if (input <= 40) { return '55%' }
    else if (input <= 60) { return '70%' }
    else if (input <= 80) { return '85%' }
    else { return '100%' }
```

```javascript
};

//Country Discriptives
function describe() {
    var country = document.getElementById('countrySelect').value;
    var finder = data.find(code => code['Country'] === country);
    var x = Object.values(finder).slice(2, 17);
    var col = [];

    for (i = 0; i < x.length; i++) {
        col.push(
            "color:" + colorfy(x[i])
        )
    };

    function drawConst() {
        var data = google.visualization.arrayToDataTable([
            ['Principle', 'Classification', { role: 'style' }, { type: 'string', role: 'tooltip', 'p': {
'html': true } }],
            ['Democracy', Object.values(finder)[2], col[0], 'Democracy in ' + country + ': ' +
tick(Object.values(finder)[2])],
            ['Subsidiarity', Object.values(finder)[3], col[1], 'Subsidiarity in ' + country + ': ' +
tick(Object.values(finder)[3])]
        ]);

        var options = {
            chartArea: { left: '50%', top: '2%', width: "100%", height: "100%" },
```

```
        hAxis: {
            minValue: 0,
            maxValue: 95,
            gridlines: {
                color: 'transparent'
            },
            textPosition: 'none',
            baselineColor: 'transparent'
        },
        vAxis: {
            gridlines: {
                color: 'transparent'
            }
        },
        legend: { position: 'none' },
        fontSize: 12,
        fontName: 'Montserrat',
        tooltip: { isHtml: true }
    };


    var chart = new google.visualization.BarChart(document.getElementById('const'));
    chart.draw(data, options);
};
google.charts.load('current', { packages: ['corechart', 'bar'], callback: drawConst });

function drawPol() {
```

```javascript
        var data = google.visualization.arrayToDataTable([

            ['Principle', 'Classification', { role: 'style' }, { type: 'string', role: 'tooltip', 'p': {
'html': true } }],

            ['Isolation from Interest Groups', Object.values(finder)[4], col[2], 'Isolation from Interest
Groups in ' + country + ': ' + tick(Object.values(finder)[4])],

            ['Primacy of Order Policy', Object.values(finder)[5], col[3], 'Primacy of Order Policy in ' +
country + ': ' + tick(Object.values(finder)[5])],

        ]);


        var options = {

            chartArea: { left: '50%', top: '2%', width: "100%", height: "100%" },

            hAxis: {

                minValue: 0,

                maxValue: 95,

                gridlines: {

                    color: 'transparent'

                },

                textPosition: 'none',

                baselineColor: 'transparent'

            },

            vAxis: {

                gridlines: {

                    color: 'transparent'

                }

            },

            legend: { position: 'none' },

            fontSize: 12,
```

```
            fontName: 'Montserrat',

            tooltip: {

                isHtml: true

            }

        };


        var chart = new google.visualization.BarChart(document.getElementById('pol'));

        chart.draw(data, options);

    };
    google.charts.load('current', { packages: ['corechart', 'bar'], callback: drawPol });


    function drawOrg() {

        var data = google.visualization.arrayToDataTable([

            ['Principle', 'Classification', { role: 'style' }, { type: 'string', role: 'tooltip', 'p': {
'html': true } }],

            ['Free Prices', Object.values(finder)[6], col[4], 'Free Prices in ' + country + ': ' +
tick(Object.values(finder)[6])],

            ['Free Trade', Object.values(finder)[7], col[5], 'Free Trade in ' + country + ': ' +
tick(Object.values(finder)[7])],

            ['Free Contracts', Object.values(finder)[8], col[6], 'Free Contracts in ' + country + ': ' +
tick(Object.values(finder)[8])],

            ['Private Property', Object.values(finder)[9], col[7], 'Private Property in ' + country + ': ' +
tick(Object.values(finder)[9])],

            ['Private Liablity', Object.values(finder)[10], col[8], 'Private Liablity in ' + country + ': '
+ tick(Object.values(finder)[10])],

            ['Price Stability', Object.values(finder)[11], col[9], 'Price Stability in ' + country + ': ' +
tick(Object.values(finder)[11])],

            ['Constancy of Economic Policy', Object.values(finder)[12], col[10], 'Constancy of Economic
Policy in ' + country + ': ' + tick(Object.values(finder)[12])],

        ]);
```

```
var options = {
    chartArea: { left: '50%', top: '2%', width: "100%", height: "100%" },
    hAxis: {
        minValue: 0,
        maxValue: 95,
        gridlines: {
            color: 'transparent'
        },
        textPosition: 'none',
        baselineColor: 'transparent',
    },
    vAxis: {
        gridlines: {
            color: 'transparent'
        }
    },
    legend: { position: 'none' },
    fontSize: 12,
    fontName: 'Montserrat',
    tooltip: {
        isHtml: true,
    }
};

var chart = new google.visualization.BarChart(document.getElementById('org'));
```

```javascript
        chart.draw(data, options);
    };
    google.charts.load('current', { packages: ['corechart', 'bar'], callback: drawOrg });


    function drawFail() {
        var data = google.visualization.arrayToDataTable([

            ['Principle', 'Classification', { role: 'style' }, { type: 'string', role: 'tooltip', 'p': {
'html': true } }],

            ['Competition Policy', Object.values(finder)[13], col[11], 'Competition Policy in ' + country +
': ' + tick(Object.values(finder)[13])],

            ['Income Policy', Object.values(finder)[14], col[12], 'Income Policy in ' + country + ': ' +
tick(Object.values(finder)[14])],

            ['Labor Market Policy', Object.values(finder)[15], col[13], 'Labor Market Policy in ' + country
+ ': ' + tick(Object.values(finder)[15])],

            ['Environmental Policy', Object.values(finder)[16], col[14], 'Environmental Policy in ' + country
+ ': ' + tick(Object.values(finder)[16])],

         ]);


        var options = {
            chartArea: { left: '50%', top: '2%', width: "100%", height: "70%" },
            hAxis: {
                minValue: 0,
                maxValue: 95,
                gridlines: {
                    color: 'transparent'
                },
                ticks: [{ v: 10, f: 'very low' }, { v: 30, f: 'low' }, { v: 50, f: 'medium' }, { v: 70, f:
'high' }, { v: 90, f: 'very high' }],
                slantedText: true,
```

```
                slantedTextAngle: 30,
                baselineColor: 'transparent'
            },
            vAxis: {
                gridlines: {
                    color: 'transparent'
                },
                textPosition: 'out',
            },
            legend: { position: 'none' },
            fontSize: 12,
            fontName: 'Montserrat',
            tooltip: {
                isHtml: true
            }
        };


        var chart = new google.visualization.BarChart(document.getElementById('fail'));
        chart.draw(data, options);
    };
    google.charts.load('current', { packages: ['corechart', 'bar'], callback: drawFail });


    var x = document.getElementsByName('uival');
    var y = document.getElementsByName('actval');


    for (i = 0; i < x.length; i++) {
```

```javascript
        $(x[i]).val(Object.values(finder)[i + 2]).attr('class', classify(Object.values(finder)[i + 2]));

        $(y[i]).val(Object.values(finder)[i + 2]).attr('class', classify(Object.values(finder)[i + 2]));



    };



    $('#SMEXsim').html(cat(finder.SMEX)).css('background-color', colorfy(finder.SMEX));

    $('#outputtable').css('width', width(finder.SMEX));

    $('#balance').html('In balancing the freedom of the market with equitable socio-economic development,
what is <b>' + country + "'s</b> social market economic performance ranking?");


    $('#y').html(Math.round(finder.y));

    $('#ytext').html('.').css('color', 'lightgrey');

    $('#ynew').html(Math.round(finder.y));



    $('#sp').html(tick(finder.GFX)).css('color', colorfy(finder.GFX));

    $('#spnew').html(tick(finder.GFX)).css('color', colorfy(finder.GFX));


    $('#eo').html(tick(finder.EQX)).css('color', colorfy(finder.EQX));

    $('#eonew').html(tick(finder.EQX)).css('color', colorfy(finder.EQX));


    $('#es').html(tick(finder.ESX)).css('color', colorfy(finder.ESX));

    $('#esnew').html(tick(finder.ESX)).css('color', colorfy(finder.ESX));


};
```

```javascript
//Calculate new SMEX
function calcSMEX() {
    var weights = [0.090464331, 0.070234151, 0.048525516, 0.051004874, 0.074463919, 0.068030485, 0.058145762,
0.045819997, 0.070000514, 0.093561426, 0.064403501, 0.053535632, 0.069179046, 0.066615578, 0.076015271]
    var slope = 0;
    var x = document.getElementsByName('uival');


    for (i = 0; i < x.length; i++) {
        slope += x[i].value * weights[i];
        $(x[i]).removeClass('vl l m h vh').toggleClass(classify(x[i].value));
        console.log(i + 'the value is ' + x[i].value + 'times weight ' + weights[i])
    };


    var input = -43.919 + 1.6685 * slope


    $('#SMEXsim').html(cat(input)).css('background-color', colorfy(input));
    $('#outputtable').css('width', width(input));
};


//Upon change in SMEX
function simulate() {
    var simSMEX = numfy(document.getElementById('SMEXsim').innerHTML);
    var finder = data.find(code => code['Country'] === document.getElementById('countrySelect').value);
    var        control        =        Object.values(controls.find(code        =>        code['Country']        ===
document.getElementById('countrySelect').value)).slice(2, 18);
    var a, b, c; a = b = c = 0;
```

```
    var d = simSMEX - finder.SMEX;


    for (i = 0; i < control.length; i++) {
        a += parseFloat(control[i]) * parseFloat(Object.values(coeff.find(code => code['dv'] ===
String('GFX')))[i + 3]);
        b += parseFloat(control[i]) * parseFloat(Object.values(coeff.find(code => code['dv'] ===
String('EQX')))[i + 3]);
        c += parseFloat(control[i]) * parseFloat(Object.values(coeff.find(code => code['dv'] ===
String('ESX')))[i + 3]);
    };


    function colorPicker(input) {
        if (input < 0) {
            return 'rgba(172, 0, 0, .7)'
        } else if (input > 0) {
            return 'rgba(50, 205, 50, .7)'
        } else if (input = finder.y) {
            return 'lightgrey'
        }
    }


    var simy = (finder.y + finder.y * d * 0.0353367) - finder.y;
    var sign, ytext, ycol;


    if (simy > 0) {
        sign = '+';
        ytext = 'Income Gain';
```

```javascript
            ycol = '#F5F5F5';
    } else if (simy < 0) {
            sign = Math.sign(simy);
            ytext = 'Income Loss';
            ycol = '#F5F5F5';
    } else {
            sign = simy;
            ytext = 'black';
            ycol = 'lightgrey'
    }


    $('#simy').html(sign + Math.round(simy)).css('color', colorPicker(simy))
    $('#ytext').html(ytext).css('color', ycol)
    $('#ynew').html(Math.round(finder.y + finder.y * d * 0.0353367))


    var  spnew  =  catfy((101.01  /  (1  +  Math.exp(-(Object.values(coeff.find(code  =>  code['dv']  ===
String('GFX')))[1] + simSMEX * Object.values(coeff.find(code => code['dv'] === String('GFX')))[2] + a)))) -
1);
    var  eonew  =  catfy((101.01  /  (1  +  Math.exp(-(Object.values(coeff.find(code  =>  code['dv']  ===
String('EQX')))[1] + simSMEX * Object.values(coeff.find(code => code['dv'] === String('EQX')))[2] + b)))) -
1);
    var  esnew  =  catfy((101.01  /  (1  +  Math.exp(-(Object.values(coeff.find(code  =>  code['dv']  ===
String('ESX')))[1] + simSMEX * Object.values(coeff.find(code => code['dv'] === String('ESX')))[2] + c)))) -
1);


    $('#spnew').html(tick(spnew)).css('color', colorfy(spnew));
    $('#eonew').html(tick(eonew)).css('color', colorfy(eonew));
    $('#esnew').html(tick(esnew)).css('color', colorfy(esnew));
};
```

```javascript
//Compare Map
function drawMap() {
    var m = document.getElementsByClassName('measure-active')[0].id;
    var c_table = [['country', m, { 'type': 'string', 'role': 'tooltip', 'p': { 'html': true } }]];
    var out;
    if (m === 'SMEX') {
        out = 'Social Market Economic Performance'
    } else if (m === 'GFX') {
        out = 'Social Peace'
    } else if (m === 'EQX') {
        out = 'Equal Opportunity'
    } else {
        out = 'Ecological Sustainability'
    };


    $.each(data, function (key, value) {
        c_table.push([
            { v: value['topo'], f: value['Country'] },
            value[m || 'SMEX'],
            out + ': ' + cat(value[m || 'SMEX']),
        ])
    });


    var mapdata = google.visualization.arrayToDataTable(c_table);
```

```
var options = {
    colorAxis: {
        colors: ['#c54c4c', '#ff4c4c', '#ffb74c', '#ffdb4c', '#6fdc6f'],
    },
    defaultColor: 'lightgrey',
    datalessRegionColor: '#ffffff',
    tooltip: {
        isHtml: true,
    },
    height: 300,
    legend: 'none',
};


var geomap = new google.visualization.GeoChart(document.getElementById('map'));
geomap.draw(mapdata, options);


google.visualization.events.addListener(geomap, 'select', selectHandler);


function selectHandler() {
    var stri = geomap.getSelection();
    var output = mapdata.getValue(stri[0].row, 0);
    var keyval = data.find(code => code['topo'] === output);
    var mapcountry = keyval.Country;

    $('#map').click(function () {
        $('#countrySelect').val(mapcountry);
```

```
            describe(mapcountry);

            drawScatter(mapcountry);

        })

    };

};
google.charts.load('current',    {    packages:    ['geochart'],    'mapsApiKey':    'AIzaSyD-9tSrke72PouQMnMX-
a7eZSW0jkFMBWY', callback: drawMap });


//Compare Surrogate Scatter Plot

function drawScatter() {

    var country = document.getElementById('countrySelect').value;

    var m = document.getElementsByClassName('measure-active')[0].id;

    var finder = data.find(code => code['Country'] === country);


    if (m === 'SMEX') { ind = 'lny' } else { ind = m };


    var ytitle, xtitle, yticks;


    if (ind === 'lny') {

        ytitle = 'ln(Income per Capita)';

        xtitle = 'SMEX';

        yticks = 'none';

    } else {

        xtitle = 'SMEX';

        yticks = [{ v: 10, f: 'very low' }, { v: 30, f: 'low' }, { v: 50, f: 'medium' }, { v: 70, f: 'high'
}, { v: 90, f: 'very high' }];

        if (ind === 'GFX') {
```

```
            ytitle = 'Social Peace';
        } else if (ind === 'EQX') {
            ytitle = 'Equal Opportunity';
        } else {
            ytitle = 'Ecological Sustainability'
        };
    };


    var control = Object.values(surr.find(code => code['Country'] === 'surrogate')).slice(1, 7);
    var d = Object.values(coeff.find(code => code['dv'] === ind)).slice(3, 8);
    var y = Object.values(coeff.find(code => code['dv'] === ind)).slice(18);
    var coefficient = d.concat(y);
    var a = 0;


    for (i = 0; i < control.length; i++) {
        a += parseFloat(control[i]) * parseFloat(coefficient[i]);
    };


    var arr = Object.entries(finder);
    var val;


    for (i = 0; i < arr.length; i++) {
        for (j = 0; j <= 2; j++) {
            if (arr[i][0] === ind) {
                val = arr[i][1];
            }
```

```
        }
    }


    var x = Array.from(Array(100), (_, i) => i + 1);

    var scatterdata = [['SMEX', { v: ind, f: ytitle }, { role: 'style' }, { 'type': 'string', 'role':
'tooltip', 'p': { 'html': true } }, country, { role: 'style' }, { 'type': 'string', 'role': 'tooltip', 'p':
{ 'html': true } }]];

    var smex = data.find(code => code['Country'] === country).SMEX;


    for (i = 0; i < x.length; i++) {

        if (ind === 'lny') {

            if (smex != x[i]) {

                scatterdata.push([

                    x[i],

                    (Object.values(coeff.find(code    =>    code['dv']    ===    ind))[1]    +    x[i]    *
Object.values(coeff.find(code => code['dv'] === ind))[2] + a),

                    colorfy(x[i]),

                    'Expected            Income            per            Capita:<br><b>US$            '            +
Math.round(Math.exp(Object.values(coeff.find(code    =>    code['dv']    ===    ind))[1]    +    x[i]    *
Object.values(coeff.find(code => code['dv'] === ind))[2] + a)) + '</b><br>given a ' + cat(x[i]) + ' SMEX',

                    null,

                    colorfy(x[i]),

                    'Income per capita in ' + country + ':<br><b>US$ ' + Math.round(finder.y) + '</b><br>with
a ' + cat(finder.SMEX) + ' SMEX',

                ])

            } else {

                scatterdata.push([

                    x[i],
```

```
                (Object.values(coeff.find(code    =>    code['dv']    ===    ind))[1]    +    x[i]    *
Object.values(coeff.find(code => code['dv'] === ind))[2] + a),

                colorfy(x[i]),

                'Expected          Income          per          Capita:<br><b>US$          '          +
Math.round(Math.exp(Object.values(coeff.find(code    =>    code['dv']    ===    ind))[1]    +    x[i]    *
Object.values(coeff.find(code => code['dv'] === ind))[2] + a)) + '</b><br>given a ' + cat(x[i]) + ' SMEX',

                val,

                colorfy(x[i]),

                'Income per capita in ' + country + ':<br><b>US$ ' + Math.round(finder.y) + '</b><br>with
a ' + cat(finder.SMEX) + ' SMEX',

            ])

        }

    } else {

        if (smex != x[i]) {

            scatterdata.push([

                x[i],

                ((101.01 / (1 + Math.exp(-(Object.values(coeff.find(code => code['dv'] === ind))[1] +
x[i] * Object.values(coeff.find(code => code['dv'] === ind))[2] + a)))) - 1),

                colorfy(x[i]),

                'Expected   '   +   ytitle   +   ':   <b>'   +   cat((101.01   /   (1   +   Math.exp(-
(Object.values(coeff.find(code => code['dv'] === ind))[1] + x[i] * Object.values(coeff.find(code => code['dv']
=== ind))[2] + a)))) - 1) + '</b><br>given a ' + cat(x[i]) + ' SMEX',

                null,

                colorfy(x[i]),

                ytitle + ' in ' + country + ': <br><b>' + cat(val) + '</b><br>with a ' + cat(finder.SMEX)
+ ' SMEX',

            ])

        } else {

            scatterdata.push([

                x[i],
```

```
                    ((101.01 / (1 + Math.exp(-(Object.values(coeff.find(code => code['dv'] === ind))[1] +
x[i] * Object.values(coeff.find(code => code['dv'] === ind))[2] + a)))) - 1),

                    colorfy(x[i]),

                    'Expected '    +    ytitle    +    ':    <b>'    +    cat((101.01    /    (1    +    Math.exp(-
(Object.values(coeff.find(code => code['dv'] === ind))[1] + x[i] * Object.values(coeff.find(code => code['dv']
=== ind))[2] + a)))) - 1) + '</b><br>given a ' + cat(x[i]) + ' SMEX',

                    val,

                    colorfy(x[i]),

                    ytitle + ' in ' + country + ': <br><b>' + cat(val) + '</b><br>with a ' + cat(finder.SMEX)
+ ' SMEX',

                ])

            }

        }

    };


    var scatterdata = google.visualization.arrayToDataTable(scatterdata);


    var options = {

        title: 'Does ' + country + "'s social market economic performance meet expectations?",

        hAxis: {

            title: xtitle,

            minValue: 0,

            maxValue: 100,

            gridlines: {

                color: 'transparent'

            },

            ticks: [{ v: 10, f: 'very low' }, { v: 30, f: 'low' }, { v: 50, f: 'medium' }, { v: 70, f: 'high'
}, { v: 90, f: 'very high' }],
```

```
        slantedText: true,
        slantedTextAngle: 30,
        baselineColor: 'transparent',


    },
    vAxis: {
        title: ytitle,
        minValue: 0,
        gridlines: {
            color: 'transparent'
        },
        baselineColor: 'transparent',
        ticks: yticks,
        fontSize: 0,
    },
    height: 300,
    legend: 'none',
    series: {
        0: { pointSize: 1 },
        1: { pointSize: 10 }
    },
    fontSize: 12,
    fontName: 'Montserrat',
    tooltip: { isHtml: true },
    keepAspectRatio: false,
};
```

```
        var chart = new google.visualization.ScatterChart(document.getElementById('scatter'));

        chart.draw(scatterdata, options);
}
google.charts.load('current', { 'packages': ['corechart'], callback: drawScatter });
```

Technical Background Paper

Technical Background Paper

The Social Market Economy as a Formula for Peace, Prosperity and Sustainability

Almuth D. Merkel

General Remarks on the Data

The final dataset consists of 165 observations. These are all the countries for which there was at least one observation available for GDP per capita and democracy (Polity 2 score), which I used to estimate missing observations. A third variable that needed at least one available observation to be included in the data set is "inflation." The variable "inflation" is not as easily estimated when unavailable as the other variables. Some of the SME output proxies have missing observations, too. Because there are no appropriate correlates, I do not estimate the missing observations of the SME output variables in a regression but fill them with respective regional averages. After obtaining a complete dataset, I apply natural log transformation to the variables whenever it improved the distributional characteristic towards greater normality. I then scale all input variables between 0 and 100 such that 0 is worst and 100 is best.

Data for the Social Market Economic Performance Index

Below Table 1 lists and describes the variables and provides sources.

<Empirical Analysis Tables 3 to 6>

Estimating Missing Observations

To estimate the missing observations of the Social Market Economic Input Variables, I employ a simple ordinary least square regression of the following kind:

$$SME\ Input\ Variable_i = \beta_0 + \beta_1 \times ln\,(y)_i + \beta_2 \times p2_i + \sum_j \beta_{2+j} \times Regional\ Dummies_i + u_i \quad (1)$$

where

$i = country\ i$

$j = count\ of\ regional\ fixed\ effects$

Below Table 2 lists and describes the variables, highlights performed transformations and provides sources. Table 3 presents the regression results.

<Empirical Analysis Table 7>

<Appendix A Table A1>

Calculating Weights

I calculate the SMEX from the 15 resulting SME input variables as a weighted average. Since many of the variables are highly correlated, variables that correlate less with all other variables receive a higher weight. I identify weights from a correlation matrix of all variables. The weights w_i are calculated as follows:

$$w_i = \frac{\arg\min S + \arg\max S - c_i}{\sum_{i=0}^{n} \arg\min S + \arg\max S - c_i} \tag{2}$$

where

r = correlation coefficient

i, j = columns, row of correlation matrix = Input Variable

$$c_i = \sum_{j=0}^{n} |r_{ij}|$$

$$S = \{c_i\}$$

After identifying the weights, I calculate the SMEX as

$$SMEX_c = \sum_{i=0}^{n} observation_i \times weight_i \tag{3}$$

where

$c = Country$

$i = Input\ variable$

Lastly, I scale the SMEX between 0 and 100 such that 0 is worst and 100 is best.

Data for Social Market Economic Output

To estimate the relationship between the Social Market Economic Performance Index and the Social Market Economic output variables, I employ logistic regressions and a simple ordinary least square regression of the following kind:

$$p(\text{Social Peace}+1)_i = \frac{1}{1+e^{-\left(\beta_0+\beta_1\times SMEX_i+\sum_j \beta_{2+j}\times Controls_{ij}+u_i\right)}} \tag{4}$$

$$p(\text{Equal Opportunity}+1)_i = \frac{1}{1+e^{-\left(\gamma_0+\gamma_1\times SMEX_i+\sum_j \gamma_{2+j}\times Controls_{ij}+u_i\right)}} \tag{5}$$

$$p(\text{Ecological Sustainability}+1)_i = \frac{1}{1+e^{-\left(\delta_0+\delta_1\times SMEX_i+\sum_j \delta_{2+j}\times Controls_{ij}+u_i\right)}} \tag{6}$$

$$\text{Economic Prosperity}_i = \varepsilon_0 + \varepsilon_1 \times SMEX_i + \sum_j \varepsilon_{1+j} \times Controls_{ij} + u_i \tag{7}$$

where

i = country i

j = numeration for control variables

Below Tables 4 and 5 list and describe the output and control variables and provide sources. Table 6 presents the regression results.

<Empirical Analysis Tables 9 to 12>

<Empirical Analysis Table 14>

<Empirical Analysis Table 20 >

Simulation Framework

Changes in the SME input variables will result in an according SMEX:

$$SMEX_i^* = -43.9 + 1.67 \times SMEWA_i^* \tag{8}$$

Where

$* = variable\ after\ change$

$i = Country\ i$

$SMEWA = Social\ Market\ Economic\ Performance\ Index$

Using the regression coefficients then allows to estimate the impact of a change in social market economic performance on social peace, equal opportunity, ecological sustainability, and economic prosperity:

$$Social\ Peace_i^* = \frac{1}{1+e^{-\left(\beta_0+\beta_1\times SMEX_i^*+\sum_j \beta_{2+j}\times Controls_{ij}+u_i\right)}} - 1$$

(9)

$$Equal\ Opportunity_i^* = \frac{1}{1+e^{-\left(\gamma_0+\gamma_1\times SMEX_i^*+\sum_j \gamma_{2+j}\times Controls_{ij}+u_i\right)}} - 1$$

(10)

$$Ecological\ Sustainability_i^* = \frac{1}{1+e^{-\left(\delta_0+\delta_1\times SMEX_i^*+\sum_j \delta_{2+j}\times Controls_{ij}+u_i\right)}} - 1$$

(11)

$$Economic\ Prosperity_i^* = \varepsilon_0 + \varepsilon_1 \times SMEX_i^* + \sum_j \varepsilon_{1+j} \times Controls_{ij} + u_i$$

(12)

Where

$* = variable\ after\ change$

$i = Country\ i$

$j = numeration\ for\ control\ variables$

References

<References>

Appendix E

Datasets

Table E1

Raw Data as used to Estimate the Missing Observations for Social Market Economic Input Variables, but with Missing

Observations Replaced and Labelled with (*)

Code	Region	democracy	subsidiarity	intgroup	primavoid	primstab	primsoc	lnprimenv	freeprice	freetrade	freecontr	privprop	privliab	pricestab	consteconpol	comppol	ypol	gcilabor_8.03	gcilabor_8.06	envpol
AFG	SA	-1	0.18	15.00	3.48*	4.23*	2.84*	0.23	81.00	66.00	54.70	48.30	3.38*	2.24	3.48*	3.2*	0*	4.12*	56*	19*
ALB	EECA	9	0.63	38.00	3.18	4.60	2.86	0.91	81.20	88.40	65.70	57.10	2.54	0.38	3.34	3.29	69.88*	4.96	79.00	24.00
DZA	MENA	2	0.24	33.00	3.53	4.63	3.27	2.56	76.20	66.20	63.00	37.90	4.08	-0.65	3.63	3.22	20.34*	4.35	57.00	19.00
AGO	SSA	-2	0.14	19.00	2.95	4.70	1.77	3.13	59.60	66.20	57.70	36.90	2.60	35.90	3.43	2.03	9.90	3.68	71.00	18.00
ARG	LAC	9	0.53	39.00	2.62	3.38	2.86	1.05	53.70	69.20	60.20	50.50	2.81	51.51	2.97	2.88	65.60	3.79	73.00	23.00
ARM	EECA	5	0.46	35.00	4.30	4.13	3.21	1.48	76.00	80.60	81.00	60.70	4.03	1.46	4.15	4.16	47.00	4.92	76*	19.00
AUS	EAP	10	0.78	77.00	4.43	5.67	4.87	1.50	86.20	88.20	87.80	82.80	4.59	3.30	4.69	4.54	82.00	4.58	82.00	24.00
AUT	WE	10	0.76	75.00	4.53	5.52	5.74	0.07	81.00	86.40	73.00	87.30	5.17	1.72	5.88	4.89	98.60	5.52	100.00	24.00
AZE	EECA	-7	0.41	31.00	5.37	4.80	4.40	2.99	69.80	74.60	80.80	67.10	4.63	-0.23	5.41	4.28	31.50	5.31	63*	18.00
BHR	MENA	-10	0.11	36.00	4.83	3.98	4.85	1.58	81.10	79.40	70.50	70.60	4.62	0.62	5.49	4.59	66.00	5.39	63.00	17.00
BGD	SA	1	0.45	28.00	3.52	4.90	2.64	0.44	70.00	63.60	52.30	41.00	3.27	4.46	3.66	3.05	15.10	4.15	61.00	20.00
BLR	EECA	-7	0.22	44.00	3.88*	5*	3.83*	0.58	69.80	82.00	76.40	63.20	3.5*	6.57	3.8*	3.6*	56.91*	4.5*	63*	19*
BEL	WE	8	0.72	75.00	4.08	4.87	4.55	0.00	80.50	86.40	75.20	84.50	4.19	1.52	4.51	5.00	100.00	4.63	89.00	26.00
BEN	SSA	7	0.23	39.00	3.95	3.94	2.20	0.59	84.30	49.40	58.00	41.30	4.18	-0.32	4.00	2.83	12.91*	4.51	67.00	27.00
BTN	SA	5	0.16	67.00	3.91*	4.58	3.65*	0.84	71.60	79.40	68.20	69.90	3.93*	1.78	4.07*	3.91	5.80	4.38*	67*	22*
BOL	LAC	7	0.40	33.00	2.01	3.96	1.97	2.00	69.90	67.80	58.30	20.10	2.09	-0.69	2.36	3.04	40.80	3.51	72.00	22.00
BIH	EECA	0	0.76	38.00	3.10	4.82	2.81	0.34	82.70	80.00	45.70	44.40	2.06	2.09	2.26	3.42	62.59*	3.52	73.00	16.00
BWA	SSA	8	0.16	61.00	4.13	6.09	2.89	0.51	73.60	82.80	69.30	60.90	4.37	0.64	4.63	3.74	15.40	4.35	71.00	18.00
BRA	LAC	8	0.78	37.00	2.52	3.44	2.64	1.28	77.20	67.80	60.50	57.30	2.71	4.15	2.68	3.87	74.90	3.65	62.00	25.00
BGR	EECA	9	0.32	43.00	3.59	5.72	3.54	0.39	85.70	86.40	62.60	64.20	3.29	4.65	3.52	3.46	88.30	3.97	80.00	27.00
BFA	SSA	6	0.08	42.00	3.63	4.55	2.02	2.51	82.40	61.80	47.60	46.90	3.96	-2.99	3.84	3.53	7.50	3.96	80.00	22.00
BDI	SSA	-1	0.14	22.00	3.95	3.59	2.61	2.46	70.30	68.20	55.10	24.90	4.00	0.82	4.02	3.29	0*	4.28	3.00	17.00
CPV	SSA	10	0.06	55.00	3.86	4.14	3.17	0.21	83.10	68.20	58.50	47.50	3.51	0.56	4.37	3.34	36.20	4.13	81*	20.00
KHM	EAP	-4	0.20	21.00	3.52	4.64	3.04	0.38	74.80	65.40	31.20	43.10	3.03	3.24	3.66	3.68	16.40	4.35	59.00	20.00
CMR	SSA	-4	0.12	25.00	3.56	4.45	2.45	1.39	84.10	59.60	46.00	45.30	3.58	1.58	3.84	3.44	8.70	3.82	67.00	23.00
CAN	NAM	10	0.90	82.00	4.21	5.13	4.80	0.63	76.00	87.00	81.70	87.70	4.70	1.91	4.89	4.82	99.80	5.05	79.00	20.00
CAF	SSA	6	0.10	23.00	3.08*	3.44*	1.94*	0.06	73.30	47.20	24.30	38.10	3.17*	2.41	3.18*	2.92*	2.34*	3.88*	70*	21*

TCD	SSA	-2	0.10	20.00	2.59	4.40	2.21	2.73	76.10	47.20	26.80	32.40	3.14	2.86	2.84	2.65	1.27*	3.62	68.00	21.00
CHL	LAC	10	0.57	67.00	4.87	5.38	3.07	2.10	85.20	89.00	75.00	69.90	4.14	2.67	5.09	4.38	57.20	4.56	70.00	24.00
CHN	EAP	-7	0.57	41.00	4.10	6.00	4.49	0.67	71.10	72.40	76.80	60.90	4.12	1.58	4.49	4.48	78.50	4.58	64.00	24.00
COL	LAC	7	0.55	37.00	3.03	4.83	2.93	1.73	77.50	81.20	71.30	61.10	3.02	4.29	3.41	3.67	28.30	4.49	55.00	19.00
COM	SSA	9	0.11	27.00	3.41*	3.92*	2.53*	0.71	81.70	59.20	47.80	43.10	3.58*	3.33	3.63*	3.35*	20.04*	4.08*	77*	23*
COD	SSA	-3	0.12	21.00	3.17	3.45	2.06	3.02	49.60	64.60	51.20	30.10	2.95	-1.70	2.69	3.13	14.10	3.81	72.00	21.00
COG	SSA	-4	0.15	21.00	3.74*	4.24*	2.93*	3.85	83.20	56.80	37.50	40.70	3.95*	-1.24	4.1*	3.58*	11.35*	4.3*	63*	20*
CRI	LAC	10	0.49	59.00	3.48	4.55	2.77	0.20	81.20	81.40	66.50	66.70	3.70	1.72	4.44	3.96	78.40	5.17	86.00	23.00
CIV	SSA	4	0.13	36.00	3.58	4.73	2.26	0.92	75.70	69.40	62.30	48.50	3.92	0.55	3.97	3.61	17.45*	4.80	73.00	26.00
HRV	EECA	9	0.41	49.00	3.37	4.85	3.30	0.35	77.60	86.40	53.60	69.90	1.87	1.49	2.63	3.41	83.04*	3.39	90.00	26.00
CUB	LAC	-7	0.28	47.00	3.48*	4.79*	2.78*	0.22	64.10	65.60	20.00	20.10	3.19*	1.00	3.83*	3.43*	35.57*	4.37*	54*	19*
CYP	WE	10	0.22	57.00	4.59	4.19	3.80	0.01	84.30	86.40	76.60	77.40	3.41	0.56	4.80	4.08	61.20	4.76	86*	23.00
CZE	EECA	9	0.73	57.00	3.12	6.23	4.99	0.06	80.80	86.40	69.70	76.80	3.46	3.52	3.54	4.02	88.80	4.70	90.00	25.00
DNK	WE	10	0.90	88.00	4.74	6.22	5.24	0.41	84.60	86.40	88.70	86.30	5.32	0.97	5.56	5.18	89.50	5.86	95.00	29.00
DJI	MENA	3	0.06	31.00	3.73*	4.02*	2.88*	0.22	76.50	49.80	62.30	58.80	3.76*	2.50	3.6*	3.25*	12.30	4.33*	53*	21*
DOM	LAC	7	0.14	29.00	3.06	5.10	2.26	0.76	73.50	76.60	50.30	55.80	3.33	2.49	3.93	2.37	75.20	4.56	88.00	22.00
ECU	LAC	5	0.44	32.00	2.78	4.34	2.27	1.96	81.00	66.00	53.80	40.40	2.95	-0.17	2.79	3.31	31.70	4.38	64.00	26.00
EGY	MENA	-4	0.10	32.00	4.21	2.59	2.62	1.82	61.30	70.20	62.00	48.50	3.91	13.63	4.03	3.09	36.90	4.75	62.00	21.00
SLV	LAC	8	0.39	33.00	3.05	4.47	1.82	0.47	78.60	80.80	53.60	41.60	2.63	1.06	2.60	3.17	20.70	4.29	81.00	18.00
GNQ	SSA	-6	0.06	17.00	4.22*	4.87*	3.71*	3.49	78.10	48.80	37.50	38.10	4.53*	-7.23	4.76*	4.14*	26.66*	4.59*	65*	21*
ERI	SSA	-7	0.06	20.00	3.68*	4.13*	2.79*	3.00	61.00	69.20	18.20	32.50	3.86*	19.54	4.02*	3.47*	4.05*	4.26*	59*	19*
EST	EECA	9	0.23	71.00	4.25	6.07	4.97	0.31	78.60	86.40	73.50	83.20	4.36	3.21	4.10	4.75	98.40	5.34	89.00	27.00
SWZ	SSA	-9	0.22*	39.00	4.06	3.28	2.28	1.04	75.20	88.60	58.90	49.80	3.54	1.78	3.80	3.16	13.7*	4.15	64.00	21.00
ETH	SSA	-3	0.36	35.00	3.42	4.87	2.90	1.87	62.70	60.80	48.60	36.50	3.51	13.18	3.12	3.53	11.60	3.36	69.00	16.00
FJI	EAP	2	0.06	44*	4.06*	5.19*	3.91*	0.56	72.50	52.80	62.60	69.90	4.09*	2.39	4.19*	4*	30.50	4.74*	69*	22*
FIN	WE	10	0.76	85.00	4.99	5.49	5.17	0.17	83.60	86.40	84.80	92.30	5.96	1.77	5.90	5.69	100.00	5.31	97.00	29.00
FRA	WE	9	0.75	70.00	4.47	4.82	4.51	0.01	76.70	81.40	82.50	85.90	4.65	1.23	4.73	4.82	100.00	4.25	91.00	28.00
GAB	SSA	3	0.22	32.00	3.10	5.55	2.24	2.69	77.30	51.20	52.10	36.90	3.06	0.79	3.28	3.29	33.97*	3.81	75*	25.00
GMB	SSA	4	0.06	30.00	4.00	2.42	3.51	1.23	63.30	64.60	53.50	43.90	4.67	6.42	4.89	4.41	6.10	4.81	69*	20.00
GEO	EECA	7	0.78	56.00	4.43	5.10	2.85	0.41	78.30	88.60	85.30	68.60	3.34	6.64	4.16	3.15	39.90	4.21	82.00	19.00
DEU	WE	10	0.67	81.00	4.72	6.10	4.94	0.03	76.70	86.40	82.80	80.50	4.84	2.14	5.26	5.26	99.50	5.01	95.00	29.00
GHA	SSA	8	0.41	40.00	3.96	2.64	3.65	2.59	68.90	63.80	58.40	52.50	4.22	9.19	4.17	3.77	18.30	4.51	79.00	24.00
GRC	WE	10	0.34	48.00	3.26	3.70	2.94	0.08	79.40	81.40	73.70	57.00	2.40	-0.38	2.14	3.53	82.46*	4.02	10.00	25.00
GTM	LAC	8	0.18	28.00	3.87	4.94	1.94	0.85	77.40	82.20	62.60	45.50	2.66	3.41	2.96	3.22	14.10	4.97	3.00	21.00
GIN	SSA	4	0.22	27.00	3.54	4.12	3.75	2.30	70.60	60.40	55.40	38.70	4.64	7.47	4.02	3.00	10.65*	5.12	70*	24.00
GNB	SSA	6	0.06	17.00	3.24*	3.65*	2.2*	2.02	82.70	49.00	39.10	41.30	3.36*	-7.41	3.39*	3.11*	8.34*	3.98*	71*	21*
GUY	LAC	7	0.06	38.00	3.08*	3.73	2.28*	2.59	82.50	66.80	58.90	53.60	2.75*	5.81	3.26*	3.47	43.3*	4.11*	68*	21*
HTI	LAC	5	0.06	22.00	2.47	4.85	1.45	0.50	61.50	67.00	33.60	16.40	2.36	14.24	2.02	2.02	20.1*	3.18	71.00	11.00
HND	LAC	5	0.29	29.00	3.40	5.04	2.44	0.77	72.20	79.40	56.70	48.60	3.15	4.34	3.39	3.32	18.10	4.72	63.00	24.00
HUN	EECA	10	0.62	45.00	3.08	5.13	3.39	0.24	79.90	86.40	60.20	64.80	3.43	4.52	3.28	3.67	86.20	4.23	82.00	27.00
IND	SA	9	0.48	40.00	3.98	4.54	3.51	0.70	73.00	73.40	65.60	63.00	4.11	2.31	4.52	4.42	22.00	4.50	58.00	26.00
IDN	EAP	9	0.50	37.00	4.26	5.72	3.98	1.31	78.40	80.80	70.00	59.80	4.07	1.60	4.62	4.30	54.00	4.48	64.00	22.00
IRN	MENA	-7	0.60	30.00	2.84	5.15	2.48	1.74	49.00	54.60	57.30	36.90	2.67	12.25	2.42	3.95	13.88*	3.55	64.00	21.00
IRQ	MENA	6	0.06	18.00	3.83*	4.17*	3.07*	2.66	76.40	40.00	52.60	43.90	3.89*	0.00	3.72*	3.4*	16.00	4.39*	58*	22*
IRL	WE	10	0.27	74.00	4.51	5.77	4.68	0.13	85.30	86.40	82.70	86.60	4.16	1.52	5.29	4.93	90.10	5.18	92.00	26.00

ISR	MENA	6	0.20	62.00	4.14	5.24	4.47	0.10	84.90	86.20	72.20	82.30	4.52	2.25	4.50	4.48	54.90	4.99	83.00	16.00
ITA	WE	10	0.49	50.00	3.55	4.24	2.82	0.07	83.20	86.40	70.40	75.40	2.37	0.91	2.86	3.85	88.38*	3.96	98.00	24.00
JAM	LAC	9	0.22	44.00	3.88	3.94	3.07	0.24	77.70	68.40	77.70	62.10	3.58	7.59	4.29	3.89	46.94*	4.35	83.00	21.00
JPN	EAP	10	0.68	73.00	4.74	4.30	4.72	0.01	84.40	80.00	81.40	86.60	5.14	0.59	5.18	5.49	76.00	5.79	90.00	26.00
JOR	MENA	-3	0.16	48.00	3.79	3.78	3.31	0.15	77.60	81.20	60.10	64.80	4.66	1.55	3.96	4.01	21.00	4.83	75.00	24.00
KAZ	EECA	-6	0.37	31.00	4.24	4.17	4.17	2.61	68.10	80.20	74.60	61.30	4.05	6.74	4.48	3.47	100.00	4.46	64.00	17.00
KEN	SSA	9	0.36	28.00	3.72	3.57	3.05	0.83	75.00	60.40	55.00	63.20	3.86	3.96	4.42	3.85	8.30	4.27	66.00	24.00
KOR	EAP	8	0.70	54.00	3.88	6.63	4.85	0.00	82.10	80.00	90.50	82.50	4.19	-0.93	3.83	4.46	67.00	3.59	64.00	25.00
XKX	EECA	8	0.19	39.00	3.52*	4.66*	3.41*	0.79*	78.40	76.20	75.00	66.30	3.1*	1.04	3.29*	3.36*	67.83*	4.27*	79*	22*
KWT	MENA	-7	0.11	39.00	4.25	5.60	3.89	2.34	73.20	76.40	61.30	57.10	4.43	-4.07	4.11	3.19	22.00	4.64	10.00	20.00
KGZ	EECA	8	0.22	29.00	3.45	4.38	2.63	2.31	76.40	79.20	73.60	53.60	3.03	-0.84	3.23	3.19	32.70	4.02	75*	16.00
LAO	EAP	-7	0.17	29.00	3.54	3.81	3.21	1.57	76.80	82.00	54.30	42.50	4.13	2.42	3.80	3.79	0.40	4.66	62.00	20.00
LVA	EECA	8	0.53	58.00	4.10	5.77	4.44	0.00	80.20	86.40	77.00	72.30	3.29	2.63	3.53	3.56	96.50	4.89	86.00	24.00
LBN	MENA	6	0.21	28.00	3.25	2.46	2.20	0.00	75.60	77.40	45.60	44.60	3.20	2.90	2.94	2.98	30.00	4.09	72.00	21.00
LSO	SSA	8	0.38	42.00	3.44	3.81	3.73	1.36	75.70	82.20	52.80	45.20	3.53	2.74	3.36	3.72	9.20	3.38	79.00	19.00
LBR	SSA	6	0.11	31.00	3.11*	3.34	1.99*	3.02	62.10	60.60	48.20	31.10	3.2*	-3.73	3.22*	3.54	3.54*	3.9*	70*	21*
LBY	MENA	0	0.11	17.00	3.89*	5.36	3.1*	2.26	53.60	80.00	40.70	30.10	3.94*	-1.10	3.82*	2.09	18.57*	4.43*	51*	20*
LTU	EECA	10	0.39	59.00	3.72	5.61	4.28	0.02	79.70	86.40	71.90	77.90	3.99	2.95	3.74	3.71	92.70	4.85	91.00	25.00
LUX	WE	10	0.89	82.00	5.36	6.27	5.52	0.00	76.40	86.40	66.80	86.40	5.24	3.39	6.22	5.09	100*	5.70	90*	27.00
MKD	EECA	9	0.19	35.00	3.22	5.20	3.29	0.70	77.70	86.20	80.60	62.50	2.53	2.37	2.97	3.90	71.86*	3.78	73.00	17.00
MDG	SSA	6	0.13	24.00	2.73	4.14	1.73	0.65	72.70	73.60	47.30	45.60	2.65	5.28	2.75	2.70	4.8*	4.20	82.00	24.00
MWI	SSA	6	0.13	31.00	3.23	2.19	2.22	1.84	69.10	75.40	41.90	43.10	3.20	8.17	3.68	3.33	21.30	4.12	87.00	19.00
MYS	EAP	5	0.41	47.00	4.80	5.44	4.88	1.65	81.60	82.00	87.80	86.50	5.14	0.08	5.33	4.74	8.40	5.36	73.00	21.00
MLI	SSA	5	0.11	31.00	3.16	4.07	2.99	2.27	81.60	65.00	49.20	36.10	3.28	2.40	3.40	3.76	10.49*	3.85	71.00	22.00
MRT	SSA	-2	0.13	28.00	2.29	4.64	2.19	2.03	79.60	62.60	61.70	32.50	2.21	4.58	2.10	2.35	10.8*	4.24	67.00	23.00
MUS	SSA	10	0.17	50.00	4.96	4.69	3.72	0.00	73.80	88.20	82.50	75.80	4.50	0.94	5.06	4.22	46.05*	4.75	74.00	24.00
MEX	LAC	8	0.42	29.00	3.41	5.17	2.76	1.32	70.90	87.60	67.00	58.30	2.98	3.33	3.60	3.75	54.70	4.54	71.00	24.00
MDA	EECA	9	0.18	31.00	3.69	4.53	3.08	0.16	72.00	78.00	68.10	60.50	2.76	5.49	3.00	2.78	61.17*	4.45	83.00	22.00
MNG	EAP	10	0.36	36.00	2.93	4.37	2.95	3.15	74.20	74.00	63.60	50.30	2.96	8.32	2.94	2.69	85.00	4.33	77*	23.00
MNE	EECA	9	0.16	46.00	4.44	3.71	4.04	0.53	80.30	83.80	70.80	59.10	4.23	1.57	4.45	3.63	76.01*	4.23	89.00	21.00
MAR	MENA	-4	0.26	40.00	4.59	4.91	2.41	0.24	77.00	78.60	70.40	66.30	4.28	0.84	5.11	3.63	10.68*	4.12	75.00	24.00
MOZ	SSA	5	0.41	25.00	3.04	1.86	1.95	1.08	72.00	78.00	55.30	34.90	2.88	2.96	3.41	2.60	10.90	3.57	76.00	22.00
MMR	EAP	8	0.09	30.00	3.52*	4.19	3.07*	1.28	77.50	70.80	53.10	32.50	3.44*	7.65	3.44*	2.88	1.60	4.4*	72*	22*
NAM	SSA	6	0.11	51.00	4.22	4.02	3.11	1.43	75.90	83.20	65.60	58.90	4.41	1.50	4.53	3.87	32.43*	4.47	82.00	23.00
NPL	SA	6	0.22	31.00	3.51	5.59	2.99	0.30	71.20	60.40	61.60	40.70	3.36	6.17	3.20	3.03	21.00	3.94	77.00	17.00
NLD	WE	10	0.36	82.00	5.00	6.08	5.21	0.27	82.50	86.40	80.40	90.00	5.54	3.05	5.70	5.61	97.50	5.85	95.00	29.00
NZL	EAP	10	0.79	89.00	4.97	6.06	4.69	0.53	87.00	92.20	90.40	93.30	5.27	2.30	4.90	5.34	67.00	5.07	89.00	23.00
NIC	LAC	6	0.16	26.00	3.11	5.09	1.69	1.21	71.50	75.40	55.10	33.50	2.26	4.67	3.41	2.78	32.99*	4.58	65*	20.00
NER	SSA	5	0.44	33.00	3.17*	3.56*	2.08*	1.81	74.80	61.20	55.40	45.60	3.28*	0.50	3.31*	3.02*	20.60	3.94*	69*	21*
NGA	SSA	7	0.24	27.00	3.04	3.51	2.11	1.87	61.70	62.40	54.70	38.10	3.06	10.38	3.17	2.77	11.00	4.02	65.00	23.00
NOR	WE	10	0.74	85.00	4.52	6.64	5.17	1.93	74.80	83.80	86.10	84.30	4.96	-0.62	5.24	5.26	95.80	5.65	97.00	29.00
OMN	MENA	-8	0.06	44.00	4.84	4.70	4.47	3.22	78.40	81.60	74.60	66.40	5.35	-3.37	5.32	3.72	24.51*	5.29	72.00	21.00
PAK	SA	7	0.50	32.00	3.86	4.03	3.77	0.70	72.50	64.80	54.90	48.30	3.82	8.62	3.80	3.68	8.00	4.12	66.00	22.00
PAN	LAC	9	0.20	37.00	3.34	6.11	2.91	0.04	79.40	79.20	70.80	58.80	3.00	-0.43	3.99	3.90	55.10	4.32	71.00	25.00
PNG	EAP	5	0.14	29.00	3.76*	4.81*	3.44*	2.83	70.70	79.80	58.40	54.90	3.73*	3.87	3.77*	3.67*	0.20	4.55*	70*	22*

PRY	LAC	9	0.39	29.00	3.73	5.19	2.10	0.80	72.50	75.40	60.90	44.70	2.25	2.87	3.82	2.88	48.87*	4.42	73.00	19.00
PER	LAC	9	0.37	37.00	3.27	5.35	2.23	1.89	86.30	88.40	67.10	54.90	2.30	1.56	3.80	3.40	43.30	4.04	73.00	23.00
PHL	EAP	8	0.50	34.00	4.11	5.82	3.82	0.68	66.90	81.60	59.50	54.60	3.01	0.76	3.49	3.21	44.10	5.35	62.00	24.00
POL	EECA	10	0.62	60.00	3.58	5.20	3.59	0.35	82.00	86.40	62.60	63.10	3.03	2.95	2.90	3.96	84.90	4.31	74.00	24.00
PRT	WE	10	0.56	63.00	3.72	4.04	4.05	0.05	83.00	86.40	76.50	75.40	2.98	1.72	4.04	4.04	90.20	4.53	90.00	28.00
QAT	MENA	-10	0.12	63.00	5.22	5.93	5.05	2.27	80.60	81.60	71.10	66.90	5.34	-3.95	5.33	4.69	4.00	5.21	10.00	20.00
ROU	EECA	9	0.43	48.00	3.55	5.25	3.72	0.51	78.10	86.40	58.60	72.50	3.92	6.92	2.83	3.36	95.00	4.28	73.00	25.00
RUS	EECA	4	0.34	29.00	3.80	5.03	3.64	2.26	68.20	77.80	80.20	56.80	3.48	3.78	3.69	3.47	90.10	4.39	77.00	19.00
RWA	SSA	-3	0.08	55.00	4.54	4.34	3.50	1.54	79.80	70.40	60.30	76.50	4.97	0.37	5.37	4.51	1.56*	4.91	80.00	18.00
SAU	MENA	-10	0.06	49.00	5.05	4.87	4.85	2.34	81.00	75.40	66.60	64.60	5.13	0.49	5.29	4.29	35.00	5.08	10.00	19.00
SEN	SSA	7	0.24	45.00	3.66	4.48	2.50	0.62	79.70	65.40	50.40	52.40	4.41	1.68	4.55	3.57	20.00	4.44	69.00	24.00
SRB	EECA	8	0.69	41.00	3.60	4.61	3.47	0.38	80.70	78.00	72.60	55.40	3.05	2.46	3.65	3.11	73.21*	4.08	69.00	21.00
SLE	SSA	7	0.06	30.00	3.21*	3.24	2.18*	2.11	64.20	69.40	50.10	40.70	3.33*	3.88	3.36*	2.81	9.19*	3.96*	72*	22*
SGP	EAP	-2	1.00	84.00	5.79	5.98	5.53	0.00	85.60	94.80	92.80	96.80	6.20	0.09	6.35	5.34	19.90	6.12	89.00	18.00
SVK	EECA	10	0.56	50.00	2.50	5.40	4.07	0.04	75.90	86.40	55.30	73.10	2.42	2.63	2.96	3.61	92.10	4.18	100.00	25.00
SVN	EECA	10	0.39	61.00	4.01	5.23	4.56	0.01	82.20	86.40	78.40	76.50	3.17	2.42	3.73	3.82	100.00	4.57	86*	27.00
SLB	EAP	8	0.35*	39.00	3.6*	4.62*	3.2*	3.00	84.30	48.00	67.70	54.60	3.54*	2.19	3.54*	3.52*	1.10	4.45*	73*	22*
SOM	SSA	5	0.06	9.00	2.69*	2.89*	1.26*	1.9*	67.47*	56.36*	31.60	20.10	2.67*	215.47	2.64*	2.43*	0*	3.64*	65*	20*
ZAF	SSA	9	0.58	43.00	3.63	4.52	2.49	1.33	75.90	75.80	62.00	58.40	4.56	4.02	3.32	4.50	47.80	3.19	86.00	24.00
SSD	SSA	0	0.18*	12.00	3.53*	3.99*	2.62*	1.55	71.75*	64.84*	49.42*	41.27*	3.7*	17.69	3.8*	3.38*	9.74*	4.16*	66*	21*
ESP	WE	10	0.74	57.00	3.48	4.35	3.90	0.04	82.00	86.40	66.80	74.90	3.94	1.58	4.18	4.11	80.90	4.43	79.00	28.00
LKA	SA	6	0.22	38.00	3.66	4.27	3.62	0.04	71.10	67.60	76.50	47.70	3.83	2.19	3.70	3.50	31.00	4.53	70.00	21.00
SDN	SSA	-2	0.22	16.00	3.73*	4.25*	2.94*	2.68	77.00	52.00	53.50	33.70	3.95*	17.83	4.09*	3.6*	14.49*	4.29*	66*	21*
SUR	LAC	5	0.06	41.00	3.3*	4.80	2.63*	3.21	76.10	69.80	48.20	45.60	3.01*	16.07	3.57*	3.32	48.56*	4.25*	68*	21*
SWE	WE	10	0.77	84.00	4.42	6.44	4.65	0.17	81.20	86.40	85.30	88.80	5.09	2.76	4.76	5.52	100.00	5.66	100.00	29.00
CHE	WE	10	0.96	85.00	4.74	6.57	5.75	0.00	84.40	86.60	74.20	87.40	5.83	0.40	6.38	5.20	92.70	6.11	89.00	26.00
SYR	MENA	-9	0.16	14.00	3.61*	4.76	2.53*	2.81	58.80	51.60	48.90	45.60	3.57*	11.97	3.45*	3.71	0*	4.27*	37*	17*
TJK	EECA	-3	0.22	21.00	4.04	4.10	4.18	1.66	71.00	75.00	65.90	49.10	4.47	5.00	4.75	3.67	16.80	4.55	62*	16.00
TZA	SSA	3	0.21	36.00	3.52	4.60	3.42	1.12	72.20	67.80	45.90	41.90	4.14	4.63	4.05	3.86	4.00	4.35	71.00	23.00
THA	EAP	-3	0.46	37.00	3.87	6.23	3.78	1.07	74.00	83.00	83.00	59.50	4.21	0.75	3.84	3.86	76.00	4.89	62.00	21.00
TLS	EAP	8	0.13	38.00	3.67*	5.12	3.33*	2.98	76.50	75.00	64.00	45.20	3.63*	3.17	3.65*	3.20	39.70	4.5*	73*	22*
TGO	SSA	-2	0.44	32.00	3.33*	3.71*	2.27*	2.34	79.50	63.20	55.00	41.60	3.45*	2.10	3.54*	3.12*	0*	4.05*	62*	20*
TTO	LAC	10	0.11	41.00	3.46	3.84	2.85	2.32	77.40	67.80	67.30	56.60	2.70	0.98	3.72	3.04	62.33*	3.00	65.00	22.00
TUN	MENA	7	0.34	42.00	4.26	3.94	2.84	1.17	73.90	66.40	78.10	56.40	3.72	7.03	3.34	3.40	39.10	3.65	72.00	22.00
TUR	WE	-4	0.46	40.00	3.77	5.10	3.76	0.20	66.10	78.00	67.00	57.40	3.48	13.93	3.77	4.09	61.72*	3.84	61.00	17.00
TKM	EECA	-8	0.18	19.00	3.95*	5.09*	3.94*	2.88	68.70	74.20	30.00	20.10	3.59*	1.20	3.9*	3.67*	58.07*	4.55*	62*	19*
UGA	SSA	-1	0.20	26.00	3.04	4.59	2.64	2.15	78.00	75.40	46.00	45.60	3.60	0.62	4.38	3.20	2.90	4.46	70.00	20.00
UKR	EECA	4	0.35	30.00	3.40	3.52	3.79	0.62	63.00	81.20	61.30	47.50	3.39	8.13	3.06	2.82	73.00	4.29	64.00	20.00
ARE	MENA	-8	0.56	71.00	5.35	5.63	4.81	1.82	79.60	80.40	78.60	80.30	5.52	-1.90	5.65	4.77	2.00	5.28	10.00	21.00
GBR	WE	10	0.52	82.00	4.54	4.65	4.30	0.47	80.30	86.40	94.70	92.20	5.08	1.86	4.60	5.15	93.50	4.97	80.00	28.00
USA	NAM	8	0.90	75.00	4.50	4.51	4.94	0.32	75.50	79.80	83.30	81.80	5.27	1.74	5.31	5.56	76.10	5.24	69.00	16.00
URY	LAC	10	0.55	70.00	3.69	4.26	3.96	0.82	72.70	77.40	73.60	72.00	4.02	7.67	4.83	3.30	84.50	3.24	99.00	25.00
UZB	EECA	-9	0.18	22.00	3.68*	4.71*	3.46*	2.59	59.90	67.60	72.60	59.10	3.25*	19.23	3.53*	3.33*	20.90	4.38*	59*	18*
VEN	LAC	-3	0.48	18.00	1.85	2.43	1.71	0.59	0.00	58.00	30.80	10.10	1.70	40.44	1.35	2.20	54.20	3.82	74.00	20.00
VNM	EAP	-7	0.16	35.00	3.72	4.59	3.16	1.11	68.20	79.60	65.60	52.60	3.58	1.79	4.02	3.40	38.00	4.34	64.00	23.00

YEM	MENA	0	0.02*	16.00	2.58	2.85	1.81	0.25	42.60	70.00	43.90	22.50	3.00	46.88	2.27	2.19	2.00	4.00	3.00	19.00
ZMB	SSA	6	0.31	37.00	3.35	3.68	2.08	2.48	72.20	72.60	66.40	45.20	3.51	3.50	3.71	3.28	15.30	3.76	70.00	19.00
ZWE	SSA	4	0.17	22.00	3.01	3.19	1.79	1.42	62.80	70.00	39.10	33.70	3.32	-4.04	2.63	3.44	16.53*	4.33	57.00	19.00

Table E2

Data as used to run Regressions, but with Missing Observations Replaced and Labelled with (*)

Code	Region	SMEX	GFX	EQX	ESX	lny	EFI	RPI	lnmses	lnnrr	indyr	Decol	WEC	WEH
AFG	SA	27.81	27.00	18.32	12.06*	6.41	0.76	0.03	1.48	0.51	101.00	1	1	0
ALB	EECA	56.18	67.00	53.81	0.00	8.39	0.14	0.94	3.25	1.21	107.00	1	0	0
DZA	MENA	38.01	34.00	43.38	2.53	8.33	0.37	0.06	0.00	3.00	58.00	1	1	0
AGO	SSA	11.63	32.00	23.35	0.00	8.20	0.78	0.50	0.39	3.32	45.00	1	1	0
ARG	LAC	40.16	85.00	55.06	25.36	9.56	0.16	0.62	1.90	1.17	204.00	1	1	0
ARM	EECA	54.25	53.00	59.10	1.19	8.31	0.05	0.26	3.12	2.03	29.00	0	0	0
AUS	EAP	84.92	97.00	92.82	53.25	10.89	0.28	0.94	1.80	2.14	119.00	0	1	0
AUT	WE	89.06	93.00	94.72	68.20	10.74	0.25	0.85	2.88	0.14	75.00	0	0	1
AZE	EECA	53.42	10.00	36.45	8.17	8.56	0.12	0.26	2.32	3.42	29.00	0	0	0
BHR	MENA	49.99	11.00	77.07	0.00	9.99	0.58	0.48	0.00	1.67	49.00	1	1	0
BGD	SA	32.59	39.00	38.75	5.65	7.31	0.03	0.48	1.11	0.51	49.00	0	0	0
BLR	EECA	41.20	19.00	81.19	9.69	8.73	0.31	0.96	2.79	0.96	29.00	0	0	0
BEL	WE	84.97	96.00	95.48	72.94	10.65	0.59	0.89	4.48	0.02	190.00	0	0	1
BEN	SSA	44.49	66.00	21.26	21.47	6.77	0.76	0.99	0.00	1.21	60.00	1	1	0
BTN	SA	49.79	59.00	37.55	7.81*	8.09	0.65	0.65	2.13	1.08	73.00	1	0	0
BOL	LAC	36.62	63.00	44.88	30.00	8.10	0.57	0.30	1.54	2.17	195.00	1	1	0
BIH	EECA	30.79	53.00	70.70	0.00	8.58	0.64	0.97	3.59	0.79	28.00	0	0	0
BWA	SSA	48.35	72.00	45.62	0.79	8.88	0.40	0.89	3.32	0.80	54.00	1	1	0
BRA	LAC	47.67	75.00	56.92	61.34	9.05	0.56	0.53	1.93	1.73	198.00	1	1	0
BGR	EECA	61.51	80.00	72.56	47.61	8.98	0.29	0.69	2.81	0.65	142.00	1	0	0
BFA	SSA	37.94	56.00	16.27	7.02*	6.58	0.77	0.96	0.00	2.72	60.00	1	1	0
BDI	SSA	18.40	13.00	6.70	4.41*	5.60	0.31	0.51	0.00	2.50	58.00	1	1	0
CPV	SSA	43.88	92.00	34.7*	45.08*	8.12	0.44	0.28	3.65	0.32	45.00	1	1	0
KHM	EAP	21.17	25.00	29.41	15.70	7.22	0.16	0.18	3.16	0.61	67.00	1	1	0
CMR	SSA	25.45	18.00	23.72	17.96	7.23	0.65*	0.98	0.00	1.97	60.00	1	1	0
CAN	NAM	84.73	98.00	90.58	47.26	10.70	0.73	0.80	2.97	1.24	153.00	1	1	0
CAF	SSA	17.03	10.00	0.00	3.14*	5.99	0.79	0.98	0.00	2.31	60.00	1	1	0
TCD	SSA	6.98	17.00	7.30	0.18*	6.60	0.86	0.97	0.00	3.22	60.00	1	1	0
CHL	LAC	68.84	90.00	70.92	60.99	9.54	0.44	0.42	1.50	2.56	202.00	1	1	0
CHN	EAP	49.24	10.00	73.17	42.12	9.15	0.19	0.76	0.99	0.95	652.00	0	0	0
COL	LAC	48.46	66.00	49.62	34.63	8.74	0.64	0.17	1.41	1.87	201.00	1	1	0
COM	SSA	36.91	44.00	22.75*	27.37*	7.18	0.05	0.11	1.24	0.87	45.00	1	1	0
COD	SSA	17.56	18.00	16.94	2.53	6.23	0.70	0.35	0.00	3.28	60.00	1	1	0
COG	SSA	22.89	20.00	23.95	0.00	7.61	0.70	0.73	1.87	4.02	60.00	1	1	0

CRI	LAC	69.31	91.00	67.79	77.07	9.40	0.40	0.53	2.80	0.60	182.00	0	0	0
CIV	SSA	43.87	51.00	20.29	18.85	7.41	0.73	0.99	1.18	1.29	60.00	1	1	0
HRV	EECA	53.10	85.00	86.56	57.05	9.48	0.17	0.42	3.36	0.59	29.00	0	0	0
CUB	LAC	20.24	14.00	57.29*	36.94	8.99	0.52	0.92	0.00	0.52	118.00	1	0	0
CYP	WE	62.42	94.00	92.08	54.34	10.19	0.35	0.83	4.12	0.01	60.00	1	1	0
CZE	EECA	69.61	91.00	87.22	55.42	9.87	0.26	0.77	4.46	0.15	27.00	0	0	0
DNK	WE	100.00	97.00	95.85	100.00	10.95	0.18	0.70	3.80	0.48	1040.00	0	0	1
DJI	MENA	30.24	24.00	27.28*	9.3*	8.02	0.65	0.14	0.00	0.23	43.00	1	1	0
DOM	LAC	47.63	67.00	45.29	43.73	8.95	0.45	0.57	2.44	0.90	176.00	0	0	0
ECU	LAC	42.26	65.00	50.97	26.98	8.69	0.53	0.46	1.40	2.16	190.00	0	0	0
EGY	MENA	29.09	21.00	39.98	15.02	8.22	0.04	0.58	2.63	2.07	98.00	1	1	0
SLV	LAC	36.69	66.00	43.35	85.55	8.28	0.17	0.59	3.38	0.47	180.00	0	0	0
GNQ	SSA	31.44	6.00	46.18*	1.26*	9.05	0.65*	0.50	0.00	3.55	52.00	1	1	0
ERI	SSA	11.39	2.00	24.78*	9.54	7.27	0.66	0.96	0.00	3.22	27.00	0	0	0
EST	EECA	78.65	94.00	95.06	64.79	9.89	0.46	0.87	4.14	0.79	29.00	0	0	0
SWZ	SSA	30.27	19.00	26.83	11.55*	8.24	0.39	0.77	3.50	1.21	52.00	1	1	0
ETH	SSA	17.74	24.00	29.18	50.35	6.59	0.78	0.94	0.00	1.97	165.00	0	0	0
FJI	EAP	43.20	60.00	61.86*	13.46*	8.69	0.53	0.93	3.41	0.91	50.00	1	1	0
FIN	WE	97.66	100.00	100.00	72.61	10.73	0.14	0.75	2.64	0.51	103.00	1	0	0
FRA	WE	83.57	90.00	93.03	47.03	10.55	0.3*	0.88	2.45	0.04	1077.00	0	0	1
GAB	SSA	29.64	22.00	40.55	10.66	8.86	0.79	0.83	0.00	3.20	60.00	1	1	0
GMB	SSA	41.05	46.00	15.82*	27.62*	6.53	0.76	0.47	0.00	1.24	55.00	1	1	0
GEO	EECA	58.08	61.00	60.07	0.00	8.35	0.37	0.74	3.53	0.57	29.00	0	0	0
DEU	WE	93.17	94.00	94.12	78.78	10.67	0.19	0.87	3.76	0.08	71.00	0	0	1
GHA	SSA	42.50	82.00	34.43	0.61	7.58	0.74	0.88	0.00	2.71	63.00	1	1	0
GRC	WE	49.24	88.00	85.93	68.73	9.87	0.17	0.29	3.37	0.14	191.00	1	0	0
GTM	LAC	31.14	52.00	41.34	77.96	8.30	0.51	0.26	2.49	0.99	181.00	0	0	0
GIN	SSA	38.08	40.00	19.84*	8.43*	6.85	0.73	0.62	0.00	2.74	62.00	1	1	0
GNB	SSA	27.36	46.00	15.33*	4.95*	6.48	0.81	0.98	0.00	2.33	46.00	1	1	0
GUY	LAC	36.23	74.00	45.24*	4.3*	8.40	0.70	0.97	0.00	3.03	54.00	1	1	0
HTI	LAC	8.23	38.00	24.09	0.00	6.66	0.11	0.70	0.00	0.52	216.00	1	1	0
HND	LAC	41.82	45.00	46.46	67.76	7.81	0.23	0.50	2.61	0.88	182.00	0	0	0
HUN	EECA	66.35	70.00	75.83	56.73	9.57	0.23	0.91	4.46	0.32	102.00	0	1	0
IND	SA	63.03	71.00	44.63	44.09	7.58	0.56*	0.73	2.80	1.19	73.00	1	1	0
IDN	EAP	61.28	61.00	44.14	41.80	8.22	0.80	0.65	1.34	1.75	71.00	1	1	0
IRN	MENA	16.72	17.00	60.26	1.92	8.59	0.74	0.06	1.63	2.95	518.00	0	0	0
IRQ	MENA	32.75	31.00	29.56	0.00	8.46	0.45	0.26	1.42	3.84	88.00	1	1	0
IRL	WE	84.36	97.00	92.93	77.73	11.20	0.17	0.35	4.13	0.12	98.00	0	1	0
ISR	MENA	61.62	76.00	91.31	24.98	10.59	0.38	0.85	3.35	0.17	72.00	1	1	0
ITA	WE	58.85	89.00	93.90	75.24	10.36	0.11	0.75	3.37	0.10	300.00	0	0	1
JAM	LAC	49.99	78.00	60.78	49.94	8.53	0.21	0.89	1.81	0.84	58.00	1	1	0
JPN	EAP	85.27	96.00	96.05	51.70	10.48	0.02	0.89	2.85	0.03	430.00	0	0	0
JOR	MENA	45.35	37.00	45.79	12.49	8.30	0.04	0.17	0.00	0.49	74.00	1	1	0
KAZ	EECA	38.64	23.00	62.38	3.70	9.31	0.54	0.96	2.27	3.15	29.00	0	0	0
KEN	SSA	45.88	48.00	42.38	92.88	7.29	0.86	0.73	0.00	0.84	57.00	1	1	0

KOR	EAP	73.00	83.00	94.51	21.87	10.35	0.10	0.99	3.60	0.02	72.00	0	0	0
XKX	EECA	48.52	56.00	62.74*	0.00	8.31	0.32*	0.67*	3.20	0.68	12.00	0	0	0
KWT	MENA	35.24	36.00	74.03	0.00	10.23	0.77	0.40	1.94	3.79	59.00	1	1	0
KGZ	EECA	40.42	39.00	45.41	0.00	7.09	0.49	0.79	0.00	2.53	29.00	0	0	0
LAO	EAP	30.48	14.00	27.95	2.62*	7.81	0.63	0.90	0.00	2.05	67.00	1	1	0
LVA	EECA	68.88	89.00	85.90	68.28	9.65	0.55	0.76	3.84	0.61	29.00	0	0	0
LBN	MENA	29.71	44.00	55.10	0.00	8.92	0.13	0.97	0.00	0.00	77.00	1	1	0
LSO	SSA	41.45	63.00	28.16	23.26*	7.10	0.31	0.30	0.81	1.47	54.00	1	1	0
LBR	SSA	25.28	60.00	20.92	8.42*	6.09	0.89	0.7*	0.00	3.12	173.00	0	0	0
LBY	MENA	27.80	9.00	65.93	0.00	8.36	0.26	0.17	0.00	3.79	69.00	1	1	0
LTU	EECA	68.88	91.00	84.24	82.75	9.70	0.28	0.67	3.23	0.30	29.00	0	0	0
LUX	WE	95.72	98.00	98.73	77.59	11.56	0.3*	0.43	5.05	0.01	153.00	1	1	0
MKD	EECA	47.11	63.00	74.84	32.46	8.55	0.56	0.93	4.13	0.92	29.00	0	0	0
MDG	SSA	28.06	61.00	16.25*	7.93*	6.19	0.19	0.96	1.96	1.96	60.00	1	1	0
MWI	SSA	29.37	62.00	23.51	9.34*	5.99	0.79	0.86	0.00	1.98	56.00	1	1	0
MYS	EAP	63.06	52.00	75.26	12.39	9.31	0.57	0.95	0.00	2.14	63.00	1	1	0
MLI	SSA	35.24	41.00	8.50	12.25*	6.75	0.85	0.31	0.00	2.42	60.00	1	1	0
MRT	SSA	17.29	34.00	21.97	2.69*	7.39	0.71	0.17	0.00	2.84	60.00	1	1	0
MUS	SSA	66.72	89.00	66.11	70.97	9.24	0.47	0.99	2.35	0.00	52.00	1	1	0
MEX	LAC	57.80	62.00	47.45	44.57	9.20	0.59	0.17	3.45	1.50	199.00	1	1	0
MDA	EECA	49.21	60.00	54.86	6.47	7.67	0.43	0.69	2.63	0.24	29.00	1	0	0
MNG	EAP	48.44	84.00	61.80	33.53	8.35	0.32	0.97	2.29	3.72	99.00	0	0	0
MNE	EECA	58.42	62.00	80.13	0.00	8.90	0.32*	0.81	3.57	0.97	14.00	0	0	0
MAR	MENA	43.30	37.00	36.16	52.87	8.06	0.57	0.06	3.54	0.95	64.00	1	1	0
MOZ	SSA	29.04	45.00	25.41	0.00	6.40	0.65*	0.99	1.98	2.82	45.00	1	1	0
MMR	EAP	38.70	30.00	29.45	0.00	7.24	0.59	0.82	0.00	2.03	72.00	1	1	0
NAM	SSA	53.95	77.00	47.67	0.00	8.47	0.76	0.57	1.83	1.73	30.00	1	0	0
NPL	SA	27.97	56.00	40.17	4.34	6.76	0.86	0.71	0.00	0.38	252.00	0	0	0
NLD	WE	92.97	99.00	95.35	61.77	10.79	0.35	0.96	3.12	0.35	439.00	1	0	1
NZL	EAP	88.33	97.00	90.14	77.25	10.63	0.49	0.97	2.51	0.84	113.00	0	1	0
NIC	LAC	33.68	31.00	40.38	90.51	7.64	0.54	0.47	0.00	1.34	182.00	0	0	0
NER	SSA	33.32	48.00	9.23	13.38	6.24	0.67	0.41	0.00	1.95	60.00	1	1	0
NGA	SSA	32.48	47.00	32.05*	0.00	7.84	0.85	0.98	0.74	2.52	60.00	1	1	0
NOR	WE	92.32	100.00	98.88	25.24	11.23	0.15	0.65	2.50	2.19	115.00	0	1	0
OMN	MENA	49.35	23.00	66.69	0.00	9.56	0.60	0.47	0.00	3.41	279.00	1	0	0
PAK	SA	46.81	38.00	22.17	13.44	7.30	0.75	0.23	2.23	0.84	73.00	1	1	0
PAN	LAC	53.44	84.00	46.46	40.86	9.61	0.61	0.12	3.08	0.12	117.00	0	0	0
PNG	EAP	43.60	62.00	56.19*	3.13*	7.87	0.41*	0.22	0.00	3.24	45.00	1	0	0
PRY	LAC	43.05	65.00	47.91	0.00	8.69	0.18	0.26	1.39	0.79	209.00	1	1	0
PER	LAC	49.11	72.00	48.71	36.31	8.79	0.62	0.32	0.00	2.29	196.00	1	1	0
PHL	EAP	51.02	59.00	39.12	65.92	8.11	0.81	0.40	2.47	0.90	74.00	1	0	0
POL	EECA	64.91	84.00	86.57	62.35	9.57	0.07	0.45	3.89	0.68	102.00	0	0	0
PRT	WE	71.42	96.00	92.30	82.32	9.95	0.22	0.60	3.68	0.17	881.00	0	0	1
QAT	MENA	47.70	25.00	71.10	0.00	11.02	0.71	0.99	2.43	3.10	49.00	1	1	0
ROU	EECA	61.50	83.00	62.09	65.34	9.27	0.21	0.14	3.64	0.71	142.00	1	0	0

RUS	EECA	49.91	20.00	72.63	2.08	9.19	0.38	0.83	1.55	2.81	563.00	0	0	0
RWA	SSA	41.79	22.00	39.25	19.51*	6.71	0.28	0.49	0.00	1.61	58.00	1	1	0
SAU	MENA	42.93	7.00	71.85	0.01	9.90	0.22	0.32	1.40	3.42	94.00	0	0	0
SEN	SSA	50.57	71.00	32.98	24.28	7.22	0.75	0.31	1.80	1.28	60.00	1	0	0
SRB	EECA	55.34	66.00	78.05	2.12	8.75	0.40	0.42	2.78	0.83	14.00	0	0	0
SLE	SSA	32.29	65.00	9.88	7.59*	6.46	0.80	0.97	0.00	2.18	59.00	1	1	0
SGP	EAP	77.22	50.00	99.81	24.71	10.98	0.40	1.00	4.92	0.00	55.00	0	0	0
SVK	EECA	59.14	88.00	80.18	52.79	9.78	0.24	0.81	4.49	0.24	27.00	0	0	0
SVN	EECA	69.08	94.00	98.41	36.84	10.06	0.26	0.67*	2.93	0.21	29.00	0	0	0
SLB	EAP	44.09	79.00	44.28*	5.11*	7.50	0.10	0.47	2.30	3.14	42.00	1	1	0
SOM	SSA	3.33	7.00	1.69*	3.14*	4.67	0.22	0.03	0.00	2.67	60.00	1	1	0
ZAF	SSA	55.07	79.00	48.56	25.62	8.64	0.86	0.72	1.65	1.82	110.00	1	1	0
SSD	SSA	25.49	2.00	26*	11.29	7.12	0.65*	0.7*	0.56	2.51	9.00	0	0	0
ESP	WE	74.48	92.00	93.71	77.48	10.23	0.67	0.73	3.35	0.10	541.00	0	0	1
LKA	SA	44.74	56.00	65.17	34.16	8.35	0.32	0.88	0.00	0.06	72.00	1	1	0
SDN	SSA	21.99	12.00	19.85	0.00	7.69	0.75	0.87	0.00	3.14	64.00	1	1	0
SUR	LAC	33.42	75.00	56.29*	0.00	9.01	0.44*	0.99	1.43	3.41	45.00	1	1	0
SWE	WE	93.17	100.00	98.55	68.55	10.90	0.22	0.81	3.64	0.43	497.00	0	0	1
CHE	WE	98.06	96.00	95.34	39.82	11.35	0.37	0.73	4.08	0.01	729.00	0	0	0
SYR	MENA	16.90	0.00	31.08	0.00	7.04	0.21	0.46	3.02	3.12	74.00	1	1	0
TJK	EECA	37.42	9.00	39.37	0.00	6.96	0.37	0.47	1.38	2.05	29.00	0	0	0
TZA	SSA	35.64	40.00	30.44	12.18	6.96	0.59	0.99	0.00	1.74	59.00	1	1	0
THA	EAP	52.22	32.00	67.63	45.93	8.78	0.35	0.57	2.78	1.10	251.00	0	0	0
TLS	EAP	47.14	71.00	49.08*	5.4*	7.74	0.80	0.11	1.87	3.54	18.00	1	0	0
TGO	SSA	27.87	44.00	27.94	46.95	6.41	0.88	0.98	0.00	2.50	60.00	1	1	0
TTO	LAC	42.42	82.00	63.68	0.00	9.71	0.66	0.97	0.00	2.45	58.00	1	1	0
TUN	MENA	46.40	70.00	51.44	29.75	8.28	0.03	0.06	0.00	1.46	64.00	1	1	0
TUR	WE	40.70	32.00	62.26	47.39	9.38	0.52	0.08	3.35	0.39	567.00	0	0	0
TKM	EECA	23.36	2.00	59.32*	0.00	8.91	0.26	0.50	0.00	3.25	29.00	0	0	0
UGA	SSA	36.47	34.00	33.98	15.82*	6.53	0.88	0.67	1.93	2.14	58.00	1	1	0
UKR	EECA	39.35	62.00	64.69	17.13	7.71	0.37	0.62	2.51	1.55	29.00	0	0	0
ARE	MENA	56.07	17.00	82.96	4.98	10.58	0.68	0.91	0.00	2.91	49.00	1	1	0
GBR	WE	86.90	94.00	89.86	75.70	10.73	0.40	0.94	3.34	0.51	954.00	0	0	1
USA	NAM	79.40	86.00	82.35	50.68	11.00	0.53	0.83	2.25	0.54	237.00	1	1	0
URY	LAC	64.87	98.00	65.79	80.57	9.70	0.18	0.70	2.20	0.95	192.00	0	0	0
UZB	EECA	17.88	10.00	44.97	0.00	7.98	0.31	0.35	1.85	2.99	29.00	0	0	0
VEN	LAC	0.00	16.00	56.18	0.00	8.83	0.52	0.26	0.37	2.43	190.00	0	0	0
VNM	EAP	32.30	20.00	45.85	2.66	7.81	0.26	0.71*	0.00	1.67	66.00	1	1	0
YEM	MENA	2.49	11.00	0.00	0.00	6.56	0.13	0.06	0.00	1.31	30.00	0	0	0
ZMB	SSA	37.37	54.00	29.96	0.00	7.20	0.71	0.57	2.30	3.00	56.00	1	1	0
ZWE	SSA	24.14	29.00	34.34	20.14	7.33	0.42	0.70	1.52	1.91	55.00	1	1	0

Table E3

Data as used for the Interactive Data Visualization and Simulation Tool

Country	Region	democracy	subsidiarity	intgroup	primacy	freeprice	freetrade	freecontr	privprop	privliab	lnprice	constecompo,	comppol	ypol	lpol	envpol	SMEX	GFX	EQX	ESX	lny	EFI	RPI	lnmses	lnrr	indyr	Decol	WEC	WEH	y
Afghanistan	SA	50	10	10	50	90	50	50	50	30	50	50	30	10	50	50	30	30	10	10	6.41	0.76	0.03	1.48	0.51	101	1	1	0	604.89
Albania	EECA	90	70	30	50	90	90	70	50	10	50	30	30	70	70	70	50	70	50	10	8.39	0.14	0.94	3.25	1.21	107	1	0	0	4409.03
Algeria	MENA	50	30	30	50	90	50	50	30	50	70	50	30	30	50	50	30	30	50	10	8.33	0.37	0.06	0.00	3.00	58	1	1	0	4166.54
Angola	SSA	30	10	10	30	70	50	50	30	30	30	50	10	10	50	30	10	30	30	10	8.20	0.78	0.50	0.39	3.32	45	1	1	0	3624.59
Argentina	LAC	90	50	30	30	70	50	50	50	30	30	30	30	70	50	70	50	90	50	30	9.56	0.16	0.62	1.90	1.17	204	1	1	0	14247.51
Armenia	EECA	70	50	30	50	90	70	90	50	50	50	50	50	50	70	50	50	50	50	10	8.31	0.05	0.26	3.12	2.03	29	0	0	0	4052.76
Australia	EAP	90	70	90	70	90	90	90	90	70	50	70	70	90	70	70	90	90	90	50	10.89	0.28	0.94	1.80	2.14	119	0	1	0	53821.95
Austria	WE	90	70	90	90	90	90	70	90	70	50	90	70	90	90	70	90	90	90	70	10.74	0.25	0.85	2.88	0.14	75	0	0	1	46009.33
Azerbaijan	EECA	10	50	30	50	90	70	90	70	70	70	90	70	30	70	30	50	10	30	10	8.56	0.12	0.26	2.32	3.42	29	0	0	0	5229.38
Bahrain	MENA	10	10	30	70	90	70	70	70	70	50	90	70	70	70	30	50	10	70	10	9.99	0.58	0.48	0.00	1.67	49	1	1	0	21840.28
Bangladesh	SA	50	50	30	50	90	50	50	30	30	50	50	30	10	50	50	30	30	30	10	7.31	0.03	0.48	1.11	0.51	49	0	0	0	1493.68
Belarus	EECA	10	30	50	70	90	70	70	70	30	50	50	50	50	50	50	50	10	90	10	8.73	0.31	0.96	2.79	0.96	29	0	0	0	6155.15
Belgium	WE	90	70	90	70	90	90	70	90	50	50	70	90	90	70	90	90	90	90	70	10.65	0.59	0.89	4.48	0.02	190	0	0	1	42267.61
Benin	SSA	90	30	30	50	90	10	50	30	50	70	50	30	10	70	90	50	70	30	30	6.77	0.76	0.99	0.00	1.21	60	1	1	0	871.51
Bhutan	SA	70	10	70	70	90	70	70	70	50	50	50	10	50	70	50	50	50	30	10	8.09	0.65	0.65	2.13	1.08	73	1	0	0	3264.44
Bolivia	LAC	90	30	30	30	90	50	50	10	10	70	30	30	50	30	70	30	70	50	30	8.10	0.57	0.30	1.54	2.17	195	1	1	0	3291.16
Bosnia and Herzegovina	EECA	50	70	30	50	90	70	30	30	10	50	10	30	70	30	30	30	50	70	10	8.58	0.64	0.97	3.59	0.79	28	0	0	0	5322.90
Botswana	SSA	90	10	70	70	90	70	70	50	50	50	70	50	10	50	30	50	70	50	10	8.88	0.40	0.89	3.32	0.80	54	1	1	0	7172.75
Brazil	LAC	90	70	30	30	90	50	50	50	30	50	30	50	70	30	70	50	70	50	70	9.05	0.56	0.53	1.93	1.73	198	1	1	0	8501.78
Bulgaria	EECA	90	30	50	70	90	90	50	70	30	50	50	30	90	50	90	70	70	70	50	8.98	0.29	0.69	2.81	0.65	142	1	0	0	7953.01
Burkina Faso	SSA	70	10	50	30	90	30	30	50	50	70	50	10	50	70	30	50	10	10	10	6.58	0.77	0.96	0.00	2.72	60	1	1	0	719.22
Burundi	SSA	50	10	10	30	90	50	50	10	50	50	50	10	10	30	10	10	10	10	10	5.60	0.31	0.51	0.00	2.50	58	1	1	0	270.88
Cabo Verde	SSA	90	10	50	50	90	50	50	50	50	50	70	30	30	50	50	50	90	30	50	8.12	0.44	0.28	3.65	0.32	45	1	1	0	3349.11
Cambodia	EAP	30	10	10	50	90	50	10	30	30	50	50	10	50	50	30	30	30	30	10	7.22	0.16	0.18	3.16	0.61	67	1	1	0	1367.67
Cameroon	SSA	30	10	10	50	90	30	30	50	50	50	50	10	50	70	30	10	30	30	10	7.23	0.65	0.98	0.00	1.97	60	1	1	0	1382.05
Canada	NAM	90	90	90	70	90	90	90	90	70	50	70	70	90	70	50	90	90	90	50	10.70	0.73	0.80	2.97	1.24	153	1	1	0	44522.60
Central African Republic	SSA	70	10	10	30	90	10	10	30	30	50	30	10	50	50	10	10	10	10	10	5.99	0.79	0.98	0.00	2.31	60	1	1	0	398.00
Chad	SSA	30	10	10	30	90	10	10	30	30	50	30	10	30	50	10	10	10	10	10	6.60	0.86	0.97	0.00	3.22	60	1	1	0	734.96
Chile	LAC	90	50	70	50	90	90	70	70	50	50	70	70	50	70	70	70	90	70	70	9.54	0.44	0.42	1.50	2.56	202	1	1	0	13950.16
China	EAP	10	50	30	70	90	50	70	50	50	70	70	70	50	70	50	10	70	50	50	9.15	0.19	0.76	0.99	0.95	652	0	0	0	9369.33
Colombia	LAC	90	50	30	50	90	70	70	50	50	50	50	50	30	50	50	50	70	50	30	8.74	0.64	0.17	1.41	1.87	201	1	1	0	6277.11
Comoros	SSA	90	10	30	50	90	30	30	30	50	50	30	30	50	70	30	50	30	30	30	7.18	0.05	0.11	1.24	0.87	45	1	1	0	1317.84
Congo, Dem. Rep.	SSA	30	10	10	30	90	50	50	30	30	70	30	10	50	50	10	10	10	10	10	6.23	0.70	0.35	0.00	3.28	60	1	1	0	506.65
Congo, Rep.	SSA	30	10	10	10	90	30	30	30	50	70	50	50	10	50	50	30	10	30	10	7.61	0.70	0.73	1.87	4.02	60	1	1	0	2012.43
Costa Rica	LAC	90	50	70	50	90	70	70	70	50	50	70	50	70	90	70	70	90	70	70	9.40	0.40	0.53	2.80	0.60	182	0	0	0	12124.26

Cote d'Ivoire	SSA	70	10	30	50	90	50	50	50	50	50	50	50	10	70	90	50	50	30	10	7.41	0.73	0.99	1.18	1.29	60	1	1	0	1650.49
Croatia	EECA	90	30	50	50	90	90	50	70	10	50	30	30	90	30	90	50	90	90	50	9.48	0.17	0.42	3.36	0.59	29	0	0	0	13061.69
Cuba	LAC	10	30	50	50	70	50	10	10	30	50	50	30	30	50	50	30	10	50	30	8.99	0.52	0.92	0.00	0.52	118	1	0	0	8047.70
Cyprus	WE	90	10	50	70	90	90	70	70	30	50	70	50	70	70	70	70	90	90	50	10.19	0.35	0.83	4.12	0.01	60	1	1	0	26596.74
Czech Republic	EECA	90	70	50	70	90	90	70	70	30	50	50	50	90	70	70	70	90	90	50	9.87	0.26	0.77	4.46	0.15	27	0	0	0	19281.23
Denmark	WE	90	90	90	90	90	90	90	90	90	50	90	90	90	90	90	90	90	90	90	10.95	0.18	0.70	3.80	0.48	1040	0	0	1	56759.12
Djibouti	MENA	70	10	30	50	90	10	50	50	50	50	50	30	10	50	50	30	30	30	10	8.02	0.65	0.14	0.00	0.23	43	1	1	0	3026.96
Dominican Republic	LAC	90	10	30	50	90	70	50	50	30	50	50	10	70	70	70	50	70	50	50	8.95	0.45	0.57	2.44	0.90	176	0	0	0	7718.05
Ecuador	LAC	70	50	30	90	90	50	50	30	30	70	30	30	30	50	90	50	70	50	30	8.69	0.53	0.46	1.40	2.16	190	0	0	0	5957.38
Egypt, Arab Rep.	MENA	30	10	30	30	70	50	50	50	50	50	50	30	70	50	30	30	30	30	10	8.22	0.04	0.58	2.63	2.07	98	1	1	0	3696.01
El Salvador	LAC	90	30	30	30	90	70	50	30	30	50	30	30	30	70	30	30	70	50	90	8.28	0.17	0.59	3.38	0.47	180	0	0	0	3925.32
Equatorial Guinea	SSA	10	10	10	30	90	10	30	30	70	90	70	50	30	70	50	30	10	50	10	9.05	0.65	0.50	0.00	3.55	52	1	1	0	8488.05
Eritrea	SSA	10	10	10	30	70	50	10	30	70	90	30	10	50	50	10	10	30	10	7.27	0.66	0.96	0.00	3.22	27	0	0	0	1433.70
Estonia	EECA	90	30	70	90	90	90	70	90	50	50	50	70	90	90	90	70	90	90	70	9.89	0.46	0.87	4.14	0.79	29	0	0	0	19809.46
Eswatini	SSA	10	10	30	50	90	90	50	50	50	50	50	30	10	50	50	30	10	30	10	8.24	0.39	0.77	3.50	1.21	52	1	1	0	3790.91
Ethiopia	SSA	30	30	30	50	70	30	30	30	50	50	30	50	10	30	30	10	30	30	50	6.59	0.78	0.94	0.00	1.97	165	0	0	0	726.55
Fiji	EAP	50	10	50	70	90	30	50	70	50	50	50	50	30	70	70	50	50	70	10	8.69	0.53	0.93	3.41	0.91	50	1	1	0	5929.82
Finland	WE	90	70	90	90	90	90	90	90	90	50	90	90	90	90	90	90	90	90	70	10.73	0.14	0.75	2.64	0.51	103	1	0	0	45675.03
France	WE	90	70	70	70	90	70	90	90	70	50	70	70	90	70	90	90	90	90	50	10.55	0.30	0.88	2.45	0.04	1077	0	0	1	38161.46
Gabon	SSA	70	10	30	30	90	30	50	30	30	50	30	30	30	50	70	30	30	50	10	8.86	0.79	0.83	0.00	3.20	60	1	1	0	7043.73
Gambia, The	SSA	70	10	30	50	70	50	50	30	70	50	70	70	10	70	50	50	50	10	30	6.53	0.76	0.47	0.00	1.24	55	1	1	0	688.19
Georgia	EECA	90	70	50	70	90	90	90	70	30	50	30	30	50	50	50	70	70	10	8.35	0.37	0.74	3.53	0.57	29	0	0	0	4225.60
Germany	WE	90	70	90	90	90	90	90	90	70	50	70	90	90	90	90	90	90	90	70	10.67	0.19	0.87	3.76	0.08	71	0	0	1	42995.13
Ghana	SSA	90	30	30	30	70	50	50	50	50	50	50	50	10	70	70	50	90	30	10	7.58	0.74	0.88	0.00	2.71	63	1	1	0	1964.13
Greece	WE	90	30	50	50	90	70	70	50	10	70	10	50	90	10	70	50	90	90	70	9.87	0.17	0.29	3.37	0.14	191	1	0	0	19294.55
Guatemala	LAC	90	10	30	50	90	70	50	50	30	50	30	30	10	10	50	30	50	50	70	8.30	0.51	0.26	2.49	0.99	181	0	0	0	4039.85
Guinea	SSA	70	10	30	50	90	30	50	30	70	50	50	30	10	70	70	30	30	10	10	6.85	0.73	0.62	0.00	2.74	62	1	1	0	941.33
Guinea-Bissau	SSA	70	10	10	30	90	10	30	30	30	90	50	30	10	50	50	30	50	10	10	6.48	0.81	0.98	0.00	2.33	46	1	1	0	652.89
Guyana	LAC	90	10	30	30	90	50	50	50	30	50	30	30	50	50	50	30	70	50	10	8.40	0.70	0.97	0.00	3.03	54	1	1	0	4456.43
Haiti	LAC	70	10	10	30	70	50	30	10	10	50	10	10	30	30	10	10	30	30	10	6.66	0.11	0.70	0.00	0.52	216	1	1	0	782.41
Honduras	LAC	70	30	30	50	90	70	50	50	30	50	50	30	10	70	70	50	50	50	70	7.81	0.23	0.50	2.61	0.88	182	0	0	0	2471.51
Hungary	EECA	90	70	50	50	90	90	50	70	30	50	30	50	90	70	90	70	70	70	50	9.57	0.23	0.91	4.46	0.32	102	0	1	0	14373.87
India	SA	90	50	30	70	90	70	70	70	50	50	70	70	30	50	90	70	70	50	50	7.58	0.56	0.73	2.80	1.19	73	1	1	0	1965.11
Indonesia	EAP	90	50	30	70	90	70	70	50	50	50	70	70	50	50	70	70	70	50	50	8.22	0.80	0.65	1.34	1.75	71	1	1	0	3732.68
Iran, Islamic Rep.	MENA	10	50	30	50	50	30	50	30	30	50	30	50	10	30	50	10	10	70	10	8.59	0.74	0.06	1.63	2.95	518	0	0	0	5384.68
Iraq	MENA	70	10	10	50	90	10	50	30	50	70	50	30	10	50	70	30	30	30	10	8.46	0.45	0.26	1.42	3.84	88	1	1	0	4705.89
Ireland	WE	90	30	90	90	90	90	90	90	50	50	70	70	90	90	90	90	90	90	70	11.20	0.17	0.35	4.13	0.12	98	0	1	0	73368.40
Israel	MENA	70	10	70	70	90	90	70	90	70	50	70	70	50	70	30	70	70	90	30	10.59	0.38	0.85	3.35	0.17	72	1	1	0	39850.46
Italy	WE	90	50	50	50	90	90	70	70	10	50	30	50	90	50	70	50	90	90	70	10.36	0.11	0.75	3.37	0.10	300	0	0	1	31437.13
Jamaica	LAC	90	10	50	50	90	50	70	50	50	50	50	50	50	70	50	50	70	70	50	8.53	0.21	0.89	1.81	0.84	58	1	1	0	5049.08
Japan	EAP	90	70	70	70	90	70	90	90	70	50	70	90	70	90	90	90	90	90	50	10.48	0.02	0.89	2.85	0.03	430	0	0	0	35666.69
Jordan	MENA	30	10	50	50	90	70	50	70	70	50	50	30	70	70	50	30	50	10	8.30	0.04	0.17	0.00	0.49	74	1	1	0	4043.38
Kazakhstan	EECA	10	30	30	50	70	70	70	50	50	50	70	30	90	50	30	30	30	70	10	9.31	0.54	0.96	2.27	3.15	29	0	0	0	11022.95
Kenya	SSA	90	30	30	50	90	30	50	70	50	50	70	50	10	50	70	50	50	50	90	7.29	0.86	0.73	0.00	0.84	57	1	1	0	1470.20
Korea, Rep.	EAP	90	70	50	90	90	70	90	90	50	70	50	70	70	30	70	70	90	90	30	10.35	0.10	0.99	3.60	0.02	72	0	0	0	31230.72

Kosovo	EECA	90	10	30	50	90	70	70	70	30	50	30	30	70	50	70	50	50	70	10	8.31	0.32	0.67	3.20	0.68	12	0	0	0	4065.30
Kuwait	MENA	10	10	30	70	90	70	50	50	70	70	50	30	30	30	50	30	30	70	10	10.23	0.77	0.40	1.94	3.79	59	1	1	0	27854.87
Kyrgyz Republic	EECA	90	10	30	50	90	70	70	50	30	70	30	30	30	50	30	50	30	50	10	7.09	0.49	0.79	0.00	2.53	29	0	0	0	1197.72
Lao PDR	EAP	10	10	30	50	90	70	50	30	50	50	50	50	10	70	50	30	10	30	10	7.81	0.63	0.90	0.00	2.05	67	1	1	0	2476.98
Latvia	EECA	90	50	70	70	90	90	70	70	30	50	50	50	90	70	70	70	90	90	70	9.65	0.55	0.76	3.84	0.61	29	0	0	0	15523.77
Lebanon	MENA	70	10	30	30	90	70	30	30	30	50	30	30	50	30	50	30	50	50	10	8.92	0.13	0.97	0.00	0.00	77	1	1	0	7461.89
Lesotho	SSA	90	30	50	50	90	70	50	50	50	50	30	50	10	30	50	50	70	30	30	7.10	0.31	0.30	0.81	1.47	54	1	1	0	1214.29
Liberia	SSA	70	10	30	30	70	30	30	30	30	70	30	50	10	50	50	30	50	30	10	6.09	0.89	0.70	0.00	3.12	173	0	0	0	439.37
Libya	MENA	50	10	10	50	70	70	30	50	70	50	10	10	50	50	30	10	70	10	8.36	0.26	0.17	0.00	3.79	69	1	1	0	4290.88
Lithuania	EECA	90	30	70	70	90	90	70	70	50	50	50	50	90	70	70	70	90	90	90	9.70	0.28	0.67	3.23	0.30	29	0	0	0	16373.47
Luxembourg	WE	90	90	90	90	90	90	70	90	70	50	90	90	90	90	90	90	90	90	70	11.56	0.30	0.43	5.05	0.01	153	1	1	0	104901.23
Macedonia, FYR	EECA	90	10	30	50	90	90	90	70	10	50	30	50	70	50	30	50	70	70	30	8.55	0.56	0.93	4.13	0.92	29	0	0	0	5188.83
Madagascar	SSA	70	10	10	30	90	70	30	50	30	50	30	10	10	50	70	30	70	10	10	6.19	0.19	0.96	1.96	1.96	60	1	1	0	487.28
Malawi	SSA	70	10	30	30	70	70	30	30	30	50	50	30	30	50	50	30	70	30	10	5.99	0.79	0.86	0.00	1.98	56	1	1	0	398.35
Malaysia	EAP	70	30	50	70	90	70	90	90	70	70	70	70	10	70	50	70	50	70	10	9.31	0.57	0.95	0.00	2.14	63	1	1	0	11057.44
Mali	SSA	70	10	30	50	90	50	50	30	30	50	50	50	10	50	70	30	50	10	10	6.75	0.85	0.31	0.00	2.42	60	1	1	0	850.80
Mauritania	SSA	30	10	30	30	90	50	50	30	10	50	10	10	10	50	70	10	30	30	10	7.39	0.71	0.17	0.00	2.84	60	1	1	0	1613.54
Mauritius	SSA	90	10	50	70	90	90	90	70	70	50	70	50	50	70	70	70	90	70	70	9.24	0.47	0.99	2.35	0.00	52	1	1	0	10321.90
Mexico	LAC	90	50	30	50	90	90	70	50	30	50	50	50	50	70	70	50	70	50	50	9.20	0.59	0.17	3.45	1.50	199	1	1	0	9939.21
Moldova	EECA	90	10	30	50	90	70	70	50	30	50	30	30	70	70	70	50	50	50	10	7.67	0.43	0.69	2.63	0.24	29	1	0	0	2147.44
Mongolia	EAP	90	30	30	30	90	70	50	50	30	50	50	10	90	70	70	50	90	70	30	8.35	0.32	0.97	2.29	3.72	99	0	0	0	4245.86
Montenegro	EECA	90	10	50	70	90	70	70	50	50	50	70	50	70	70	50	50	70	90	10	8.90	0.32	0.81	3.57	0.97	14	0	0	0	7313.21
Morocco	MENA	30	30	30	50	90	70	70	70	50	50	70	50	10	50	70	50	30	30	50	8.06	0.57	0.06	3.54	0.95	64	1	1	0	3179.25
Mozambique	SSA	70	30	10	10	90	70	50	30	30	50	50	10	10	30	70	30	50	30	10	6.40	0.65	0.99	1.98	2.82	45	1	1	0	602.44
Myanmar	EAP	90	10	30	50	90	50	50	30	30	50	50	30	10	70	70	30	30	30	10	7.24	0.59	0.82	0.00	2.03	72	1	1	0	1397.69
Namibia	SSA	70	10	50	50	90	70	70	50	70	50	70	50	30	70	70	50	70	50	10	8.47	0.76	0.57	1.83	1.73	30	1	0	0	4766.78
Nepal	SA	70	10	30	70	90	30	50	30	30	50	30	30	30	50	30	30	50	50	10	6.76	0.86	0.71	0.00	0.38	252	0	0	0	859.63
Netherlands	WE	90	30	90	90	90	90	90	90	90	50	90	90	90	90	90	90	90	90	70	10.79	0.35	0.96	3.12	0.35	439	1	0	1	48401.37
New Zealand	EAP	90	70	90	90	90	90	90	90	70	50	70	90	70	90	70	90	90	90	70	10.63	0.49	0.97	2.51	0.84	113	0	1	0	41524.32
Nicaragua	LAC	70	10	30	30	90	70	50	30	10	50	50	30	30	70	50	30	30	50	90	7.64	0.54	0.47	0.00	1.34	182	0	0	0	2077.13
Niger	SSA	70	50	30	30	90	30	50	50	30	50	30	30	30	50	50	30	50	10	10	6.24	0.67	0.41	0.00	1.95	60	1	1	0	511.07
Nigeria	SSA	90	30	30	30	70	50	50	30	30	50	30	30	10	50	70	30	50	30	10	7.84	0.85	0.98	0.74	2.52	60	1	1	0	2552.70
Norway	WE	90	70	90	70	90	70	90	90	70	70	70	90	90	90	90	90	90	90	30	11.23	0.15	0.65	2.50	2.19	115	0	1	0	75710.56
Oman	MENA	10	10	50	50	90	70	70	70	90	70	70	50	30	70	50	50	30	70	10	9.56	0.60	0.47	0.00	3.41	279	1	0	0	14134.32
Pakistan	SA	90	50	30	50	90	50	50	50	50	50	50	50	10	50	70	50	30	30	10	7.30	0.75	0.23	2.23	0.84	73	1	1	0	1479.69
Panama	LAC	90	10	30	70	90	70	70	50	30	70	50	50	50	70	50	90	50	50	9.61	0.61	0.12	3.08	0.12	117	0	0	0	14843.24
Papua New Guinea	EAP	70	10	30	50	90	70	50	50	50	50	50	50	10	70	50	70	50	70	10	7.87	0.41	0.22	0.00	3.24	45	1	0	0	2611.46
Paraguay	LAC	90	30	30	50	90	70	50	30	10	50	50	30	50	70	50	50	70	50	10	8.69	0.18	0.26	1.39	0.79	209	1	1	0	5919.71
Peru	LAC	90	30	30	50	90	90	70	50	10	50	50	30	50	70	50	70	50	50	30	8.79	0.62	0.32	0.00	2.29	196	1	1	0	6573.28
Philippines	EAP	90	50	30	70	70	70	50	50	30	50	50	30	50	70	70	50	50	30	70	8.11	0.81	0.40	2.47	0.90	74	1	0	0	3325.49
Poland	EECA	90	70	70	70	90	90	50	70	30	50	30	50	90	50	70	70	90	90	70	9.57	0.07	0.45	3.89	0.68	102	0	0	0	14321.88
Portugal	WE	90	50	70	70	90	90	70	70	30	50	50	50	90	70	90	70	90	90	90	9.95	0.22	0.60	3.68	0.17	881	0	0	1	21022.12
Qatar	MENA	10	10	70	70	90	70	70	70	90	70	70	70	10	30	50	50	30	70	10	11.02	0.71	0.99	2.43	3.10	49	1	1	0	61222.88
Romania	EECA	90	50	50	70	90	90	50	70	50	50	30	30	90	50	70	70	90	70	70	9.27	0.21	0.14	3.64	0.71	142	1	0	0	10642.26
Russian Federation	EECA	70	30	30	50	70	70	90	50	30	50	50	30	90	70	50	50	10	70	10	9.19	0.38	0.83	1.55	2.81	563	0	0	0	9773.13

Country	Region																														
Rwanda	SSA	30	10	50	50	90	50	50	70	70	50	90	70	10	70	30	50	30	30	10	6.71	0.28	0.49	0.00	1.61	58	1	1	0	821.90
Saudi Arabia	MENA	10	10	50	70	90	70	70	70	70	50	70	70	30	30	50	50	10	70	10	9.90	0.22	0.32	1.40	3.42	94	0	0	0	20024.85
Senegal	SSA	90	30	50	50	90	50	50	50	70	50	70	50	10	50	70	50	70	30	30	7.22	0.75	0.31	1.80	1.28	60	1	0	0	1363.32
Serbia	EECA	90	70	30	70	90	70	70	50	30	50	50	30	70	50	50	50	70	70	10	8.75	0.40	0.42	2.78	0.83	14	0	0	0	6334.98
Sierra Leone	SSA	90	10	30	30	70	50	50	30	30	50	50	30	10	50	70	30	70	10	10	6.46	0.80	0.97	0.00	2.18	59	1	1	0	641.11
Singapore	EAP	30	90	90	90	90	90	90	90	90	70	90	90	10	90	30	70	50	90	30	10.98	0.40	1.00	4.92	0.00	55	0	0	0	58691.96
Slovak Republic	EECA	90	50	50	50	90	90	50	70	10	50	30	50	90	70	70	50	90	90	50	9.78	0.24	0.81	4.49	0.24	27	0	0	0	17758.44
Slovenia	EECA	90	30	70	70	90	90	70	70	30	50	50	50	90	70	90	70	90	90	30	10.06	0.26	0.67	2.93	0.21	29	0	0	0	23342.27
Solomon Islands	EAP	90	30	30	50	90	10	70	50	50	50	50	50	10	70	70	50	70	50	10	7.50	0.10	0.47	2.30	3.14	42	1	1	0	1803.36
Somalia	SSA	70	10	10	70	30	10	10	30	10	30	10	30	10	30	50	10	10	10	10	4.67	0.22	0.03	0.00	2.67	60	1	1	0	107.20
South Africa	SSA	90	50	50	50	90	70	50	50	70	50	30	70	50	30	70	50	70	50	30	8.64	0.86	0.72	1.65	1.82	110	1	1	0	5636.26
South Sudan	SSA	50	10	10	50	90	50	50	30	50	30	50	30	10	50	50	30	10	30	10	7.12	0.65	0.70	0.56	2.51	9	0	0	0	1240.56
Spain	WE	90	70	50	70	90	90	70	70	50	50	50	50	90	70	90	70	90	90	70	10.23	0.67	0.73	3.35	0.10	541	0	0	1	27771.72
Sri Lanka	SA	70	10	30	70	90	50	70	50	50	50	50	50	30	70	50	50	50	70	30	8.35	0.32	0.88	0.00	0.06	72	1	1	0	4234.63
Sudan	SSA	30	10	10	50	90	30	50	30	50	30	50	50	10	50	50	30	10	10	10	7.69	0.75	0.87	0.00	3.14	64	1	1	0	2188.59
Suriname	LAC	70	10	30	30	90	50	30	50	30	50	50	30	50	50	50	30	70	50	10	9.01	0.44	0.99	1.43	3.41	45	1	1	0	8197.37
Sweden	WE	90	70	90	90	90	90	90	90	70	50	70	90	90	90	90	90	90	90	70	10.90	0.22	0.81	3.64	0.43	497	0	0	1	54153.49
Switzerland	WE	90	90	90	90	90	90	70	90	90	50	90	90	90	90	90	90	90	90	30	11.35	0.37	0.73	4.08	0.01	729	0	0	0	84844.51
Syrian Arab Republic	MENA	10	10	10	30	70	30	50	50	50	50	50	50	10	50	30	10	10	30	10	7.04	0.21	0.46	3.02	3.12	74	1	1	0	1137.27
Tajikistan	EECA	30	30	10	50	90	70	70	50	70	50	70	50	10	50	30	30	10	30	10	6.96	0.37	0.47	1.38	2.05	29	0	0	0	1058.69
Tanzania	SSA	70	10	30	50	90	50	30	30	50	50	50	10	50	70	30	30	30	30	10	6.96	0.59	0.99	0.00	1.74	59	1	1	0	1056.37
Thailand	EAP	30	50	30	70	90	70	90	50	50	50	50	50	70	70	50	50	30	70	50	8.78	0.35	0.57	2.78	1.10	251	0	0	0	6471.00
Timor-Leste	EAP	90	10	30	50	90	70	50	50	50	50	30	30	70	70	50	70	50	10		7.74	0.80	0.11	1.87	3.54	18	1	0	0	2294.21
Togo	SSA	30	50	30	30	90	50	50	30	50	50	30	10	50	50	30	50	30	50		6.41	0.88	0.98	0.00	2.50	60	1	1	0	608.76
Trinidad and Tobago	LAC	90	10	30	50	90	50	70	50	50	50	50	30	70	10	70	50	90	70	10	9.71	0.66	0.97	0.00	2.45	58	1	1	0	16466.20
Tunisia	MENA	90	30	50	50	90	50	70	50	50	50	30	30	30	50	70	50	70	50	30	8.28	0.03	0.06	0.00	1.46	64	1	1	0	3943.35
Turkey	WE	30	50	30	70	70	70	70	50	50	30	50	50	70	50	30	50	30	70	50	9.38	0.52	0.08	3.35	0.39	567	0	0	0	11906.71
Turkmenistan	EECA	10	10	10	50	70	70	10	10	50	50	50	50	50	50	30	10	50	10		8.91	0.26	0.50	0.00	3.25	29	0	0	0	7395.82
Uganda	SSA	50	10	30	50	90	70	30	50	50	50	70	30	10	70	50	30	30	30	10	6.53	0.88	0.67	1.93	2.14	58	1	1	0	687.89
Ukraine	EECA	70	30	30	50	70	70	50	50	30	50	30	30	70	50	50	30	70	70	10	7.71	0.37	0.62	2.51	1.55	29	0	0	0	2231.60
United Arab Emirates	MENA	10	50	70	70	90	70	70	90	90	70	90	70	10	30	50	50	10	90	10	10.58	0.68	0.91	0.00	2.91	49	1	1	0	39177.03
United Kingdom	WE	90	50	90	70	90	90	90	90	70	50	70	90	90	70	90	90	90	90	70	10.73	0.40	0.94	3.34	0.51	954	0	0	1	45923.51
United States	NAM	90	90	90	70	90	70	90	90	70	50	70	90	70	70	30	70	90	90	50	11.00	0.53	0.83	2.25	0.54	237	1	1	0	59668.44
Uruguay	LAC	90	50	70	70	90	70	70	70	50	50	70	30	90	30	70	70	90	70	90	9.70	0.18	0.70	2.20	0.95	192	0	0	0	16374.07
Uzbekistan	EECA	10	10	10	50	70	50	70	50	30	30	50	30	30	50	30	10	10	50	10	7.98	0.31	0.35	1.85	2.99	29	0	0	0	2936.17
Venezuela, RB	LAC	30	50	10	10	10	30	10	10	10	30	10	10	50	50	50	10	10	50	10	8.83	0.52	0.26	0.37	2.43	190	0	0	0	6839.67
Vietnam	EAP	10	10	30	50	70	70	70	50	50	50	50	30	30	50	70	30	10	50	10	7.81	0.26	0.71	0.00	1.67	66	1	1	0	2456.79
Yemen, Rep.	MENA	50	10	10	30	50	50	30	10	30	30	10	10	10	50	10	10	10	10		6.56	0.13	0.06	0.00	1.31	30	0	0	0	709.60
Zambia	SSA	70	30	30	30	90	50	70	50	50	50	50	50	10	50	50	30	50	30	10	7.20	0.71	0.57	2.30	3.00	56	1	1	0	1343.90
Zimbabwe	SSA	70	10	10	30	70	50	30	30	30	70	30	30	10	50	50	30	30	30	30	7.33	0.42	0.70	1.52	1.91	55	1	1	0	1529.03