



Formulating a Human Well-Being Index Based on Nussbaum's Central Capabilities

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Formulating a Human Well-Being Index Based on Nussbaum's Central Capabilities

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A Thesis in the Field of Sustainability
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Abstract

For decades, scholars and political organizations have grappled with the problem of how to define and measure human development and well-being as part of the global endeavor to assess and alleviate poverty. Initially, academics evaluated human development exclusively through economic metrics; however, critics such as Amartya Sen noted that these measures were not designed to capture human well-being. As an alternative, Sen (1985) formulated the capabilities approach that characterizes poverty as a person's inability to potentially achieve different combinations of "functionings," which are the various things that a person values doing or being. Building on Sen's unique approach, Martha Nussbaum (2011) formulated a list of ten central capabilities that she viewed as the basis for achieving a minimum of human dignity.

The purpose of this thesis is to formulate a human well-being index based on Nussbaum's central capabilities approach (the "Capabilities Index"). My primary research question is whether an alternative human development index based on this approach captures components of country-level well-being that existing indices do not. I hypothesize that (1) there will be a significant difference between purely economic measures of well-being and indices that purport to capture human well-being using non-economic measures, including the Capabilities Index; (2) there will be a significant difference in the way that the Capabilities Index ranks and quantifies a country's human development progress when compared to traditional measurements and indices; (3) Capabilities Index values for countries will be a good predictor of variation in country-level subjective well-being scores; and (4) to the extent that the Capabilities Index is

similar in nature to existing indices, it measures some aspects of human well-being that are important for human flourishing, but are absent from other indices and, therefore, should be included in an ideal index.

In order to test the hypotheses concerning the Capabilities Index, I relied upon Pearson's correlation, Spearman's rank correlation, and step-wise multiple linear regression to analyze a sample of indexed, well-being scores for a total of 109 countries, which consisted of 60 countries with complete datasets, 36 countries with one of 20 metrics missing, and 13 countries with two metrics missing. The results indicate that gross national income per capita, an economic measure, is strongly correlated with almost all well-being indices. However, economic data fail to identify the drivers of well-being and fail to explain differences in subjective well-being, particularly among the wealthiest countries. The Capabilities Index does account for these differences, but it is strongly correlated with four existing well-being indices: the Human Development Index, the Where-to-be-Born Index, the Social Progress Index, and the Sustainable Development Goals ("SDG") Index. While the Capabilities Index is more robust than the first two, it most resembles the Social Progress Index and the SDG Index, which each measure more than twice as many aspects of well-being than the Capabilities Index does. To the extent that these indices differ in rating country-level well-being, these differences are primarily due to the Capabilities Index's emphasis on individual liberties. Because variation in such liberties plays a significant role in predicting subjective well-being, the ideal human well-being index should include them.

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Chapter I

Introduction

In its report to the United Nations General Assembly, the World Commission on Environment and Development (1987) provided the oft-quoted definition of sustainable development: “meet[ing] the needs of the present without compromising the ability of future generations to meet their own needs” (p. 16). While it recognized that economic growth is necessary in order to alleviate poverty, the Brundtland Commission, as it became known, emphasized that such growth could not be sustained if it came at the expense of the environment. Thus, the Commission framed sustainable development as a balance among economic, environmental, and social components, which are now commonly referred to as the three pillars of sustainability or the triple bottom line.

Despite the fact that the Commission clearly indicated that the primary goal of sustainable development is “the satisfaction of human needs and aspirations” (p. 41), subsequent academic and policy discourse focused on the economic and environmental aspects of sustainability and placed less emphasis on the human dimension. Social sustainability, which considers aspects related to human well-being, has garnered the least attention of the three pillars (Littig & Greißler, 2005; Dillard, Dujon, & King, 2009). Though the economic goals of maintaining or increasing production and the environmental concern of ensuring that we live within the carrying capacity of our ecosystems are important aspects of sustainable development, the social component is critical to ensuring that the other two factors are pursued in a manner that results in the

just distribution of economic and environmental benefits and burdens. As well, given the positive correlation between high levels of poverty and environmental degradation (Rogers, Jalal, & Boyd, 2007), increasing human well-being on an equitable basis is a key component of environmental management. Unless people enjoy a level of welfare that allows them to survive, and ideally flourish, they are unlikely to perceive environmental protection as a pressing matter and subsistence will take precedence over maintaining ecosystems. Accordingly, measuring human well-being and striving to improve it globally is critical to the overall goal of achieving sustainable development.

Research Significance and Goals

Even though human well-being is fundamental to sustainability, efforts to measure the phenomenon have been inadequate. Historically, economists have relied upon purely economic measures to capture well-being despite the fact that indicators of growth and income are unsuitable proxies. Although academics and international organizations have developed indices that purport to measure well-being as an alternative to these economic measures, they have generally failed to account for important factors that impact well-being or have not been global in scope. Accordingly, a comprehensive well-being index that is based on Nussbaum's capabilities approach, which has strong philosophical and theoretical justification, may be a more suitable measure of well-being.

Thus, the goal of this thesis is to construct a human well-being index based on Nussbaum's concept of central capabilities with a view to comparing it to existing indices in order to discover new insights regarding how we should assess well-being at the

country level. This effort will include determining what life factors may be significant for facilitating human satisfaction and flourishing.

Background

In order to properly measure human well-being, it is first necessary to identify what it is. Although the Brundtland Commission's report (1987) uses the term "well-being" 13 times, it does not define it. However, from the context in which it mentions well-being, one can deduce that it not only involves the satisfaction of basic human needs, but also extends to factors that exceed this minimal threshold. In paragraph 39 of its report, the Commission states that "sustainability requires views of human needs and well-being that incorporate such non-economic variables as education and health enjoyed for their own sake, clean air and water, and the protection of natural beauty. It must also work to remove disabilities from disadvantaged groups...". In other parts of the report, the Commission mentions the importance of access to employment (§43), food (§44), energy (§46), housing, a water supply, sanitation, health care (§47), as well as the protection of traditional rights and lifestyles (§77). The Commission also endorses Principle 1 of the 1972 Declaration of the United Nations Conference on the Human Environment (§81), which states: "man has the fundamental right to freedom, equality, and adequate conditions of life, in an environmental of a quality that permits a life of dignity and well-being". Thus, the Brundtland Commission clearly intends well-being to extend beyond need satisfaction and also incorporate aspects of culture, and political and social rights that promote human flourishing.

Given that human well-being is placed at the center of the Brundtland Commission's conception of sustainable development, it is surprising that its characterization of the concept is not well-defined. However, as McGillvary and Clarke (2006) note, well-being is difficult to articulate since it cannot be directly observed or measured. This likely explains why the pillar of social sustainability is the most neglected: it is the most difficult component to measure and implement (Boström, 2012).

Those who have attempted to define "well-being" have generally described it as either hedonic or eudaimonic in nature (Ryan & Deci, 2001; Dodge, Daly, Huyton, & Sanders, 2012). Hedonic well-being, which can be traced to early Greek philosophers, such as Aristippus and Epicurus, is the view that the good human life involves attaining pleasure and avoiding pain. Thus, the principle human objective, according to hedonistic theories, should be desire fulfillment in order to achieve happiness. This appears consistent with the Brundtland Commission's stated aim of sustainable development as being the satisfaction of human needs and aspirations; however, hedonism's focus on desires instead of needs and its failure to encompass aspirations that cannot be reduced to pleasure are short-comings.

Griffin (1986) argues that the satisfaction of human needs rather than desires is a more suitable basis for determining whether well-being has been achieved. After all, those who have more wealth will adjust their desires and may seek luxury goods, such as champagne and yachts, that may provide great pleasure, but are not particularly relevant in our moral deliberations. Thus, there is a basis for viewing well-being as the extent to which our basic needs are met. These needs tend to be universal (e.g., food, water,

shelter, and health care) while our desires beyond these needs vary depending on many factors, including our age, gender, and culture.

However, even assessing the satisfaction of basic needs can be problematic. It is difficult to specifically determine how much access to health care meets a threshold of adequacy or what a sufficient life expectancy is. These change over time as our technology and resource base expands. Still, as Griffin (1986) states, “expectations adjust to possibilities, and a standard minimum acceptable level of life, admittedly very rough, will naturally emerge” (p. 44). This will often be based on the relative levels of well-being that residents of different countries enjoy. Thus, calculating country-level measures of need satisfaction will aid policy makers in determining what program goals should be.

Even if one focuses on the extent to which needs are satisfied in order to measure human well-being, such an analysis is incomplete. After all, a good human life demands more than the rudimentary requisites for mere survival. It also requires what Aristotle referred to in Greek as “Eudaimonia,” which has been translated as “happiness” or, more precisely in modern usage, as “human flourishing” (Carson, 2006). Proponents of eudaimonic well-being believe that happiness and well-being are not synonymous. Happiness fails to account for needs that are rooted in our human nature that facilitate our personal growth and aid us in reaching our potential (Ryan & Deci, 2001). Ryff (1989), one of the principal advocates of eudaimonic well-being, claims that additional factors, such as autonomy, purpose in life, and positive relations with others, are critical to human well-being. Eudaimonic well-being is reflected in the Brundtland Commission’s mention of the importance of culture, freedom, and equality, though the prerequisites for human flourishing are not adequately expressed in the report.

Though academics dispute how to precisely define well-being, the concept can be generally described and includes characteristics of both hedonic and eudaimonic well-being (Ryan & Deci, 2001). However, when social scientists attempt to measure a phenomenon like well-being that cannot be directly observed, they must rely on proxy measurements that reflect well-being that may be subject to dispute and reflect differing value judgments. Despite this, society has made considerable progress in selecting proxies that reflect the satisfaction of peoples' basic needs and prerequisites for flourishing.

Economic Measures of Well-Being

In order to assess progress towards attaining social goals, sustainability scholars and political organizations have relied upon various metrics. Historically, the social component of sustainable development has been conflated with economic growth. Governments equated well-being with economic measures, such as gross domestic product ("GDP"), gross national income ("GNI") and net national income ("NNI"), even though economists only devised these indicators to aid macroeconomic policy development (Neumayer, 2004) and did not intend them as measures of social well-being (Costanza, Hart, Talberth & Posner, 2009). While GNI improves on GDP by accounting for the impacts from income transfers to residents abroad and foreigners, and NNI further accounts for capital depreciation, these metrics usually produce very similar results. Though NNI is consistently lower than GDP, the ranking of countries by both measures is the same and the correlation between the two is 0.98 (Boarini, Johannson, & d'Ercole, 2006).

Certainly, an increase in the production of goods and services is positively correlated with an increase in social progress. After all, such resources can aid us in satisfying needs and personal goals and thereby improve human welfare. Accordingly, it is not surprising that well-being improves as those with little income begin to earn more (Sachs, 2012). However, as Oswald (1997) notes, economic performance is a means to attaining well-being rather than an end in itself. Thus, we should view economic growth as a potential element of well-being rather than as a proxy for it since there is no guarantee that an increase in economic measures will necessarily translate into greater levels of well-being. Production may not lead to societal advancement and wealth distribution may not be equitable.

An additional concern with economic measures is that they include components that bear no relationship to human well-being at all. For example, GDP incorporates the replacement of depreciated capital and income paid to foreigners, which do not increase domestic well-being (Bergheim, 2006). As well, GDP includes regrettables, which are expenditures made to prevent a loss of well-being rather than to increase well-being. These include military spending, policing costs, and insurance. Catastrophic events that reduce well-being usually increase GDP because it includes remediation expenditures. For example, if there is an oil spill or a natural disaster, repair and rehabilitation costs will be included in the economic measure even though the entire event has a negative net impact on human well-being. In addition, the standard economic measures do not include factors such as leisure time, volunteer work, political freedom, health, life expectancy, relationships, and equitable distribution (Costanza et al., 2009; Osberg & Sharpe, 2002; Boarini et al., 2006) that better explain variation in life satisfaction than income alone

does (Layard, Clark, & Senik, 2012). This may also explain Diener, Diener, & Diener's (1995) finding that income growth and relative income have a low or inconsistent relationship with subjective measures of well-being.

Using GDP as a proxy for well-being is also at odds with the more general concept of sustainability. Actions that are not sustainable, such as harvesting and consuming non-renewable resources, or over-harvesting renewable ones, increase GDP since it does not take natural capital into account. In addition, as Osberg & Sharpe (2002) emphasize, economic metrics typically measure flows rather than stocks so they do not consider the value of what is left for future generations, which is critical in the context of sustainable development. Unbridled production and consumption increase GDP, GNI, and NNI even though these behaviors often undermine long-term well-being. Similarly, quality improvements and gains in efficiency are not captured in national income since they are not necessarily reflected in the ultimate price of goods and services (Chiripanhura, 2010) even though they should theoretically increase well-being.

All of the factors that are relevant to well-being, but are absent from the economic measures, likely explain examples that would otherwise defy expectations. For instance, subjective measures of happiness in the United States have not changed significantly since the 1960s even though gross national product per capita has risen by a factor of three in that time-frame (Sachs, 2012). In post-perestroika Russia, concerns about resident well-being were better reflected by declining life expectancy than increasing GDP per capita (Stiglitz, Sen, & Fitoussi, 2010). Given the limitations of purely economic measures as proxies for human welfare, it is necessary to consider alternative, multi-factor conceptions of well-being.

Subjective Well-Being

One possible means of overcoming the apparent failure of economic measures to capture human well-being is to simply ask people whether they are happy and flourishing. Instead of assuming that consumption, income, life expectancy, or some other combination of statistics can encapsulate well-being, perhaps surveys of subjective well-being will inform us whether attempts to improve human welfare are succeeding. In fact, this is what social scientists have been doing for decades with recent, notable efforts including the World Happiness Report (Helliwell, Layard, & Sachs, 2015) and the Gallup-Healthways Global Well-Being Index (2014). However, there are concerns that subjective well-being scores may not adequately reflect human well-being.

One key worry is that subjective well-being is affected by the subject's mood at the time of the survey. In one experiment (Schwarz, 1987), respondents were asked to photocopy a piece of paper prior to taking the well-being survey. For a randomly-selected half of the subjects, the experimenters had placed a dime on the photocopier. Those subjects who discovered the dime had statistically significantly higher life satisfaction scores than those who did not. Other factors, such as weather or the content of early questions in the survey, can have similar impacts (Kahneman & Krueger, 2006). Subjective well-being results can also fluctuate significantly over time, even when two surveys are administered to the same respondent in the same day (Krueger & Schkade, 2008). Lucas, Diener, & Suh (1996) found that the correlation between subjective well-being scores for tests administered four weeks apart was 0.77 while Kahneman & Krueger (2006) reported a correlation of 0.59 between life satisfaction scores from tests given two-weeks apart.

Another concern with subjective well-being measures is that they almost always ignore eudaimonic well-being. Instead, they generally focus exclusively on three components of hedonic well-being: a person's assessment of his or her life satisfaction, and the experience of positive and negative feelings and emotions (respectively known as positive and negative affect) at particular moments in time (Boarini, Comola, Smith, Manchin, & de Keulenaer, 2012). Thus, to the extent that human flourishing plays a role in well-being, it is not captured in most subjective well-being measures. There are also concerns with the aspects of well-being that these surveys do measure. The Expert Panel of the National Research Council's Committee on National Statistics (Stone & Mackie, 2013) found that measurements of positive and negative affect do not "establish any sort of overall measure of social well-being" and that they are "skeptical about the usefulness of an aggregate measure [of subjective well-being] to track some average of an entire population." (p. 90). However, the panel did acknowledge that subjective well-being can be useful as one of many possible indicators of human welfare. In contrast, representatives of the OECD (Boarini et al., 2012) have argued that subjective well-being scores are "valid and consistent measures of people's sense of well-being" (p. 6), though their analysis focused on its member countries, which are among the wealthiest in the world.

Sen (1985) also expresses concern with measurements of subjective well-being because they focus on utility, specifically happiness or desire fulfilment, rather than what a person has the potential to achieve. Because happiness and desire fulfilment are grounded in a person's mental attitude, Sen believes that they are subject to what he calls "physical-condition neglect": it focuses on a person's feelings about his or her position in

life and fails to measure actual deprivations. If someone lives in poverty, her desires may tend to be muted by the practical reality of limited opportunity and she may learn to be happy with what she possesses given her relative condition in her community and that chances for a substantially better life are unrealistic. Studies confirm that a person's self-assessment of his or her well-being may be influenced by factors such as the relative well-being of others in their communities (Deaton, 2010) and adaptation to and acceptance of one's circumstances (Kahneman & Kreuger, 2006).

Because subjective well-being surveys typically ask respondents to evaluate their lives on a numeric or qualitative scale, there is also concern that people have different "response styles" that have an impact on self-assessment scores (Boarini et al., 2012). For example, Diener, Scollon, Oishi, Dzokoto, & Suh (2000) found that residents of Latin American countries tend to overstate their levels of life satisfaction in surveys while residents of the Pacific Rim countries understate their subjective well-being (Diener, Suh, Smith, and Shao, 1995). These multiple concerns suggest that although subjective well-being assessments may play a role in measuring aspects of social sustainability, it is not an adequate proxy for this pillar of development.

Amartya Sen, Capabilities, and the Human Development Index

Perhaps the most vocal opponent of traditional approaches to measuring well-being has been Amartya Sen, who received a Nobel Prize for his work in welfare economics and social choice theory. Sen's first formal elaboration of an alternative to economic measures of well-being was outlined in his book *Commodities and Capabilities* in 1985. In that work, Sen criticized the use of economics in assessing human well-being

due to its focus on goods. Goods consumption and utility, he argued, do not tell us whether or not people are doing well and are leading fulfilling lives because economics does not consider what people are able to do with the goods they possess. By using economics to measure well-being, society is confusing “well-being” with “being well off”, or opulence. According to Sen, this confounds “the *state* of a person with his or her *possessions*” [his emphasis] (p. 23).

Though utilitarianism, which forms the theoretical basis for hedonic well-being, does focus on the state of the person by emphasizing pleasure or desire fulfilment, Sen rejects this as a proper focus as well. He claims that utility incorrectly emphasizes a person’s mental reaction to using or consuming a good rather than the actual use itself (Sen, 1984). Thus, a content peasant who lacks adequate food, shelter, and health care could self-rank herself as happier than the cranky wealthy person simply because the former has had harsh reality temper her desires, which had the effect of increasing her reported subjective well-being. However, a person is not any less deprived if “‘considerations of ‘feasibility’ and of ‘practical possibility’ enter into what we dare to desire and what we are pained not to get” (Sen, 1985, p. 21).

Instead, Sen asserts that the ability to actually make use of bundles of resources depends on personal and social circumstances, including individual, environmental, and relational diversities, as well as how wealth may be distributed within a country, community, or family. Rather than viewing poverty as a shortage of utility, income or resources, Sen suggests that it be framed in terms of not possessing the capability to live the type of life one values. While a characteristic, as the term is used in consumer theory, is a feature of a commodity, a capability is a feature of a person in relation to that

commodity (Sen, 1984). The capability articulates what the person can do (i.e., it is the set of activities from which the person can select) while a functioning is the actual activity that the person selects to do because the person values it most. A capability is the ability to potentially achieve alternative combinations of functionings.

As an example, Sen (1984) states that a commodity, such as a bicycle, does not tell us what a person can achieve since he or she may be subject to a disability, or there may be inadequate roads in the community that prevents one from using the bicycle for its intended purpose. Instead, our conception of well-being in relation to the bicycle requires knowledge about the person's capability (i.e., movement) and functioning (i.e., riding around), which is the true basis for the resultant utility (i.e., the pleasure or fulfillment derived from riding). A commodity's characteristics (e.g., the bicycle's ability to transport) are only indirectly related to the person's well-being. What is important, according to Sen, is the capabilities at the person's command rather than the specific functioning that he or she ultimately chooses. For example, even if an illiterate person may not have chosen to read if he was able to do so, the fact that he could have (i.e., he possessed the capability) still has value as a positive freedom even if the person chooses not to exercise it (Sen, 1984).

Even if well-being is better viewed as a function of capabilities rather than of goods and services production, a concern remains regarding how one adequately measures capabilities. Because economic metrics are based on market values, their calculation is more objective than valuing the capability of a bicycle or other commodity. Measurements of this nature will be subjective and will likely vary greatly from person to person. Acknowledging this, Sen (1985) concedes that he has "no magic solution" (p.

48), but believes that the process of making non-market observations regarding people's capabilities remains valuable. There are relatively uncontroversial factors that increase capabilities that we can measure. For example, Sen (1985; 1999) mentions life expectancy, clothing, shelter, education, morbidity, and civil and political rights as aspects central to capabilities. Unlike commodity measurements, these factors help explain what a person is capable of doing and come "closest to the notion of standard of living" (Sen, 1984, p. 334).

Sen's viewpoint not only represented a departure from using purely economic indicators to measure social progress, but also characterized human well-being in a new manner. As a result, academics began to debate how to define well-being in a practical rather than theoretical sense. The Millennium Ecosystem Assessment (2005) suggested that there is a continuum between well-being and poverty, with poverty representing a pronounced deprivation in well-being. However, the panel acknowledged that "well-being" is a value-laden concept that greatly depends on context since it varies due to factors, such as geography, age, gender, and culture. The Office for the High Commissioner for Human Rights (2004) clarified that although poverty implies a low-level of well-being, a lack of well-being does not necessarily imply poverty since non-economic factors, such as genetic disorders, may impact one's welfare.

The United Nation's Development Programme's ("UNDP") first Human Development Report (1990), which Sen's work greatly influenced, characterizes well-being as the expansion of peoples' choices and capabilities. While the report acknowledges that income is a means to acquiring well-being, it emphasizes that this is only one dimension of well-being and that other factors, including long life, personal

security, human rights, knowledge, and community participation, are also important. Sen's capabilities approach formed the theoretical basis for the UNDP's Human Development Index (United Nations Development Programme, 2015b) ("HDI") (Noorbakhsh, 1998; Gasper, 2002), but there is limited resemblance between the two. While Sen's capabilities are potentially numerous and multifaceted, the HDI only measures three variables: life expectancy, years of schooling, and GNI per capita at purchasing power parity. Though these factors are arguably prerequisites to people achieving the capabilities necessary to realize the types of lives they value, it is by no means an exhaustive list. Even Sen himself acknowledges that the HDI only reflects the most basic capabilities and could be more refined (Anand & Sen, 1994).

In order to be suitable, an indicator should be reasonably user-friendly and cost-effective to compute (Bagolin & Comim, 2008). Thus, it is unrealistic to expect the HDI, or any other well-being index, to encapsulate all aspects of human capabilities, or reflect all potential differences in personal preferences. As Streeten (1994) notes, the concept of human development is too complex to be properly reflected in an index. However, he feels indices, such as the HDI, are still useful since their simplicity draws public attention and focuses policy makers on the key aspects of a difficult problem.

However, the HDI has been subject to criticism because it incorporates so few capabilities. Many emphasize the HDI's failure to incorporate any measure of inequity since GNI per capita is merely an average that does not indicate the extent to which wealth is concentrated within a country (see, for example, Bagolin & Comim, 2008; Stanton, 2007; and Sagar & Najam, 1998). Bagolin and Comim (2008) also mention the index's failure to include civil and political freedoms that impact well-being. In addition,

the HDI ignores levels of human security, human rights, healthcare, access to leisure time, food security, as well as environmental and sustainability concerns, which are all likely to be substantial contributors to well-being. This suggests that a more comprehensive index that includes more variables may better reflect countries' progress towards achieving human well-being.

Martha Nussbaum's Central Capabilities

Subsequent to her collaboration with Sen, philosopher Martha Nussbaum (2011) formulated her own normative version of the capabilities approach that focused on the essentials for leading a dignified life. While Sen has focused on capabilities as a means of measuring quality of life, Nussbaum (2006) views them as a theoretical “underpinning for an account of core human entitlements...as a bare minimum of what human dignity requires” (p. 70) in a just society. Like Sen, Nussbaum believes that it is appropriate to focus on capabilities rather than functioning. Though functions reflect an individual's choices from sets of capabilities, she feels that the capabilities themselves have intrinsic value because they provide a person with freedom to choose. Capabilities, Nussbaum (2011) argues, respect the fact that there is a plurality of different views regarding what constitutes human flourishing since they focus on measuring opportunities for action rather than mandating that certain choices are the best for everyone, or assessing the utility of the outcomes, which is much more subjective. As an example, Nussbaum (2006) states that we should be more concerned with whether people have the right to vote (i.e., the capability) rather than whether they actually vote (i.e., the functioning) since the latter could justify mandatory voting initiatives that could impede rather than

enhance well-being. Similarly, she believes that society should be concerned with whether people have the capability to lead a healthy lifestyle or freely express their religion, but provide them the freedom to make unhealthy choices or not espouse religious beliefs if they choose (Nussbaum, 2006 and 2000).

Where Sen and Nussbaum particularly part company is on whether society should articulate a specific list of capabilities. While Sen was reluctant to do so, despite acknowledging that some capabilities, such as health and education, were central to his approach, Nussbaum (2006) felt that enumerated capabilities were necessary for formulating an appropriate theory of social justice. Without differentiating between important capabilities (e.g., having adequate nourishment) and those that are either relatively trivial (e.g., the capability to drive a motorcycle without a helmet) or downright bad (e.g., the capability to pollute the environment), Nussbaum (2006) believes that Sen is left protecting capabilities *qua* capabilities, which has little merit.

Accordingly, Nussbaum (2011) identified ten capabilities that she views as “so central that their removal makes a life not worthy of human dignity” (p. 31). She states that her list is subject to revision based on public debate, but believes that a threshold level of each of the ten central capabilities she identifies are a prerequisite for living a life worthy of human dignity. She describes these central capabilities as follows:

1. Life: Being able to live to the end of a human life of normal length; not dying prematurely, or before one’s life is so reduced as to be not worth living.
2. Bodily health: Being able to have good health, including reproductive health; to be adequately nourished; to have adequate shelter.
3. Bodily integrity: Being able to move freely from place to place; to be secure against violent assault, including sexual assault and domestic

violence; having opportunities for sexual satisfaction and for choice in matters of reproduction.

4. Senses, imagination, and thought: Being able to use the senses, to imagine, think and reason – and to do these things in a ‘truly human’ way, a way informed and cultivated by an adequate education, including, but by no means limited to, literacy and basic mathematical and scientific training. Being able to use imagination and thought in connection with experiencing and producing works and events of one’s own choice, religious, literary, musical, and so forth. Being able to use one’s mind in ways protected by guarantees of freedom of expression with respect to both political and artistic speech, and freedom of religious exercise. Being able to have pleasurable experiences and to avoid non-beneficial pain.

5. Emotions: Being able to have attachments to things and people outside ourselves; to love those who love and care for us, to grieve at their absence; in general, to love, to grieve, to experience longing, gratitude, and justified anger. Not having one’s emotional development blighted by fear and anxiety. (Supporting this capability means supporting forms of human association that can be shown to be crucial in their development).

6. Practical reason: Being able to form a conception of the good and to engage in critical reflection about planning one’s life. (This entails protection for the liberty of conscience and religious observance).

7. Affiliation: (A) Being able to live with and toward others, to recognize and show concern for other human beings, to engage in various forms of social interaction; to be able to imagine the situation of another. (Protecting this capability means protecting institutions that constitute and nourish such forms of affiliation, and also protecting the freedom of assembly and political speech.) (B) Having the social bases of self-respect and non-humiliation; being able to be treated as dignified being whose worth is equal to that of others. This entails provisions of nondiscrimination on the basis of race, sex, sexual orientation, ethnicity, caste, religion, national origin.

8. Other species: Being able to live with concern for and in relation to animals, plants, and the world of nature.

9. Play: Being able to laugh, to play, to enjoyment recreational activities.

10. Control over one’s environment: (A) *Political*. Being able to participate effectively in political choices that govern one’s life; having the right of political participation, protections of free speech and association. (B) *Material*. Being able to hold property (both land and

movable goods), and having property rights on an equal basis with others; having the right to seek employment on an equal basis with others; having the freedom from unwarranted search and seizure. In work, being able to work as a human being, exercising practical reason and entering into meaningful relationships of mutual recognition with other workers. (Nussbaum, 2011, pp. 33-4).

Nussbaum emphasizes that these central capabilities are not fungible. A society cannot compensate for a deficit in one capability by simply providing more of another. She does suggest that the affiliation and practical reason capabilities organize and pervade the others, but she does not claim that they should receive any superior status as a result. However, Nussbaum (2011) does recognize that some capabilities “may justly take priority” (p. 45) over others, although she does not specify which ones. One potential guide for prioritizing certain capabilities that she does theoretically endorse is based on Wolff and De-Shalit’s (2007) concepts of “fertile functioning” and “corrosive disadvantage”. Fertile functioning, which Nussbaum (2011) believes should more correctly be stated as “fertile capabilities” noting that she assumes “alliteration has superseded theoretical clarity” (p. 44), recognizes situations in which one capability tends to promote others. In contrast, corrosive disadvantage reflects a deprivation of a capability that has large negative impacts in other areas of life. To the extent that fertile capabilities and corrosive disadvantage exist, the former potentially merit superior status and the latter lower status among the ten central capabilities. However, Nussbaum does not indicate which capabilities might fit into these categories.

Nussbaum also characterizes capabilities as individual in nature given that each human being is an end in his or herself. Therefore, the goal is not to foster capabilities for groups except to the extent that they help create individual capabilities. Nussbaum emphasizes that this does not entail that all individuals’ capabilities are to be equalized,

such as a requirement for equal housing for all. Rather, people should all enjoy a minimum threshold that is necessary in order to lead a dignified life. The HDI only integrates three components of Nussbaum's ten central capabilities: life expectancy, education, and income. Thus, it is possible that incorporating additional aspects of Nussbaum's criteria may produce a more robust, accurate, and informative measure of human well-being.

Operationalizing the Capabilities Approach

Many scholars have discussed issues involved in operationalizing the capabilities approach, but have not attempted to create a comprehensive composite statistic for measuring human well-being based on Nussbaum's work. Robeyns (2006) has discussed how academics have employed aspects of the capabilities approach on a localized scale, particularly the quantitative and qualitative assessment of functionings. She suggests that one of the advantages of a capabilities approach is that it has sound philosophical foundations, is multidimensional in nature, and appropriately stresses the need to integrate both theory and practice. However, Robeyns concludes that because the approach is "radically underspecified" (371), each application of the capabilities approach must justify its components.

Alkire (2003; 2005) and Comim (2001) have discussed the operationalization of certain aspects of the capabilities approach and the issues involved in doing so. Both suggest that the endeavor is feasible and advisable. Alkire (2005) states that although the capabilities approach appears unwieldy in the abstract, problems relating to poverty are concrete and, therefore, the approach can be tailored to address practical concerns. She

also acknowledges that selecting metrics to quantify capabilities requires many value judgments, but states that a non-value laden approach is not possible (Alkire, 2003). In a similar vein, Comim (2001) quotes Sen's (1992) position that "the need for selection and discrimination is neither an embarrassment nor a unique difficulty for the conceptualisation of functionings and capabilities" (p. 44). Comim suggests that operationalization of the capabilities approach could be achieved through four steps: "i) theoretical inclusion: elaboration of theoretical concepts with potential empirical significance; ii) measurement: transformation of these theoretical concepts into empirical variables; iii) application: use of these variables in qualitative empirical analysis; and iv) quantification: use of these variables in quantitative empirical analysis" (p. 1). In my attempt to operationalize the capabilities approach, Nussbaum's ten central capabilities will satisfy Comim's first step. Achieving steps ii) and iv) will be the principal objective of the paper while step iii) is beyond the scope of this analysis.

Anand et al. (2009) did design and administer a survey in an attempt to measure Nussbaum's ten central capabilities, though on a limited basis. While the authors recognized that Nussbaum's list was not necessarily definitive in determining what capabilities relate to human well-being, they did suggest that other attempts to catalog capabilities were very similar in nature to hers and that Nussbaum's central capabilities "can be taken as a general, high-level account of capabilities that public policy must address" (p. 131). Anand et al. also used regression analysis to determine how different survey questions explained variation in subjective well-being that they measured through results from a separate study. However, many of their survey questions were very subjective (e.g., "To what age do you expect to live?" as an indicator of life expectancy)

or had questionable relevance to the capability (e.g., “Do you eat fresh meat, chicken, or fish at least twice a week?” as an indicator of bodily health). As well, the survey was only administered to elderly residents of England, Scotland, and Wales and was not an attempt to measure human well-being on a global scale.

Other Indices for Measuring Well-Being

Academics and policy makers have developed other indices in an attempt to measure human well-being. In addition to the aforementioned HDI, other well-being indices include the Genuine Progress Indicator; the Index of Sustainable Economic Welfare; the Human Economic Welfare Index ; the Where-to-be-Born Index , which was previously known as the Quality-of-Life Index; the Happy Planet Index; the Gross National Well-being Index, which is also referred to as the Gross National Happiness Index; the World Happiness Report rankings; the Gallup-Healthways Well-Being rankings; the Social Progress Index; the SDG Index; and the OECD’s Better Life Index.

The first three (i.e., the Genuine Progress Indicator, the Index of Sustainable Economic Welfare, and the Human Economic Welfare Index) only focus on the economic dimension of well-being. While they each improve upon GDP by adjusting it for important factors, such as depletion of environmental capital and adjustment for social costs and benefits, they do not consider the non-economic factors that are incorporated in Nussbaum’s ten central capabilities. As well, none of the three has been applied on a global, country-by-country scale.

The Where-to-be-Born Index (Economist Intelligence Unit, 2013) is more robust than those that only focus on economic data. In addition to GDP per capita, it includes

measures of life expectancy; divorce, unemployment, crime, and homicide rates; political security; climate; membership in social organizations; corruption levels; and gender equality in legislatures. While these capture important aspects of well-being, its exclusion of key factors, such as access to food, shelter, education, and biodiversity, make it substantially different from Nussbaum's approach.

The Happy Planet Index (New Economics Foundation, 2012), the Gross National Well-Being Index, the World Happiness Report rankings, and the Gallup-Healthways Well-Being rankings are all indices based on subjective survey responses. As such, they are subject to the criticisms discussed above regarding measures of subjective well-being. The Social Progress Index (2015), the SDG Index (Sachs, Schmidt-Traub, Kroll, Durand-Delacre, & Teksoz, 2016), and the OECD's (n.d.) Better Life Index most closely resemble a capabilities approach. The SDG Index is the most robust of the indices purporting to measure human well-being and include many components of the capabilities approach. However, it does not include some key factors mentioned in Nussbaum's ten central capabilities, particularly individual liberties, such as freedom of movement, religion, assembly, speech, and association. As well, the SDG index includes factors, such as the prevalence of automatic teller machines, mobile broadband subscriptions, patent applications, and rooms per person, which are arguably tangential to human well-being and potentially reward developed countries with excessive consumerism. Likewise, the Social Progress Index incorporates metrics that are not mentioned in Nussbaum's capabilities and may or may not play a role in increasing well-being. These include access to telephone and Internet services, living near globally ranked universities, and rates of obesity, which Nussbaum specifically rejects as a form

of capability since it imposes a lifestyle choice on others regardless of whether it results in harm. As well, the Social Progress Index does not include any metrics relating to worker rights or gender economic participation, which the Capabilities Index does.

The OECD's Better Life Index has been limited to the organization's 36 member countries. It consists of a weighting of 11 categories that range from health and safety to civic engagement and a pollution-free environment. However, while Nussbaum's approach emphasizes the importance of civil and political rights, such as freedom of speech, expression, religion, assembly, and association, the Better Life Index does not incorporate these aspects. As well, unlike Nussbaum's central capabilities, the Better Life Index does not consider food security.

Research Question and Hypotheses

Based on the foregoing, there is reason to believe that a human well-being index based on Nussbaum's ten central capabilities will provide country-level ratings that are considerably different from existing indices and economic measures and may better capture the key aspects of human well-being. My primary research question is whether an alternative human development index based on Martha Nussbaum's central capabilities captures components of country-level well-being that existing indices do not. Thus, the purpose of this thesis is to construct such an index based on Nussbaum's capabilities approach and test the following hypotheses:

1. There is a significant difference between purely economic measures of well-being (as represented by GNI per capita) and indices that purport to capture human

well-being using non-economic measures, including an index based on the capabilities approach.

2. There is a significant difference in the way that the capabilities index ranks and quantifies a country's human development progress when compared to traditional measurements and indices.
3. Capabilities Index values for countries will be a good predictor of variation in country-level subjective well-being scores as measured by the aforementioned World Happiness Report and the Gallup-Healthways Well-Being rankings.
4. To the extent that an index based on the capabilities approach is very similar in nature to existing indices, it measures some aspects of human well-being that are positively correlated with subjective well-being and, therefore, should be included in an ideal index.

Chapter II

Methods

The principal aim of this thesis is to construct a human well-being index based on Nussbaum's concept of central capabilities in order to compare it to existing indices with a view to discovering new insights regarding how we should assess well-being at the country level. In order to create the Capabilities Index, it is necessary to identify appropriate data sources to represent each of the ten capabilities for human well-being that Nussbaum identifies.

Selecting Index Metrics and Data Sources

The OECD (2008) outlines steps for constructing a composite indicator that include:

1. developing a theoretical framework for the selecting and combining variables;
2. selecting the appropriate data;
3. addressing any missing data;
4. normalizing the data;
5. weighting and aggregating the data;
6. determining the main drivers of country scores; and
7. assessing the correlation of index values with those of other indices.

Given that Nussbaum's approach provides the necessary theoretical framework for the proposed composite indicator (step 1), the principal task becomes selecting appropriate measures of her enumerated central capabilities. In order to formulate the

Capabilities Index, I created a list of metrics that represent each key component of her ten central capabilities (Appendix 1). Each component represents an aspect of a central capability that I measured. Each metric is a description of the statistic that I used to represent the component while each source comprises the actual country-level data that I collected to measure each metric.

The OECD (2008) recommends that data selection “be based on the analytical soundness, measurability, country coverage, and relevance of the indicators to the phenomenon being measured” and that it is “necessary to discuss the strengths and weaknesses of each selected indicator” (p. 20). The justification for the selection of each component, metric, and source relating to the Capability Index is as follows:

Capability 1: Life

Nussbaum’s first capability is life, which she defines as “being able to live to the end of a human life of normal length; not dying prematurely, or before one’s life is so reduced as to be not worth living.” (Nussbaum, 2011, p. 33). An appropriate metric that represents this capability is the life expectancy at birth in each country, which the World Bank (2015) publishes for 195 countries and territories. The incidence of premature death that Nussbaum mentions will be captured by this statistic since it will reduce life expectancy at birth.

Although Nussbaum’s capability also refers to lives reduced to being not worth living, this is a difficult characteristic to capture since it requires a normative judgment regarding what constitutes a valuable life. The World Health Organization (2015a) does calculate a healthy life expectancy at birth statistic that adjusts life expectancy figures by

the number of years per capita lost due to disability due to disease or injury. The difference provides the average number of years that a resident of a country can expect to live in good health. While this may capture Nussbaum's component to some extent, the correlation between this measure and life expectancy at birth for the countries measured is so high (0.99) that it does not add anything significant to the index.

Capability 2: Bodily Health

Bodily health constitutes the second central capability that reflects human well-being. Nussbaum defines the capability as "being able to have good health, including reproductive health; to be adequately nourished; to have adequate shelter." (2011, p. 33). Rankings of health by country tend to focus on health care systems or general proxies for health, such as life expectancy. A country's health care system rating may not reflect whether or not residents tend to be in good health. As well, because life expectancy is used to measure the first capability, it is not repeated for this second one. However, the other aspects of health that Nussbaum mentions, namely reproductive health, nourishment, and shelter, are included. The Capabilities Index captures reproductive health through the World Health Organization's (2015b) maternal mortality rate metric, which estimates the number of maternal deaths per 100,000 live births.

There are several composite metrics that one could use to measure the adequate nourishment component. The International Food Policy Research Institute's (2015) Global Hunger Index provides country-level indexed scores that measure undernourishment, particularly in children under age five. However, the index does not include developed countries, which are valuable in an index for comparison and

benchmarking purposes. Oxfam's (2016) Food Index does include major developed countries, but a quarter of each country's index score is based on diabetes and obesity rates that reflect unhealthy eating rather than lack of sufficient nutritional food. As discussed in the last chapter, Nussbaum specifically rejects obesity as an appropriate capability concern since she believes that what matters is that people have the capability to lead a healthy lifestyle rather than whether they exercise the freedom to make unhealthy choices. In addition, the Global Hunger Index's undernourishment data has many missing values and relies upon some data that is over 20 years old.

Instead of these metrics, the Capabilities Index incorporates the Economist Intelligence Unit's (2015b) Global Food Security Index. It is far more robust than the other two in that it incorporates 28 different factors in three broad categories: food affordability, availability, and quality and safety. Though it may be a better reflection of anticipated vulnerability to food insecurity rather than an actual lack of adequate nourishment in the countries analyzed, it arguably has fewer drawbacks than other potential metrics. In any event, for countries in common, the Global Food Security Index is highly correlated with both the Global Food Index (0.92) and the Global Hunger Index (0.90).

The last of Nussbaum's bodily health components is adequate shelter. Though various agencies provide housing and homelessness data for a limited number of countries, the Social Progress Imperative (2015) publishes shelter index scores for 159 countries and territories. One of the principal advantages of its data is that, rather than merely measuring homeless rates, it incorporates the availability of affordable housing, access to a quality electricity supply, and deaths attributable to indoor air pollution. Thus,

the Capabilities Index incorporates these shelter index scores as a metric for this component.

Capability 3: Bodily Integrity

Nussbaum's (2011) bodily integrity capability consists of "being able to move freely from place to place; to be secure against violent assault, including sexual assault and domestic violence; having opportunities for sexual satisfaction and for choice in matters of reproduction" (p. 33). Because freedom of movement within a country and between countries can vary significantly, the Capabilities Index incorporates both components from the CIRI Human Rights Data Project (the "CIRI Project") (Cingranelli, Richards, & Clay, 2014). These metrics are categorical in nature. The CIRI Project gives a country a score of zero (indicating severe restriction) if mobility restrictions fit into one of eight categories, which include requiring specific documentation to travel outside one's neighborhood, village, or province; forbidding women to travel without accompaniment of a male relative; and imposing restrictions on where people may reside. A score of one reflects moderate mobility restrictions as represented by one of seven restriction types, which include a requirement that one register his or her residence with the government. Those countries that do not have severe or moderate restrictions receive a score of two. The CIRI Project evaluates foreign movement and travel on the same categorical scale by considering similar mobility restrictive criteria.

Due to its nature, freedom of movement is difficult to measure objectively. What counts as an unreasonable restriction on mobility and how restrictions are quantified is necessarily subjective. However, the advantage of the CIRI Project's freedom of

movement metrics is that the methodology is clearly articulated. As well, scholars and policy groups have employed the data in academic work (see, for example, Goodhart, 2013 and Alemán & Woods, 2014) and in the Cato Institute and Fraser Institute's Human Freedom Index (Vásquez & Porčnik, 2015).

The bodily integrity capability also includes freedom from violent assault. Though Nussbaum mentions sexual assault and domestic violence as examples, it is clear that the component is not limited to those instances. The Capabilities Index utilizes the Institute for Economics & Peace's (2015) Global Peace Index to reflect freedom against acts of violence. The index purports to measure the absence of violence, or the fear of violence, by assessing 23 indicators in three broad categories: ongoing domestic and international conflict; societal safety and security; and militarization. Though the index does not specifically include the incidence of sexual assault and domestic violence in countries, these are possibly captured by the level of violent crime indicator. Unfortunately, other estimates of rates of sexual assault and domestic violence are only provided on a regional rather than a country-level basis (see, for example, World Health Organization, 2013).

Nussbaum's third capability also includes having opportunities for sexual satisfaction and choice in reproduction. There does not appear to be adequate survey data to capture the first of these aspects and, therefore, it is omitted from the Capabilities Index. Although Nussbaum does not specify what she means by choice in reproduction, elsewhere she indicates that it includes access to abortion (Dixon & Nussbaum, 2011) and implies that it also comprises contraceptive methods (Nussbaum, 1995). The Capabilities Index relies upon Population Action International's (2015; 2007)

Reproductive Health Index, which reflects 11 indicators under four broad dimensions: preventing unintended pregnancy; increasing access to safe abortion and post-abortion care; preventing and treating sexually transmitted infections, and fostering an enabling environment. The last dimension specifically measures the proportion of women who were married prior to age 18 and the percentage of married women who participate in certain household decisions. Thus, this metric is broader, though not necessarily inconsistent with, the choice in reproduction component that Nussbaum has in mind. The Reproductive Health Index was most recently published in 2015; however, it almost exclusively covered developing countries. The index values for countries that were not included in the 2015 index are from Population Action International's 2007 report.

Capability 4: Senses, Imagination, and Thought

The fourth central capability references “being able to use the senses, to imagine, think and reason” in a way “cultivated by an adequate education” (Nussbaum, 2011, p. 33). Nussbaum specifically mentions the importance of literacy, basic mathematics, and scientific training, but states that her conception of “adequate education” is not limited to these. The capability also mentions “experiencing and producing works and events of one’s own choice” (p. 33) while emphasizing freedom of expression, speech, and religion, as well as experiencing pleasure and avoiding pain.

The two principal potential metrics for reflecting adequate education are the UNDP Human Development Report's (2015) Education Index and UNESCO's (2015) Education for All Development Index. The HDI measure is an indexed average of mean years of schooling that adults 25 years of age and older have received and the expected

years of future education that a current five-year old student will receive based on current enrollment rates at each school level. The UNESCO measure reflects the percentage of primary school age children enrolled in primary or secondary school, the adult literacy rate, the student survival rate to the fifth grade, and gender parity and equality measures relating to those three measures. The concern with the UNESCO data is that it focuses more on primary schooling that is unlikely to provide people with the level of education that Nussbaum has in mind for flourishing in matters of sense, imagination, and thought. This is better reflected in the number of years of schooling that the HDI measures. As well, the UNESCO data omits index measures for seven of the 20 most populous countries in the world (India, Brazil, the Philippines, Ethiopia, Vietnam, the Democratic Republic of the Congo, and Thailand), as well as other important countries (e.g., Kenya, South Africa, Uganda, Canada, and Argentina). Thus, the Capabilities Index uses the HDI Education Index as the appropriate metric for the education component. In any event, the correlation between the HDI and UNESCO measure is quite high (0.89).

Though it is difficult to measure the capability “to use imagination and thought in connection with experiencing and producing works and events” (Nussbaum, 2011, p. 33) in an index, the related freedoms of speech, expression, and religion that Nussbaum mentions have been quantified on a country-level basis. The Pew Research Center published a report in 2015 regarding freedom of expression and speech in certain countries (Wike & Simmons 2015), but it focuses on public attitudes towards these freedoms rather than the actual ability to exercise them. The Human Freedom Index (Vásquez & Porčnik, 2015) measures freedom of expression and information based on the number of press killings; laws and regulations that influence media content; political

pressures and controls on media content; freedom of access to foreign information; and state control over Internet access.

The Reporters Without Borders' 2015 World Press Freedom Index assesses similar factors through the use of a survey. It considers diversity of opinion in the media, media independence, journalist censorship, the legislative framework governing news and information, transparency of media institutions, news and information infrastructure, and abuses of the freedoms. Its correlation with the Human Freedom Index country scores is 0.84. Because these results are quite similar, the Capabilities Index utilizes the World Press Freedom Index since it rates more countries and uses a more robust survey to evaluate them. Though both the World Press Freedom Index and Human Freedom Index focus on freedom of speech and expression in the media rather than in the public at large, the latter information is not available at the country level and these indices likely provide a suitable proxy since restrictions on public expression are likely correlated with media restrictions.

The Capabilities Index measures the religious freedom component of the fourth capability through the Pew Research Center's (2015) Religious Restrictions Index. This index's values are based on a combination of two sub-indices: a Government Restrictions on Religion index and a Social Hostilities Involving Religion index. The former consists of 20 measures of government restrictions and includes government efforts to ban particular faiths or limit preaching, as well as acts of preferential treatment to one or more religious groups. The latter consists of 13 measures of incidences of social hostilities involving religion, which include religion-related armed conflict and terrorism, and harassment over religious attire. Because the second sub-index relies on reports of

hostilities from national and international governmental and non-governmental organizations, the precision of the country scores is dependent on the accuracy of the information these sources provide.

Capability 5: Emotions

Nussbaum's (2011) fifth central capability involves being able "to love, to grieve, to experience longing, gratitude, and justified anger" and to not have "one's emotional development blighted by fear and anxiety" (pp. 33-4). While many of these aspects appear to be associated with freedom of expression, Nussbaum instead states that "supporting this capability means supporting forms of human association" (p. 34). Since freedom of expression is already one of the components of the fourth capability, the Capabilities Index follows Nussbaum's guidance and attempts to capture freedom of association.

The CIRI Project (Cingranelli, Richards, & Clay, 2014) collectively measures freedom of assembly and association. In a fashion similar to how it measured freedom of movement (see Capability 3 above), the Project gave each country a score of 0, 1, or 2 depending on whether it severely restricted, limited, or virtually unrestricted freedom of assembly and association. The Project provided examples of characteristics that would mandate scores in each category rather than well-defined criteria. In contrast, the Institutional Profiles Database ("IPD") (2012), a joint venture project of the French Development Agency and the University of Maastricht measured freedom of association separately from freedom of assembly. In consultation with local experts, the French Development Agency and the French Ministry for the Economy and Finance's country

offices rated each country on a scale from 0 (no freedom of association) to 4 (strong freedom of association). Accordingly, the data are subjective and qualitative in nature and do not include an assessment of any specific criteria underlying freedom of association.

The correlation between the CIRI Project's freedom of assembly and association country scores and the IPD scores are 0.51. Some of this difference may be due to the fact that the IPD scoring system is more granulated and is only measuring freedom of association. As well, there may be data integrity issues relating to the CIRI Project's country scores. For example, Somalia has a negative score even though all ratings are supposed to be between zero and two. In addition, the CIRI Project may be giving a country a score of zero, which is supposed to reflect severely restricted freedom of association and assembly, instead of no score when there is no data for a specific country. Otherwise, it is difficult to explain why the CIRI Project gives scores of zero for countries, such as Israel and India, which have laws protecting freedom of association and are generally viewed as protectors of civil liberties (see, for example, Freedom House, 2016). In contrast, the IPD gave the highest scores of four to both of these countries. Despite drawbacks concerning subjectivity that are inherent in any evaluation of civil liberties protection, the IPD scores relating to freedom of association are the most suitable to be included in the Capabilities Index. Interestingly, the Human Freedom Index (Vásquez & Porčnik, 2015), which relied on the CIRI Project ratings for freedom of movement, used the IPD scores rather than the CIRI Project scores for measuring freedom of association.

Capability 6: Practical Reason

For Nussbaum (2011), practical reason requires “being able to form a conception of the good and to engage in critical reflection about planning one’s life,” which “entails protection for the liberty of conscience and religious observance” (p. 34). She also states that this capability “organizes all the others” since “the opportunity to plan one’s own life is an opportunity to choose and order the functionings corresponding to the various other capabilities” (p. 39). Thus, practical reason is a broad capability that requires protection of many types of freedom. Therefore, the Capabilities Index incorporates the Human Freedom Index (Vásquez & Porčnik, 2015) scores for each country to encapsulate this component since it reflects a broad range of personal, civil, and economic freedoms that are necessary for forming and pursuing one’s own conception of the good. It is broader than Freedom House’s (2016) Freedom in the World index, which only considers political rights and civil liberties, and The Heritage Foundation’s (2016) Index of Economic Freedom, which exclusively focuses on economic rights.

Capability 7: Affiliation

Nussbaum’s seventh central capability consists of two parts that can be summarized as relating to social interaction and dignity. She states that providing the first part of the capability “means protecting institutions that constitute and nourish...affiliation, and also protecting the freedom of assembly and political speech” (Nussbaum, 2011, p. 34). The second part of the capability “entails provisions of nondiscrimination on the basis of race, sex, sexual orientation, ethnicity, caste, religion, national origin” (p. 34). Components relating to freedom of assembly and speech were

captured in the fourth and fifth central capabilities. In order to incorporate the freedom from discrimination component in the Capabilities Index, it includes the tolerance and inclusion metric from the Social Progress Imperative (2015), which aggregates country scores for tolerance for immigrants, tolerance for homosexuals, discrimination and violence against minorities, and religious tolerance.

Capability 8: Other Species

The eighth central capability involves “being able to live with concern for and in relation to animals, plants, and the world of nature” (Nussbaum, 2011, p. 34). It entails people having access to the natural environment so that they can interact with it.

Quantifying this component is difficult because it is not clear what constitutes nature and what exactly should be measured. Are human-created urban parks sufficient for providing this capability or is there a requirement for access to pristine nature? There are environmental ethicists that claim that restored landscapes are inauthentic and are akin to fake copies of famous artworks (Elliot, 1982) and that there is no such thing as pristine wilderness since humans have altered all environments on the planet (Cronon, 1995).

In addition, each country is endowed with a different natural environment. Thus, although there are indices that measure the level of biodiversity in countries (see, for example, Global Environment Facility, 2008), which would arguably correlate with the capability to live with other species, they are not suitable for the Capabilities Index. One of the purposes of the index is to evaluate countries and the world community on their efforts to improve human well-being and to identify potential policy measures that could increase the index metrics. Thus, it is inappropriate to include criteria that are not

sufficiently within a country's control. Otherwise, a country such as Brazil that has a high rate of biodiversity would receive a high metric ranking while a small, land-locked country such as Luxembourg would be penalized for relatively low biodiversity even though its efforts to maintain the biodiversity that it has may be superior. In order to avoid these concerns, the Capabilities Index incorporates the biodiversity and habitat score from Hsu et al.'s (2014) Environmental Performance Index. The principal advantage of this metric is that it evaluates each country's success in protecting existing habitats and species that are rare or threatened.

Capability 9: Play

Nussbaum's (2011) ninth central capability is "being able to laugh, to play, to enjoy recreational activities" (p. 34). Because people can enjoy satisfying recreational activities with very limited resources, the key for measuring this component is to focus on leisure time. Unfortunately, studies on leisure time at the country level typically focus on developed countries. An alternative to leisure time measurements would be to use the average number of hours that adults work in each country as a proxy for leisure time. Presumably leisure time would be inversely related to time spent working. However, working hour data is fairly scarce. The OECD (2014) has published annual average working hours per adult, but this only covers 38 countries. The International Labour Office (Lee, McCann, & Messenger, 2007) has published working hours for 56 countries, many of which are also OECD members, but the methodology is different for each country, the most recent data is from 2004, and aggregate average hours worked are not

reported. Without sufficient data to measure this capability, its measurement is omitted from the Capabilities Index.

Capability 10: Control Over One's Environment

The last of Nussbaum's (2011) central capabilities has a political and a material aspect. Political control over one's environment involves "having the right of political participation, protections of free speech and association" (p. 34). Material control over one's environment includes "being able to hold property...and having property rights on an equal basis with others; having the right to seek employment on an equal basis with others; having the freedom from unwarranted search and seizure" and "entering into meaningful relationships of mutual recognition with other workers" (p. 34).

With respect to the political aspect, free speech and association are already reflected in the metrics for the seventh and fifth capability respectively. The remaining component, having the right of political participation, is usually associated with the right to vote in free elections. One of the most thorough measures of this component is The Economist Intelligence Unit's (2015a) Democracy Index, which provides metrics for a country's electoral process and pluralism, functioning of government, political participation, political culture, and civil liberties, as well as an averaged aggregate score. The aggregate score is broader than Nussbaum's component. While the Democracy Index's political participation metric shares some of the wording of the tenth central capability, it measures the extent of political participation by factors such as voter turnout. Because Nussbaum specifically refrains from considering the actual pursuit of a capability and instead focuses on its availability, the appropriate metric should measure

entitlement to vote rather than the exercise of that right. Therefore, the Capabilities Index only includes the Democracy Index's electoral process and pluralism metric that considers the free and fair nature of voting, running for office, and campaigning.

The material control over one's environment aspect of the tenth central capability mentions property rights, the right to equality of employment, freedom from unwarranted search, and access to meaningful relationships with other workers. The Heritage Foundation (2016) assesses property rights by placing each country in one of ten categories with associated scores ranging from zero to 100 with increments of ten between each one. In addition to these scores not being finely granulated, each category descriptor is very general. As well, the property rights scores include factors that are only peripherally relevant, such as limited government and regulatory efficiency. In contrast, the International Property Rights Index (Levy-Carciente et al., 2015), which is included in the Capabilities Index, provides country-level scores based on legal and political rights, physical property rights, and intellectual property rights based on a total of ten factors, including rule of law, property registration systems, and an intellectual property regime. Despite the differences between the two metrics, they have a strong correlation of 0.91.

Nussbaum's component concerning the right of equality of employment is likely broader than only the difference between the sexes. However, other forms of employment inequality are not adequately measured on a country basis. Therefore, the Capabilities Index includes the economic participation and opportunity metric from the World Economic Forum's (2015) Global Gender Gap Index. This metric considers differences in gender participation, remuneration, and advancement in the work place.

Although the World Justice Project's (2015) Rule of Law Index does not separately measure freedom from unwarranted search in its index, it does provide criminal justice country rankings that consider due process rights, as well as the effectiveness and fairness of the criminal justice system. The results are computed from a survey of legal academics and practitioners in each country. Scores are based on factors such as deficient mechanisms to obtain evidence, prosecutorial and judicial independence, case delays, and excessive pre-trial detention. While this list is broader than mere freedom from unwarranted search, it is likely that the additional factors are highly correlated with it.

The last component of the final central capability, access to meaningful relationships of mutual recognition with other workers, is difficult to measure. Because the Capabilities Index is based on factors that governments can impact through policy and the phrase "mutual recognition" in the capability suggests the dignified treatment of workers, the most appropriate metric to include should reflect appropriate worker rights. The International Trade Union Confederation's (2015) Global Rights Index ranks the world's best and worst countries for employees based on respect for worker rights. The principal drawback of the index is that it only ranks countries on a six-point categorical scale ranging from no guarantee of worker rights due to a breakdown of the rule of law to irregular violations of worker rights. However, it is the most thorough assessment of the manner in which countries treat their workers.

Missing Data

The OECD (2008) recommends that missing index data be addressed through either case deletion or imputation. Citing Dempster and Rubin (1983), the OECD cautions that “the idea of imputation is both seductive and dangerous” (p. 25) since it makes the dataset look complete even though the values that are imputed may be inaccurate. Since the different data sources for the Capabilities Index do not evaluate the exact same set of countries, missing data are a significant concern. Because the most common methods of imputation (e.g., substituting the mean, median, mode, a random data value, or a regression imputation) could result in an imputed value for a country that is significantly different from what the actual one would be if it was available, the Capabilities Index primarily relies on case deletion.

Because the purpose of constructing the Capabilities Index is to assess whether it measures human well-being in a manner that is not captured by existing indices, it is not crucial to have index scores for every country provided that there are a sufficient number of countries with scores to permit their statistical comparison with the scores of other well-being indices, and provided that all of the world regions are represented. Of the 20 metrics measured, I obtained a complete dataset for 60 countries. An additional 36 countries had one of the 20 metric values missing while another 13 countries had two metric values missing. Of the 60 countries with complete datasets, all world regions were represented, although there were only three countries from the Middle East. In order to increase the number of countries assessed, I included those with only one or two missing data values. Given that all of the normalized metrics had reasonably similar means and

standard deviations, the omission of one or two out of 20 values for a country was unlikely to have a substantial impact on a country's overall Capabilities Index score.

Data Adjustment and Normalization

Because the 20 metrics that form the basis for the Capabilities Index are measured in different units, it is necessary to normalize them so that they are comparable for the purpose of aggregating them into a single country score. Of the various normalization techniques that the OECD (2008) recommends, I have chosen to utilize min-max normalization, which is the same process that the United Nation's Development Programme employs for indexing the HDI components (Bagolin & Comim, 2008). This involves selecting minimum and maximum thresholds for each metric, subtracting the minimum threshold from a country's metric value, and then dividing that difference by the range of the thresholds using the following formula:

$$\text{metric value} = \frac{\text{country's value} - \text{minimum threshold}}{\text{maximum threshold} - \text{minimum threshold}}$$

The minimum and maximum thresholds constitute the potential maximum and minimum values that a country could attain for the metric in question. For some metrics, such as average life expectancy at birth, there are no obvious minimum and maximum thresholds since life expectancy has risen over time. Thus, it is necessary to select thresholds for each metric that allow for possible fluctuations in country values. The choice of minimum and maximum thresholds has an impact on the mean and the standard deviation of metric values. Ideally, the mean and the standard deviation for each metric should be similar so that one metric does not have more impact on a country's overall Capabilities Index score than another metric. However, one would expect that there would be some

variation in metric means and standard deviations due to the different nature of the metrics being measured. As a result of indexing, metric values for each country are between zero and one. In addition, different metric values are comparable since indexing removes the impact of different units of measurement.

Specific Normalization Procedures

The specific normalization procedures for each of the 20 metric variables were as follows:

Life expectancy at birth. This variable was indexed using a minimum threshold life expectancy of 35 and a maximum threshold of 90. Each threshold was beyond the minimum and maximum country life expectancies of 46 and 84 respectively. In order to have consistent country metric scores between zero and 100, each resulting value was multiplied by 100;

Maternal mortality rate (“MMR”). This variable was indexed using a minimum threshold MMR of one and a maximum threshold of 500. The resulting value was subtracted from 100 in order for countries with the lowest MMRs to have the highest indexed scores. The minimum threshold was below the lowest country MMR of three. However, due to outliers with extremely high MMR rates, setting the maximum threshold above the maximum country MMR would have distorted the normalized data (OECD, 2008, p. 28). The highest MMR of all the countries, 1,360 out of every 10,000 births for Sierra Leone, was nearly twice as high as the MMR for the second ranked country (i.e., Central African Republic with an MMR of 882). If the maximum threshold was set above Sierra Leone’s MMR, the difference in the indexed values for countries with low, but still significantly

different MMRs, would be inappropriately small. For example, with the maximum threshold set at 1,500, Canada, with an MMR of seven, would have an indexed metric of 99.6 while Indonesia, with an MMR eighteen times greater of 126, would have only a slightly lower indexed score of 91.7, which arguably fails to capture the difference between the two countries.

In order to adjust the normalized values for countries with relatively lower MMRs, the maximum threshold was reduced from 1,500 to 500. This resulted in the greater differentiation among countries with lower MMRs. For instance, Canada's indexed score dropped slightly to 98.8 while Indonesia's fell more substantially to 74.9 given its much higher MMR. However, such an adjustment comes with a cost. Countries with MMRs above the maximum threshold receive negative indexed values, which were adjusted to zero to keep all the indexed scores between zero and 100. While this results in scores of zero for all countries above the threshold regardless of the differences between their MMRs, arguably this is consistent with the view that from a policy standpoint, such high MMRs should all be considered socially unacceptable, which is reflected in an indexed score of zero.

Global Food Security Index. The Global Food Security Index is already indexed on a 100-point scale, so no modifications were necessary.

Shelter Index Score. The shelter index scores are already indexed on a 100-point scale, so no modifications were necessary.

Freedom of movement. This index ranks freedom of domestic movement in countries using categorical variables of zero, one, and two. The designers of the Human Freedom Index (Vásquez & Porčnik, 2015), which incorporated this data into its composite

country ratings, decided to transform the original index's scores of zero, one, and two respectively into scores of zero, five, and ten in order to conform with its ten-point scale used for each metric. Thus, the mean and standard deviation of country scores for this variable both increased as one would expect. However, what is known as the coefficient of variation (i.e., the ratio of the standard deviation to the mean expressed as a percentage), which is a standardized measure of dispersion that is independent of the unit of measure, increases from 47.2% to 59.6%. This means that country scores for this metric in the Human Freedom Index are more dispersed than in the original data set even when the change to a 10-point scale is taken into account. Despite this impact from transformation, the authors of the Human Freedom Index do not discuss their rationale for altering the categorical data in the manner that they did.

Another index that incorporates the Freedom of Domestic Movement data is the Social Progress Index (the "SPI"). The SPI aggregates the freedom of domestic movement and freedom of foreign movement scores into a single score ranging from zero to four, which was then normalized using the min-max method. Unlike the Human Freedom Index's method, the SPI method maintains the same coefficient of variation from the original data source. This SPI metric for freedom of movement then constitutes 20% of an umbrella category called "Personal Rights," which includes political rights, private property rights, and freedom of speech, association and assembly. Thus, it similarly considers the original ordinal data as if it is continuous in nature.

Treating ordinal data, such as the Freedom of Domestic Movement scores, as interval data is problematic. This original CIRI Project data merely indicate that countries with scores of two enjoy more domestic freedom than those with scores of one, which

enjoy more domestic freedom than those with scores of zero. However, there is no basis for extrapolating this ordinal ranking into equidistant measures. For example, there is nothing that indicates that a country with a score of two enjoys twice the freedom as a country with a score of one, or should receive twice the index points for this metric.

Despite these concerns, the OECD (2013), in its *Guidelines on Measuring Subjective Well-Being*, states that it is common in the social sciences to treat ordinal data as continuous in nature and that its usually does not lead to significant biases that impact conclusions (pp. 174, 189). In any case, without a source of interval measurement of this metric, utilizing and transforming the ordinal data is the only recourse for including domestic freedom of movement in the Capabilities Index. In order to maintain the same coefficient of variation as the original data, the Capabilities Index sums the measures of domestic and foreign movement and then transforms the resulting scores ranging from zero to four to scores ranging from zero to 100 (i.e., zero, 25, 50, and 100).

Global Peace Index. This index assigned each country a computed score on a scale of one to five with a low score of 1.148 and a high of 3.645. The values were indexed using a minimum threshold of one and a maximum threshold of five since these were the scale boundaries. The results were multiplied by 100. As well, because countries with greater levels of peace received lower Global Peace Index scores, results were subtracted from 100 for the Capabilities Index.

Reproductive Health Index. The Reproductive Health Index was most recently published for developing countries in 2015. The index values for other countries that were not included in the 2015 report are from the 2007 Reproductive Health Index. Unfortunately, the 2007 report gave the lowest indexed scores on a 100-point scale to the countries with

the best reproductive health while the 2015 index gives the lowest scores to the countries with the worst reproductive health. This was rectified by subtracting the 2007 index scores from 100. For countries that were rated in both the 2007 and 2015 reports, the correlation between their adjusted 2007 scores and their 2015 scores was 0.72, which is reasonably high considering the time difference.

Human Development Index – Education Index. These scores are already indexed on a 100-point scale, so no modifications were necessary.

World Press Freedom Index. Though the scores are already indexed on a 100-point scale, countries with more press freedom have lower scores. Therefore, scores were adjusted by subtracting the World Press Freedom Index scores from 100.

Religious restrictions – government. Each country received a score on a scale of one to ten with a low score of 0.2 and a high of 9.10. The values were indexed using a minimum threshold of zero and a maximum threshold of ten since these were the scale boundaries, which is equivalent to multiplying the original scores by 10. As well, because countries with greater levels of peace received higher scores, results were subtracted from 100 for the Capabilities Index.

Religious restrictions – social. The scaling of the scores for this metric was identical to the Religious Restrictions – Government metric and was therefore adjusted in the same manner. Original scores ranged from zero to nine on the ten-point scale.

Freedom of association. This measurement ranks freedom of association using categorical variables ranging from zero to four. These were normalized by using the min-max method with a minimum threshold of zero and a maximum of four. This converted

the original scores to scores of zero, 25, 50, 75, and 100. As described above, this method of normalization maintains the coefficient of variation of the original data.

Human Freedom Index. Each country received a score on a scale of zero to ten with a low score of 4.48 and a high of 9.04. The values were indexed using a minimum threshold of one and a maximum threshold of ten since these were the scale boundaries, which is equivalent to multiplying the original scores by ten.

Tolerance and inclusion. These scores are already indexed on a 100-point scale, so no modifications were necessary.

Biodiversity and habitat. These scores are already indexed on a 100-point scale, so no modifications were necessary.

Electoral process and pluralism. Each country received a score on a scale of one to ten with a low score of zero and a high of ten. The values were indexed using a minimum threshold of zero and a maximum threshold of ten since these were the scale boundaries, which is equivalent to multiplying the original scores by ten. The resulting standard deviation of the Electoral Process and Pluralism scores (35.47) was almost twice as high as the average of the other metric standard deviations (18.88).

The concern with a higher metric standard deviation is that it will have a greater impact on index scores than a metric with a lower standard deviation since the average difference between country metric scores will be greater. In contrast, when metric country scores are closely bunched, that metric will have little relative influence on the difference in overall index scores among countries and may therefore be underrepresented. To address this potential problem, the OECD (2008) suggests transforming metric scores to a particular standard deviation (p. 72).

The danger with transforming metrics scores with very high or low standard deviations is that one should not expect that the dispersal of values for each variable being measured would be the same. For example, one would expect there to be a higher standard deviation among countries' Electoral Process and Pluralism scores since the extremes are typically greater. Many countries have open elections with all adults possessing the right to vote, run for election, and express political views. Yet, there are also a substantial number of countries that do not extend any of these rights to its citizens. Artificially transforming the metric scores in order to reduce the differences among countries in such situations is inappropriate since it blunts the reality that levels of political freedom vary widely. Similarly, with a metric such as life expectancy at birth that has a standard deviation below average since most countries have an average life expectancy above age 70, it is inappropriate transform country scores to increase the standard deviation. If countries enjoy similar levels of well-being in terms of a particular metric, then their scores should reflect this fact.

The standard deviations among the various components of the Social Progress Index (Stern, Wares, & Orzell, 2015) vary from 8.42 to 26.84, which reflect a far greater range than the Capabilities Index exhibits. Despite this, the Social Progress Index does not standardize variance. The authors note that “some components have a high overall range (such as Water and Sanitation), because some countries score perfectly with no need for improvement, while others struggle to meet these infrastructure needs. Other components, such as Health and Wellness, have a much smaller range, due in part to the great strides the world has made in health since 2004.” (p. 19).

Because the Electoral Process and Pluralism metric scores have the highest variance, I transformed them in order to determine the overall effect of adjusting the standard deviation to the average of the other metrics (i.e., 18.88). The 100-point scale scores were transformed using the following formula with the desired standard deviation being 18.88 and the original standard deviation being 35.47:

$$100\text{-point scale score} \times \frac{\text{desired standard deviation}}{\text{original standard deviation}} + \text{adjustment to achieve original mean}$$

This adjusted the standard deviation from 35.47 to 18.88 and returned the post-transformation mean to a similar level by adding 35. If the transformed values are used instead of the original values that have a higher standard deviation, the impact on the country index scores is minimal; the correlation between Capability Index country scores using non-transformed and transformed scores for this metric is 0.99. This very high correlation is primarily due to the fact the electoral process and pluralism scores represent only one of 20 metrics.

The OECD (2008) also recommends analyzing the correlation among the metrics and the resulting index scores to determine if there are a few metrics that dominate inappropriately the index values for countries. The average correlation between a country's Capability Index score and each of the 20 metrics is 0.70. While the correlation between index scores and the Electoral Process and Pluralism metric scores (0.80) is higher than average, there were four other metrics with higher correlations and all four of them had lower than average standard deviations among their metric scores. As well, there was a slight negative relationship (i.e., a correlation of -0.23) between the standard deviation of a metric's scores and its correlation with country index scores. This suggests

that the concern over metrics with high standard deviations having too great an influence over the Capability Index country scores is unwarranted. Thus, the Electoral Process and Pluralism scores included in the index were not adjusted to change their standard deviation.

International Property Rights Index. Each country received a score on a scale of zero to ten with a low score of 2.5 and a high of 8.3. The values were indexed using a minimum threshold of one and a maximum threshold of ten since these were the scale boundaries, which is equivalent to multiplying the original scores by ten.

Economic participation and opportunity. Each country received a score on a scale of zero to one with a low score of 0.23 and a high of 0.87. Each score was multiplied by 100.

Criminal Justice. Each country received a score on a scale of zero to one with a low score of 0.16 and a high of 0.85. Each score was multiplied by 100.

Worker Rights Index. This measurement ranks worker rights using categorical variables ranging from one to six, with one representing the best protection of worker rights and six representing the least protection. These were normalized by using the min-max method with a minimum threshold of one and a maximum of six. This converted them to scores of 100, 80, 60, 40, 20 and zero respectively. As described above, this method of normalization maintains the coefficient of variation of the original data.

Weighting and Aggregating Metrics

After normalizing the metrics, I then aggregated them in order to compute a single index score for each country. There are typically three ways to achieve component weighting: summing, averaging and multiplying. Summing is appropriate when the resulting aggregate would be on a base-ten scale (e.g., ranging from zero to ten or from

zero to 100). With 20 metrics and nine central capabilities being measured due to the lack of data for the ninth central capability (i.e., play) summing was not appropriate for the Capabilities Index.

Averaging is the most common method for weighting human well-being indices. This has an advantage over summing in that the resulting value remains in the same scale. Some academics have criticized this approach. Sagar & Najam (1998) suggest that index components should be multiplied rather than averaged since this better reflects the contention that each aspect of well-being is non-substitutable. However, this approach would hinder the comparison of the Capabilities Index to other indices since the multiplication of each additional metric lowers the aggregate country score. Thus, indices with a different number of total metrics would not be comparable. Given that almost every human well-being index has a different number of metrics, this is problematic. Moreover, since the aim of this thesis is to determine whether the capabilities approach measures something that is not currently captured by existing human well-being indices, it is most appropriate to aggregate index components in a similar manner. Otherwise, any differences in aggregate country scores using the Capabilities Index may only be due to the aggregation method rather than the actual metrics being measured.

Because Nussbaum posits the capabilities approach as a theoretical endeavor rather than as a basis for creating an index for measuring human well-being, she does not consider how capabilities or their components should be weighted. Though Nussbaum (2011) does recognize that some capabilities “may justly take priority” (p. 45) over others, she does not specify which ones. Similarly, Nussbaum does not mention that any particular components of each capability supersede others. Therefore, I employed two

separate methods for weighting the various metrics: (1) a simple average of all 20 metrics regardless of the capability to which each of them relate; and (2) a weighted average with each capability having an equal weight and each capability's constituent components having an equal weight (Appendix 2). For example, Nussbaum's third capability, bodily integrity, consists of three components: freedom of movement, freedom against violence, and reproductive choice. Freedom of movement and reproductive choice are each measured by one metric, which each receive a capability weight of one-third. In contrast, the two separate metrics used to measure freedom against violence, are weighted at one-sixth each since they together constitute one of three capability components.

The resulting Capabilities Index scores for the 109 countries based on both the average and weighted approaches are reported in Appendix 3.

Main Drivers of Country Scores

After selecting, normalizing, aggregating, and weighting index data in order to generate country scores, the OECD (2008) suggests that the designer of the composite indicator should determine the main drivers of good and poor country performance as measured by the output. The concern is that a few metrics might inappropriately dominate the index values for countries. The OECD recommends "checking for correlation and causation (if possible)" (p. 21). Since there is no statistical method for demonstrating causation, I relied on correlation tests to determine which metrics and capability scores are most highly correlated with each other and with overall country scores.

Analysis of Index Values

Based on the OECD's recommendations, I also assessed the correlation of Capabilities Index score for countries with similar scores from other indices. In order to accomplish this, I used correlation and multiple regression analysis in order to test the following hypotheses:

1. There is a significant difference between purely economic measures of well-being (as represented by gross national income per capita) and indices that purport to capture human well-being using non-economic measures, including the Capabilities Index.
2. There is a difference in the way that the Capabilities Index ranks and quantifies the human well-being of a country's residents when compared to traditional measurements and indices;
3. The Capabilities Index values for countries are a good predictor of variation in country-level subjective well-being scores.

Testing the first hypothesis involved computing correlation matrices that compare normalized GNI per capita scores for each country with the non-economic measures of well-being as represented by the Happy Planet Index, the Human Development Index, the Where-to-be-Born Index, the Social Progress Index, the World Happiness Report Index, the Gallup-Healthways Well-Being rankings, and the Capabilities Index. The normalized GNI per capita scores were taken from the United Nation Development Programme's (2015) Human Development Report.

In order to test the second hypothesis, I relied upon a correlation matrix that compares the Capabilities Index computed using the averaging and weighting approaches

with the aforementioned well-being indices, as well as GNI per capita. Because the World Happiness Report Index and the Gallup-Healthways Well-Being rankings rely on test subjects assessing their own levels of well-being, they were used as proxies for subjective well-being. If the Capabilities Index measures human well-being in a manner that is different from these other existing indices, the correlation of its country-level scores should be significantly different from the country scores of other indices. I generated separate correlation matrices based on the 60 countries with complete data and the 109 countries that have two or less missing data points for both the averaging and weighting approaches. Correlation scores for the relationship between Capabilities Index scores and another index's scores only included countries that each index assessed.

In addition to determining the correlation between the actual scores that each index assigned to countries, I also assessed whether there is a difference between how each index ranks countries. In order to accomplish this, I assigned a ranking to each country based on its Capabilities Index score (i.e., a ranking of one to the country with the highest score and a ranking of two to the country with the second highest score, etc.), as well as the other indices. I then compared them using Spearman's rank order correlation, which provides a correlation coefficient that compares the extent to which two different indices rank the same set of countries. It relies on the following formula:

$$1 - \frac{6 \sum d_i^2}{n(n^2-1)}$$

The computation involves summing the squared differences between each country's ranking under the two different indices, multiplying the result by six, and then dividing this product by the square of the number of countries compared minus one multiplied by

the number of countries compared. The result was then subtracted from one to provide a correlation between the two sets of rankings that can be interpreted in a similar manner to a Pearson correlation coefficient that compares values. The correlations only compare country ranks where both indices have provided a country score. Once again, the hypothesis being tested is that there is a difference in the way that the Capabilities Index ranks countries in terms of well-being compared to other indices. After all, there is no need for an additional index if it merely provides redundant results.

I also tested the hypothesis that the Capabilities Index values for countries are a good predictor of variation in country-level subjective well-being scores. While an index that purports to measure human well-being should be connected to how people in each country evaluate their own well-being, this should not be overstated. After all, if subjective assessments of well-being were perfect indicators of actual well-being, then there would be no need for objective indices. As discussed in the last chapter, subjective well-being assessments can be problematic. Despite these shortcomings, one should still expect some positive relationship between variation in a suitable well-being index and how people evaluate their lives. In order to determine the extent to which variation in the numerous well-being indices explain variation in subjective well-being, I computed a correlation matrix in order to determine the extent to which the Capabilities Index country scores have a linear relationship with subjective well-being scores, as represented by the World Happiness Report Index country scores and the Gallup-Healthways country Well-Being rankings. I also conducted a step-wise multiple regression analysis with various index values for each country as the independent variables and country values of subjective well-being as the dependent variable. I also conducted separate multiple

regression analyses in order to determine which Capabilities Index metrics and capabilities explain variation in the subjective measurement of well-being. Because regression analysis requires complete data, only countries with no missing values were included in this part of the analysis.

In addition, because initial results demonstrated a strong correlation between Capabilities Index scores and Social Progress Index scores, I generated an additional correlation matrix comparing Capabilities Index metrics and Social Progress Index scores in order to determine if some factors that the Capabilities Index measures are absent from the Social Progress Index. Presumably metrics that have a low correlation with Social Progress Index scores might capture aspects of well-being that the Social Progress Index does not.

Chapter III

Results

The OECD (2008) recommends checking for correlation among the various metrics used to create a well-being index in order “to identify if the composite indicator results are overly dominated by few indicators and to explain the relative importance of the sub-components of the composite indicator” (p. 21). Of the nine capabilities that were quantified and aggregated to provide country-level Capabilities Index scores, three had a higher correlation than most (#3 - Bodily Integrity, #6 – Practical Reason, and #10 – Control Over One’s Environment) and one had a relatively lower correlation (#8 – Other Species):

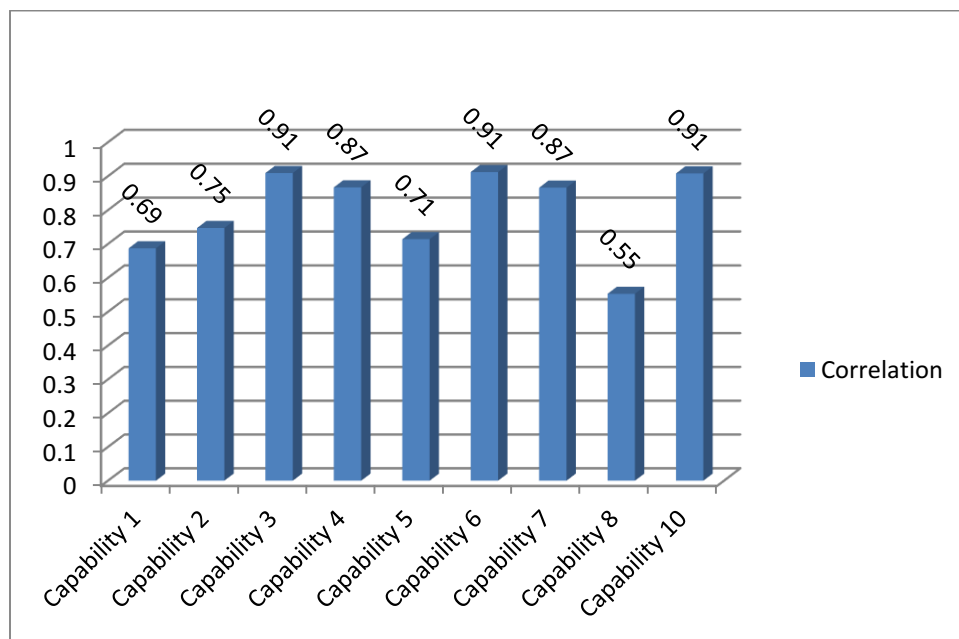


Figure 1. Correlation between each capability and Capabilities Index scores.

The three capabilities that correlated most highly with the aggregated country scores each consisted of an average of multiple factors (i.e., domestic and foreign freedom of movement, peace, and reproductive risk for Capability 3; a wide range of freedoms for Capability 6; and an aggregation of five disparate data sources for Capability 10). These different factors tended to moderate the scores for these three capabilities in a similar manner to how overall aggregation moderates country scores. The lower correlation of Capability 8 reflects that biodiversity and habitat scores for each country tended to be less correlated with most other metrics. Otherwise, the remaining capability values have fairly similar correlations with the country scores, which ranged from 0.69 to 0.87. Thus, no indicator or indicators overly dominate the Capabilities Index.

Hypothesis 1 – Economic vs. Non-Economic Measures of Well-Being

In order to test the hypothesis that there is a significant difference between purely economic measures of well-being and indices that purport to capture human well-being using non-economic measures, I computed the following Pearson's correlations among GNI per capita and the various indices for the 60 countries with complete data and the 109 countries with either complete data or only one or two missing capabilities metric scores:

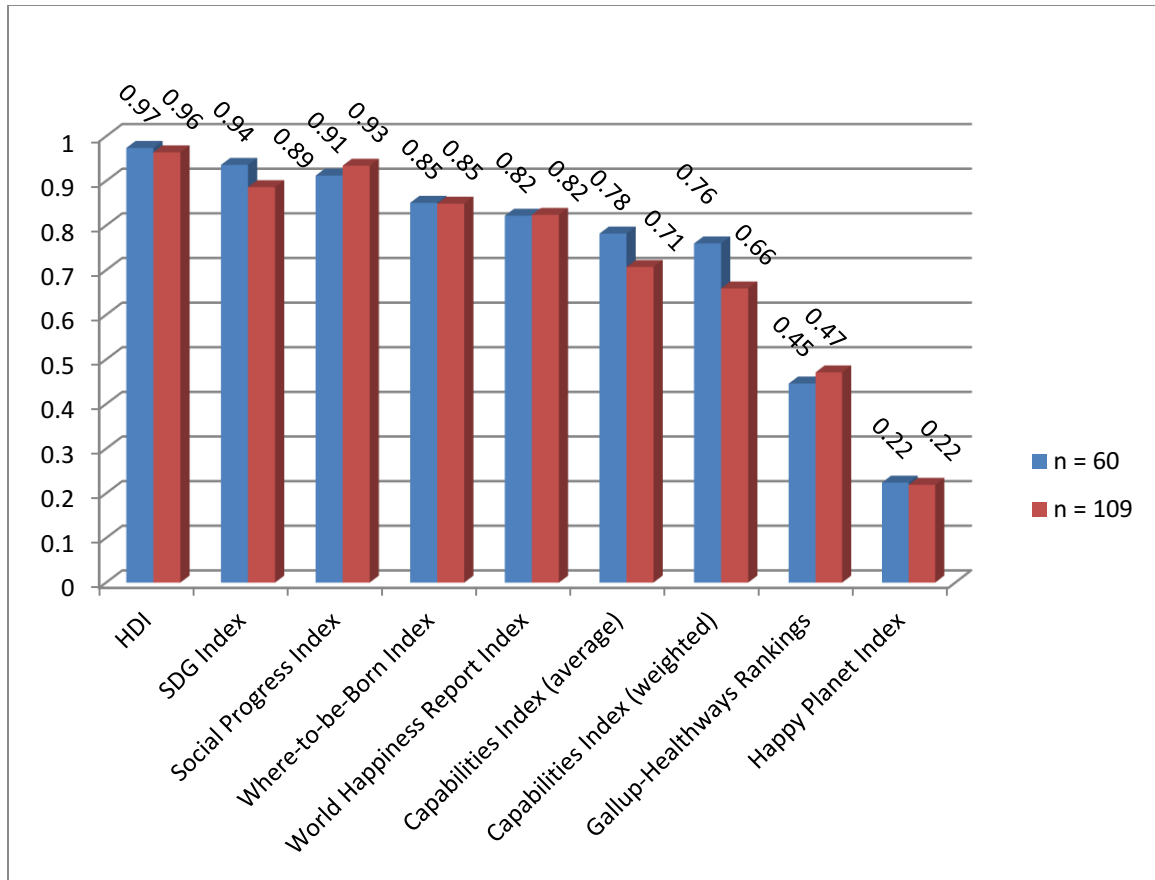


Figure 2. Correlation between normalized GNI per capita and well-being indices.

The correlation matrices for 60 countries and 109 countries respectively (Appendix 4) are so similar (i.e., their matrix values have a correlation of 0.99) that my subsequent statistical analysis only relies upon the latter data for the 109 countries. In addition, I computed Spearman's rank correlations for GNI per capita and the various indices for the 109 countries (Figure 3). I also created a list of the countries with the greatest difference in Capabilities Index scores compared to GNI per capita as a basis for determining what accounts for a difference between the two measures (Table 1). The Capabilities Index scores for the first eight countries are lower relative to their normalized GNI per capita scores primarily due to lower scores relating to individual

liberties, including a lack of political and material control over one's environment, limited freedom of association, and little tolerance of diversity.

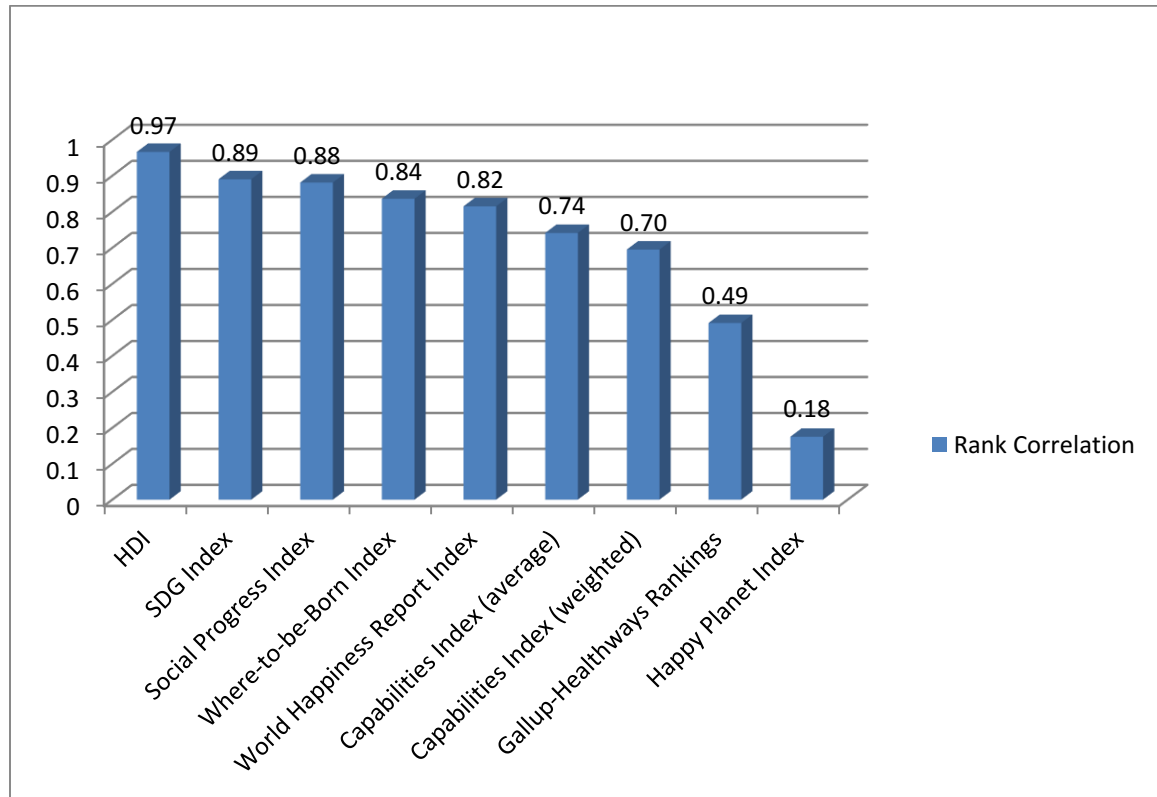


Figure 3. Rank correlation between normalized GNI per capita and well-being indices.

Table 1. Countries with the greatest difference in Capabilities Index scores and GNI per capita.

Country Name	Capabilities Index Score	GNI per capita (100-point scale)	Difference
Saudi Arabia	50.41	94.7	-44.29
United Arab Emirates	58.64	96.8	-38.16
Singapore	65.17	100	-34.83
Kuwait	69.66	100	-30.34
Iran	47.85	76.1	-28.25
Kazakhstan	55.48	80.7	-25.22
China	48.52	73.0	-24.48
Angola	43.50	63.8	-23.23
Burundi	51.28	30.6	20.68
Benin	65.14	43.4	21.74

Senegal	69.04	46.6	22.44
Madagascar	63.70	39.1	24.60
Mozambique	62.27	36.5	25.77

Higher levels of such freedoms also account for the higher Capabilities Index scores that Madagascar and Mozambique received despite their low GNI per capita. However, GNI per capita has a much higher correlation with the proxies for subjective well-being than the Capabilities Index scores do for this set of countries (Table 2). In contrast, this relationship changes when one analyses the countries with the highest GNI per capita (Table 3).

Table 2. Correlation matrix comparing Capabilities Index scores, GNI per capita, and subjective well-being for selected countries.

	Capabilities Index Score	GNI per capita	World Happiness Report Index	Gallup-Healthways Ranking Scores
Capabilities Index	1			
GNI per capita	-0.05	1		
World Happiness Report Index	0.14	0.96	1	
Gallup-Healthways Ranking Scores	-0.004	0.79	0.80	1

Table 3.
Comparison of Capabilities Index and subjective well-being scores for countries with the highest GNI per capita.

Country Name	GNI per capita	Capabilities Index Score	World Happiness Report Index	Gallup Healthways Ranking Scores
Kuwait	1.000	69.66	6.239	23.5
Singapore	1.000	65.17	6.739	12.7

Norway	0.978	88.44	7.498	32.0
United Arab Emirates	0.968	58.64	6.573	30.8
Switzerland	0.957	89.90	7.509	39.4
Saudi Arabia	0.947	50.41	6.379	28.5
United States	0.947	82.75	7.104	30.5
Sweden	0.925	88.10	7.291	29.1
Netherlands	0.924	89.50	7.339	31.9
Denmark	0.920	89.87	7.526	37.0

A correlation matrix that compares GNI per capita, Capabilities Index scores, and the two measures of subjective well-being for the ten wealthiest countries (Table 4) indicates that the Capabilities Index scores account for differences in subjective well-being that GNI per capita does not:

Table 4. Correlation matrix comparing Capabilities Index scores, GNI per capita, and subjective well-being for countries with highest GNI per capita.

	Capabilities Index Score	GNI per capita	World Happiness Report Index	Gallup-Healthways Ranking Scores
Capabilities Index	1			
GNI per capita	-0.46	1		
World Happiness Report Index	0.90	-0.55	1	
Gallup-Healthways Ranking Scores	0.53	-0.64	0.61	1

Hypothesis 2 – Capabilities Index vs. Other Measures of Well-Being

To determine whether or not the Capabilities Index quantifies and ranks human development progress differently from the other existing indices, I computed a correlation matrix that compares country scores and rankings using both the Capabilities Index average method that gives equal weight to all 20 metrics and the Capabilities Index weighted method that gives equal weight to each of the 10 capabilities, which are each comprised of different numbers of metrics.

The correlation between Capabilities Index country scores and those that other indices publish range from a low correlation of 0.25 to a high of 0.88. Rank correlations are similar to these correlation coefficients and range from 0.28 to 0.89:

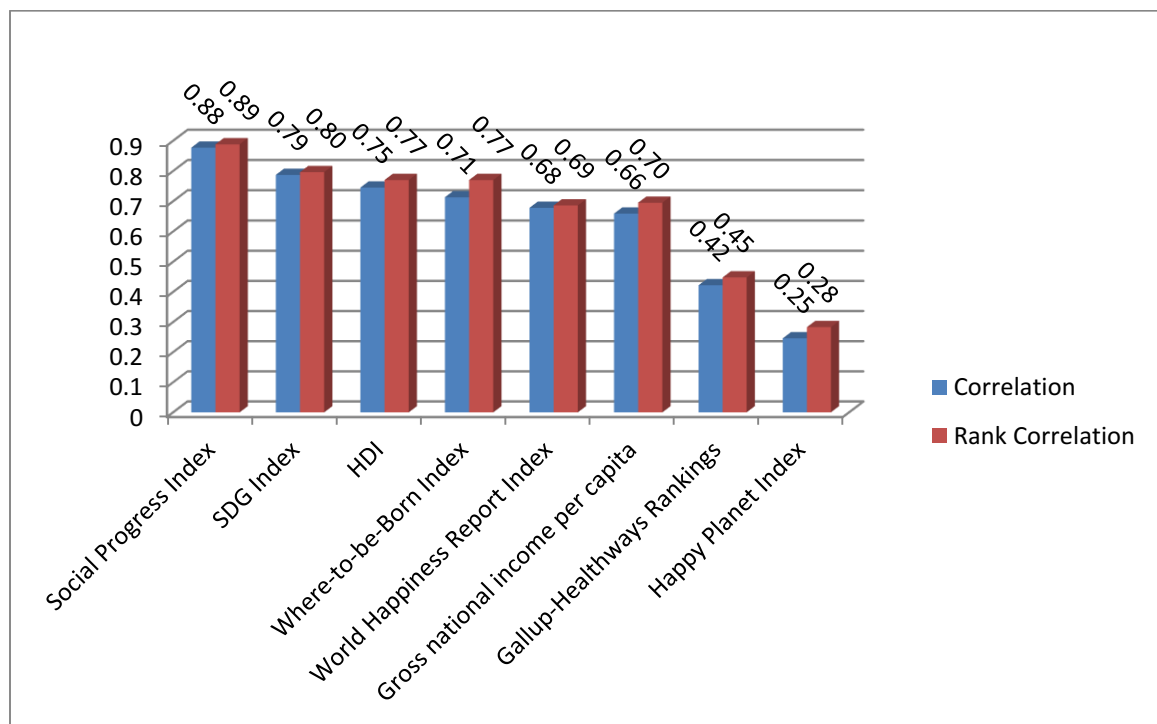


Figure 4. Correlation between Capabilities Index and other well-being indices

Hypothesis 3 – The Capabilities Index as a Predictor of Subjective Well-Being

The third hypothesis tested was that Capabilities Index values for countries are a good predictor of variation in country-level subjective well-being scores. World Happiness Report Index scores and Gallup-Healthways Well-Being rankings, which both purport to measure subjective well-being through a series of survey questions, were used as a proxy for subjective well-being. The correlation between World Happiness Report Index and Gallup-Healthways country-level subjective well-being scores is 0.73. For country rankings, the correlation is 0.74.

The correlation among the various indices scores that purport to measure human well-being and these two measures of subjective well-being are reported in Figure 5 while the country rank correlations are reported in Figure 6:

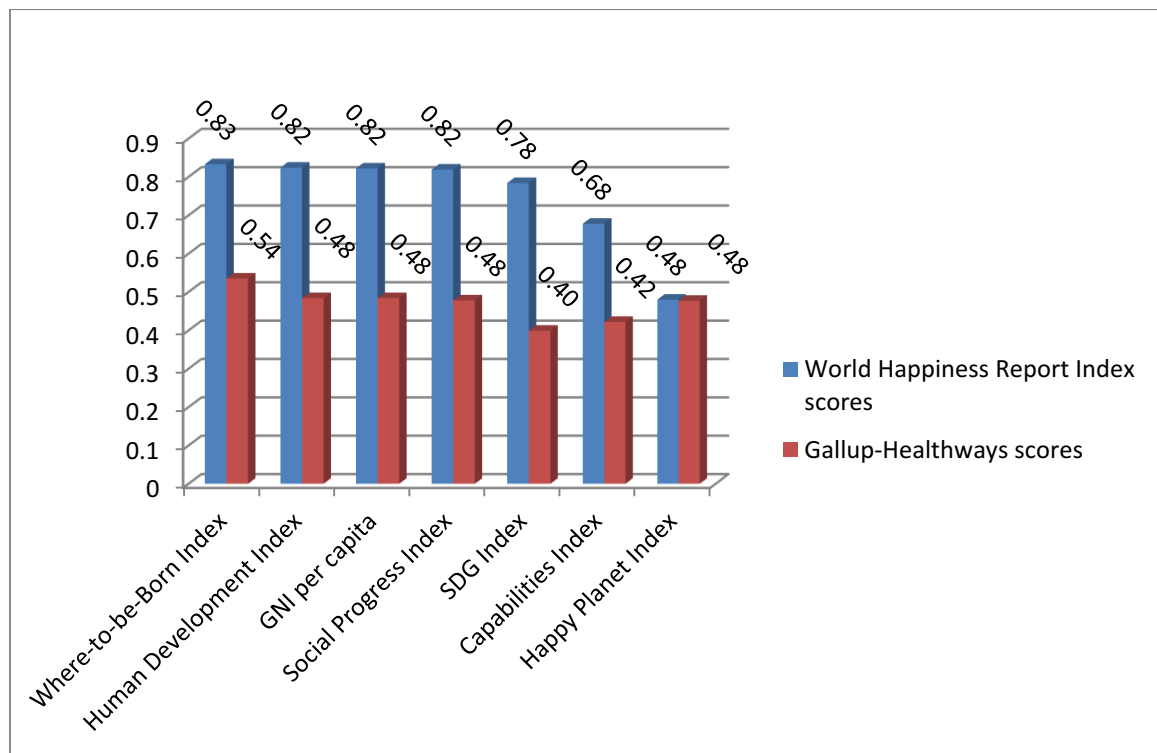


Figure 5. Correlation between well-being indices scores and subjective well-being.

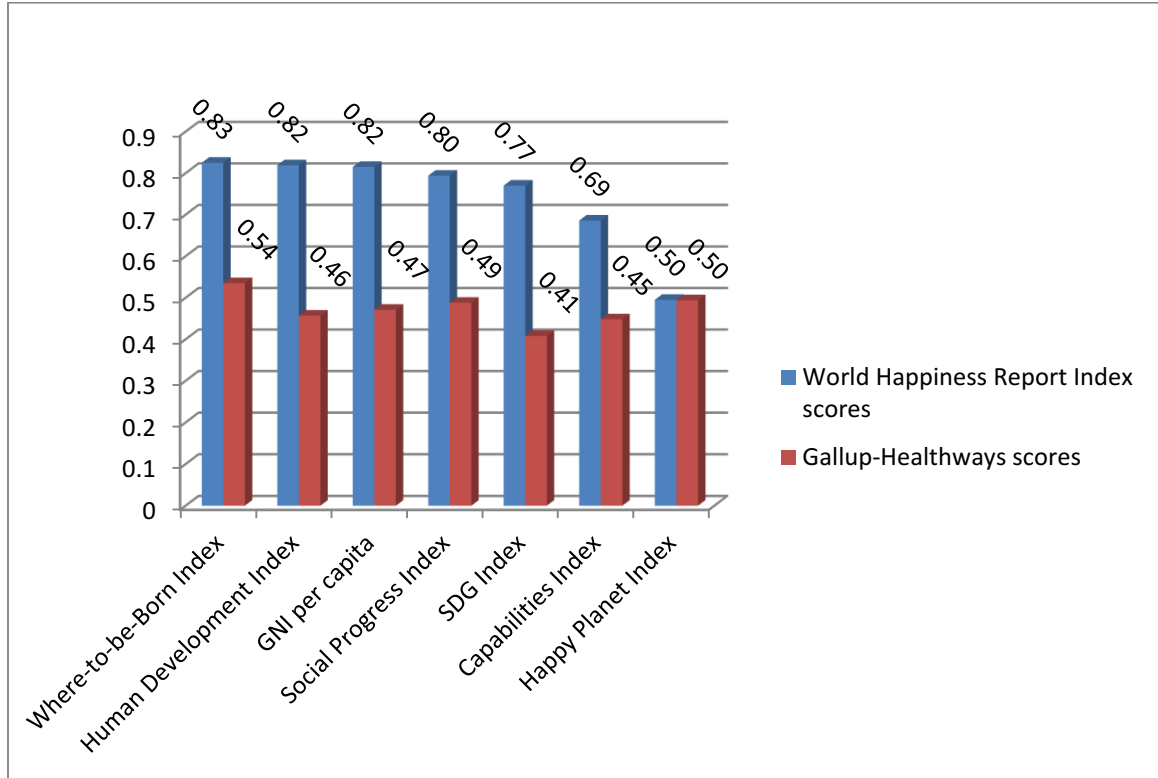


Figure 6. Rank correlation between well-being indices scores and subjective well-being

In addition, I conducted two step-wise multiple regression analyses with the various country index values as independent variables in order to determine the relationship between how the variance in and interaction of these numerous variables explain changes in measures of subjective well-being. For the first regression, the World Happiness Report Index values were used as the dependent variable; for the second one, Gallup-Healthways Well-Being country values were used.

The following is a summary of the regression results from the first analysis using backward elimination with an alpha to remove of 0.05, which indicate that the Happy Planet Index, GNI per capita, and the Where-to-be-Born index explain about third-quarters of the variation in World Happiness Report Index country scores:

Table 5. Well-being indices regression with World Happiness Report Index as dependent variable.

Adjusted R-Squared:	75.71%	
Regression P-Value:	0.000	
Significant Independent Variables	Beta Coefficient	P-Value
Constant	-1.054	0.096 (not significant at p < 0.05)
Happy Planet Index	0.0413	0.001
Gross national income per capita	3.96	0.005
Where-to-be-Born Index	0.421	0.014

The following is a summary of the regression results from the second analysis using backward elimination with an alpha to remove of 0.05, which indicate that the Capabilities Index (averaging method) and the Happy Planet Index explain almost half the variation in Gallup-Healthways Ranking country scores:

Table 6. Well-being indices regression with Gallup-Healthways Ranking scores as dependent variable.

dependent variable:

Adjusted R-Squared:	42.03%	
Regression P-Value:	0.000	
Significant Independent Variables	Beta Coefficient	P-Value
Constant	-26.57	0.004
Capabilities Index (Average)	0.380	0.000
Happy Planet Index	0.710	0.000

If the average version of the Capabilities Index is removed as a potential independent variable, then stepwise regression results in the weighted version of the Capabilities Index replacing it with an adjusted r-squared of 40.68% and the weighted Capabilities Index having a beta coefficient of 0.372 and a p-value of 0.001. The Happy Planet Index remains in the regression equation though its beta coefficient changes to 0.682.

In order to determine which specific metrics and capabilities from the Capabilities Index best explain variance in the two different measures of subjective well-being, I also conducted step-wise multiple regression analyses respectively using the metrics and capabilities as independent variables. The results of the regression analysis using the 20 metrics as independent variables and the World Happiness Report Index and the Gallup-Healthways ranking scores respectively as the dependent variable, which indicate that life expectancy, shelter, peace, tolerance/inclusion, and property rights are the metrics that best predict subjective well-being scores, are:

Table 7. Metrics regression with World Happiness Report Index as dependent variable.

Adjusted R-Squared:	78.54%	
Regression P-Value:	0.000	
Significant Independent Variables	Beta Coefficient	P-Value
Constant	2.278	0.000
Life Expectancy	0.022	0.015
Shelter	0.026	0.001
Peace	0.016	0.016

Table 8. Metrics regression with Gallup-Healthways Ranking scores as dependent variable.

Adjusted R-Squared:	54.91%	
Regression P-Value:	0.000	
Significant Independent Variables	Beta Coefficient	P-Value
Constant	-16.21	0.003
Life Expectancy	0.431	0.000
Tolerance/Inclusion	0.302	0.000
Property Rights	0.333	0.040
Criminal Justice	-0.562	0.000

The results of the regression analysis using the capabilities instead of the metrics as independent variables and the World Happiness Report Index and the Gallup-Healthways ranking scores respectively as the dependent variable, which indicate that the first, second, fifth, sixth, and seventh capabilities explain about three-quarters of the variation in World Happiness Report Index country scores, are:

Table 9. Capabilities regression with World Happiness Report Index as dependent variable.

Adjusted R-Squared:	76.52%	
Regression P-Value:	0.000	
Significant Independent Variables	Beta Coefficient	P-Value
Constant	2.612	0.002
Capability 1 – Life	0.027	0.024
Capability 2 – Bodily Health	0.025	0.005
Capability 5 – Emotions 60	-1.744	0.027
80	-2.131	0.027
Capability 6 – Practical Reason	-0.042	0.007
Capability 7 – Affiliation	0.063	0.000

Note that Capability 5 is a categorical variable based on the level of freedom of association in a given country. Countries received scores of zero, 20, 40, 60, 80, or 100. Only scores of 60 and 80 were significant compared to the base value of 100.

The regression results using the Gallup-Healthways Ranking scores as the dependent variable indicate that the first and the seventh capabilities are significant, although they only explain about one-quarter of the variation in these subjective well-being scores:

Table 10. Capabilities regression with Gallup-Healthways Ranking scores as dependent variable.

Adjusted R-Squared:	27.84%	
Regression P-Value:	0.000	
Significant Independent Variables	Beta Coefficient	P-Value
Constant	-14.35	0.049
Capability 1 – Life	0.315	0.002
Capability 7 – Affiliation	0.187	0.038

Hypothesis 4 – Differences between the Capabilities Index and the Social Progress Index

Given that there is a high correlation (0.88) between Capabilities Index and Social Progress Index scores for countries, I also conducted a correlation analysis among the 20 metrics that comprise the Capabilities Index scores and Social Progress Index scores in order to determine which metrics may not be represented in Social Progress Index scores. Presumably, these would be metrics that have less than a 0.5 correlation with Social Progress Index scores, which are as follows:

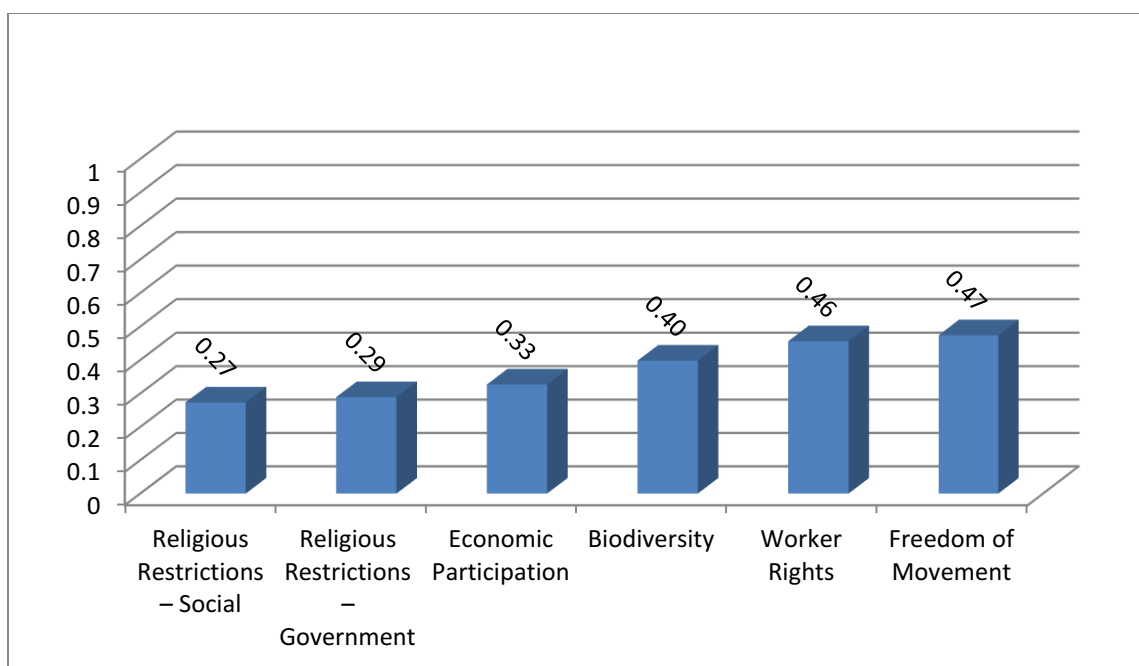


Figure 7. Capabilities Index metrics with low correlation to Social Progress Index scores

In addition, I also created a list of the countries with the greatest difference in Capabilities Index scores compared to Social Progress Index scores as a basis for determining what accounts for a difference between the two indices:

Table 11. Countries with the greatest difference in Capabilities Index scores and Social Progress Index scores.

Country Name	Capabilities Index Score	Social Progress Index Score	Difference
Madagascar	63.70	44.50	19.20
Chad	51.25	33.17	18.08
Cambodia	64.06	47.42	16.64
Mozambique	62.27	46.02	16.25
Benin	65.14	50.04	15.10
Mali	60.40	46.51	13.89
Ghana	71.40	58.29	13.11
Saudi Arabia	50.41	64.27	-13.86
United Arab Emirates	58.64	72.79	-14.15
China	48.52	68.85	-20.33

To compare the extent to which the Capabilities Index and Social Progress Index scores for these countries account for differences in subjective well-being scores, I generated a correlation matrix that indicates that the Social Progress Index is better correlated with World Happiness Report Index and Gallup-Healthways Ranking scores:

Table 12. Correlation matrix comparing Capabilities Index and Social Progress Index scores with subjective well-being for selected countries.

	Capabilities Index Score	Social Progress Index Score	World Happiness Report Index	Gallup-Healthways Ranking
Capabilities Index	1			
Social Progress Index Score	-0.205	1		
World Happiness Report Index	-0.515	0.884	1	
Gallup-Healthways Ranking	-0.427	0.693	0.891	1

Chapter IV

Discussion

The first hypothesis that I tested was that there is a significant difference between gross national income (GNI) per capita and indices that purport to capture human well-being using non-economic measures, including the Capabilities Index. The method of analysis for determining the relationship between country-level GNI per capita and various different index country scores was Pearson's correlation. For country rankings, the primary method of analysis was Spearman's rank correlation.

There is no universally accepted standard for what constitutes a strong correlation between two variables. One oft-cited source is Cohen (1988) who suggested that positive or negative correlations with an absolute value of 0.50 be considered strong. Others (see, for example, Taylor (1990) and Saha & Paul (2010)) consider values around 0.7 to represent a high correlation and that slightly lower correlation should be viewed as moderate. However, as Weinburg & Abramowitz (2015) state, the interpretation of correlation coefficients depends on the circumstances. In instances where no correlation between variables is anticipated, a correlation of 0.50 would be noteworthy. However, if variables are likely to be correlated to some degree, even higher correlation coefficients might not be remarkable.

With respect to the relationship between the various measurements of human well-being, one would expect that many of the variables that indices assess would be positively correlated. For example, life expectancy, access to health care, and the output of a country's economy are all likely to be interrelated since greater access to health care

has a positive impact on life expectancy and health care facilities cost significant money. However, if human well-being indices are almost perfectly correlated with economic measures, then it is unlikely that they measure aspects of well-being that economic measures already capture.

Comparing Economic and Non-Economic Measures of Well-Being

The advent of various human well-being indices was a response to criticisms of traditional economic measures being used to measure social development. Accordingly, one might expect that purely economic measures, such as a country's GNI per capita, would not be strongly correlated with well-being index country scores. However, this is not the case. Despite the extensive criticisms that academics have articulated concerning the use of economic data for measuring well-being, which I discussed in Chapter I, the correlation between countries' GNI per capita and country scores from well-being indices is remarkably high. Based on my analysis of data for 109 countries, the Capabilities Index (using the average method), the Human Development Index ("HDI"), the Where-to-be-Born index, the Social Progress Index, the SDG Index, and the World Happiness Report Index country scores all bear a correlation to country-level GNI per capita of at least 0.7.

Surprisingly, it is the HDI, the result of an initiative to provide an alternative to economic measures of well-being based on Sen's criticisms, which is most highly correlated with GNI per capita (0.97). The metrics that the HDI incorporates accounts for this very high correlation. The HDI only measures life expectancy, years of schooling, and GNI per capita itself. Thus, a third of a country's HDI score is perfectly correlated

with GNI per capita while the other two metrics are very highly correlated with the economic measure. This does not imply that the HDI has no separate purpose or usefulness. Part of the aim of the HDI was to consider and draw attention to factors other than economic output that impact well-being, particularly education and life expectancy. After all, GNI per capita may be correlated with how much wealth a country may be able to allocate to initiatives such as health care services or shelter, but it does not provide any information about what specific types of expenditures better enhance well-being. Thus, there is a valid policy reason to consider a spectrum of non-economic factors even if they do not appreciably impact the overall scores that we attribute to a country's development progress.

Even indices that include a wider range of metrics are strongly correlated with GNI per capita. The SDG Index, the Social Progress Index, and Capabilities Index (average method) scores, which incorporate 63, 52, and 20 separate metrics respectively, have correlations of 0.89, 0.88, and 0.71 with GNI per capita. Again, this reflects the fact that many of the factors that impact human well-being are costly and require a country to have sufficient wealth in order to provide them.

There were several indices that were not as highly correlated with GNI per capita: the Capabilities Index (weighted method) (0.66), the Gallup-Healthways Well-Being Rankings (0.47), and the Happy Planet Index (0.22). As discussed below, the Happy Planet Index has a low to moderate correlation with all the other indices, including those that purport to measure subjective well-being. It computes country scores by multiplying inequality-adjusted subjective well-being and inequality-adjusted life expectancy scores and then dividing them by the ecological footprint per capita. It is this last factor that

differentiates Happy Planet Index scores from other measures of well-being since countries with higher emissions tend to enjoy greater prosperity and levels of self-assessed life satisfaction. Because the ecological footprint per capita is positively correlated with inequality-adjusted life expectancies (0.66) and inequality-adjusted subjective well-being (0.66), its use as a divisor in the Happy Planet Index formula accounts for why it is an anomaly compared to the other indices.

One could contend that the Happy Planet Index captures something other than human well-being given its strong emphasis on carbon footprints. However, it arguably measures the sustainability of current levels of well-being due to the fact that a country's well-being gains may have been realized at a significant environmental cost. In such situations, these high levels of well-being may be difficult for a country to maintain in the future. However, this is complicated by the fact that developing countries with relatively lower levels of well-being are more likely to bear the climate change costs of developed countries' larger ecological footprints (Samson, Berteaux, McGill, & Humphries, 2011). Thus, the Happy Planet Index may measure the environmental efficiency of well-being gains, which is important to assess, but this is something distinct from a pure measure of human well-being.

The Gallup-Healthways Well-Being Rankings (2014), which have a moderate correlation with GNI per capita figures of 0.47 (and a rank correlation of 0.49), are based on interviews that measure subjective well-being in five categories: purpose in life, social support, financial security, community affiliation, and physical health. Because these aspects of well-being emphasize factors that are not necessarily tied to wealth, such as strong personal relationships, liking what one does each day, and enjoying one's

community, per capita income does not account for a substantial portion of what the Gallup-Healthways Well-Being Rankings capture.

Though the average and weighted methods of calculating the Capabilities Index both had a lower correlation with GNI per capita than most of the other indices (0.71 and 0.66), they were still fairly strong. The two computation methods were also similar with respect to their rank correlation with GNI per capita (0.74 and 0.70 respectively).

Overall, the correlation between the average and weighted approaches to calculating Capabilities Index scores for each country result in very similar outcomes. The correlation between average and weighted scores is 0.98 and the correlation between the rankings of the countries under each approach is 0.98. This suggests that the choice of which of these two methods to use for weighting and aggregating the metrics is not consequential. Therefore, the remainder of the discussion focuses on the weighted approach since it gives each of Nussbaum's ten central capabilities equal weight.

The results from the comparison of human well-being indices and GNI per capita indicate that a measure of a country's economic output does provide an indication of the level of well-being that its residents enjoy. Wealth provides a means for acquiring the resources necessary for living a satisfying life. However, a country's high level of wealth does not guarantee greater well-being for its residents. Of the ten countries with the highest normalized GNI per capita (Table 3), four countries rank substantially lower than the others in the two indices that measure subjective well-being: Kuwait, Singapore, the United Arab Emirates, and Saudi Arabia. Of the 109 countries evaluated, these countries had the first, second, fourth, and sixth highest GNI per capita. Yet, the subjective well-being scores for these countries do not reflect this. The four countries have an average

World Happiness Report Index ranking of 27 compared to six for the remaining countries in the top ten and a Gallup-Healthways ranking of 38 compared to 11 for the others. This suggests that there is something that GNI per capita does not capture that impacts subjective well-being for certain countries.

In contrast, the Capabilities Index scores for these ten wealthy countries do account for the differences among them in subjective well-being measurements. Whereas GNI per capita figures for these countries are negatively correlated with both the World Happiness Report Index (-0.55) and the Gallup-Healthways Well-Being Ranking scores (-0.64), the Capabilities Index scores for the top ten are positively correlated with both (0.90 and 0.53). The reason for the difference is that the Capabilities Index assigns relatively low scores to these four countries for the metrics related to individual liberties, political participation, and tolerance of diversity.

The extent to which countries recognize political and civil freedoms accounts for much of the difference between Capabilities Index and GNI per capita country rankings. Of the eight countries that have a Capabilities Index score more than 20 points lower than normalized GNI per capita on a 100-point scale (Table 1), all of them have questionable records on extending individual liberties: Saudi Arabia, the United Arab Emirates, Singapore, Kuwait, Iran, Kazakhstan, China, and Angola. The Capabilities Index rated five countries more than 20 points above their normalized GNI per capita scores: Burundi, Benin, Senegal, Madagascar, and Mozambique. While these countries do face issues concerning human rights violations, relative to their economic output, they are ranked higher in recognizing individual liberties, particularly freedom of association.

To what extent do the civil and political liberties that Nussbaum emphasizes in her capabilities approach contribute to human well-being? While they appear to account for the differences in subjective well-being among the countries with the highest rates of GNI per capita, it is unlikely that they impact well-being anywhere near as much as wealth does. When one analyzes the countries noted above with Capabilities Index scores and normalized GNI per capita scores that differ by more than 20 points (Table 2), the GNI per capita scores are much more highly correlated with World Happiness Report Index scores (0.96) and Gallup-Healthways Well-Being Ranking scores (0.79) for those countries than the Capabilities Index scores are (0.14 and -0.004 respectively). There are two potential explanations for these results. It may be that national wealth impacts the aspects of life that matter most to people and is the most important means to achieving human well-being. Alternatively, as discussed in Chapter I, it is likely that a person's self-assessment of his or her subjective well-being is subject to biases. It may be that those who have never experienced high levels of civil and political freedom, and are unlikely to in the future, may adapt to and accept their circumstances and evaluate their well-being with this in mind.

Even if economic data do constitute a fairly accurate account of human well-being distinctions among countries, their usefulness as a policy and evaluation tool are limited. They do not identify the drivers of well-being that could be used to determine how scarce monetary resources should be allocated among potential opportunities to increase human well-being. This requires a model, such as the Capabilities Index, that considers numerous metrics and their relationship with human flourishing. Yet, for the Capabilities Index to be of use, it should capture aspects of well-being that existing indices do not.

Otherwise, it is redundant and does not add anything to the discourse on measuring human well-being.

The Capabilities Index Compared to Existing Measures of Well-Being

The second hypothesis that I tested was that there is a significant difference in the way that the Capabilities Index ranks and quantifies a country's human well-being level when compared to traditional measurements and indices. If two indices measure country well-being in a comparable fashion, one would expect that each country would have similarly scaled scores and that country score rankings among indices would be similar.

The correlation between Capabilities Index country scores and those that other indices publish (Figure 4) range from a low correlation of 0.25 to a high of 0.88. Rank correlations are very similar to these correlation coefficients and range from 0.28 to 0.89. Assuming that two indices are highly correlated if they have a correlation of 0.7 or higher, the Capabilities Index is highly correlated with the HDI (0.75), the Where-to-be-Born Index (0.71), the Social Progress Index (0.88), and the SDG Index (0.83). There is a moderate correlation between the Capabilities Index and both GNI per capita (0.66) and the World Happiness Report Index (0.68); there is a low correlation between Capabilities Index scores and Gallup-Healthways Well-Being Rankings (0.42); and there is little correlation between the Capabilities Index and the Happy Planet Index (0.25).

Thus, purely on the basis of correlation analysis, the Capabilities Index appears to quantify the well-being of countries' residents similarly to several indices, including the much simpler HDI that only measures life expectancy at birth, expected years of schooling, mean years of schooling, and GNI per capita. The Capabilities Index, the

Where-to-be-Born Index, the Social Progress Index, and the SDG Index include additional metrics, though they result in similarly high correlations among country scores and rankings.

While the differences between the Capabilities Index and these other highly correlated indices may be a result of different data sources and methods, less than perfect correlations could also reflect that the Capabilities Index does measure aspects of human well-being that are unique. Even if this is not the case, the existence of a significant correlation between the Capabilities Index and other indices does not entail that they are capturing the same phenomena that impact well-being. It may be that different factors that influence well-being tend to be highly correlated though each may still need to be assessed individually to ensure it is not being neglected. For example, although the violation of political freedoms may be more prevalent in countries with less economic output, simply measuring this output will not identify lack of political freedom as a concern that adversely impacts human well-being. This possibility is discussed below in connection with the comparison between the Capabilities Index and the index to which it is most similar, the Social Progress Index.

Apart from the Social Progress Index, the Capabilities Index is most highly correlated with the SDG Index. Though it has a human well-being component, the SDG Index (2016) is intended to measure country progress towards achieving 17 sustainable development goals. Thus, it purports to measure all three pillars of sustainability rather than just the social one. It characterizes the social dimension of sustainability as achieving social inclusion rather than human flourishing. Thus, it places greater emphasis on gender and income equality.

The architects of the sustainable development goals are incredibly ambitious given that they intend to measure progress towards the 17 goals by setting 169 targets and using 231 indicators, 63 of which are incorporated into the SDG index. While such a comprehensive endeavor is laudable, it has been criticized as being too broad to the point of being unwieldy (Economist, 2015). Despite the fact that the SDG Index includes so many metrics compared to other indices, it remains very highly correlated with GNI per capita (0.89), as well as the HDI (0.95), which only consists of a handful of metrics.

Notwithstanding that the SDG Index has so many indicators, notably absent from the list are the individual freedoms that Nussbaum emphasizes in her approach. Thus, the SDG Index gives higher scores to countries with a record of human rights abuses, including China, Iran, and Belarus than the Capabilities Index does. The countries that the Capabilities Index scores substantially higher than the SDG Index (i.e., Benin, Burkina Faso, Madagascar, Senegal, and Zambia) impose fewer restrictions on religious freedom, freedom of association, and freedom of the press when compared to countries at a similar level of economic development.

Moore (2015) suggests that the SDG Index approach merely sets a long list of goals without addressing the necessary task of challenging the underlying framework that emphasizes development instead of prosperity. Instead, echoing Nussbaum, she recommends that a plan for social improvement involve facilitating human flourishing, which Moore believes must involve “inclusive political institutions” and “civil liberties” (p. 803). These aspects differentiate the Capabilities Index from the SDG Index, and as discussed below, also explain differences between the Capabilities Index and the Social Progress Index.

Relationship to Subjective Well-Being

The third hypothesis that I tested was that, when compared to other indices, Capabilities Index values for countries are a good predictor of variation in country-level subjective well-being scores. However, there is no general agreement on the proper way to measure subjective well-being. Two extensive surveys that purport to measure well-being at the country level are the World Happiness Report Index and the Gallup-Healthways Well-Being Rankings. The two are highly correlated (0.73 in terms of country scores and 0.74 for country rankings); however, because both indices use different survey questions and methods to measure the phenomenon, there are considerable differences with respect to certain countries. For example, the World Happiness Report Index ranks Singapore as the 19th best country for well-being while the Gallup-Healthways Well-Being Rankings rank the country 76th. In contrast, the Gallup-Healthways Well-Being Rankings rank Myanmar 16th overall for well-being while the World Happiness Report Index ranks the country 87th.

The World Happiness Report (Helliwell, Layard, & Sachs, 2016) assesses the well-being of each country's residents by using what is known as a Cantril ladder. The surveyor asks each person being assessed to rate his or her life on a scale from zero to ten with zero representing the worst possible life and ten representing the best possible life (p. 3). In contrast, the Gallup-Healthways Country Well-Being Rankings (2014) are based on interview answers to ten questions on a five-point Likert scale with zero representing a strong disagreement with a statement and five representing a strong agreement. The questions profess to measure subjective well-being in five categories: "purpose: liking what you do each day and being motivated to achieve your goals; social:

having supportive relationships and love in your life; financial: managing your economic life to reduce stress and increase security; community: liking where you live, feeling safe and having pride in your community; and physical: having good health and enough energy to get things done daily” (p. 8). A country’s score is the percentage of its residents surveyed that indicated that they were thriving in at least three of the five categories. It is not clear from the report what Likert scale score is considered to constitute thriving. Considering these very dissimilar methodologies, the high correlation of the country scores under each subjective well-being measure is noteworthy.

It is arguably desirable to have an index’s country well-being scores bear some relation to subjective well-being. Certainly, if an index’s methodology results in a country receiving a score that represents very high well-being, but the residents of that country subjectively feel that their lives are miserable, the index’s viability as a tool for improving human well-being is questionable. For example, the Happy Planet Index, which is the index analyzed with the lowest correlation with World Happiness Report Index scores and the second-lowest correlation with Gallup-Healthways Well-Being Rankings scores, gives Bangladesh the seventh highest country score even though the country is in the lowest quartile when it comes to how its residents rate their lives (80th overall according to the World Happiness Report Index and 79th overall according to the Gallup-Healthways Well-Being Rankings). This suggests that either, as discussed above, the Happy Planet Index is capturing something other than subjective well-being or that subjective well-being scores do not accurately gauge genuine well-being.

Yet, the requirement for a strong relationship between index measures of well-being and subjective well-being should not be overstated. As discussed in Chapter I, there

are multiple concerns that subjective views of people's quality of life are not a perfect basis for measuring human well-being. Thus, the hypothesis only tested whether the Capabilities Index is as good a predictor of subjective well-being as other indices rather than whether or not it is the best.

Based on the score and rank correlations in Figures 5 and 6, there is a fairly strong correlation between each of the human well-being indices and the World Happiness Report Index with the exception of the Happy Planet Index, which has a Pearson correlation of 0.48 and a Spearman rank correlation of 0.50. Though the Capabilities Index's correlation with this subjective well-being index is lower than the other remaining indices (a score correlation of 0.68 and a rank correlation of 0.69), there is still a substantial relationship between variation in the Capabilities Index and the World Happiness Report Index scores.

The correlations among the various well-being indices and the Gallup-Healthways Well-Being Rankings are all much lower than those between each index and the World Happiness Report Index. While the latter range from 0.48 to 0.83, the Gallup-Healthways correlations range from 0.42 to 0.54. The Capabilities Index has the lowest correlations in this range with a country score correlation of 0.42 and a country rank correlation of 0.45. However, given a total correlation range of only 0.11 among all the indices examined, they are all fairly similar. Given that these correlations to the Gallup-Healthways Well-Being Rankings are all moderate, it may be that the World Happiness Report Index, which has higher correlations with the human well-being indices, better captures subjective well-being. Alternatively, the more robust Gallup-Healthways Well-Being Rankings may more accurately measure subjective well-being, which the indices fail to

reflect. Lastly, due to the potential flaws involved in the personal assessment of well-being discussed in Chapter I, subjective well-being rankings may only be partially relevant. Regardless, with the possible exception of the Happy Planet Index, all of the human well-being indices, including the Capabilities Index, bear a significant correlation to subjective well-being measures.

While correlation coefficients quantify the linear relationship between two variables, multiple linear regression models the relationship between how the variance in and interaction of numerous variables explain changes in another variable. For the purposes of testing the third hypothesis, I used regression analysis in order to determine the extent to which variation in index country scores explained variation in subjective well-being. The regression results indicate that the indices that are significant in explaining variation in World Happiness Report Index subjective well-being scores are the Happy Planet Index, GNI per capita, and the Where-to-be-Born Index. Collectively, these three independent variables explain 75.71% of the variation in World Happiness Report Index scores.

The HDI was likely excluded from this list of significant independent variables because the variation in its country scores is captured by GNI per capita since the two variables have a correlation of 0.96. It is more surprising that the most robust indices, the Capabilities Index, the SDG Index, and the Social Progress Index, are excluded though the Where-to-be-Born Index that shares some of the same metrics as these three indices is included. It may be that the Where-to-be-Born Index's consideration of life expectancy, divorce, unemployment, crime, homicide, political security, climate, membership in social organizations, corruption levels, and gender equality in legislatures better captures

factors that impact one's view of his or her well-being. However, its exclusion of aspects, such as access to food, shelter, and education that people typically associate with well-being calls this into question.

When a step-wise regression is conducted with the Gallup-Healthways Well-Being Rankings used as the dependent variable instead of the World Happiness Report Index, the Where-to-be-Born Index is not a significant independent variable. Instead, two indices best explain variation in this measure of subjective well-being: the Capabilities Index and the Happy Planet Index. However, together they only explain 42.03% of the variation in Gallup-Healthways Well-Being Rankings scores, so much of the variation in these subjective well-being scores remains unexplained. Even though the beta coefficient for the Happy Planet Index is almost twice as high as the beta coefficient for the weighted Capabilities Index, the influence of the Capabilities Index on predicted Gallup-Healthways subjective well-being scores is higher since the average Capabilities Index score is 2.6 times as high as the average Happy Planet Index score. Thus, more than any other index, variation in Capabilities Index scores explains variation in Gallup-Healthways Well-Being Rankings scores.

I also utilized stepwise regression in order to determine which specific Capabilities Index metrics and capabilities best explain variation in subjective well-being. With respect to the 20 metrics included in the Capabilities Index, variation in life expectancy, access to adequate shelter, and the prevalence of peace explained almost 80% of the variation in subjective well-being as measured by the World Happiness Report Index.

A similar regression conducted with the Gallup-Healthways Well-Being Rankings scores as the dependent variable indicate that variation in life expectancy, tolerance and inclusion, and property rights explain almost 55% of the variation in country subjective well-being scores. The effectiveness of a country's criminal justice system was also statistically significant, but its beta coefficient was negative indicating that it is inversely related to Gallup-Healthways subjective well-being scores.

Similar regression analyses that considered the capabilities rather than the metrics that comprise them indicated that variation in Capability 1 - Life, Capability 2 - Bodily Health, and Capability 7 - Affiliation scores best explained variation in World Happiness Report Index scores. Life and affiliation were the only significant variables when Gallup-Healthways Well-Being Rankings were utilized as the dependent variable. The close relationship between the life capability, which is measured in terms of life expectancy at birth, has a logical relationship with human well-being and is not surprising. Most consider a long life to be a better one and it typically reflects good health and positive living conditions. Almost every well-being index includes some measurement of length of life.

The other significant capability that is common to the regression results, affiliation, which consists of measures of freedom of association and freedom from discrimination, are less commonly represented in other indices though they are undoubtedly key to human flourishing. Civil and political freedoms play an underlying role in many of Nussbaum's capabilities and are specifically emphasized in these two significant ones. Though Capabilities Index scores are highly correlated with many existing indices, most notably the Social Progress Index, Nussbaum's emphasis on

individual liberties, which have explanatory value relative to subjective well-being and certainly play a role in facilitating peoples' ability to thrive, should be incorporated into any precise measure of human well-being.

Differences between the Capabilities Index and the Social Progress Index

The Capabilities Index bears the most resemblance, both in terms of the aspects measured and correlation among country scores, to the Social Progress Index. Despite this, there is potential evidence that the Capabilities Index may reflect different elements of well-being than the Social Progress Index does. Interestingly, compared to Capabilities Index scores, Social Progress Index country scores are more strongly correlated with GNI per capita (0.88 vs. 0.74) and the HDI (0.93 vs. 0.81), which incorporates a GNI component. This may be due to the fact that the Social Progress Index includes factors, such as mobile telephone subscriptions and living near globally ranked universities that are positively correlated with economic measures of wealth, but may not significantly impact well-being. The Capabilities Index also includes metrics that emphasize rights, such as gender economic participation and worker rights, which do not have similar counterparts in the Social Progress Index. Given that work plays an important role in most peoples' lives and likely has an impact on well-being, this omission from the Social Progress Index is surprising considering that it incorporates 52 metrics compared to the Capabilities Index's 20 metrics. Moreover, economic participation (0.33) and worker rights (0.46) have more moderate correlations with the Social Progress Index so that their inclusion in the Capabilities Index may explain some of the differences between the these two indices' country scores.

Four other metrics, social religious restrictions (0.27), governmental religious restrictions (0.29), biodiversity protection (0.40), and freedom of movement (0.47), also have relatively lower correlation with Social Progress Index scores. Measures of freedom of movement and biodiversity protection are included in the Social Progress Index, but because they are only two of 52 metrics, some of which are arguably tangentially related to human well-being, their weight in country scores is lower than in the Capabilities Index. Both indices measure freedom of religion using Pew Research Center data, but the Social Progress Index uses a slightly older version (Pew Research Center, 2014) and ignores the ratings based on social hostilities involving religion in favor of only considering government restrictions on religion. As well, instead of the using the Pew Research Center's more granulated data that provide country scores on a scale of one to ten, the Social Progress Index converted this to a four-point scale. Overall, this minimizes the differences between these countries in terms of religious restrictions. In contrast, the Capabilities Index preserved the coefficient of variation of the original data and included both the governmental and social measures of religious restrictions.

The most extreme differences in country scores between the Capabilities Index and the Social Progress Index relate to how they treat countries with poor human rights records. The Capabilities Index, which places more weight on individual liberties, gives much lower scores to countries such as China, Saudi Arabia, and the United Arab Emirates than the Social Progress Index does (Table 11). These three countries are among the small list of nations that have not signed and ratified the International Covenant on Civil and Political Rights. Likewise, some African countries, as well as Cambodia, have considerably higher well-being scores under the Capabilities Index compared to the

Social Progress Index because of relatively better human rights records. Although these countries still may impose some substantial impediments on the exercise of civil liberties, their performance with respect to these metrics is better than those that relate to metrics closely correlated with wealth. Thus, their overall scores are higher than they would be without any emphasis on civil and political freedoms.

As discussed earlier, with the countries that had markedly different GNP per capita levels compared to Capabilities Index scores, subjective well-being scores were more highly correlated with GNP per capita, which suggests that wealth is perhaps the most important factor that influences well-being. Similarly, where Social Progress Index scores, which are also very highly correlated with economic measures, differ greatly from Capabilities Index scores it is the Social Progress Index scores that better align with the proxies for subjective well-being while the Capabilities Index scores are actually negatively correlated with those measures (Table 12). Once again, the appropriate conclusion is either that measures of subjective well-being do not adequately reflect true human well-being or that the capabilities approach's emphasis on individual liberties for improving human well-being is unwarranted.

For the subset of countries with the highest GNI per capita levels (Table 3), both the Capabilities Index and the Social Progress Index account for the fact that Kuwait, Saudi Arabia, and the United Arab Emirates have lower subjective well-being scores than the others (the Social Progress Index did not publish an index score for Singapore). Overall, the Social Progress Index was more highly correlated with the World Happiness Report Index subjective well-being scores than the Capabilities Index was (0.96 versus 0.90). However, the Capabilities Index scores for these countries were more highly

correlated with the Gallup-Healthways Well-Being Rankings scores (0.53 versus 0.45). This suggests that both indices are similarly successful at identifying countries where wealth alone is an inadequate measure of well-being.

Conclusion

Country-level well-being is highly correlated with national measures of wealth. Even the SDG Index, which incorporates 63 distinct metrics (none of which are per capita economic measures), yields similar country rankings and scores when compared to purely economic measures, as well as in comparison to many other well-being indices. Although the authors of the SDG Index report express concerns regarding incomplete and less than ideal data sources (Sachs et al., 2016, p. 11), and although the various indices that I examined rely upon different metrics, methodologies, and data sources in the attempt to measure human well-being, the generally high correlations among them is striking.

However, economic measures alone fail to account for all significant differences in the well-being levels among countries and do not provide any guidance for determining how available funds should be spent in order to improve human well-being. In contrast, indices that were specifically designed in order to measure well-being consist of various metrics that can be analyzed to determine what drives human flourishing.

The difficulty in determining which index best measures well-being is that there is no objective standard for comparison. Though measures of subjective well-being are often proffered as a proxy for actual well-being, asking people to assess their personal situation is fraught with many biases. As well, different methods of measuring subjective

well-being, as the World Happiness Report Index and the Gallup-Healthways Well-Being Rankings illustrate, produce markedly different results. Thus, the utility of comparing the results of well-being indices to those that attempt to quantify subjective well-being is limited. That being said, one would expect a positive correlation between index country scores and country subjective well-being scores and this relationship was present for every index considered.

Although the Capabilities Index is uniquely based on Nussbaum's central capabilities approach, its country scores and rankings are highly correlated with other indices, most notably the Social Progress Index. To the extent that these two differ, it is primarily the result of the Capabilities Index placing more emphasis on the importance of civil and political liberties. Though regression analysis indicates that these liberties play a significant role in predicting subjective well-being, and the World Happiness Report Index's (2016) analysis of drivers of subjective well-being confirms this (p. 21), the only indices analyzed that include any metric relating to individual liberties are the Capabilities Index, the Social Progress Index, and the SDG Index. Because the Social Progress Index and the SDG Index include more than twice as many metrics compared to the Capabilities Index, the presence or absence of these freedoms in the Social Progress Index and the SDG Index has less impact on aggregate country well-being scores. As well, certain liberties are not included in the Social Progress Index, namely the gender gap in economic participation and worker rights. As well, the SDG Index only includes property rights.

Ultimately, the ideal measure of well-being should include a full complement of metrics that impact human flourishing and provide countries and the international

community with data that help guide efforts to improve the human condition. Unlike purely economic measures and indices that rely on only a few interrelated metrics, the Capabilities Index provides greater insight into how human well-being levels in every country can be improved. Nussbaum's recognition that human flourishing not only requires the satisfaction of basic needs, but also demands the ability to exercise personal freedoms provides the basis for a different perspective on how society should measure well-being that is lacking from almost every alternative index. By incorporating aspects of Nussbaum's ten central capabilities into measures of well-being, society can ensure that the important facets of social sustainability are not ignored.

Appendix 1

Nussbaum's Ten Central Capabilities and Their Components

Central Capability	Component	Metric(s)	Data Source
1. Life	living a human life of normal length	life expectancy at birth	World Bank (2015)
2. Bodily health	reproductive health	maternal mortality rate	World Health Organization (2015b)
	adequate nourishment	Global Food Security Index	Economist Intelligence Unit (2015b)
	adequate shelter	Shelter Index Score	Social Progress Imperative (2015)
3. Bodily integrity	freedom of movement	Freedom of Domestic Movement Index and Freedom of Foreign Movement and Travel Index	Cingranelli, Richards, & Clay (2014)
	freedom vs. violence	Global Peace Index	Institute for Economics and Peace (2015)
	reproductive choice	Reproductive Health Index	Population Action International (2015, 2007)
4. Senses, imagination, and thought	adequate education	Human Development Index – Education Index	United Nations Development Programme (2015a)
	freedom of speech/expression	World Press Freedom Index	Reporters Without Borders (2015)
	freedom of religion	Religious Restrictions Index	Pew Research Center (2015)
5. Emotions	freedom of association	Freedom of association	Institutional Profiles Database (2012)
6. Practical Reason	freedom to form one's own conception of the good	Human Freedom Index	Vásquez & Porčnik (2015)

Central Capability	Component	Metric(s)	Data Source
7. Affiliation	freedom of assembly	included in capability #5	
	freedom of speech	Included in capability #4	
	freedom from discrimination	tolerance and inclusion	Social Progress Imperative (2015)
8. Other species	living in relation to nature	biodiversity and habitat score	Hsu et al. (2014)
9. Play	ability to enjoy recreation		
10. Control over one's environment	political participation	electoral process and pluralism	Economist Intelligence Unit (2015a)
	property rights	International Property Rights Index	Levy-Carciente et al. (2015)
	right to equality of employment	economic participation and opportunity	World Economic Forum (2015)
	Freedom from unwarranted search	criminal justice ranking	World Justice Project (2015)
	access to meaningful work	Worker Rights Index	International Trade Union Confederation (2015)

Appendix 2

Weighting of Capability Metrics

Central Capability	Component	Metric(s)	Percent of Capability Weight
1. Life	living a human life of normal length	life expectancy at birth	100.0%
2. Bodily health	reproductive health	maternal mortality rate	33.3%
	adequate nourishment	Global Food Security Index	33.3%
	adequate shelter	Shelter Index Score	33.3%
3. Bodily integrity	freedom of movement	Freedom of Domestic Movement Index and Freedom of Foreign Movement and Travel Index	16.7%
			16.7%
	freedom vs. violence	Global Peace Index	33.3%
	reproductive choice	Reproductive Health Index	33.3%
4. Senses, imagination, and thought	adequate education	Human Development Index – Education Index	33.3%
	freedom of speech/expression	World Press Freedom Index	33.3%
	freedom of religion	Religious Restrictions Index	33.3%
5. Emotions	freedom of association	Freedom of association	100.0%
6. Practical Reason	freedom to form one's own conception of the good	Human Freedom Index	100.0%
7. Affiliation	freedom of assembly	included in capability #5	33.3%
	freedom of speech	Included in capability #4	33.3%
	freedom from discrimination	tolerance and inclusion	33.3%
8. Other species	living in relation to nature	biodiversity and habitat score	100.0%

Central Capability	Component	Metric(s)	Percent of Capability Weight
9. Play	ability to enjoy recreation		
10. Control over one's environment	political participation	electoral process and pluralism	20.0%
	property rights	International Property Rights Index	20.0%
	right to equality of employment	economic participation and opportunity	20.0%
	Freedom from unwarranted search	criminal justice ranking	20.0%
	access to meaningful work	Worker Rights Index	20.0%

Appendix 3

Well-being Indices Scores for 109 Countries

Country Name	Capabilities Index (Average)	Capabilities Index (Weighted)
Albania	70.61	73.48
Algeria	51.44	53.39
Angola	43.50	40.57
Argentina	73.69	76.60
Australia	86.39	88.39
Austria	86.48	88.14
Azerbaijan	56.51	57.31
Bangladesh	49.74	57.09
Belarus	60.52	58.04
Belgium	86.25	89.00
Benin	61.39	65.14
Bolivia	68.18	73.08
Botswana	71.74	68.82
Brazil	75.99	78.73
Bulgaria	74.91	79.25
Burkina Faso	54.29	61.48
Burundi	47.95	51.28
Cambodia	58.96	64.06
Cameroon	50.48	54.54
Canada	86.28	87.45
Chad	46.78	51.25
Chile	79.13	82.23
China	48.62	48.52
Colombia	68.32	73.37
Costa Rica	78.94	83.10
Cote d'Ivoire	51.43	59.10
Croatia	79.49	83.24
Czech Republic	83.98	87.40
Denmark	88.40	89.87
Dominican Republic	68.74	71.43
Ecuador	75.05	77.59

Country Name	Capabilities Index Average	Capabilities Index Weighted
Egypt	48.75	54.44
El Salvador	71.06	71.88
Estonia	85.97	87.66
Ethiopia	47.86	52.20
Finland	90.41	91.35
France	80.99	85.66
Germany	85.47	89.24
Ghana	68.25	71.40
Greece	72.53	79.78
Guatemala	64.17	67.13
Honduras	64.19	67.53
Hungary	78.87	83.21
India	54.60	62.91
Indonesia	56.75	66.03
Iran	45.59	47.85
Ireland	87.64	89.17
Israel	65.20	77.18
Italy	81.88	85.78
Jamaica	76.75	80.82
Japan	84.22	86.82
Jordan	59.35	62.64
Kazakhstan	58.33	55.48
Kenya	50.02	57.43
Korea, Rep. (South)	76.52	80.10
Kuwait	65.30	69.66
Latvia	82.34	84.77
Lebanon	57.97	65.42
Lithuania	84.56	86.12
Madagascar	57.69	63.70
Malaysia	65.31	69.89
Mali	55.52	60.40
Mauritania	47.46	50.24
Mexico	67.49	73.33
Morocco	60.19	65.61
Mozambique	57.75	62.27
Myanmar	41.80	38.88
Nepal	56.79	62.73
Netherlands	87.94	89.50

Country Name	Capabilities Index Average	Capabilities Index Weighted
New Zealand	88.96	90.24
Nicaragua	66.28	69.97
Nigeria	44.52	53.85
Norway	88.17	88.44
Pakistan	44.12	52.80
Panama	75.28	79.29
Paraguay	70.08	70.65
Peru	70.10	73.02
Philippines	63.85	67.01
Poland	79.72	84.74
Portugal	84.19	86.31
Romania	72.95	79.63
Russian Federation	56.45	60.03
Rwanda	56.88	56.22
Saudi Arabia	51.22	50.41
Senegal	64.57	69.04
Serbia	67.35	68.91
Sierra Leone	50.29	53.48
Singapore	71.12	65.17
Slovakia	84.07	86.63
Slovenia	85.03	86.92
South Africa	73.09	73.32
Spain	81.49	86.03
Sri Lanka	59.01	63.94
Sweden	85.91	88.10
Switzerland	87.97	89.90
Tanzania	55.06	58.51
Thailand	65.15	69.89
Tunisia	60.59	64.52
Turkey	59.52	62.03
Uganda	56.18	58.52
Ukraine	63.91	67.02
United Arab Emirates	60.57	58.64
United Kingdom	82.88	87.26
United States	79.59	82.75
Uruguay	81.24	80.90

Country Name	Capabilities Index Average	Capabilities Index Weighted
Venezuela	67.21	73.02
Vietnam	53.27	52.55
Zambia	59.40	63.02
Zimbabwe	47.64	53.65

Appendix 4

Correlation Matrices for Well-Being Indices using 109 and 60 Countries

109 countries	CI (A)	CI (W)	HPI	HDI	GNI	WTTB	SPI	SDG	WHRI	GH
CI(A)	1									
CI(W)	0.98	1								
HPI	0.21	0.25	1							
HDI	0.78	0.75	0.31	1						
GNI	0.71	0.66	0.22	0.96	1					
WTTB	0.76	0.71	0.04	0.85	0.86	1				
SPI	0.91	0.88	0.29	0.93	0.87	0.89	1			
SDG	0.83	0.79	0.27	0.95	0.89	0.78	0.94	1		
WHRI	0.70	0.68	0.48	0.82	0.82	0.83	0.82	0.78	1	
GH	0.44	0.42	0.49	0.47	0.47	0.54	0.49	0.40	0.73	1

60 countries	CI (A)	CI (W)	HPI	HDI	GNI	WTTB	SPI	SDG	WHRI	GH
CI(A)	1									
CI(W)	0.99	1								
HPI	0.20	0.23	1							
HDI	0.82	0.80	0.27	1						
GNI	0.78	0.76	0.22	0.97	1					
WTTB	0.89	0.88	0.08	0.86	0.85	1				
SPI	0.92	0.89	0.25	0.94	0.91	0.93	1			
SDG	0.83	0.80	0.19	0.96	0.94	0.81	0.94	1		
WHRI	0.77	0.76	0.43	0.81	0.82	0.83	0.84	0.78	1	
GH	0.49	0.48	0.58	0.45	0.45	0.41	0.46	0.36	0.71	1

Legend: CI(A) = Capabilities Index (average); CI(W) = Capabilities Index (weighted); HPI = Happy Planet Index; HDI = Human Development Index; GNI = gross national income per capita; WTTB = Where-to-be-Born Index; SPI = Social Progress Index; SDG = Sustainability Development Goals Index; WHRI = World Happiness Report Index; and GH = Gallup-Healthways Rankings

The correlation between 109 country and 60 country correlations is 0.98.

References

- Alemán, J. & Woods, D. (2014). No way out: Travel restrictions and authoritarian regimes. *Migration and Development*, 3(2), 285-305.
- Alkire, S. (2003). *The capabilities approach as a development paradigm?* Material for the training session preceding the 3rd International Conference on the Capability Approach, Pavia, Italy. Retrieved from https://www.researchgate.net/profile/Sabina_Alkire/publication/228832403_The_Capability_Approach_as_a_development_paradigm/links/004635231a3c01d715000000.pdf
- Alkire, S. (2005). Why the capabilities approach? *Journal of Human Development*, 6(1), 115-133.
- Anand, P., Hunter, G., Carter, I., Dowding, K., Guala, F., & Van Hees, M. (2009). The development of capability indicators. *Journal of Human Development and Capabilities: A Multi-Disciplinary Journal for People-Centered Development*, 10(1), 125-152.
- Anand, S. & Sen, A. (1994). *Human development: Methodology and measurement*. New York: World Bank.
- Bagolin, I.P. & Comim, F.V. (2008). Human development index (HDI) and its family of indexes: an evolving critical review. *Revista de Economia*, 34(2), 7-28.
- Bergheim, S. (2006). *Measures of well-being: There's more to it than GDP*. Frankfurt: Deutsche Bank Research.
- Boarini, R., Comola, M., Smith, C., Machin, R., & de Keulenaer, F. (2012). What makes for a better life?: The determinants of subjective well-being in OECD countries – Evidence from the Gallup World Poll, *OECD Statistics Working Papers*, 2012/03, OECD Publishing.
- Boarini, R., Johansson, A. & d'Ercole, M.M. (2006). Alternative measures of well-being. *OECD Social, Employment and Migration Working Papers*, No. 33. Paris: OECD Publishing.
- Boström, M. (2012). A missing pillar? Challenges in theorizing and practicing social sustainability: Introduction to the special issue. *Sustainability: Science, Practice, & Policy*, 8(12), 3-14.

- Carson, S. (2006). Eudaimonia. In D.M. Borchert (Ed.) *Encyclopedia of Philosophy*, Vol. 10, 2nd ed., (pp. 10-12) Detroit: MacMillan Reference USA.
- Chiripanhura, B. (2010). Measurements of economic activity and their implications for societal well-being. *Economic & Labour Market Review*, 4(7), 56-65.
- Cingranelli, D.L., Richards, D.L., & Clay, K.C. (2014). *The CIRI human rights dataset*. Retrieved from <http://www.humanrightsdata.com/p/data-documentation.html>.
- Cohen, J. (1988) *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed. Hillsdale, NJ: Erlbaum.
- Comim, F. (2001). *Operationalizing Sen's capabilities approach*. Paper prepared for the Justice and Poverty: Examining Sen's Capability Approach, Cambridge. Retrieved from https://www.researchgate.net/profile/Flavio_Comim/publication/239922491_Operationalizing_Sen's_Capability_Approach/links/02e7e5291ff5f0e035000000.pdf
- Costanza, R., Hart, M., Talberth, J., & Posner, S. (2009). *Beyond GDP: The Need for New Measures of Progress*, Pardee Paper No. 4. Boston: Pardee Center for the Study of the Longer-Range Future
- Cronon, W. (1995). The trouble with wilderness; or, getting back to the wrong nature. In W. Cronon (Ed.). *Uncommon ground: Rethinking the human place in nature*, 69-90, New York: W.W. Norton & Co.
- Deaton, A. (2010). Price indexes, inequality, and the measurement of world poverty. *American Economic Review*, 100(1), 5-34.
- Dempster A.P. and Rubin D.B. (1983). Introduction. In W.G. Madow, I. Olkin, & D.B. Rubin (Eds.). *Incomplete Data in Sample Surveys (vol. 2): Theory and Bibliography*, pp. 3-10. New York: Academic Press.
- Diener, E., Diener, M. & Diener, C. (1995). Factors predicting the subjective well-being of nations. *Journal of Personality & Social Psychology*, 69(5), 851-64.
- Diener E., Scollon, C. K. N., Oishi, S., Dzokoto, V. & Suh, E.M. (2000). Positivity and the construction of life satisfaction judgements, global happiness is not the sum of its parts. *Journal of Happiness Studies*, 1, 159-176.
- Diener, E., Suh, E.M., Smith, H. & Shao, L. (1995). National differences in reported subjective well-being. *Social Indicators Research*, 34(1), 7-32.
- Dillard, J., Dujon, V. & King, M. (2009). *Understanding the Social Dimension of Sustainability*. New York: Routledge.

- Dixon, R. & Nussbaum, M.C. (2011). *Abortion, dignity, and a capabilities approach*. Public Law & Legal Theory Working Paper No. 345. Retrieved from <http://www.law.uchicago.edu/files/file/345-rd-mn-abortion.pdf>
- Dodge, R., Daly, A.P., Huyton, J., & Sanders, L.D. (2012). The challenge of defining well-being. *International Journal of Wellbeing*, 2(3), 222-35.
- Economist (2015). *The 169 commandments*. Retrieved from <http://www.economist.com/news/leaders/21647286-proposed-sustainable-development-goals-would-be-worse-useless-169-commandments>
- Economist Intelligence Unit. (2015a). *Democracy index 2015: Democracy in an age of anxiety*. Retrieved from <http://www.yabiladi.com/img/content/EIU-Democracy-Index-2015.pdf>
- Economist Intelligence Unit. (2015b). *Global food security index*. Retrieved from <http://foodsecurityindex.eiu.com/Downloads>
- Economist Intelligence Unit (2013). *The lottery of life*. Retrieved from <http://www.economist.com/news/21566430-where-be-born-2013-lottery-life>
- Elliot, R. (1982). Faking nature. *Inquiry: An Interdisciplinary Journal of Philosophy*, 25(1), 81-93.
- Freedom House. (2016). *Freedom in the world*. Retrieved from https://freedomhouse.org/sites/default/files/FH_FITW_Report_2016.pdf
- Gallup-Healthways Well-Being Index. (2014). *State of global well-being: 2014 country well-being rankings*. Retrieved from http://info.healthways.com/hubfs/Well-Being_Index/2014_Data/Gallup-Healthways_State_of_Global_Well-Being_2014_Country_Rankings.pdf
- Gaspar, D. (2002). Is Sen's capability approach an adequate basis for considering human development? *Review of Political Economy*, 14(4), 435-461.
- Global Environment Facility. (2008). *GEF benefits index (GBI) for biodiversity: Initial and revised July 2008*. Retrieved from <https://www.thegef.org/gef/sites/thegef.org/files/documents/GEF%20Benefits%20Index%20Biodiversity.pdf>
- Goodhart, M. (ed.). (2013). *Human rights: Politics and practice*. Oxford: Oxford University Press.
- Griffin, J. (1986). *Well-being: Its meaning, measurement, and moral importance*. Oxford: Clarendon Press.

- Helliwell, J., Layard, R. & Sachs, J. (eds.). (2016). *World happiness report 2016*. Retrieved from http://worldhappiness.report/wp-content/uploads/sites/2/2016/03/HR-V1_web.pdf
- Helliwell, J., Layard, R. & Sachs, J. (eds.). (2015). *World happiness report 2015*. Retrieved from http://worldhappiness.report/wp-content/uploads/sites/2/2015/04/WHR15_Sep15.pdf
- Heritage Foundation. (2016). *2016 Index of economic freedom*. Retrieved from http://www.heritage.org/index/pdf/2016/book/index_2016.pdf
- Hsu, A., Alexandre, N., Cohen, S., Jao, P., Khusainova, E., Mosteller, D., ...Zhang, X. (2016). *2016 Environmental performance index*. New Haven, CT: Yale University. Retrieved from https://issuu.com/2016yaleepi/docs/epi2016_final
- Institute for Economics & Peace. (2015). *Global peace index 2015*. Sydney: Institute for Economics & Peace. Retrieved from http://economicsandpeace.org/wp-content/uploads/2015/06/Global-Peace-Index-Report-2015_0.pdf
- Institutional Profiles Database. (2012). *Presentation of the institutional profiles database 2012*. Retrieved from http://www.cepii.fr/institutions/doc/IPD_2012_cahiers-2013-03_EN.pdf
- International Food Policy Research Institute. (2015). *2015 global hunger index*. Retrieved from <http://ghi.ifpri.org/>
- International Trade Union Confederation. (2015). *The 2015 ITUC global rights index: The world's worst countries for workers*. Retrieved from http://www.ituc-csi.org/IMG/pdf/survey_global_rights_index_2015_en.pdf
- Kahneman, D. & Krueger, A.B. (2006). Developments in the measurement of subjective well-being. *Journal of Economic Perspectives*, 20(1), 3-24.
- Krueger, A.B. & Schkade, D.A. (2008). The reliability of subjective well-being measures. *Journal of Public Economics*, 92(8-9), 1833-45.
- Layard, R., Clark, A., Senik, C. (2012). The causes of happiness and misery. In J. Helliwell, R. Layard & J. Sachs, (eds.). (2015). *World happiness report 2012*, 58-83. Retrieved from <http://www.earth.columbia.edu/sitefiles/file/Sachs%20Writing/2012/World%20Happiness%20Report.pdf>
- Lee, S., McCann, D., & Messenger, J.C. (2007). *Working time around the world: Trends in working hours, laws, and policies in a global comparative perspective*. Abingdon, UK: Routledge

- Levy-Carciente, S., De Soto, H., Lenhart, W., Kalkan, B., Hasselgren, B., Krassen, P., ...Grassl, W. (2015). *2015 International property rights index*. Washington, DC: Americans for Tax Reform Alliance. Retrieved from <https://s3.amazonaws.com/ipri2015/IPRI+FINAL+110415.pdf>
- Littig, B. & Greißler, E. (2005). Social sustainability: A catchword between political pragmatism and social theory. *International Journal of Sustainable Development*, 8(1/2), 65-79.
- Lucas, R., Diener, E. & Suh, E.M. (1996). Discriminant validity of well-being measures. *Journal of Personality and Social Psychology*, 71(3), 616–28.
- McGillvary, M. & Clarke, M. (2006). Human well-being: Concepts and measures. In M. McGillvary & M. Clarke (Eds.), *Understanding human well-being*, (pp. 3-17), Tokyo: United Nations University Press.
- Millennium Ecosystem Assessment. (2005). *Ecosystems and human well-being: Synthesis*. Washington: Island Press.
- Moore, H.L. (2015). Global prosperity and sustainable development goals. *Journal of International Development*, 7, 801-815.
- Neumayer, Eric. (2004). Sustainability and well-being indicators. *WIDER research papers*, 2004/23. Helsinki: UNU-WIDER.
- New Economics Foundation. (2012). *The Happy Planet Index: 2012 report*. London: New Economics Foundation.
- Noorbakhsh, F. (1998). The human development index: Some technical issues and alternative indices. *Journal of International Development*, 10, 589-605.
- Nussbaum, M.C. (2011). *Creating capabilities: The human development approach*. Cambridge, MA: Belknap Press.
- Nussbaum, M.C. (2006). *Frontiers of justice: Disability, nationality, species membership*. Cambridge, MA: Belknap Press.
- Nussbaum, M.C. (2000). Aristotle, politics, and human capabilities: A response to Anthony, Arneson, Charlesworth, and Mulgan. *Ethics*, 111, 102-40.
- Nussbaum, M.C. (1995). Emotions and women's capabilities. In. M.C. Nussbaum & J. Glover (Eds.). *Women, culture, and development: A study of human capabilities*, 360-95, Oxford: Oxford University Press.
- OECD. (2014). *Average annual hours actually worked per worker*. Retrieved from <https://stats.oecd.org/Index.aspx?DataSetCode=ANHRS>

- OECD. (2013). *Guidelines on Measuring Subjective Well-Being*. Paris: OECD Publishing.
- OECD. (2008). *Handbook on constructing composite indicators: Methodology and user guide*. Paris: OECD Publishing.
- OECD. (n.d.). *OECD Better life index*. Retrieved from <http://www.oecdbetterlifeindex.org/>
- Office for the High Commissioner for Human Rights. (2004). *Human rights and poverty reduction: A conceptual framework*. New York: United Nations. Retrieved from <http://www.ohchr.org/Documents/Publications/PovertyReductionen.pdf>
- Osberg, L. & Sharpe, A. (2002). An index of economic well-being for selected OECD countries. *Review of Income and Wealth*, 48(3), 291-316.
- Oswald, A.J. (1997). Happiness and economic performance. *The Economic Journal*, 107, 1815-31.
- Oxfam. (2016). *The food index*. Retrieved from <http://www.oxfam.org.uk/what-we-do/good-enough-to-eat>
- Pew Research Center. (2015). *Latest trends in religious restrictions and hostilities*. Retrieved from http://www.pewforum.org/files/2015/02/Restrictions2015_fullReport.pdf
- Pew Research Center. (2014). *Religious hostilities reach six-year high*. Retrieved from <http://www.pewforum.org/files/2014/01/RestrictionsV-full-report.pdf>
- Population Action International. (2015). *A reproductive health index: Rights and results*. Retrieved from <http://pai.org/wp-content/uploads/2015/05/RHIreport.pdf>
- Population Action International. (2007). *A measure of survival: Calculating women's sexual and reproductive risk*. Retrieved from <http://pai.org/wp-content/uploads/2012/01/mos.pdf>
- Reporters Without Borders. (2015). *2015 World press freedom index*. Retrieved from <https://index.rsf.org/#!/index-details>
- Robeyns, I. (2006). The capability approach in practice. *The Journal of Political Philosophy*, 14(3), 351-376.
- Rogers, P. Jalal, K. & Boyd, J. (2007). *An introduction to sustainable development*. London: Earthscan.

- Ryan, R.M. & Deci, E.L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology*, 52, 141-66.
- Ryff, C.D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, 57(6), 1069-81.
- Sachs, J. (2012). Introduction. In J. Helliwell, R. Layard & J. Sachs, (eds.). *World happiness report 2012*, 2-9. Retrieved from <http://www.earth.columbia.edu/sitefiles/file/Sachs%20Writing/2012/World%20Happiness%20Report.pdf>
- Sachs, J. Schmidt-Traub, G., Kroll, C., Durand-Delacre, D. & Teksoz, K. (2016). *SDG index and dashboards: Global report*. New York: Bertelsmann Stiftung and Sustainable Development Solutions Network.
- Sagar, A.D. & Najam, A. (1998). The human development index: A critical review. *Ecological Economics*, 25, 249–264.
- Saha, I. & Paul, B. (2010). *Biostatistics: MCQ and essentials*. Kolkata, India: Academic Publishers.
- Samson, J., Berteaux, D., McGill, B.J., & Humphries, M.M. (2011). Geographic disparities and moral hazards in the predicted impacts of climate change on human populations. *Global Ecology and Biogeography*, 20(4), 532-44.
- Schwarz, N. (1987). *Stimmung als information: Untersuchungen zum einfluß von stimmungen auf die bewertung des eigenen lebens*. (Mood as information on the impact of moods on evaluations of one's life). Heidelberg: Springer Verlag.
- Sen, A. (1999). *Development as freedom*. New York: Random House Press.
- Sen, A. (1992). *Inequality reexamined*. Oxford: Oxford University Press.
- Sen, A. (1985). *Commodities and capabilities*. Amsterdam: North-Holland.
- Sen, A. (1984). *Resources, values and development*. Cambridge, MA: Harvard University Press.
- Social Progress Imperative. (2015). *Social progress index 2015*. Retrieved from http://www.socialprogressimperative.org/data/spi#data_table/countries/spi/dim1,dim2,dim3

- Stanton, E.A. (2007). The human development index: A history. *Political Economy Research Institute, Workingpaper Series No. 127*. Amherst, MA: University of Massachusetts – Amherst.
- Stern, S., Wares, A., & Orzell, S. (2015). *Social progress index 2015: Methodological report*. Washington, DC: Social Progress Imperative. Retrieved from <http://www.socialprogressimperative.org/wp-content/uploads/2016/04/2015-Methodology-Report.pdf>
- Stiglitz, J.E., Sen, A., & Fitoussi, J.-P. (2010). *Mismeasuring our lives: Why GDP doesn't add up*. New York: New Press.
- Stone, A.A. & Mackie, C. (Eds.). (2013). *Subjective well-being: Measuring happiness, suffering, and other dimensions of experience*. Washington: National Academies Press.
- Streeten, P. (1994). Human development: Means and ends. *The American Economic Review*. Papers and Proceedings of the Hundred and Sixth Annual Meeting of the American Economic Association, 84(2), 232-7.
- Taylor, R. (1990). Interpretation of the correlation coefficient: A basic review. *Journal of Diagnostic Medical Sonography*, 6(1), 35-9.
- United Nations Development Programme. (2015a). *Education Index*. Retrieved from <http://hdr.undp.org/en/content/education-index>
- United Nations Development Programme. (2015b). *Human Development Report*. Retrieved from http://hdr.undp.org/sites/default/files/2015_human_development_report.pdf
- United Nations Development Programme. (1990). *Human development report 1990*. Oxford: University of Oxford Press. Retrieved from http://hdr.undp.org/sites/default/files/reports/219/hdr_1990_en_complete_nostats.pdf
- United Nations Education, Scientific and Cultural Organization (UNESCO). (2015). *The education for all development index*. Retrieved from <http://en.unesco.org/gem-report/education-all-development-index>
- Vásquez, I. & Porčnik, T. (2015). *The human freedom index: A global measurement of personal, civil and economic freedom*. Washington: Fraser Institute. Retrieved from <http://object.cato.org/sites/cato.org/files/human-freedom-index-files/human-freedom-index-2015.pdf>
- Weinberg, S.L. & Abramowitz, S.K. (2015). *Statistics using SPSS: An integrative approach*. New York: University of Cambridge.

- Wike, R. & Simmons, K. (2015). *Global support for principle of free expression, but opposition to some forms of speech: Americans especially likely to embrace individual liberties*. Pew Research Center. Retrieved from <http://www.pewglobal.org/files/2015/11/Pew-Research-Center-Democracy-Report-FINAL-November-18-2015.pdf>
- Wolff, J. and de-Shalit, A. (2007), *Disadvantage*. Oxford: Oxford University Press.
- World Bank. (2015). *Life expectancy at birth, total (years)*. Retrieved from <http://data.worldbank.org/indicator/SP.DYN.LE00.IN>
- World Commission on Environment and Development (1987). *Our Common Future - Brundtland Report*. Oxford: Oxford University Press.
- World Economic Forum. (2015). *Global gender gap report 2015*. Retrieved from <http://www3.weforum.org/docs/GGGR2015/cover.pdf>
- World Health Organization. (2015a). *Life expectancy data by country*. Retrieved from <http://apps.who.int/gho/data/node.main.688>
- World Health Organization. (2015b). *Trends in maternal mortality: 1990 to 2015*. Retrieved from http://apps.who.int/iris/bitstream/10665/194254/1/9789241565141_eng.pdf?ua=1
- World Health Organization. (2013). *Global and regional estimates of violence against women: Prevalence and health effects of intimate partner violence and non-partner sexual assault*. Retrieved from http://apps.who.int/iris/bitstream/10665/85239/1/9789241564625_eng.pdf
- World Justice Project. (2015). *Rule of law index 2015*. Retrieved from http://worldjusticeproject.org/sites/default/files/roli_2015_0.pdf