Rethinking Welfare Metrics: Beyond Aggregative and Composite Indicators to a Dashboard Approach

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Table of Contents

Introduction

In Economics, the concept of welfare, and specifically maximizing welfare, has been an important area of study since the inception of the field. In modern discussions, there are at least two main uses of the term. The first, more traditional usage refers to the notion of well-being, enjoyment, or utility that an individual, group, or society enjoys. The second meaning, while connected, refers to the concept of the "welfare state". This term, at times with a negative connotation, describes programs designed to ensure a basic level of welfare, in the first meaning, for citizens through government action, rather than through the market. These discussions have given a new meaning to welfare as something that the government provides to its citizens. This paper will refer to welfare in the first sense and specifically it will discuss the methods of measuring welfare in society and what those methods imply about our understanding of welfare.

The first step in defining and calculating welfare as a question of economics is to specify its content in economic terms. While this paper will later argue that it is difficult to fully disentangle the economics of welfare from its philosophical aspects, attempts at separating the two notions were happening as early as Aristotle. Economists and philosophers have historically understood that there is a degree of economic welfare necessary to ensure overall welfare for a society, and Gross Domestic Product (GDP), or a proto-version of it, has traditionally been the measure for economic welfare. However, for reasons that we will discuss later, this economic welfare is not a sufficient condition for ensuring overall societal welfare.

In this paper, I will develop a dashboard of indicators rather than choosing one key indicator to replace GDP. I will present a collection of welfare measures that together give a better picture of the welfare of a population than any single measure or composite measure. In order to best identify indicators for the dashboard, we must first reconsider and reevaluate the

economic understanding of welfare in a few key ways in order to best identify indicators for the dashboard. These include the ethical underpinnings of aggregative welfare compared to distributional welfare, the balance between individual preferences and community-wide preferences, the practical and ethical assumptions behind cost-benefit analyses, accounting for the confounding effects of repeated cost-benefit analysis outcomes on equity, and the applicability of different indicators across cultures.

After weighing these considerations, the final version of the dashboard includes GDP/capita, the Gini Coefficient, Life Expectancy, the Poverty Gap, and the percent of income held by the lowest 10% of income earners. The specific reasons for each will be discussed in more detail later, but generally, these indicators succeed in balancing the concerns listed above. Namely, they provide a balance between aggregate and distributional welfare and between individual and overall welfare. Furthermore, these indicators provide viable information on the welfare conditions of a given society without knowledge of the particular culture and cultural understanding of welfare.

Philosophical Background

Before exploring these economic questions, we must provide the required philosophical background to discuss the problem of measuring welfare. To adequately measure welfare, we must answer three key questions. First, how does a society define itself and its understanding of welfare, both in reference to its internal structure and external societies or cultures? Second, what is the relationship between economic welfare and overall welfare? Finally, what is the relationship between the well-being of the individual and the welfare of the society of which he or she is a part? To answer these questions, we will use the work of several philosophers,

including Plato, Aristotle, John Locke, Adam Smith, John Stuart Mill, Karl Marx, Immanuel Kant, GWF Hegel, Ronald Dworkin, Franz Fanon, Chantal Mouffe, John Christman, and David Weissman, as well as some of the existing economic literature that is in conversation with these issues.

I. Historical Understanding of Economic Growth and Collective Welfare

In his *Politics*, Aristotle differentiates between property acquisition and wealth acquisition, and this discussion highlights the ethical limits constraining the development of a conception of purely economic welfare. For Aristotle, property acquisition is limited to the goods that meet the current and reasonably expected needs of the household, including the appropriate means for any necessary future exchanges. Acquisition beyond that limit becomes wealth acquisition, for Aristotle, which is unnatural in the sense that such acquisitions serve no purpose beyond the acquisition itself (Aristotle, 1257b 10-40).[i]

The first major break from this viewpoint comes from John Locke and Adam Smith. Specifically, this break is in allowing the functionally limitless acquisition of capital or property by getting around the limits on acquisition coming from need, ability to use, and spoilage by understanding labor as the basis of both property and money. For Locke almost all the value of property comes from the labor put into it, and because an individual can continue to use his or her labor until death, that individual must be allowed to accumulate indefinitely, so long as the accumulated wealth will not spoil before it can be used by anyone—and gold, or money, does not spoil (Locke, 25-28)[ii]. It should be noted, however, that Locke is not making the normative claim that one should acquire as much property as possible, but under this new understanding of the nature of property, one could now acquire limitless property without violating norms.

This background, and specifically the shift away from regarding theoretically limitless capital accumulation, that is acquiring an amount beyond what one might ever use up, as ethically problematic, gives insight into Adam Smith's theory of the aggregation of general stock (i.e., the amount of goods held by a society rather than an individual as either capital commodities or rents) for the improvement of overall living conditions. For Smith, an economy develops through further divisions of labor. As this creates ever more particularized jobs, individuals in the community become more reliant on one another to provide their needs and to acquire them through purchase. Because division of labor increases productivity, as it develops, society can produce more goods with the same number of laborers. This means that each laborer increases their individual share. For, Smith this is the basis of economic welfare, and it is an approach that manifests itself today in measuring the welfare of a country with Gross Domestic Product (GDP) or GDP per capita.

Smith does not merely suggest an aggregate societal welfare measure but essentially outlines one of the ways that economists continue to use to calculate GDP: the income approach. In *The Wealth of Nations* II.2, Smith writes that "the price of the greater part of commodities resolves itself into three parts, of which one pays the wages of the labour, another the profits of the stock, and a third the rent of the land" (286, Smith). What Smith refers to here can be rewritten in the form of GDP = W + P + R. While the modern formula includes some tweaks to include factors like interest (i), depreciation (D), and taxes (T), as well as imports (M) and exports (X) in an open economy, Smith's work here is the foundation for an understanding of economic welfare that is tied up in the total production of society. This understanding of economic welfare persists up to today and along with GDP per capita, GDP is perhaps the most often cited measure when comparing welfare on a country-wide level.

What Smith is after here is directly tying equitably distributed economic prosperity, as measured in the accumulation of the general stock, to individual well-being. While his measurement choice gives no guarantees concerning the distribution of this stock, he does argue that an individual's wages must be sufficient to maintain both that individual and his or her household. Otherwise, if the individual worker and his or her family cannot survive on the income, there will be a decline in birth rates that will lead to a reduced adult workforce in the future. The drive for increasing the general stock, as he puts it in *Wealth of Nations* I.8, "is not the actual greatness of national wealth, but its continual increase, which occasions a rise in the wages of labour." (Smith, 87). For Smith, wages provide explicitly for an individual's well-being, and focusing on society's accumulation rather than any one individual's accumulation allows for universal rises in this well-being.

Modern thinkers often credit the development of the contemporary understanding of GDP to the American economist Simon Kuznets, whose work on what he called "national income" sought to measure the production level of a country using data from the Great Depression. In "National Income and Industrial Structure", Kuznets more narrowly conceptualizes this measurement as "the net output of commodities and services flowing during the year from the country's productive system into the hands of ultimate consumers or…to the country's stock of capital goods" (1949, 207). He lays out the two main methods for calculating GDP that ring true in today's understanding of the project: through payments (wages, rates, interests, dividends, etc.) and through production.[iii] Even in his earliest works on the subject, Kuznets makes clear the limitations and possibility for abuse of his national income measurement, specifically if used as a tool for measuring welfare, and these observations will continue to apply as the idea of GDP continues to develop. Some of these limitations include the lack of consideration for income

distribution, acquired wealth, and non-market activities. Furthermore, he questions one of Smith's key assumptions, that higher production levels and income levels have a causal relationship with welfare.

Perhaps the most critical shortcoming Kuznets identifies in using national income to measure welfare is that it does not consider the distribution. He asserts that the distribution of personal income is a necessary measurement towards knowing economic welfare. He specifically discusses how national income values direct services to illustrate this point. The market value of luxury or high-quality services that an upper class consumes in one country will exceed the value of the services that a middle class consumes in a country with a lower level of distributional inequality. His argument here separates what we might call welfare value, i.e., how much a good or service contributes to an individual's welfare, from market value. Furthermore, these inflated market values in countries with a rich upper class will serve to increase national income in a way that less accurately represents national welfare (1949, 6-7). This example points towards a more general issue that Kuznets' analysis raises for using national income, understood as GPD, as a measurement for welfare: measuring economic indicators on a societal level gives little to no insight into the conditions of any given individual and perhaps not even into the conditions of the average individual. Societal measures like this at best give an estimate of a society's potential for ensuring individual welfare, but Kuznets also seems suspicious of this type of analysis.

Another limitation of national income in measuring welfare stems from its nature as a flow variable rather than a stock variable in that consumption with income from past years is misassigned. As discussed above, national income considers only payment or production that occurred within a given year. Kuznets points out that this type of indicator uses the flow of

consumption goods rather than the actual consumption level. The second category takes into account "the yield of goods owned by the consumers; and…goods they do not actually consume during the period" (1949, 228). In the context of welfare, this distinction means that some consumption goods that make up an individual year's national income measure do not provide welfare benefits to individual citizens during that year and conversely, individual citizens may gain welfare benefits from consumption goods that are not a part of national income. This disconnect seems particularly likely in countries with high levels of wealth inequality where the upper class may gain welfare benefits from durable consumption goods accumulated over past years or even generations, such as houses or vehicles the value of which persists long after the initial purchase.

Kuznets also considers the limits of national income in its application across economies at different levels of industrialization. This critique not only limits the indicator's usefulness in measuring economic welfare but even suggests it might struggle in measuring economic production as Kuznets intends. National income's focus on markets is again at the root of this limitation, and particularly in pre-industrial economies where household or other non-market production may be more common, national income fails to measure all the output in a given society. Kuznets cautions specifically about comparing two countries at different stages of economic development using national income and claims that "the apparent consistency of applying the rules of national income accounting in industrial countries to those in a pre-industrial economy is no consistency at all" (1949, 211). We will revisit this discrepancy in measurements across different levels of economic development when considering that this same discrepancy may also exist across cultures regardless of their level of economic development.

The overarching critique here is Kuznets' pushback against Smith's assumption that higher levels of income or general stock not only are linked to increasing societal and individual welfare but also is the cause of that increase. While the most charitable interpretation of Smith's arguments for using his understanding of a proto-GDP measurement is that there is only a correlation between the accumulation of general stock and welfare rather than the former causing the latter, Kuznets' critiques imply that there may not exist any universalizable relationship between welfare and national income. Kuznets first is explicit that his measure of national income does not account for "consumption levels, planes of living, and functional equivalents", i.e., it is strictly a measurement of national production and does not describe the living situation of a society to any degree necessary to make assertions with respect to welfare (1949, 229). Kuznets also comments that future thinkers' interest in comparisons across industrial development and social systems will need to expand beyond the current definition of national income and redefine it or replace it all together. However, for decades, policy makes have not heeded this advice as GDP assumed its role as the dominant measure for comparing societal development after the Bretton Woods conference in 1944.

In light of this discussion, we can see that GDP best functions as a specific measure of economic output via the market, and while statements that GDP was never meant to measure welfare, like the one Andrew Aitken (2019) makes, may be true in some respect, they overlook the historical context of the term. However, Aitken's main argument that GDP is an insufficient welfare measure is well taken and follows from Kuznets' encouragement for further development in this area (Aitken 2019). As Aitken and other scholars have pointed out, GDP does not take into consideration factors like inequalities in income and wealth distribution, poverty rates, education, health outcomes, individual happiness (a term notoriously difficult to

define and measure), and environmental quality. These deficiencies are why indicators of these specific characteristics of an economy such as the Gini coefficient for distributional equity or indicators that seek to incorporate more than one of these factors like the Human Development Index (HDI), or the Measure of Economic Welfare (MEW) have been developed. However, each of these indicators individually fails to encompass all of the qualities of welfare laid out above.

II. Welfare Analysis Approaches

It is important both to establish the ethical underpinnings of welfare and to reform the way it is measured because welfare measurements are both guides and rubrics for welfare policy. As Verena Risse (2015) points out, this project is far from a solely theoretical issue and welfare measuring strategies have direct effects on public policy. To give some oversimplified examples, a one-time broadly targeted welfare scheme, like the COVID relief checks, may show significant results under aggregate measurement strategies, but under strategies that emphasize distributional equity, these programs may show minimal results over time.[iv] Conversely, a more narrowly targeted, ongoing program like SNAP Food Benefits, formerly known as Food Stamps, may not significantly affect aggregate consumption or income measurements but have a much larger effect when considering distributional equity.[v] Furthermore, important factors like environmental quality are completely overlooked in many welfare measurements. While it is tempting to meet this problem with the belief that no set of indicators could possibly encompass the meaning of economic welfare in its totality, the goal of this paper is to identify which factors of welfare we can most adequately measure and to consider how to best utilize those measurements.

Risse is working under the framework that Ronald Dworkin (2013) outlines in his discussion of the social contract, where he argues that goals, rights, and duties act as the justification for political decision making and around which societies form.[vi] Political theories and forms of social organization, therefore, differ from each other not just based on what goals, rights, or duties they emphasize but also how those three types of societal pillars interact, support, or underpin one another. Dworkin does not define any specific relationship between the three as he argues that each type could underpin any of the three. For example, a goal of general welfare might support the goal of increased employment, or this same goal may support the duty to drive safely. So, while any coherent political and societal structure will have a fundamental understanding of all three, any one theory will unavoidably emphasize one over the other two and function either as goal-based, rights-based, or duty-based (241-243).

Dworkin most closely associates a goal-based society with overall welfare and correctly recognizes that right-based and duty-based societies concern themselves more with the individual. However, it is not clear that rights-based and duty-based approaches to society cannot offer any insight into how to achieve higher levels of overall welfare. Furthermore, this goal may require support from certain rights and duties to better facilitate the means necessary to achieve it. It is from this perspective that Risse attempts to outline an understanding of overall welfare through the lens of all the types of societal structures.

In her work, Risse lays out three distinct approaches for welfare analysis that all seem important to consider for evaluating current and future economic welfare. First, she describes the goal-based approach to welfare, an approach that follows closely with traditional, GDP-style welfare measurement. This approach emphasizes a type of consequentialism[vii] towards the fundamental goal of the society. While in principle, this goal could be anything, building on the

work of the political philosopher Joseph Raz, Risse acknowledges that the goal with respect to welfare must be to benefit all members as they compose the society itself. However, because of the acceptance of consequentialism, achieving this societal goal can come at the expense of specific individuals in the society. This sentiment is encapsulated in the concept of benefit-cost analysis, a topic we will explore further later in this paper. Generally, this strategy fits best with aggregate welfare measurements like GDP and GDP per capita but also some more progressive indicators concerning health, education, and environmental quality that aggregate positive and negative outcomes without consideration for specific individuals.

The second approach Risse discusses in the context of welfare is the duty-based approach, and this approach has three possible interpretations. The first is a purely deontological understanding of duty in the vein of Immanuel Kant's Categorical Imperative.[viii] The second is an understanding of duties as deriving from individual rights. The third interpretation sees a similar relationship but rather than between duties and rights it is between duties and goals, like in the first welfare approach. Risse's conclusion here is that while it is possible that duties alone are sufficient as a foundation for moral concerns, in the political, and therefore economic, domain, they are most useful in support of either a goal-based system or a welfare approach that focuses on rights. This means that in Risse's understanding, a society will still need to define goals and/or a system of rights that promotes the growth of economic and therefore overall welfare.

This rights-based approach concerns itself most with protecting the normative standing of each individual in society as someone holding rights. This approach seems to be the converse of the goal-based approach in that it sees each member of the society as individually valuable rather than valuable only in their participation in the group. However, this can lead to difficulties in

separating an individual's rights from his or her personal interests, and there is an inherent danger in conflating these two categories. While there is certainly some ambiguity here, personal interests are usually less necessary and less universalizable than individual rights. This approach lends itself to welfare indicators like the Gini coefficient that take each individual into consideration by looking at the distribution of resources rather than just a mean or an aggregation of all the individuals.

The problem that Dworkin and Risse leave us with, then, is how to conceptualize a welfare measurement scheme across a variety of different societal structures that vary in not only the content of their goals, rights, and duties but also how they weight them against one another. While both thinkers are considering welfare on a per-society basis, welfare in the comparative sense between societies is equally if not more important. Because the numerous political communities will have different foundational goals, rights, and duties, the best way to measure welfare must work across these different societal structures and also function in a way that does not inherently favor one system over another. The main tension to be worked out, therefore, is around accounting for the goal of societal welfare without neglecting the rights and duties tied to individual well-being, and the goal of this project is to argue that a dashboard approach to welfare best achieves that balance.

David Merrill (2015) further discusses a rights-based approach to welfare through the lens of Hegelian philosophy and the understanding that each individual has the right to pursue his or her particular interests through the economy. Paired with this is the right of the community to determine the method by which to satisfy the particular interests of each individual. Merrill comes to this approach because of its ability to work within the context of market disequilibrium.[ix] Hegel's philosophy achieves this in three ways that other ethical

systems fail. First, it is able to define welfare in a way that maintains its subjectivity. Second, it is able to reconcile the subjectivity of welfare with self-determination and freedom. Thirdly, using Hegel's theory allows for reasoning about welfare in the particular. Merrill sees these as addressing three issues with utilitarianism, Lockean ethics, and Kantian ethics respectively (440).

Merrill's first philosophical concern, around maintaining subjectivity, targets utilitarianism. Utilitarianism fails because of the way in which it requires some defined and universal system for measuring utility and welfare. Once some authoritative third-party implements this system, the truth of the individual's well-being is lost because it is only known through the lens of this system. In general, Merrill argues that an external understanding of the individual's well-being is impossible or at least can only ever show partial truths. Merrill demands an ethical underpinning for welfare that both allows for individual judgements and knowledge without overly restraining their options. A utilitarian structure does not allow for the adequate opportunity to learn and act on the subjective knowledge that the individual has concerning their own well-being.

The second philosophical concern that Merrill raises with these other ethical systems applies most strongly to Locke's discussion of freedom and rights. Locke seeks to define the freedoms of the individual in his *Second Treatise on Government* both through their right to life, liberty, and property and with the creation of the social contract, but Merrill is concerned with the lack of an explicit space for welfare in this creation of freedom. More specifically, Merrill argues that "the right to welfare is not being upheld in the right to a social contract" (438). Furthermore, these rights do not provide structure for the individual to determine and understand what is necessary for their own well-being. So, while Locke has ensured a sense of individual freedom and has not restricted the subjective understanding of well-being for the individual,

Merrill is concerned that this has come at the cost of failing to describe well-being in any meaningful way—life, liberty, and property are good ideals, but at best, they leave the question of what constitutes individual welfare underdetermined.

Merrill targets his third concern towards Kantian ethics and particularly the problem of universalizability. Kantian philosophy fails to provide opportunity for considering welfare in the particular terms that are necessary to maintain the individual subjectivity Merrill argues for. The first form of the Categorical Imperative, which states that one should "act only according to the maxim whereby you can at the same time will that it should become universal law" is the main focus of Merrill's critique (Kant, 421). Merrill, like other critics of Kant, argues that actions are nearly always too particular to be universalizable in this way. Kant is famously strict on this point, as shown in the short essay "On a Supposed Right to Lie Because of Philanthropic Reasons", where he argues that even in the extreme situation of a murderer asking whether or not his or her future victim is in the house, one has a duty to tell the truth. This is the case because for Kant "to be truthful (honest) in all declarations is…a sacred and unconditionally commanding law of reason that admits of no expediency whatsoever" (427). Merrill raises one additional note with respect to Kant, arguing that there may not be a strong connection between acting in a way that Kant would consider right, i.e., acting according with the Categorical Imperative, and acting in a way that improves one's well-being.

In his *Elements of Philosophy*, the work that Merrill most often references, Hegel outlines a view of civil society that focuses on the relations between particular individuals and argues that these individuals must interact in such a way that "each asserts itself and gains satisfaction through the others" (220). Because of this and despite each individual acting selfishly, the interdependence creates a society in which an individual's well-being is based in the welfare of

the community and the rights of all the members (221). Hegel also views the conditions for individual well-being and societal welfare as continually increasing and "inexhaustible" in relation to the economic advancement of society. Henrich Hotho, a Hegelian scholar some of whose notes are included in the text, gives a somewhat anecdotal example of this to make his point when considering the way in which the English define what it means to be "comfortable" and the way that the conditions for being comfortable continue to change with economic and technological developments. (229). These two concepts are Merrill's main focus in advocating for a Hegelian ethics of freedom in justifying welfare practices.

This Hegelian version of the rights-based society, to use Dworkin's terminology, is unique because in some ways it overcomes the comparison issue because these individual rights to pursue self-interest in an interdependent civil society are universal for Hegel. However, because in his application of Hegel's philosophy Merrill insists on maintaining the subjective nature of welfare, these rights alone may not be sufficient to establish the full scope of societal values necessary for Dworkin. The system of rights for defining welfare advanced in Dworkin seems to demand something even more specific than what Hegel's system outlines. However, these seem beyond the scope of what is necessary of an ethical framework because it will depend on the individuals within the society. Therefore, different societies operating under this Hegelian framework will need to reach a greater understanding of the rights (or duties or goals) that establish their welfare values. So, while it may seem that Merrill gives a universalizable yet particularly applicable understanding of foundational rights and welfare in civil society, the economic policy decisions that drive societal welfare require greater specificity that Merrill cannot commit to from this *ex ante* understanding of the societal conditions. This again highlights the importance of a dashboard approach to welfare, particularly in comparisons across

societies, because it is more successful in maintaining and displaying these particulars, and so gives greater insight into the best welfare remedies.

III. Normative Welfare & A Post-Colonial Critique

Merrill's discussion of the subjectivity of welfare brings up a further consideration that is important for this project of reevaluating economic welfare: is welfare normative? In other words, is there some natural or innate "best" welfare situation or is welfare dependent on context? This second option raises the further question of whether there is a type of welfare specific to economic activity or if economic welfare is just a way of describing societal and individual welfare overall. While these questions are important to consider, for the purposes of this project it is necessary to take their answers as given in order to proceed. In other words, we are assuming that a successful welfare dashboard will have a collection of indicators such that if the indicators show identical output for two different societies, we can assume that the two societies have provided an equivalent state of welfare for their respective citizens.

But we will need to consider a post-colonial critique of our assumption to ensure that the measures we consider can be reasonably and consistently applied across different societies. The question this critique raises concerns the uniqueness of cultural values in light of the independence and development of non-Western nations. We will use the works of Frantz Fanon and Chantal Mouffe to discuss how societies determine their values, particularly in the post-colonial context. Fanon outlines the vacuum left after the removal of the colonial power and the different ways that formerly colonized people might replace those values. Following from this, we will borrow Derrida's language of the constitutive outside, as Mouffe does, to discuss the formation of cultural values more generally. This recent shift in the values of the newly

independent nations provides the most accessible touchstone for the discussion of changing cultural values. It will be important for an effective welfare dashboard to account for this variation in values, so to do this, it is important to understand what those values might be and how they came to be. Furthermore, it would be problematic to impose a Western perspective and assume that all cultures have homogenous values.

During the period of European colonization, especially in Europe, there existed a stark dichotomy between the "good" values of the West and the "evil" value of the colonized and the foreigner, and this general attitude that holds the outsider as lesser has its roots as far back as ancient Greece. Decolonization, says Fanon, must therefore involve "the urgent need to thoroughly challenge the colonial situation" (2). Fanon discusses several possible value systems or power structures that might arise during decolonization. This culture war first begins when the colonial bourgeoise realize they can no longer maintain their domination and so begin to subvert the culture and values of the colonized as a way of protecting themselves. What this eventually leads to is a replacement of the colonial bourgeoise with the colonized intellectual, who seeks to recreate or perpetuate the existing value system that brought them into power.

This cultural divide became engrained in the value system of the colonized people in such a way that after decolonization, there was the need for a new "them" against which to define the culture. While the former colonist certainly fills this role, there is also a desire for the new nations to distinguish themselves from their neighbors. This occurs on geographic and religious lines between what Fanon calls "White Africa", north Africa and predominantly Muslim, and "Black Africa", sub-Saharan Africa and predominantly Christian. Even these identities have their roots in conquest and colonization, but these communities, according to Fanon, struggle to return to their "native" culture. Fanon argues that this struggle partially emerges from the

colonial understanding of the colonized as "impervious to ethics, representing not only the absence of values but also the negation of values" (6). While this view has no basis, it is important for contextualizing the development of new cultural values in a post-colonial environment.

While Fanon operates in the context of post-colonial Africa, in her work on group identity, Chantal Mouffe argues that all societies determine their values against a constitutive outside, some 'other' with a different identity and set of values. This is the process Fanon describes as part of decolonization, where newly independent nations define their cultural values in contrast to the previous colonial values and those of their neighbors, not necessarily in line with Western values. For Mouffe, all identities are, by definition, relational, and she argues that "the affirmation of a difference is a precondition for the existence of any identity" (5). Mouffe's main project is to argue against consensus theories and say that these identity-defining differences, to a degree, can coexist with an eye towards forming communities.[x] On the scale of a country, or even a region of culturally similar political societies, the values must explicitly determine what is not acceptable to the identity, and this is the constitutive outside. Because most of the recent colonial empires have been Western, the constitutive outside against which the former colonies build their identities *is* the West and their values. This does not mean there is no overlap in values, but it ensures there is not complete unity or compatibility between values in Western and non-Western cultural contexts. This critique is not only applicable across countries but also within countries: we could apply it to the distinction between urban and rural welfare and whether or not those sub-societies share the same welfare values, for instance.

This lack of consensus is of paramount importance for considering welfare measurement in light of the question of normativity that Merrill poses, as cultural values may conflict in their

understanding of welfare. We will use this critique to set limits on the kinds of indicators available for this dashboard because a successful welfare indicator, either a dashboard or a composite indicator, must be applied only in areas of universal or near-universal overlap of cultural values rather than imposing a certain culture's set of values universally. The first type of indicators that seems to fit this description are economic ones like GDP per capita and income and wealth distributions because basic economic conditions are necessary to experience other factors of well-being that may be culturally specific, as Smith claimed. In this same vein is the second type of indicators: health indicators. Like the basic level of economic well-being, an individual's health is a necessary part of their well-being. These seem to be the two main types of indicators that are widely universalizable, so we can include them in the welfare dashboard.[xi] The flexibility and transparency of the dashboard approach comes to the fore here because of the ability to add, remove, or focus on certain indicators given a certain cultural context.

Given this approach there are two notable categories of indicators that are not included in measuring welfare: educational indicators and measures of government structure or of particular government institutions. This is not to say that these cannot contribute to societal welfare, but they do present a problem of light of the post-colonial critique. To take educational attainment as an example, different cultures may value different levels and types of education differently so a simple metric like "average years of schooling" or "percent of high school graduates" imposes a certain cultural position, usually a Western one, on whatever society it is meant to measure. Similarly, looking for certain types of government structures or programs like democratic elections or a national healthcare service present these same types of issues that make it difficult to measure their import across cultures. Another notable indicator that is not included under this

restriction is living arrangements because there is a discrepancy in the value of multi-generational family homes between non-Western and Western cultures.

IV. The Relationship Between Economic and Overall Welfare

We set out to answer two key questions about welfare: is welfare normative, and can we use economic welfare to measure overall welfare? In the discussion above, we answered the first question and determined that while there are certain facets of welfare that are non-specific to the society and are thus normative, many facets of welfare are society specific and so cannot be considered normative. We used two different approaches to consider this issue. First, we considered how societies define themselves internally, particularly with respect to their goals, rights, and/or duties. Second, we considered how societies might define themselves against some 'other', and why that necessarily requires different cultural identities with unique understandings of welfare.

Concerning the second question on the connection between overall welfare and economic welfare, in this paper I will argue that economic welfare is a necessary but not sufficient condition for overall welfare. This understanding of the relationship between economic welfare and overall welfare is acceptable both because there is precedent for it in much of the economic and philosophical literature and because of the limitations of data collection. The precedent, particularly in the philosophical literature, is concerned with individual economic well-being as a necessary but not sufficient condition for individual overall well-being. However, this general argument can also be applied to the discussion of economic welfare as a necessary but not sufficient condition for overall welfare. We will later discuss the specific differences between

individual well-being and societal welfare, but first we will examine the arguments for the role of economic condition in leading to improved overall conditions.

As far back as in the opening of Plato's *Republic*, Socrates and his interlocutors discuss the relationship between wealth, understood as the ability to pay one's debts, and being just as a core condition for happiness. In *Republic* I, Cephalus comments that the hardships of old age are redoubled if paired with poverty. He goes on to argue that the possession of wealth is most useful because it makes it easier for an individual to be good because he can provide for himself without cheating others (331a-b). The more important discussion of the relationship between material goods and overall well-being or virtue, however, comes in *Republic* IV where Plato discusses the dangers of both poverty and wealth for creating virtuous and happy citizens (422a). The focus in both discussions is that lack of economic resources will drive an individual to act in ways that go against their natural good to compensate. Plato gives the analogy of shepherds neglecting to care for their dogs, which causes them to do evil to sheep, "acting not like sheepdogs but like wolves" (416a).

In *Nicomachean Ethics* I.8, Aristotle addresses arguments concerning what kinds of goods are necessary to be happy and achieve human flourishing, which is how he describes the highest state of individual well-being. Most important for this discussion is how he characterizes the role of external goods. The accumulation of these goods is not a part of virtue, but rather these goods are often instruments of virtuous actions (1098b 30). As we discussed earlier, Aristotle argues against the accumulation of wealth beyond the current needs and reasonably expected needs for subsistence. But here he is clear that there is a minimum level of these external goods that is not only good to have for their own sake for their external uses, but also that they directly facilitate higher actions of the type he argues are critical for happiness and

individual well-being. Aristotle also comments on the relationship between a certain degree of physical property and economic well-being and an individual's overall well-being in the *Politics* as discussed above.

Both Plato and Aristotle show equal concern for excessive wealth and poverty in terms of the effects on individual well-being (and this corresponds to Aristotle's understanding of virtue as being in moderation or at the mean between two extreme vices), but because this project is focusing on countries rather than individuals, this concern is not truly applicable. While in many, if not all, countries there may exist a group of individuals who would meet the threshold set by these ancient thinkers for excessive wealth, no society has reached such a level of economic prosperity, both in terms of both aggregate and distributional indicators, such that these ill-effects of wealth are pervasive on even a large minority of individuals within that society. Furthermore, the shift in the understanding of property that occurs with thinkers like Smith and Locke, as discussed earlier, extends the ranges of potentially acceptable wealth levels in such a way that problematically excessive accumulation becomes less prevalent than poverty.

Both Plato and Aristotle here are discussing how material conditions, which we can measure with economic indicators, are critical for individual, overall well-being, and the arguments, particularly Aristotle's, do seem to carry over to the societal level. The idea of economic power and material goods as instruments for providing overall welfare and happiness to the society has clear practical applications, particularly in the effects that cannot be measured as easily. We can apply this both to aggregate measures and distributional ones. The aggregate amount of output, wealth, or income might show how a government could provide further welfare benefits to the citizens and increase overall welfare in society because higher levels of individual wealth or income should correlate with the amount of funds available to the

government for welfare increasing programs. Similarly, the distributional indicators that take greater account of each individual may show the capacity across society for individuals to use their own wealth or income in the way Aristotle describes as instruments for their own well-being.

More contemporary thinkers like John Christman (1998) discuss this connection between material needs and well-being in the context of autonomy. In the American welfare context, Christman explains how the goal of anti-poverty programs is to provide independence, but he wants to distinguish this freedom from certain dependencies from autonomy as the true driver of an increase in the welfare conditions. He is clear that dependence in many cases does not degrade welfare, and he gives the example of a religious institution or ideology as a type of dependency that is "so constant and unavoidable and so deeply involved in our deliberations, value constructions, motives, and the like that they… become part of who we are" (385). Dependencies only become negative when they disrupt the manifestation of one's authentic self and in doing this, they conflict with one's autonomy.

For Christman, the connection between autonomy and welfare conditions manifests itself in a capitalist society because the state relies on markets to provide citizens with many of the goods and services they need for their well-being, and so if the citizens cannot act in such a way due to economic restrictions, it is the duty of the state to provide them with the material conditions necessary for their autonomy. The most obvious and basic of these material conditions are health care and nutrition because these "resources are clearly necessary for the competence required for autonomy" (391). Deprivation of these needs can lead to detrimental effects on cognitive development and quality of life. What Christman's argument emphasizes on the whole is the ability for the individual to make choices for their own benefit, and this requires

both economic freedom and cognitive autonomy, with the former being a necessary condition for the latter.

David Weissman (2018) makes a similar argument that the question of autonomy and free will is inherently connected with one's material conditions. This argument, and the one Christman makes, fall in line with Kant's argument in *The Metaphysics of Morals* concerning the necessary financial independence of a citizen to participate in the government. For Kant, the requirement for citizenship is fitness for voting, and this implies that "anyone whose preservation in existence… depends…on the arrangements made by another (except the state)" lacks the independence necessary to act as an active citizen (315). For Kant, this dependency is explicitly economic: he gives as examples apprentices, servants, and young children. Both Weissman and Christman assent to this position and recognize the importance of material conditions on human choice, but they take it slightly further than Kant in terms of connecting that free choice to ensuring one's own happiness and well-being. Therefore, because a certain level of material wealth is necessary for truly autonomous choice, which is in turn necessary for ensuring one's own well-being, there is a certain level of material wealth, understood through indicators of economic welfare, necessary for well-being.

Under this understanding of the connection between economic or material well-being on the scale of the individual and how this might apply to society at large, we can return to the more general issue of the connection between individual well-being and overall societal welfare: is overall societal welfare more than the sum of a society's individual well-beings? To answer this, we will look to further define the relationship between an individual and the society of which they are a member. Furthermore, because of the types of data available, this project has no available method for measuring other facets of overall welfare, like some measure of happiness

or temperament. Therefore, this discussion of the relationship between an individual and their society will give insight into which of the available indicators will be most useful in attempting to measure welfare.

V. Beyond Summing Well-Beings

Considering which of Risse's welfare approaches to take, it seems ideal to take aspects of the right-based and the goal-based approaches, rather than choosing any one of the three approaches over another. While this may at first seem antithetical to the principles of each, our individual and collective duties seem aligned in both directions. One values the societal goal over each individual's circumstances while the other is focused on the individual, therefore the use of a dashboard of indicators (rather than attempting to construct a single indicator) is most effective for measuring economic welfare across a variety of relevant modes and perspectives. Essentially, this comes down to finding a balance between valuing the individual and valuing the societal goal. However, as discussed earlier, the main issue with valuing individual welfare outcomes is the possibility of conflating individual interests and individual welfare. Talbot Brewer (2009) discusses the difficulties of both of these approaches, arguing that personal welfare is completely reliant on subjective experience. This makes aggregative approaches difficult because, to have any meaning, these types of measures must assume that "each individual has a distinct good and that this good remains uniform enough across different occasions and lives to admit of being tallied up into a meaningful measure of the social good" (2009). While there is an argument to be made here that statistical analysis is specifically intended to overcome this issue of individual perspectives, there is also an important

philosophical discussion to be had here concerning why society is more than just the sum of its individual parts.

Brewer's argument about the subjectivity of the welfare experience seems to align itself with the writings of the personalists, a school of philosophy and theology that argues that the ultimate value of reality is on the individual level of the human person. John Nota (1986) discusses how the personalist thinkers Max Scheler and Karol Wojtyla understand this position in the context of the individual's membership in community. The person, for these thinkers, includes community, so rather than individuals contributing to the community at large, the community incorporates itself within the identity of the individual. Thus, the community is the sum of its manifestation in each of its members. This outlook leads to the problem raised in Brewer's article that these individual layers may cause the well-being of any one individual to not share a connection to the societal welfare. It is clear that the state of the individual must be considered, using strategies such as distributional indicators, but a necessary condition for any type of welfare measurement is that the societal welfare level gives meaningful insight into the well-being of the individual members of that society. To justify this condition, we can turn to the work of John Stuart Mill and Karl Marx's "Die Judenfrage".

In "On Liberty", Mill emphasizes the necessary balancing act between developing individuality and the strength of society. While he argues that the individual can be left to determine certain things for himself or herself, society itself is not just the grouping of these individuals together; rather, it ensures certain liberties for each individual. However, he also cautions against the possibility that society will overreach and exercise too great a level of control over individual actions that do not affect other members of society. Generally, society serves to educate the individual in accepted customs and enforce those customs against the

individual, and most often these customs or rules of conduct result from the interests of the upper class rather than the combined interests of all the individuals in a society (2015, 10). Despite this biased process, society should still intend to work for the protection of all individuals in exchange for acting by these rules of conduct. Mill does not understand this exchange as a contractual one; instead, society can demand certain actions solely because that is its role (73). For Mill, society has clear imperatives and spheres of action that go beyond the role of any one individual within the society.

Society, in Mill's view, functions to ensure individual liberties and prevent tyranny, educates individuals on its customs, and works with individuals to alter those customs. Society's role in ensuring individual liberties is complex because society itself presents the greatest dangers in creating a tyranny of the majority, a tyranny of the most prevalent ideas and customs. However, combatting this danger requires society to act a certain way, and the acts of certain individuals alone cannot prevent this tyranny (8-9). Mill recognizes the need for a check on the power of society, and he places that boundary such that society should not interfere with individual acts that do not affect others interests of others (14). This still leaves room for variation in the restrictions that society imposes on the individual, and it is the customs discussed above that further define society's role. Ideally, these customs promote individuality so that the entirety of humanity is better off (62). The health of society therefore is measured against its performance in these functions towards the betterment of its members and not only the state of the individuals in the society.

Furthermore, Marx also argues that civil society has a tremendous impact on the individuals in society and the way they interact with each other economically and otherwise. Marx understands this impact as negative overall: he argues that in joining society, individuals

give up their humanity and lose the power to structure relationships with their fellow humans. Critical to understanding Marx's argument is his idea of species-being, the way humans naturally are outside the influence of society and as governed by human nature alone, and species-life, the normal relationships between humans within species-being. Marx has a very optimistic understanding of these natural operations and believes that humans operating as species-being within species-life will work to provide for themselves and one another in a way only available because of their intimate understanding of their individual needs. The economic, political, and social machinery that develop in civil society reduce each individual to parts of a greater machine and that removes them from species-life and separates social force from the individual. Furthermore, the understanding that what society does not explicitly allow for is forbidden limits the power of the individual.

Marx argues that there are two steps for the internalization of one's own social power from society: taking back one's individual works and defining the structure of one's relationships with other individuals (1994, 21). In terms of the individual, Marx is not only concerned that they have traded away their labor to the capitalist, but the separation from working to satisfy one's individual needs also removes one's individuality and humanity. The proper work for the individual human being is working to provide for themselves. In doing the work society demands, the individual is standardized and molded into whatever is most useful to society, and this redefining of the individual makes them unrecognizable not just as an individual but as a human. This process can be likened to a craftsman fashioning a spear from a tree. In chopping down the tree, cutting it down to a standardized length, and sharpening it into a fine point, the craftsman eliminates the ability of the tree to exercise its proper functions (growing, photosynthesizing, reproducing, etc.) and has destroyed most traces what made that particular

tree different from any other. In the same way, society eliminates the individual's ability to exercise the functions that make one human and destroys and devalues each person's individuality.

Similarly, society functions to reorganize relationships by assigning new goals to be achieved, and it creates new types of relationships that would not exist between the same individuals outside of the societal context. Just as the individual is changed to suit the new socially defined needs, the relationships between members of society are completely different than the relationships they would form under species-being in their species-life. Unlike under these ideal conditions, relationships in society are no longer structured to the benefit of the particular individuals but rather to some less specific goal. Although these relationships may form with the same physical individuals, the structure is changed in such a way that each member becomes a non-descript agent in society's goals of standardization and efficiency. So, while Marx emphasizes society's contributions to the consumer mentality, rather than producing towards our individual or communal needs and the separation of the worker from the products of their labor, perhaps most important for this project is that society as Marx understands it functions to alter individuals and their relationships in a way that makes them fundamentality different from what those individuals and relationships would be outside of society but fundamentally better suited to improve and increase well-being of society as a whole and, given just power relationships, the material well-being of all of its members (within limits).

Both Mill and Marx, despite coming to the topic from their own direction, acknowledge the critical role society itself plays in structuring and defining the lives of its members and the relationships between them. In other words, society acts on the individual and is more than just the term used to refer to a collection of individuals. This is critical for the discussion of welfare

because it means that a higher level of societal welfare allows society to function better in its role in providing the conditions that make it possible for each individual to enhance their own well-being through socially-constructed cooperation. Thus, measuring societal welfare gives insight into individual well-being. Different measures will give varying degrees of insight as distributional indicators describe in more detail the conditions of a wider range of individuals in the society and aggregative measures mostly explain the conditions of some hypothetical average or median individual the manifestation of which may or may not actually exist in the society.

Economic Analysis

Having now adequately considered these philosophical concerns with measuring welfare, we can turn to the economic issues and methodologies for this project. We will first discuss the meaning of welfare in a specifically economic context and what measuring that might entail. This will include an examination of the process and consequence of cost-benefit analysis and different ways to evaluate income distributions. Next, we will review the reasons for selecting each indicator that will be included in the dashboard and the reasons for excluding certain other indicators. Third, we will categorize culturally and geographically the countries in the data from The World Bank in a way that more accurately reflects their respective cultures. This will allow us to analyze trends within the data both over time and between the different indicators we have included in the dashboard. Finally, we will discuss four example welfare comparisons using the dashboard we have created throughout this project.

VI. Measuring Welfare

In light of this discussion on the differences and connections between individual well-being and societal welfare, a guiding principle for the strategy of welfare measurement discussed in this paper is finding a balance between the importance of any one individual and the success of society at large. Practically, this means that we must consider metrics that specifically measure both individuals, like those considering income distribution, and those measuring the overall state of some characteristic of society, like life expectancy or GDP per capita. However, before collecting indicators for the dashboard approach, it is necessary to discuss what might be necessary for a welfare strategy to meet the needs of comparison between societies and over time.

In "A Cardinal Concept of Welfare", Marcus Fleming (1952) discusses which types of ethical systems provide an understanding of welfare that can be measured and compared numerically. He lists what conditions are necessary in a welfare approach to meet these measurement needs. First it must guide behavior through its consequences. Second, it must be self-consistent. Third, there cannot exist any indeterminacy in the relative desirability of distinct situations, that is, all situations can be ranked using strict inequalities. To understand his fourth requirement, it is important to understand how Fleming understands overall individual welfare as a function of individual momentary well-beings that make up each situation. What this means is that every situation is either an elementary situation where only one mental state exists or a situation made up of several mental states, each with their own well-being measure, that sum to indicate the welfare in that overall situation. What the fourth requirement states is that overall welfare as a function of the well-being measure of each mental state involved in the current moment is increasing and all partial derivatives with respect to each mental state are greater than

0.[xii] Fifth and finally, the approach should only consider differences in outcomes. What seems most pressing from these requirements is the emphasis on consequentialism as the only option for cardinal welfare measurements. So, while an exploration of Kantian and Hegelian implications on welfare measurement along with strictly consequentialist ones is important to understand what types of indicators are best, we must impart the insights from our deontological considerations in a format that is compatible with consequentialist measurements. To do this, the dashboard of welfare indicators must include measures of distributions, along with aggregative measures, to best measure the effects on the individual.

The use of distributive indicators is meant as a check on a faulty key assumption underlying the repeated use of benefit-cost analysis as a tool in a policy context: that repeated decisions based on costs and benefits, usually to different people, tend to spread the costs and benefits in such a way that in the long-run, everyone will be better off to varying degrees. This assumption is discussed in Alder and Posner (2006) who argue that this strong assumption is rarely met in practice. Under either the Pareto standard or the Kaldor-Hicks standard that one could argue cost-benefit analysis approximates, there is little practical evidence to show that this assumption generally holds (20-22).[xiii] Because of this, distributional indicators are important for showing the compounding effects of losses on certain individuals or groups over time. For example, pollution abatement policy seems well suited for cost-benefit analysis because environmental quality is a public good. However, throughout the United States there is a pattern of "environmental injustice" such that communities with lower income and communities with a high percentage of people of color have worse levels of air quality (Badger). This seems to imply that these communities are the environmental policy losers a higher percentage of the time.

A further concern with the use of cost-benefit analysis is that under this common assumption of cost and benefit functions, it fails to meet Fleming's fourth condition for a cardinal understanding of welfare. An example can highlight this deficiency from Fleming's perspective. Suppose that the government is considering a new policy that can be implemented in such a way that its effects can have varying degrees; for example, consider pollution abatement or the extraction of some natural resource. As shown in Figure 1 to the right, cost-benefit analysis prescribes evaluating the cost and benefit functions of the potential domain of policy implications and finding the level that maximizes net benefits.[xiv] In this example, as is common in economics, we have assumed marginally increasing costs and marginally decreasing benefits. The issue here, as is made clear by the graph, is that increasing the quantity (or intensity) of the policy will not always result in an increase of net benefits, and eventually this increase will result in negative net-benefits, where the value of marginal costs outweighs the marginal benefits. This, however, is in direct conflict with Fleming's fourth condition that states that the welfare function, in this case the benefits function minus the cost function, must be strictly increasing.

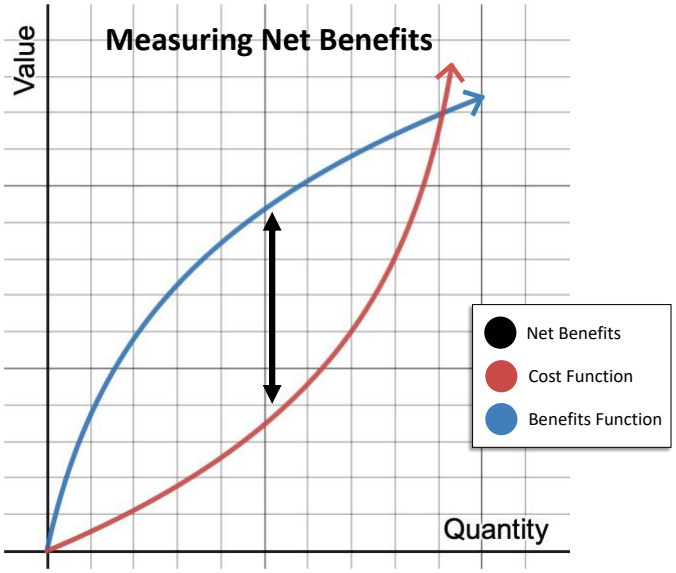

Figure 1

While we have shown that distributional indicators will offer key insights, it is also important to discuss, as Moti Michaeli (2021) does, how to value different distributions. The first method for ranking different distributions we will consider comes from the work of John Rawls and his idea of the original position. In his *Political Liberalism*, Rawls seeks a method for

developing justice as fairness in the social contract. The main problem for that he encounters is that the existing background framework, each individual's social status, religious affiliation, and racial identity, among other factors, will affect how he or she values certain distributions. To overcome this bias, Rawls proposes that we judge these distributions from what he calls the "original position". This hypothetical and nonhistorical agreement allows individuals to assent to or dissent from certain societal structures, or for our purposes, specific income or wealth distributions, from symmetrical viewpoints, thus eliminating the biases derived from the background framework. Rawls argues that from behind this "veil of ignorance" towards one's social status, each individual will assent to a certain distribution if and only if the minimum outcome is sufficient to them. Despite this focus on the left-tail of the distribution, Rawls argues that the minimum values give rise to specific middle and right-tail values. In other words, he believes that, for a given set of technological and social conditions, there exists only one shape of distribution with an acceptable left-tail, but this will change with those conditions.[xv]

While it is clear that the left-tail of wealth and income distributions deserve a great degree of focus, particularly from a policy perspective, it seems unlikely that Rawls' assumption holds strongly enough that the other parts of the distribution can be fully ignored or expected to simply fall into place. This is where an alternative method becomes necessary to further rank distributions based on their other characteristics after some initial Rawlsian evaluation of the lower end. One method that Michaeli proposes is to rank distributions based on a geometric mean. This method follows from the economic understanding of welfare like a lottery, that it is the expected value of overall welfare that is most important, not the minimum. This is known as the Kelly criterion for valuing distribution. While it is possible that these methods, when used

independently, rank some sets of distributions the same way, it is more important to consider the times when they will differ, such that using them in tandem offers the best outcome.

A final method for considering the whole distribution is calculating a distribution's Gini coefficient. Like the geometric mean, this method considers the whole distribution rather than just a certain section, like the left-tail. As Robert Moore (1996) discusses, there is a close connection between geometric mean rankings and rankings by the Gini coefficient, and when used in conjunction they can create a complete ranking of distributions given certain parameters. The Gini coefficient is calculated using a Lorenz curve to represent the observed cumulative distribution of income or wealth. The Gini coefficient (or index in percentile form) shows the difference between this Lorenz curve and the line of equality (a 45° line with a Gini coefficient of 0) as shown in the figure to the right. The Gini coefficient (G) is calculated by the formula G = A/(A+B) with A representing the area between the line of equality and the Lorenz curve and B representing the area under the Lorenz curve.[xvi] The Gini coefficient serves to further differentiate distributions in the same way that the geometric mean can differentiate distributions with the same arithmetic mean.

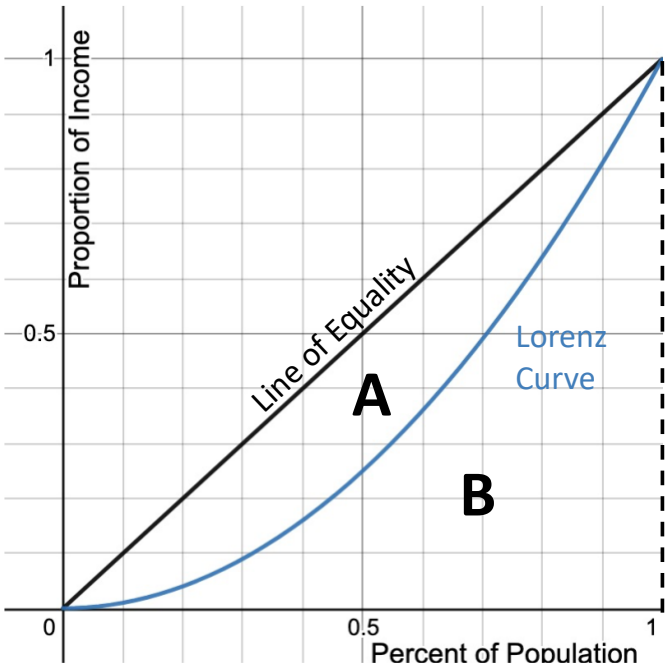

Figure 2

To take a simplified an example of how these distribution ranking systems differ, consider three distributions, each with 10 individuals and the same sum.[xvii] Distribution 1 is a uniform distribution with all values at 5 units. Distribution 2 consists of the values {1.4, 5.4, 5.4,

5.4, 5.4, 5.4, 5.4, 5.4, 5.4, 5.4}. Distribution 3 consists of the values {2, 2, 2, 3, 4, 6, 6, 8, 8, 9}. I have displayed these distributions in three ways below. Figure 3 is a table showing their minimum, geometric mean, and Gini coefficients. Figure 4 is a chart showing each individual and their income in each distribution. Figure 5 is the Lorenz curves to measure the Gini coefficient for each distribution.

	Distribution 1	Distribution 2	Distribution 3
Minimum	5	1.4	2
Geometric Mean	5	4.7	4.3
Gini Coefficient	0	.07	.3

Figure 3

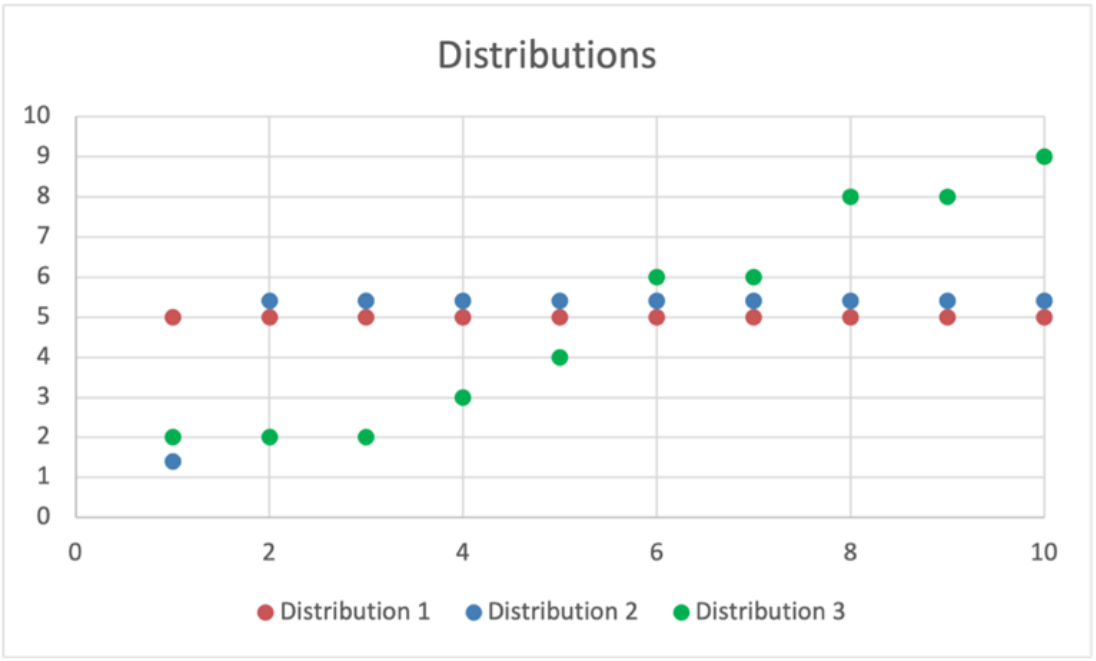

Figure 4

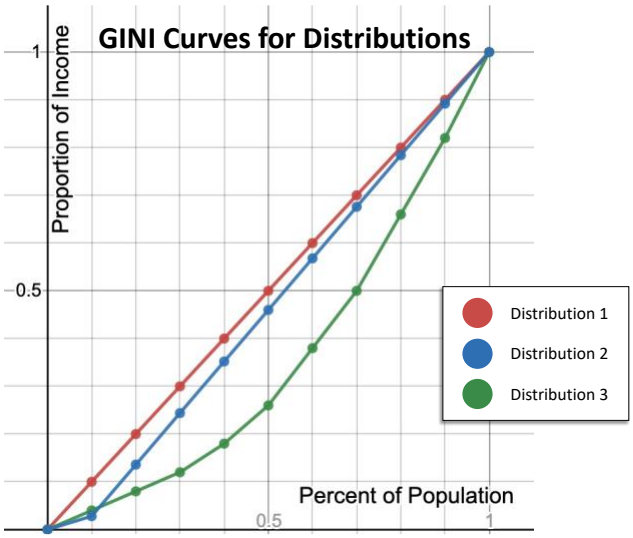

Figure 5

Using the Rawlsian-style distribution ranking, Distribution 1 is the best followed by distribution 3 and then distribution 2. Using the geometric mean or the Gini coefficient, however, we arrive at a different ranking. This method still ranks distribution 1 as the best, but the difference comes in flipping the rankings of distribution 2 and 3. Notable here is the larger percentage difference between Gini coefficients than the geometric means in distributions 2 and 3. This is most visible when graphing their Lorenz curves as shown above where it becomes more evident how close distributions 1 and 2 are.

While this example may not present the most extreme case, it does highlight a limitation of the Rawlsian approach, notably that one outlier value at the minimum affects the evaluation of the entire distribution regardless of the rest of the values. As the number of individuals in the distribution increases, the significance of the left and right tails of the distribution may become more or less significant depending on the number and degree of the outliers. Taken to the extreme, there is certainly a danger here, but would this flaw actually come into effect in income or wealth distributions, and should we still be concerned from a welfare standpoint about those in outlier positions on the lower end of the distribution? While wealth distributions in particular

can have such outliers, they are almost always on the higher end of the spectrum. If the top 1% doubles their wealth, with no other changes in wealth, should it concern us from a welfare perspective? Regarding outliers on the lower end of the distribution and the Rawlsian method, there does seem to be a balancing point from a percentage standpoint that might give credence to this method. Can we neglect 0.1% of the population if the rest of the distribution is favorable? 1%? 5%? Although this presents an ethical dilemma of some interest, this line of questioning misses the point. The fallacy here is to disregard any part of the distribution, and this is why approaches that consider the whole distribution, like calculating the Gini coefficient, will be the main measurement strategy used in this project. However, there is also some value to be gained from the Rawlsian approach in that not all inequality contributes to or degrades welfare in the same ways.

Using the Gini coefficient in tandem with the Rawlsian approach assigns value to all parts of the distribution rather than just the minimum, but we will not disregard the Rawlsian approach completely because the lower end of the distribution holds substantial value in understanding the overall welfare of a society. This balance is critical for the goal of using distributional indicators as a focus on individual well-being in its connection to societal welfare. Like aggregate indicators, income and wealth distributions can give insight into the nature of societal welfare, but for the purpose of the dashboard, we will view them from a slightly different perspective: to give insight into individual well-being. So, while the Rawlsian approach of looking at the minimum and using that as a basis for the rest of the justification is ultimately focused on the value of the overall distribution to society, using the Gini coefficient and considering the whole distribution presents an efficient way of interpreting the condition of several individuals as individuals rather than as part of society. This strategy connects with the

earlier discussion of the critique of personalist thinkers and how the dashboard takes that critique into account through distributional indicators and the effects of the distribution on individuals, not just what the distribution says about society as a whole.

VII. Collecting Indicators

In light of the above discussion, the goal of this paper is to suggest one possible collection of indicators that better represent the welfare conditions in a certain country compared to using only one indicator. Despite critiques of using GDP or GDP per capita as a measure of welfare on its own, the starting point for this dashboard will still be GDP per capita for two main reasons. First, while a higher degree of economic output, either in aggregate or on a per capita basis, does not guarantee any specific level of welfare, a certain level of economic output, and the wealth that it generates for the country, can facilitate the conditions necessary for maintaining and providing means of improving welfare. This idea heavily relies on the assumption that there is a reasonably equitable distribution of that wealth that would allow each member of society access to the means to cater to their own individual well-being or for the government to provide a greater degree of welfare programs.

The second reason is methodological and comes from Aitken's work on welfare measurement and his understanding of the theoretical spectrum (shown below in Figure 6) from what he calls GDP minus (market sector GDP) to what he somewhat confusingly terms well-being, which is a measurement strategy he describes as a "pluralistic dashboard capturing economic and social impacts on quality of life" (R5, 2019). Between these two extremes are options that offer different levels of plurality of measurement related to welfare. These include (going from the GDP minus side to the well-being side) GDP, market adjusted GDP which he

terms “future GDP”, “welfare minus” which is National Net Disposable Income (NNDI), and “welfare” or NNDI adjusted for income distributions. Each of these different levels is meant to give a more nuanced and detailed understanding of the welfare conditions in the particular country, with the left side focusing more on simple economic measures and increasing in scope as the spectrum moves from left to right. Furthermore, each level builds on or corrects some shortcoming in the preceding level rather than replacing it entirely with new indicators.

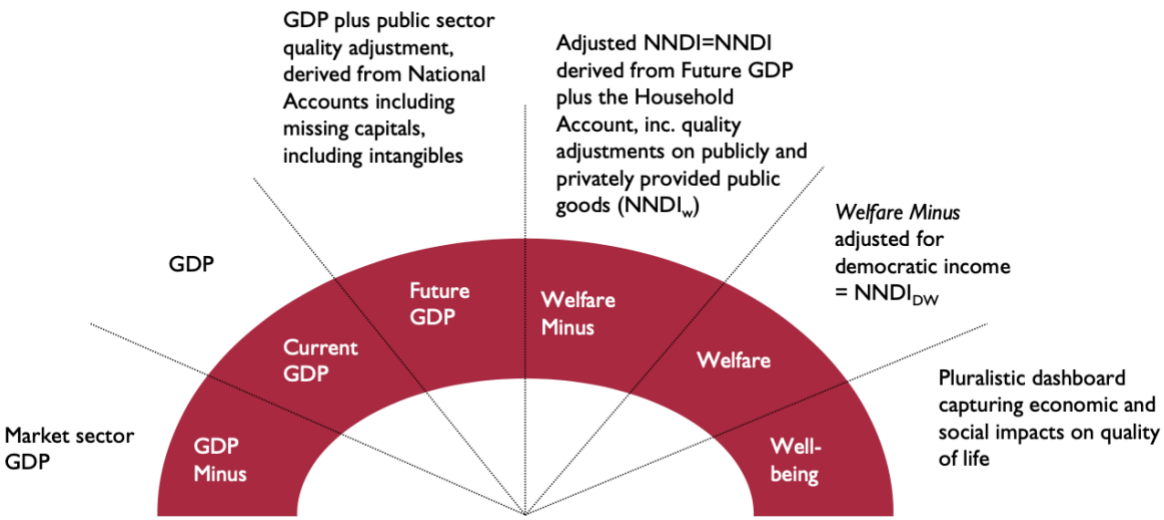

Figure 6

Aitken does not specify any particular indicators that should be included in the final level, so one of the challenges of this project is determining which available indicators in addition to GDP per capita, and how many, to consider. The dashboard for this project will include five key variables: GDP per capita, the Gini coefficient, life expectancy, the Poverty Gap at $1.90 a day, and the share of income held by the lowest 10% of income earners (hereafter referred to only as Lowest 10%). These indicators were selected for a variety of reasons including their widespread availability over a range of countries and years, their applicability across cultural norms, and their coverage of a large section of the facets of welfare. Why these specific indicators were chosen in their respective areas will be explained in the rest of this

section, but first I will mention certain categories of indicators that were left out entirely and why.

Perhaps the most glaring omission here is a measure of education, but as discussed earlier, this resulted directly from challenges from a post-colonial critique and difficulties in effectively comparing the welfare provided by varying levels of education across different cultures. Another notable category that I chose not to include was a measure of environmental quality. This presents three different challenges. The first is that local environmental factors like access to clean water closely correlate with local climate. The second issue exists when including measures of global environmental factors like CO_2 emissions as international borders to not constrain the impacts and costs of these emissions. The third challenge is that there is very little historical data on environmental quality available for most countries, and for countries where it is available, it is does not extend back in time a sufficient amount for this analysis. Finally, a third category of indicator that was considered but not ultimately included was some survey of average individual happiness, like the Happiness Index that originated in Bhutan. The problem with this category was mostly a data one both in terms of availability of data across different countries and times and in terms of consistency in data as there is no standard survey or measurement system that has been systematically applied to any sufficient percentage of countries or regions.

Another way to understand welfare that is not directly accounted for here is whether or not the current conditions are conducive for the future survival and betterment of the society. Some of this may have been contained in educational or environmental indicators, but there is a further consideration of how to weigh future benefits and costs as they apply to current welfare

conditions. In some ways all measures of welfare perform this predictive function[xviii], but I have chosen not to include measures that explicitly model these outcomes.

To attempt to account for distributional equity issues inherent in aggregate measures like GDP per capita, the Gini coefficient for income was selected for the welfare dashboard. While there are also equity issues with environmental and happiness indicators that may not be captured in income distribution, it serves as the best approximation for accounting for other issues of equity. It should also be noted that this adjustment only accounts for equity in income and does not account for factors like race, neighborhood, or legal status. While in some cases there is a correlation between income and those later variables it is difficult to create a universalizable system to apply this correlation, particularly considering the post-colonial critique we discussed above.

We will use the Gini coefficient for income but not for wealth mainly due to a restriction in available data but also due to the potential policy aims of the welfare dashboard. While there are historical data available on wealth inequality, it is not presented with the precision of income inequality and often the Gini coefficient can misrepresent the data. This misrepresentation occurs when the population cannot be divided into enough buckets, for example if data only exist on the top 1% and bottom 50%. There exists then a large area for ambiguity in the Lorenz curve that produces the Gini measurement. Furthermore, wealth redistribution in most societies is a more difficult task than correcting for income inequality because of the illiquidity of most wealth.

The Gini coefficient is not without its faults, however, specifically the way it does not account for where the inequality in the distribution is present. While earlier we adjusted from the Rawlsian approach of only considering the minimum value to the Gini coefficient which

considers the whole distribution equally, there is a different assumption here that is fleshed out in Shlomo Yitzhaki's (1983) paper on measuring income inequality. Summarizing the work of A.B. Atkinson, he describes the value judgement that comes with measuring inequality. He claims that this value judgement can be represented as a single parameter from 0 to infinity with 0 representing complete indifference to inequality and with infinity representing the Rawlsian position, i.e., evaluating inequality according to the minimum value. With this in mind, we can generalize an inequality index that considers this value judgement. This results in the formula: $\delta_F(v) = \int_0^b A^v(y)dy,\ v \geq 0$, where $\delta_F(v)$ is the absolute index of inequality, $A(y) = 1 - F(y)$, where F(y) is the cumulative income distribution, and v is the value judgement parameter (617-618). Yitzhaki works out that the value of 2 for v gives the standard Gini coefficient. This places the Gini coefficient rather close to an indifference towards inequality, and a key reason for this the way it treats the upper and lower ends of the distribution as equivalent.

This problem is best illustrated through another example of a simple society with only 4 individuals with a total income of 100 units to be split between them. These individuals can divide their income in two distinct ways. Consider distribution 1 with the values {10, 20, 35, 35} and distribution 2 with the values {15,15,30,40}. Using the Gini coefficient alone to evaluate them, the two distributions are completely equivalent with a Gini coefficient of 20. This equivalency is visible in Figure 7 to the right where the

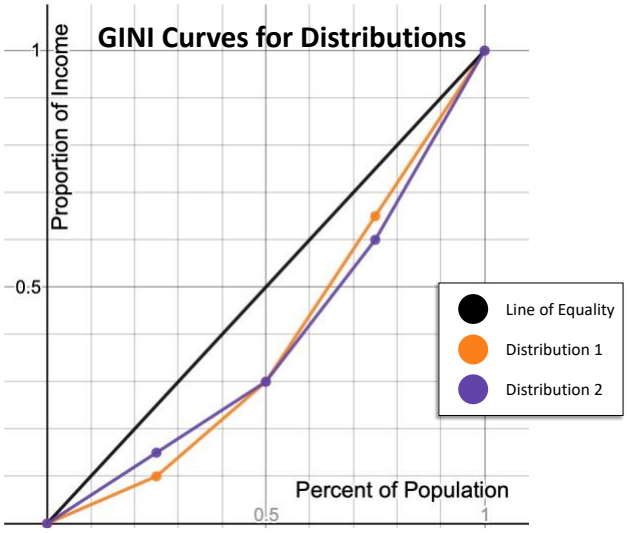

Figure 7

two curves have the same mid-point (with 2 individuals having 30% of the income) but the points on either side are mirrored. Conceptually, this means that the Gini coefficient is indifferent towards equivalent changes in the top and bottom halves of the distribution. Yitzhaki proposes several alternative indicators, including Atkinson's index, but in this paper, we will turn to a simpler solution of adding two indicators, a poverty measurement and a measurement of a specific section of the income distribution, to work in tandem with the Gini coefficient to give extra weight to the bottom half of the distribution.

The poverty measured to correct this problem in this dashboard is the poverty gap at $1.90 per day in 2011 purchasing power parity. The $1.90 per day poverty line comes from The World Bank and was last adjusted in 2015 to reflect changes in costs of living around the globe. The figure is based primarily on data from low-income countries to track extreme poverty. A poverty gap measure is weighted for the distance from the poverty line as opposed to a poverty headcount measure that only considers whether an individual is above or below the line.[xix] Using this indicator, we will be able to distinguish between equivalent Gini coefficients while giving particular importance to the lower part of the distribution, specifically those below the poverty line.

Returning to the example above with equivalent Gini coefficients, we can calculate the poverty gap measures for each distribution given a certain poverty line. We will consider two different potential poverty lines, 11 units and 16 units. At a poverty line of 11 in distribution 1 there is one individual below the poverty line with an income of 10, and in distribution 2 there are none. This means that distribution 1 has a poverty gap index of 2.27% and distribution 2 has a poverty gap index of 0. At a poverty line of 16, in distribution 1 there is one individual below the poverty line with an income of 10, in distribution 2 there are two individuals both with an

income of 15. This means that distribution 1 has a poverty gap index of 9.38% and distribution 2 has a poverty gap index of 3.13%. There are three things important to note from this example. First, at both poverty lines, distribution 2 is preferable to distribution 1. This is not universally true, but for any poverty line less than or equal to 30, distribution 2 is preferable. Second, the preferability is not necessarily equivalent to the preferability based on the poverty headcount, as with the poverty line at 16 units. Finally, if the poverty line is too low, in this case less than or equal to 10, the poverty gap measure will not give any insight. We can expand this to a society with a higher population to say that a sufficiently low poverty line may capture some information but the number of individuals it accounts for will not give sufficient information on the state of the society's welfare. All of these points will be useful for the dashboard in accounting for adding additional value to the lower part of the distribution and for extreme poverty having a larger effect than less than extreme poverty.

Initially, poverty indicators were the only correction for ambiguities in the Gini coefficient, but because The World Bank sets the poverty line based on low income countries, offering $1.90 per day, $3.20 per day, and $5.50 per day, all of which are far too low to show any variation in the poverty level in the high income and some upper middle income countries, the dashboard will also include the percentage of income held by the lowest 10% of income earners. This measure effectively looks at the specific section of the income distribution, that as we discussed earlier, may display more adverse welfare effects than the other sections of the distribution. Returning to the example above, rather than using the lowest 10%, we will use the lowest 25%, or the income of the individual with the lowest income, because there are only four individuals. In distribution 1, the lowest earning individual makes 10 units out of the total 100 in the society, and in distribution 2 the lowest earning individual makes 15 units out of the total

100. This would give distribution 1 a score of 10% and distribution 2 a score of 15%, and therefore distribution 2 is preferable as we found with relevant poverty lines.

Unlike the poverty gap measure, the preferability of one distribution over another is not dependent on any exogenous poverty line, but there is still room to create ambiguity based on which fraction of income earners to consider. In our simplified example, if we shifted from the lowest 25% of income earners to the lowest 50%, the distributions are measured as equivalent with the lowest 50% of income earners earning 30% of income. While using 50% does not adequately provide information on the left-tail of the distribution, there is an argument to use 5%, 15%, 20%, or some other fraction, rather than 10%. For this project, the 10% share was chosen both due to data restrictions and because the goal in including it was to focus on the lowest end of the income distribution with a scale sufficient to avoid situational anomalies in smaller countries.[xx]

The final indicator included in this dashboard is life expectancy at birth to represent in broad terms the overall health conditions in a given country. The main reason for selecting this indicator over several other health-related indicators is its widespread availability. Other options that were considered included birth weights, which gives information on the health of the mother and the health of the future generations, or life expectancy given the individual reaches a certain age, which separates out infant mortality, but particularly in low-income countries, data for these indicators are unavailable. Life expectancy does give insight into the health-related welfare, but it is explicitly not a direct measure of the healthcare system in a given country.

A further consideration is that none of the indicators that this paper will focus on are composite welfare measures. Each is specifically tailored to a specific facet of economic life and/or the economy at large. The aim of this paper in creating a dashboard of welfare indicators

is to try to pair indicators with complementary advantages that account for their shortcomings. I argue that this method better illuminates economic welfare, when compared a composite indicator, because it prevents a canceling out effect. To take an oversimplified example, consider two countries: one with a relatively high GDP per capita but most of it in the hands of a few, and therefore a Gini coefficient close to 1, and a second with a GDP per capita and a Gini coefficient close to the global medians. A composite indicator, depending on how it is calculated, may rank these hypothetical countries similarly, that is with a somewhat average level of economic welfare. The danger in this assessment is assuming that similar welfare policy decisions will be applicable because of equivalent overall welfare levels. However, a dashboard of economic indicators sufficiently highlights which facets of economic welfare are deficient in each society, and so points to unique welfare policy outcomes for each.

VIII. Categorizing Countries

The final dataset combined data from The World Bank over the five indicators discussed above from 159 countries. The data spanned from 1967 to 2017, but for most countries there were not data available from every year in that range, and especially among lower income countries, there are significant gaps. GDP per capita was most often collected across that span of years, but the other indicators were more sparsely collected. To adjust for this, I took as data points all the instances of one country having all five indicators measured in a single year. While it is likely that indicators from adjacent years would function similarly well, using only years with all five indicators measured gave a more consistent methodology. This significantly trimmed down the dataset from the initial 13,020 observations of country-year pairs to a still significant 1,357 observations, and there is at least one for every year from 1978 onward.

Besides the time dimension, it is also important to have data from a selection of countries from different geographical regions as well as different levels of wealth. The World Bank provides categorizations along both of these dimensions. There are four country income groups: low income, lower middle income, upper middle income, and high income. These classifications are based on the country's gross national income (GNI) per capita in the current fiscal year. There are significantly fewer countries in the data, only 23, that The World Bank classifies as low income compared to the 54 lower middle income, 44 upper middle income, and 38 high income countries. Unfortunately, The World Bank does not reclassify countries on any regular basis, nor do they provide access to the historical classifications for countries that may have changed groups over time. Because of this, in my analysis countries will only be categorized by their current income group, not any historical ones.

The World Bank also provides seven regional groupings: North America, South Asia, Sub-Saharan Africa, Middle East & North Africa, Latin America & Caribbean, Europe & Central Asia, East Asia & Pacific.[xxi] I have mapped the World Bank regions in Figure 8, below. However, several issues arise when using these classifications, so it became necessary to create a new set of regional groupings. These issues include the mega-region of Europe & Central Asia, the degree of influence of former European colonial powers in countries like South Africa, and the general lack of cultural consideration. These cultural differences are particularly important to this project because it is the variations in cultural values that often lead to variations in understanding of welfare and therefore implementation of welfare programs.

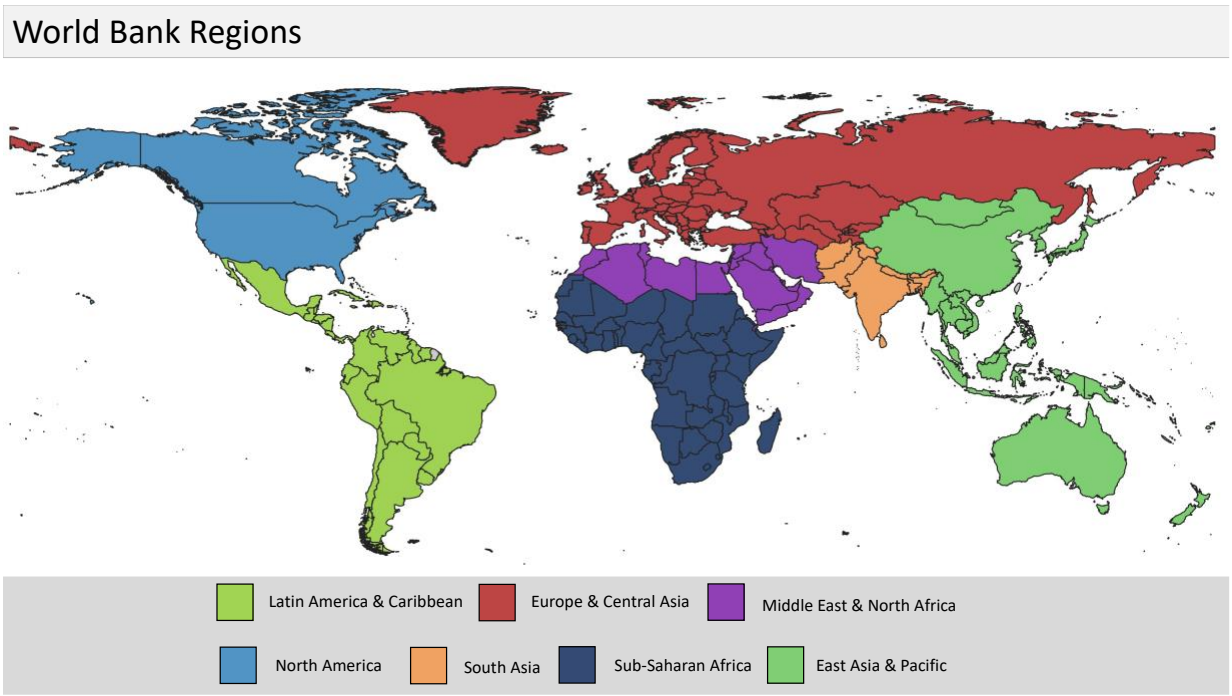
World Bank Regions
Latin America & Caribbean
Europe & Central Asia
Middle East & North Africa
North America
South Asia
Sub-Saharan Africa
East Asia & Pacific

Figure 8

In his article "The Clash of Civilizations?", Samuel Huntington (1993) provides the tools necessary to break up the mega-region of Europe & Central Asia and to guide the other deviations from the regions given by The World Bank. He argues that after the end of the Cold War, culture, rather than political ideology, is the most divisive force throughout Europe. Following William Wallace's proposition from his 1990 book *The Transformation of Western Europe*, Huntington argues that a religious boundary divides Europe under Western Christianity, i.e., Catholicism and Protestantism, from Europe under Orthodox Christianity or Islam (1993, 30). While there is also strong economic regionalism within and between the two regions as a consequence of the Cold War, he argues that the ongoing success of economic regionalism depends on a strong shared cultural experience, which for these regions, comes from their religious histories. This religious division is the foundation for the three new regions out of what is the Europe & Central Asia region under the classification of The World Bank. Huntington endorses the line Wallace draws starting at the border between Finland and Russia to mark the split between Western Christianity and Orthodox Christianity, but for this project, I adjusted the line slightly so that it follows along current international borders. In the map to the right, Wallace's original line is shown in grey, and the adjusted line is shown in red.

Figure 9

Notably, South Africa has also been combined with Western Europe despite its geographical separation. There is an obvious connection to Europe with its colonial history, but unlike many of the other countries in the Sub-Saharan Africa region, a Euro-centric, western government ruled until 1994 when the country held its first democratic election.[xxii] Furthermore, it is one of the few functional Western-style democracies in Africa, and so it seems likely that their political values are more aligned with Western Europe than with their African neighbors.

Using the line Wallace defines, however, still leaves a mixed region that includes the Orthodox Christian countries and the Islamic countries. The existence of the Middle East & North Africa region under the classification of The World Bank further complicates this issue because the culture of Islam already largely defines that region. To remedy this, we can turn to a collection of countries Huntington classifies as non-Arab Muslim countries (28). Huntington includes ten countries in this group: Iran, Pakistan, Turkey, Azerbaijan, Kazakhstan, Kyrgyzstan, Turkmenistan, Tajikistan, Uzbekistan, and Afghanistan. However, for this project, Pakistan will remain in the South Asia region mainly due to its time as part of the British empire and its close historical connection to India.

The final new region differing from the classification of The World Bank is the Western Pacific Rim region that includes Canada, the United States, Australia, New Zealand, and Japan. The first four countries have a clear connection to the British Empire, and this new division bolsters the former North American region which formerly was made up of Canada, the United States and Bermuda (now in the Latin America & Caribbean region). The addition of Japan to the region is based on the cultural and economic reconstruction that occurred after WWII. The full geographic reclassification is shown in Figure 10.

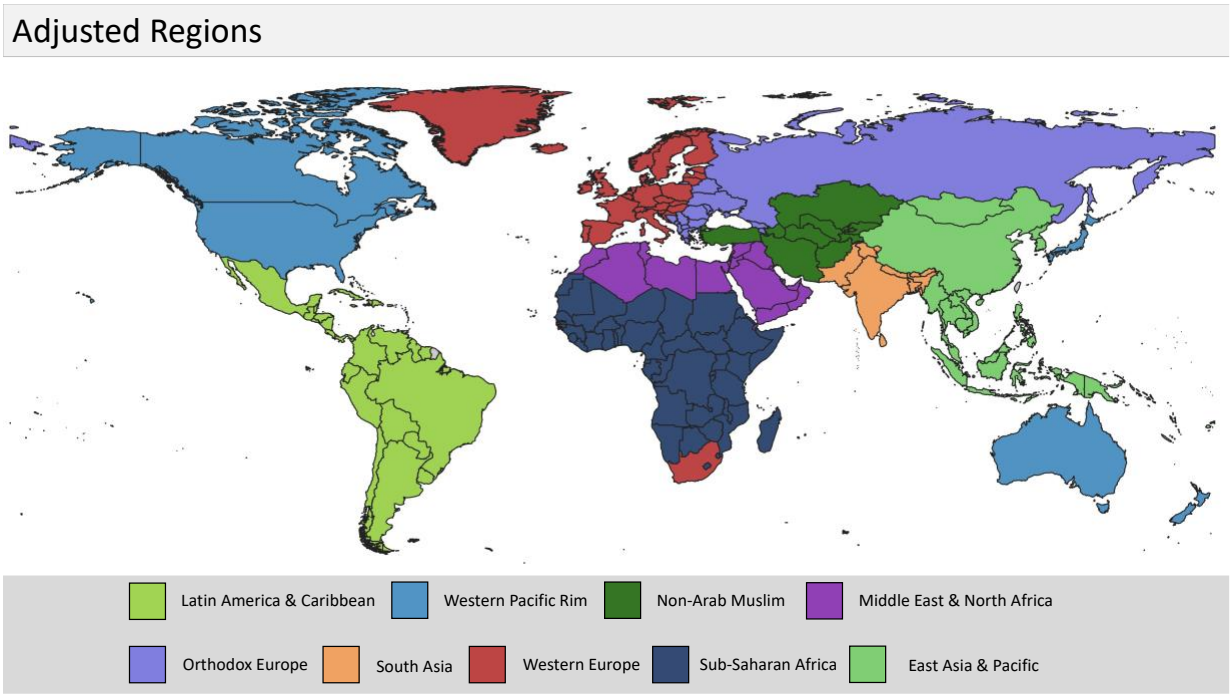

Figure 10

It was also important to consider the intersection of these two dimensions, that is, how the different income groups are spread throughout the seven regions, and the full breakdown is shown in Figure A1 in the appendix. Of note, there are only 2 low-income countries in the dataset that are not in Sub-Saharan Africa, and they are both from the Middle East & North Africa. Furthermore, the division of what was the Europe & Central Asia region under the original classification follows closely with the income groups. Nearly all countries in the new Western Europe region are high-income countries, with South Africa as the only exception. Meanwhile, 13 out of 16 member countries in the Orthodox Europe region are in the upper middle income group. The Western Pacific Rim region has only four countries (New Zealand and Bermuda were not included in the final analysis because there were no years in the dataset in which all five indicators were taken), all of which fall into the high-income group, but this is an improvement on the old North America region in that respect as the original region would have had only two countries, both of which are high income countries.

IX. Analyzing Data

The first steps in analyzing the data were to obtain some basic summary statistics for the five indicators as well as summary data based on the regions and income groupings and to determine the number of years considered for each country. For the overall data the mean, median, minimum, and maximum values are as follows for each indicator are shown in the table below, and the remaining summary statistics shown in Figure A2 of the appendix. The year counts, as well as information about the countries' region and income group are found in Figure A3, and the year counts based on region and income group can be found in Figure A4.

	GDP/capita	Gini Coefficient	Life Expectancy	Poverty Gap	Lowest 10% Share
Mean	11,874	40	71	4.7	2.3
Median	4,038	39	73	1.0	2.3
Minimum	119	23	42	0.1	.1
Maximum	123,514	66	83	64	4.5

Figure 11

All the minimum welfare values (minimums for GDP/capita, Life Expectancy, and Lowest 10% income share, and maximums for Gini Coefficient and Poverty Gap) are from countries in the low-income group except for Lowest 10% income share, where the minimum welfare value is from upper middle income countries in Latin America & Caribbean region. This is not totally unexpected because the nature of the measure is not based on internal factors, not how the countries compare internationally (although this is also the case with the Gini coefficient). Similarly, all the maximum welfare values except Lowest 10% income share are from countries in the high-income group. The maximum welfare value for Lowest 10% income

share is from Bangladesh in 1985, a lower middle income country. In terms of regional groupings, the regions with welfare maximizing mean values for each indicator are all found in regions based in Western culture except Lowest 10% income share and are listed here: GDP/capita – Western Pacific Rim; Gini Coefficient – Western Europe; Life Expectancy – Western Pacific Rim; Poverty Gap – Western Pacific Rim; Lowest 10% income share – South Asia .[xxiii] Conversely, the regions with the welfare minimizing mean values for each indicator are: GDP/capita – South Asia, Gini Coefficient – Latin America & Caribbean, Life Expectancy – Sub-Saharan Africa, Poverty Gap – Sub-Saharan Africa, Lowest 10% income share – Latin America & Caribbean.

To start investigating welfare trends, I ran a correlation of each indicator and the year in which it was collected in to see if, across all regions and income groups, there was a general trend towards improving welfare according to these five indicators, and generally this was the case. There were, however, some exceptions or weak correlations that we will focus on here. The full table is shown is Figure A5.

GDP/capita, no matter the subsection of data, always showed a positive correlation with time, with the weakest correlations in the low-income group, which had a correlation coefficient of .138, and the non-Arab Muslim and Orthodox Europe regions, which had correlation coefficients of 0.296 and 0.299 respectively. However, significant outliers have a great effect on the coefficient for the low-income countries and the Orthodox Europe region, while the scatter plot for the non-Arab Muslim region reveals disparate trends in growth of GDP/capita. The correlation coefficient for low-income countries was largely skewed by the way the Syrian Arab Republic appears in the data. The World Bank currently categorizes the Syrian Arab Republic as a low-income country, but the two years in which it appears in this dataset are 1996 and 2003,

both of which are before civil war broke out there, which caused a significant change in the economic conditions. The correlation coefficient for the low-income countries not including the Syrian Arab Republic is one of the largest at 0.532, and the scatter plots for that subset of the data both with and without the Syrian Arab Republic, along with trend lines, can be found in Figures 12 and 13 below.

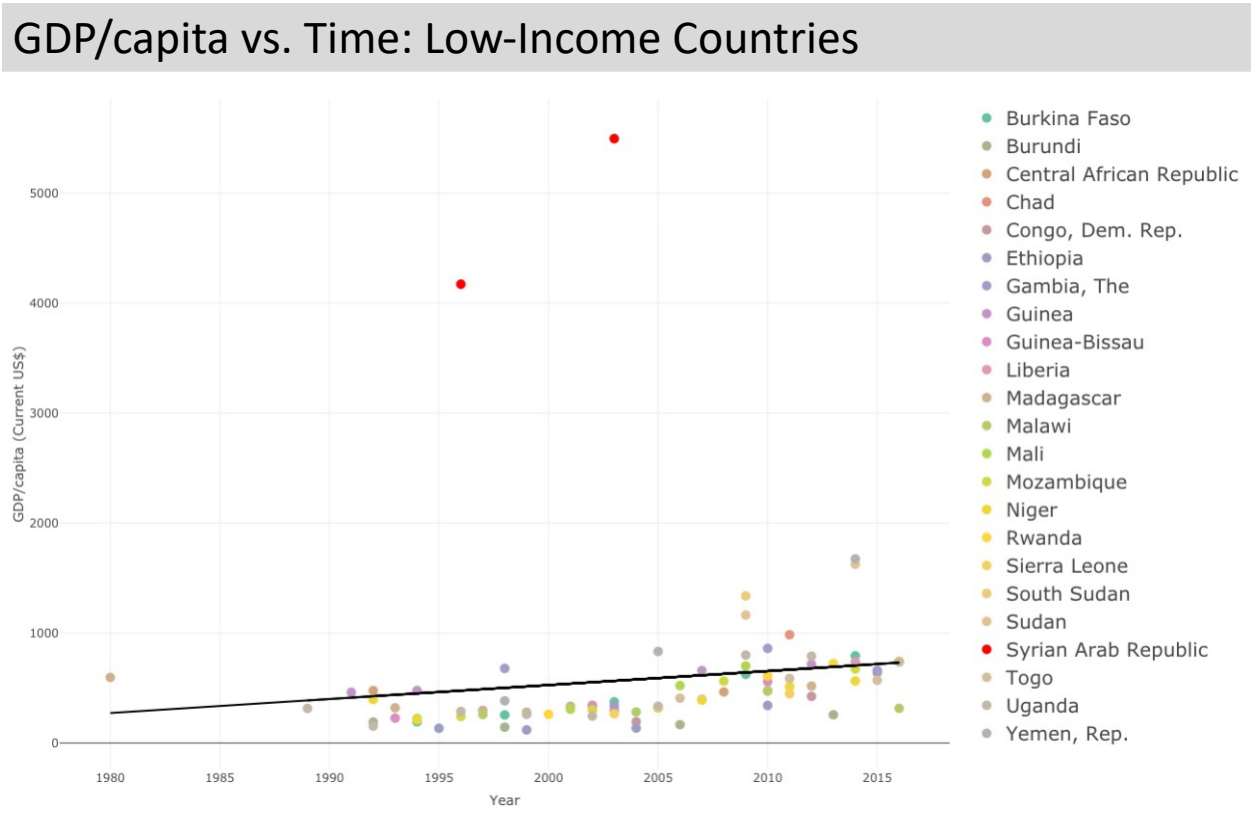

Figure 12

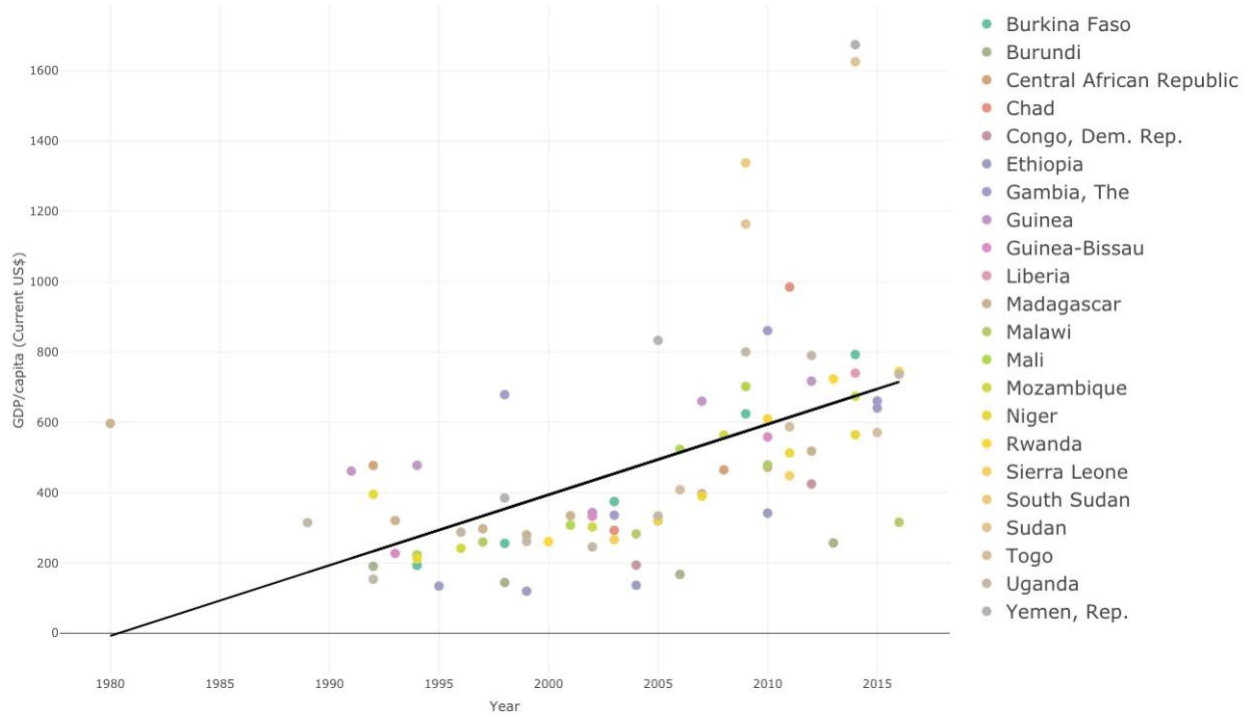

Figure 13

The large effects of the Great Recession felt in Greece and Cyprus, the only high-income countries in the region, skew the correlation coefficient for the Orthodox Europe region towards the lower end. In the scatter plot below, while the other countries in the region continue to grow, albeit at a lower rate, Greece and Cyprus show a steep decline in GDP/capita after 2008. This is particularly evident in Figures 14 and 15 show below. If these two high income countries are excluded, the correlation coefficient between GDP/capita and year for the remaining countries in the region jumps to 0.696, which would be one of the strongest correlations compared with the other subsets of the data.

GDP/capita vs. Time: Orthodox Europe

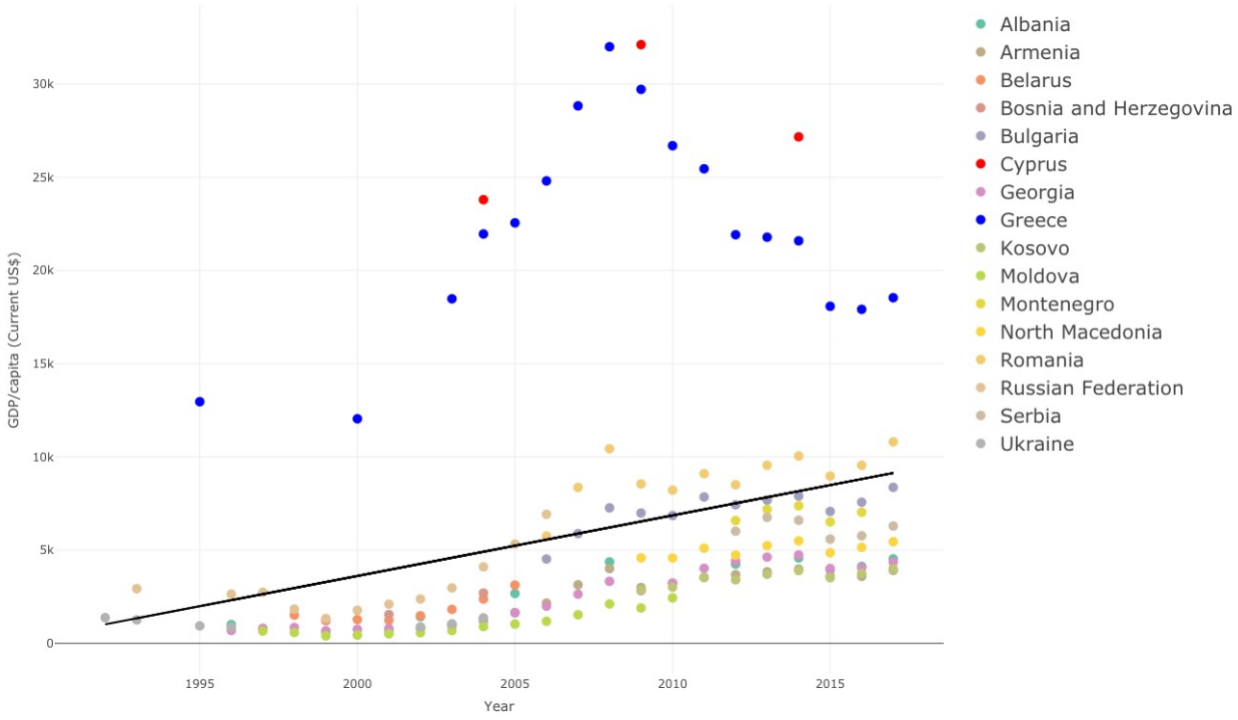

Figure 14

Figure 15

Finally, unlike the previous two examples of low correlation coefficients, there is no simple explanation for the non-Arabic Muslim region. Looking at the scatter plot in Figure 16 below, three levels of growth appear. Turkey, and perhaps Kazakhstan, follows the first growth pattern, which exhibits steep growth starting in 2002. The second growth level describes Iran, which shows growth in GDP/capita at a more moderate rate. The final level with minimal growth in GDP/capita describes Uzbekistan, Tajikistan, and the Kyrgyz Republic.

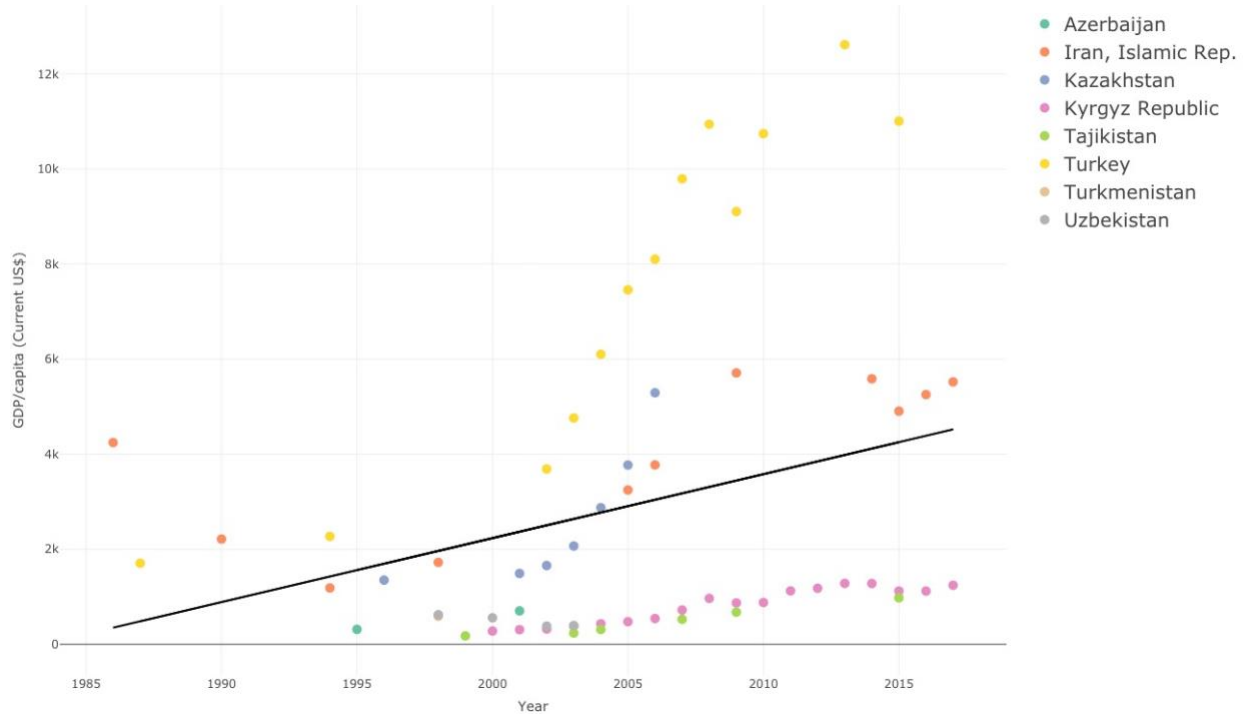

Figure 16

The overall correlation coefficient between GDP/capita and time was the second lowest at .264, only higher than the coefficient for low-income countries, and this may also be the result of the types of outliers or disparate trends shown in the three examples above. The subsets of the data with the highest correlation coefficients were the upper middle income group with a correlation coefficient of .604, and the Western Pacific Rim region with a correlation coefficient of .928. Unlike the subsets of the data with particularly low coefficients, these subsets exhibit relatively universal growth trends. With respect to the upper middle income countries, Figure 17 below shows that the range of growth rates over time is relatively small. One noticeable pattern is that the countries from Orthodox Europe, shown in green, have overall lower GDP/capita measurements and the growth seems more affected by the Great Recession than the countries

from the Latin America & Caribbean or non-Arab Muslim regions, shown in orange and pink respectively.

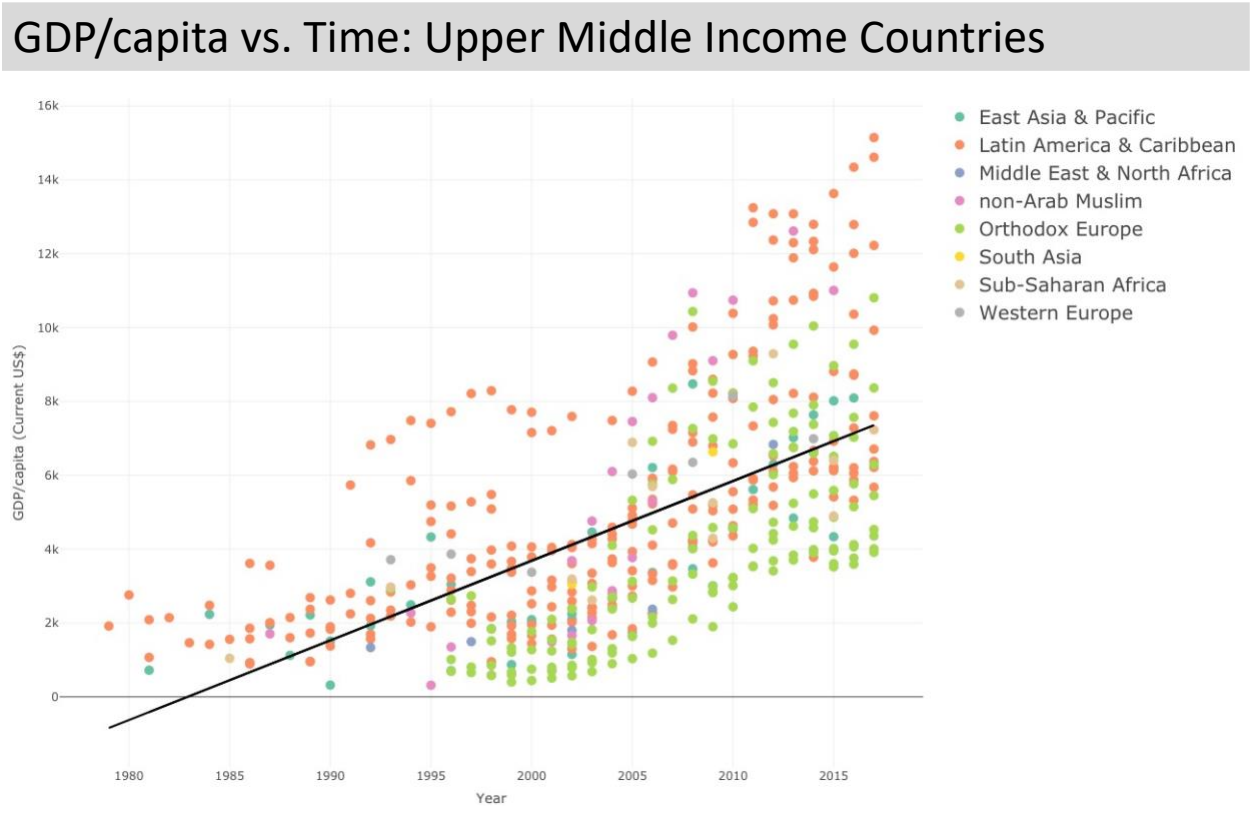

Figure 17

There are fewer data points for the Western Pacific Rim region, but all four countries show significant growth in GDP/capita during the time period sampled and the steep slope of the trendline in Figure 18 below highlights this. This is particularly notable because this region also has the highest mean GDP/capita of any subset of the data.

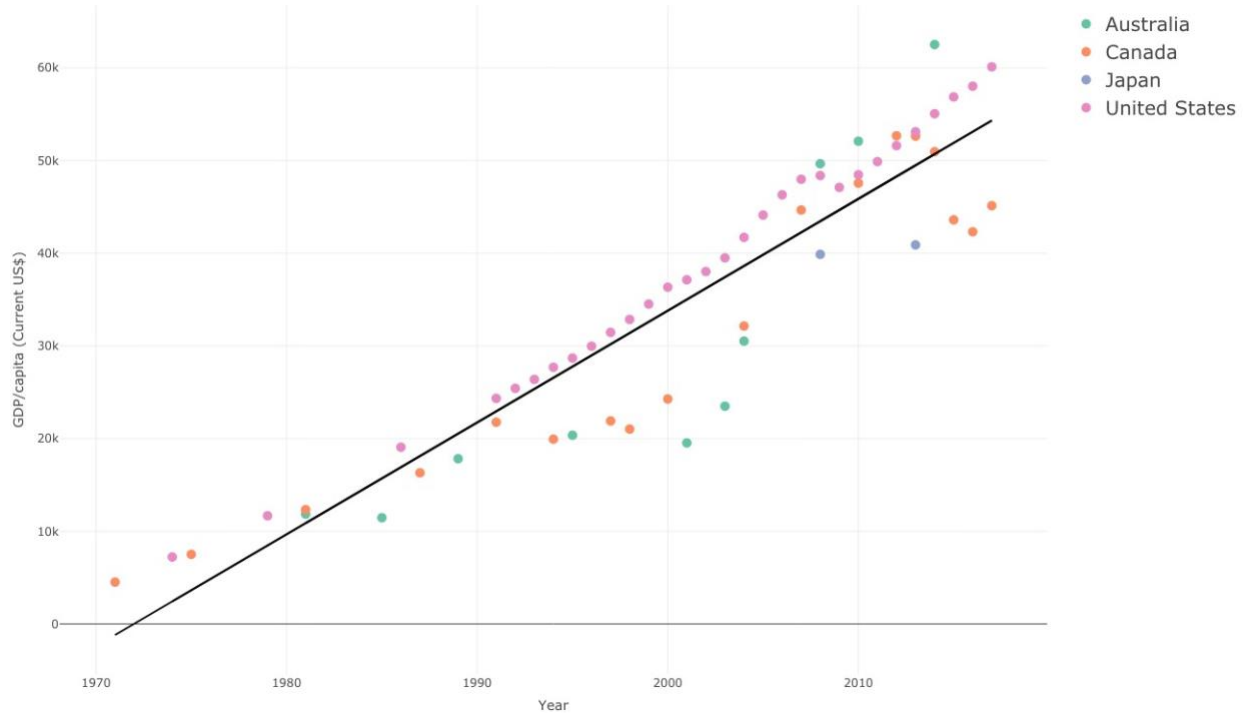

Figure 18

In the overall data the correlation coefficient between the Gini coefficient and time is -0.180, which still shows a trend towards increasing welfare over time, as lower Gini coefficient values indicate lower levels of wealth inequality, if not as strong as the overall correlation in GDP/capita. However, the Western Pacific Rim and South Asia regions both have positive coefficients, indicating a greater degree of income inequality over time. Furthermore, the lower middle income, Orthodox Europe, and Western Europe subsets all have negative coefficients that are within one-tenth of zero indicating a relatively constant (though slightly decreasing) level of income inequality over time, and the high-income, East Asia & Pacific, and Sub-Saharan Africa subsets have negative coefficients within fifteen one-hundredths of zero.

There are several possible reasons for these unexpected or weak correlation in the Gini coefficient in these subsections of the data including a natural minimum on the level of income

inequality, improved data collection techniques, a higher number of observations closer to the present, or a combination of those factors and others. The natural minimum idea comes from the fact that in a large enough society that functions by some capitalist system, there is a practical lower limit to income inequality because of the different values the market assigns to various occupations. In other words, further income equality is not possible because society places distinct values on different occupations and the income for each occupation comes from that valuation. An alternative system to capitalism could achieve a higher level of income equality if it assigned income without regard for the nature of the occupation.

The relatively steady value of the Gini coefficient in Western Europe is a good candidate in this data as the seventy-fifth percentile of this subset at 35.1 is well below the overall mean and median values of 40.13 and 38.5 respectively. As shown in Figure 19 below for all the countries geographically in Western Europe, i.e., excluding South Africa, the Gini coefficients are below global means and medians. Despite shared cultural values, South Africa is at a different level of economic development and has not yet reached this theoretical natural maximum. However, in the data, the country seems to have a relatively constant level of income inequality.

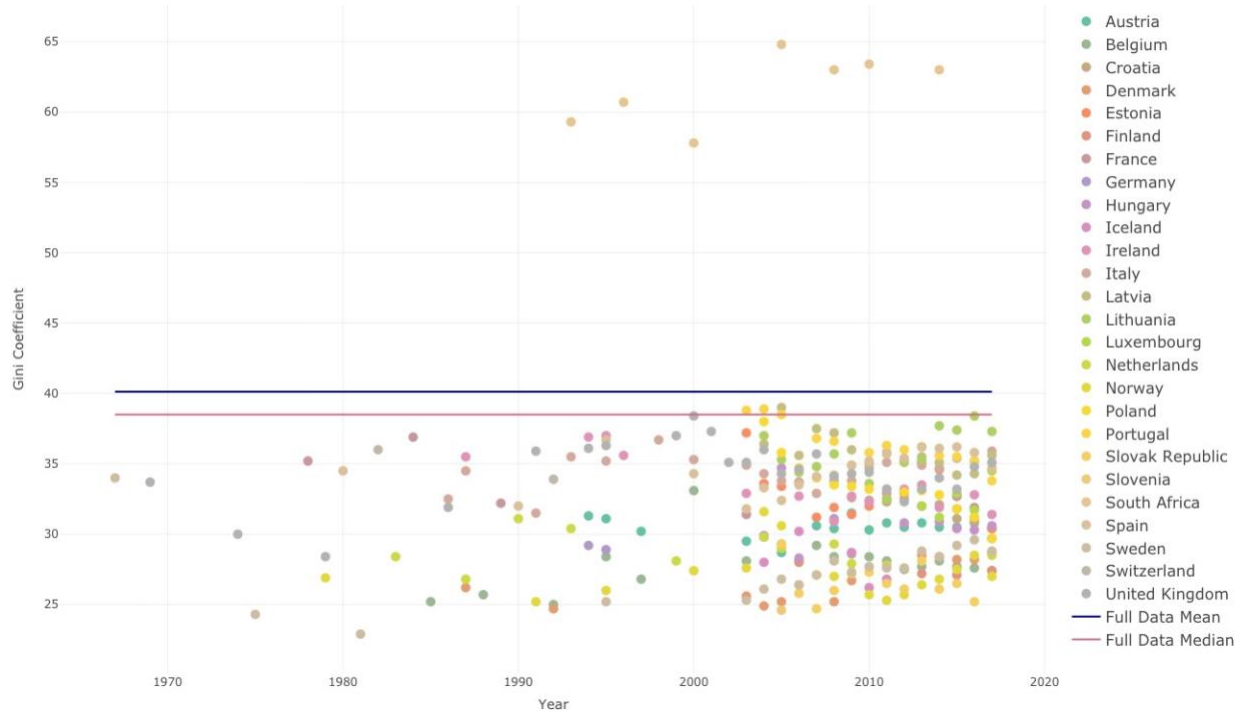

Figure 19

The other two reasons named above seem closely connected, at least in the data collected here. The data for Gini coefficients, as well as the other indicators, are skewed towards the present, and this seems to be the case because data for more countries became accessible as data collection became cheaper. This seems to be one factor of the positive correlation coefficient in the South Asia region as the datapoints (circled in Figure 20 below) from Sri Lanka, the Maldives, Bhutan, all of which have a high level of income inequality relative to the region, are skewed towards the present. The data for the rest of the region show more constant income inequality levels.

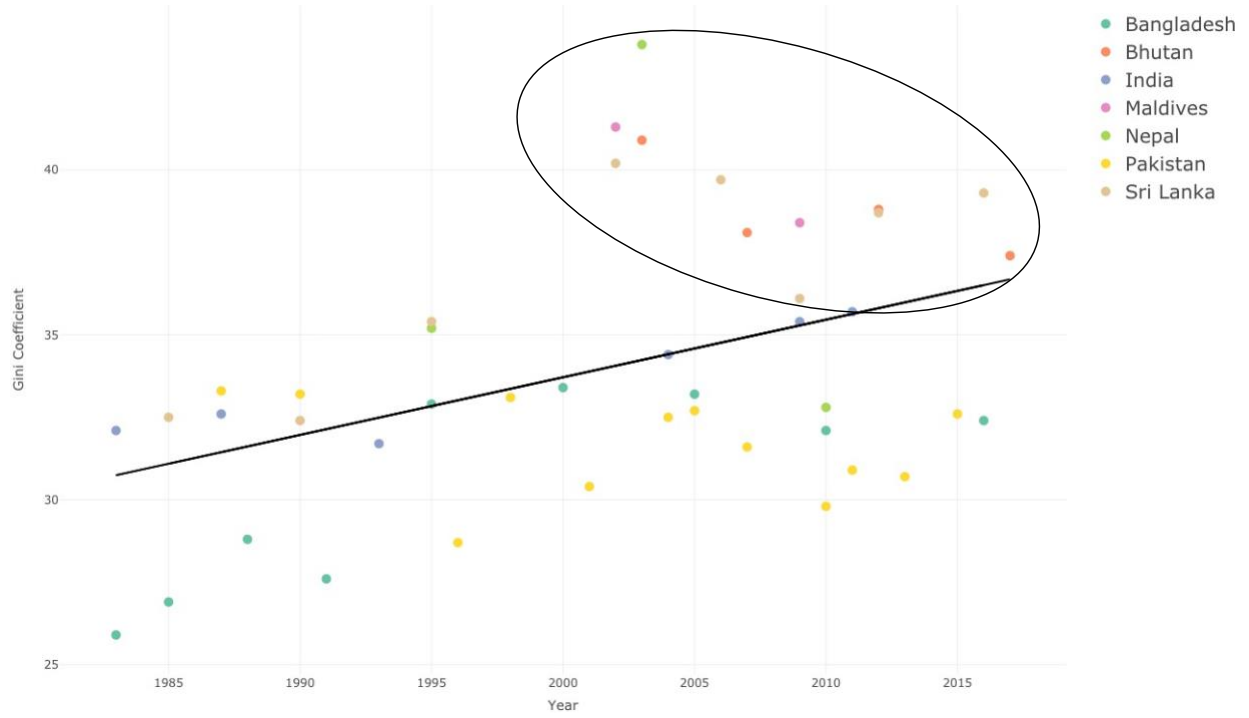

Figure 20

However, this bias towards the present can also skew the trendline the opposite way as in the upper middle income subset of the data. Data in this income group from Orthodox Europe only appears later in the dataset, and these countries have a lower average Gini coefficient than the other upper middle income countries. Therefore, despite no particular region having a greatly improved level of income equality, the addition of the new data gives the trendline a slope that implies this to be the case. In Figure 21 below, this is highlighted with the Orthodox Europe and Latin America & Caribbean regions, both of which have much less steep region specific trendlines.

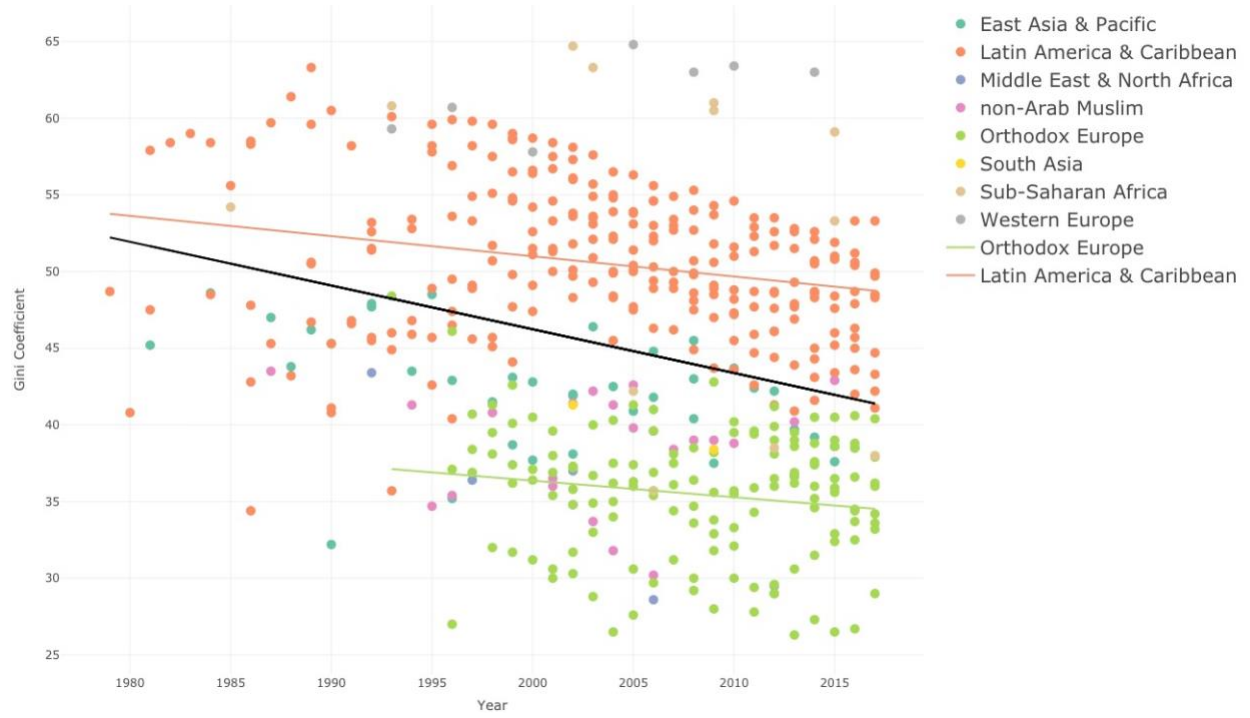

Figure 21

Despite some of these data-specific biases, better welfare scores for Gini coefficients, along with the more specific Lowest 10% income share variable, seem to have a weak connection with the passage of time. As highlighted for the Western Pacific Rim region in Figure 22 below, an emphasis on growth in GDP/capita, a much more common measure of welfare in government, seems to come either without consideration for or at the cost of improving income equality. In the region overall, higher Gini coefficients, associated with worse income inequality, show up closer to the present. The growth in GDP/capita in the United States coincides with an increase in income inequality as the correlation coefficient between the Gini coefficient and time for just the United States is 0.861. This strong correlation shows negative welfare effects over time. The correlation coefficient for the rest of the region is still positive, indicating adverse welfare effects over time, but it is much weaker at 0.168. Therefore, while the

high levels of growth in GDP/capita do not necessarily lead to higher levels of income inequality, from the data here, it seems likely that decreasing income inequality is more difficult during periods of high growth in GDP/capita.

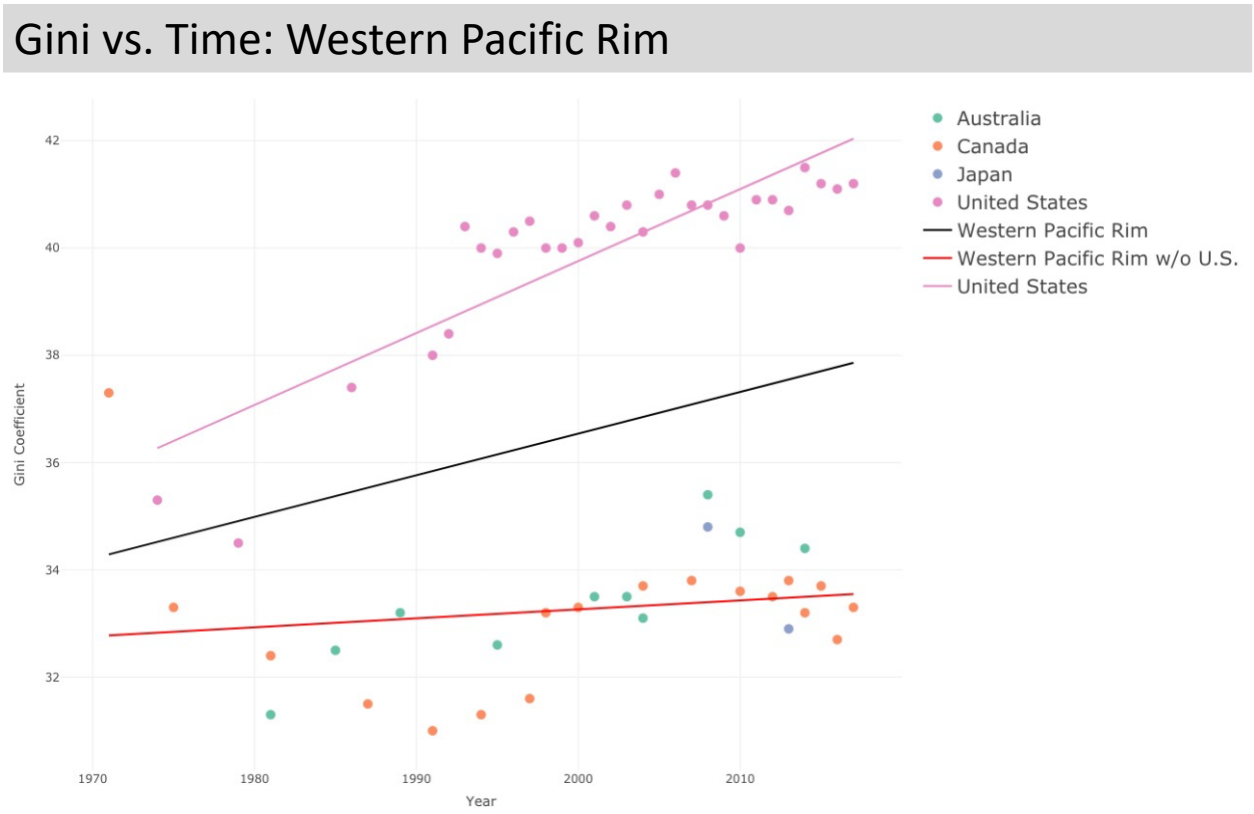

Figure 22

Across all subsets of the data and in the overall data itself, there is a positive correlation between Life Expectancy and the year. The ability of health innovations to spread outside of the country in which they developed is a main factor in this global trend towards better health. This occurs in at least two ways. First, much of these innovations come as a result of the research and development of private companies which have profit incentives to sell or implement their products universally, or at least over a large region. The relatively short length of 20 years agreed upon for drug patents to by most of the world under Patent Cooperation Treaty allows for more widespread availability of the drug in a generic form.[xxiv] This allows countries without the

necessary resources to develop the drugs to either produce or import them at a much lower price than was required during the initial production, albeit with a time lag. Figures 23 and 24 below show the five-year rolling mean for life expectancy for the geographic regions and income groups. We should expect to identify something approximating this twenty-year gap if drug patents play a key role in the increase of global life expectancy. Unfortunately, the graph for the South Asia region is severely lacking because of the lack of consistent data from the countries in that region. There is also a discontinuity in the Middle East & North Africa region, but it is significantly less severe.

These graphs also highlight the limitations in the data for the low income group as it is nearly identical to the Sub-Saharan Africa region, but we can still look for the twenty-year lag that patent law might predict. However, this gap may not appear in the data because companies often release biosimilar drugs, or nearly identical versions of their previous drugs, to get around this patent expiration. These drugs are still usually cheaper to produce and would thus be more widely available in lower income countries. While not perfectly visible in either graph, it seems that the increase in rate of increase in life expectancy in the low income group starting around 2007 coincides with a similar increase in slope for the two middle income groups, particularly the upper middle income group, that begins in the late 1980s. Despite the data not stretching back far enough we might hypothesize that a similar jump occurred in the high income group in the 1950s or 1960s. This gap is less apparent when classifying the data by geographic region because most of the regions have some variety in income level that obscures this effect.

Life Expectancy 5 Year Rolling Average by Region

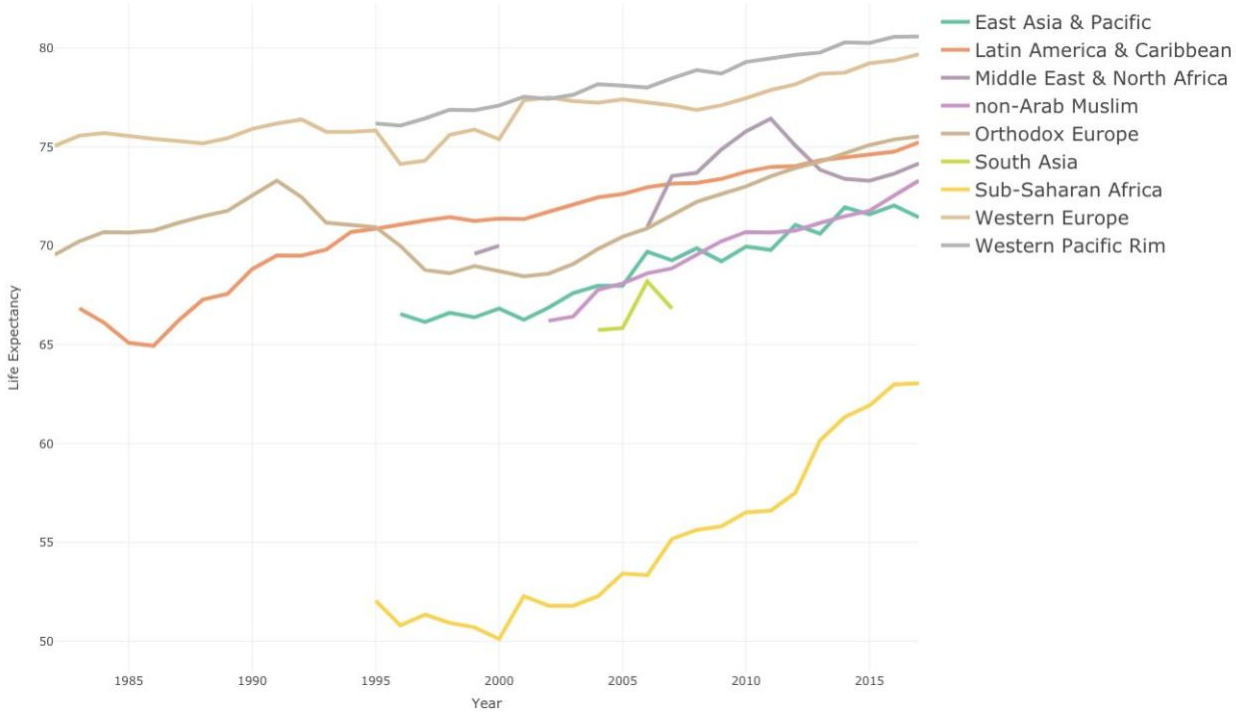

Figure 23

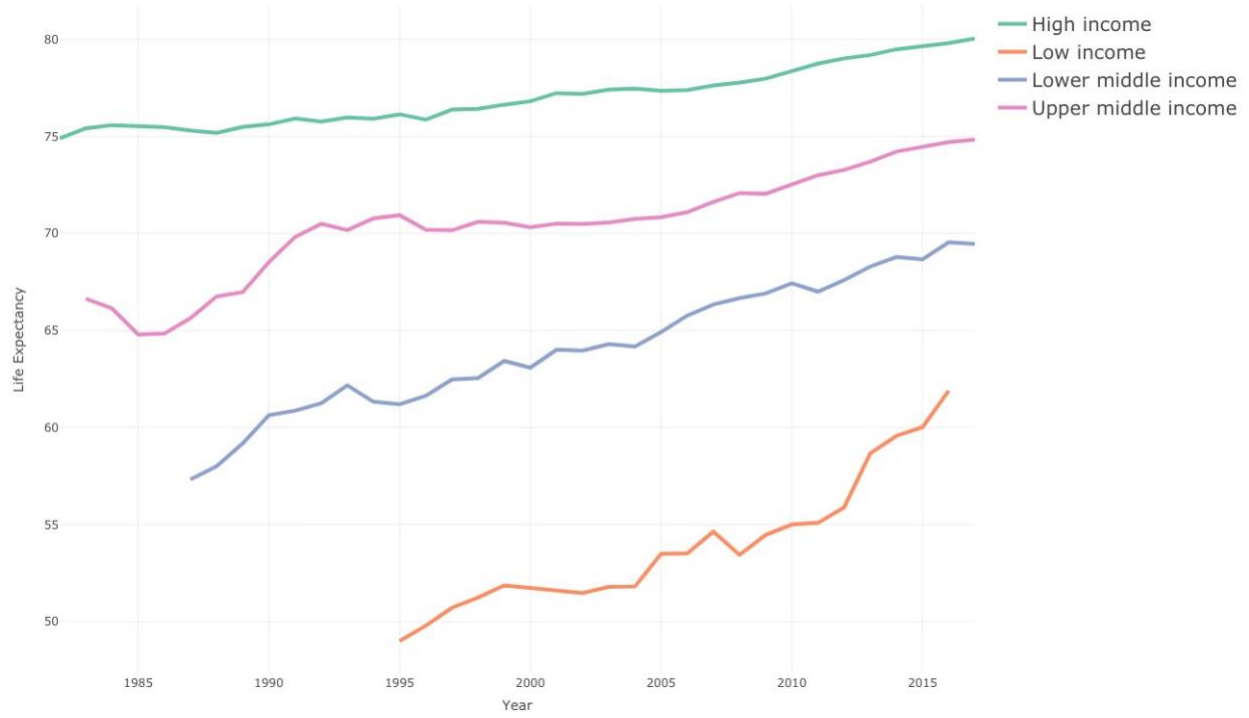

Figure 24

There may also be humanitarian incentives both for private companies and governments to spread innovations in healthcare and medicine to those regions of the world that formerly had less access to these life-improving goods. This may further shrink the lag time of drug patents and may explain why we do not observe the same degree of lag between high income countries and upper middle income countries or upper middle income countries and lower middle income countries. The correlation coefficient for the entire dataset is 0.334. The low income group has the largest for income groups with a correlation coefficient of 0.624, and lower middle income group has the smallest with 0.444. The trendlines by income group are shown in Figure 25 below as well as the trend line for the overall data.

Figure 25

The Poverty Gap indicator was taken across all countries in the dataset, but it is most important to consider it only in low income or lower middle income countries because of the severity of the poverty line selected. The World Bank determined the lowest global poverty line to be $1.90 per day. Therefore, in most of the high income and upper middle income countries the poverty rate gives little to no insight into the welfare conditions of the society, and in all the high income countries it is below 1%. In the regions and income groups where applicable, there does seem to be a strong downward trend in the poverty rates at this level. Both of the lower income groups have a correlation coefficient with time of around -0.4. The strongest correlation among the income groups is in the upper middle income group with a correlation coefficient of -0.467. This may be due to the historical nature of the data Poverty Gap and using income groups only based on present data.

In the low income group there is also a noteworthy split along regional lines. Most of the income group is countries in the Sub-Saharan Africa region. The exceptions are Syria and Yemen, which come from the Middle East & North Africa Region. In Figure 26 below, those two countries are highlighted in blue and red respectively, and contrary to the trend displayed by the countries in the Sub-Saharan Africa region, they consistently show low poverty rates.

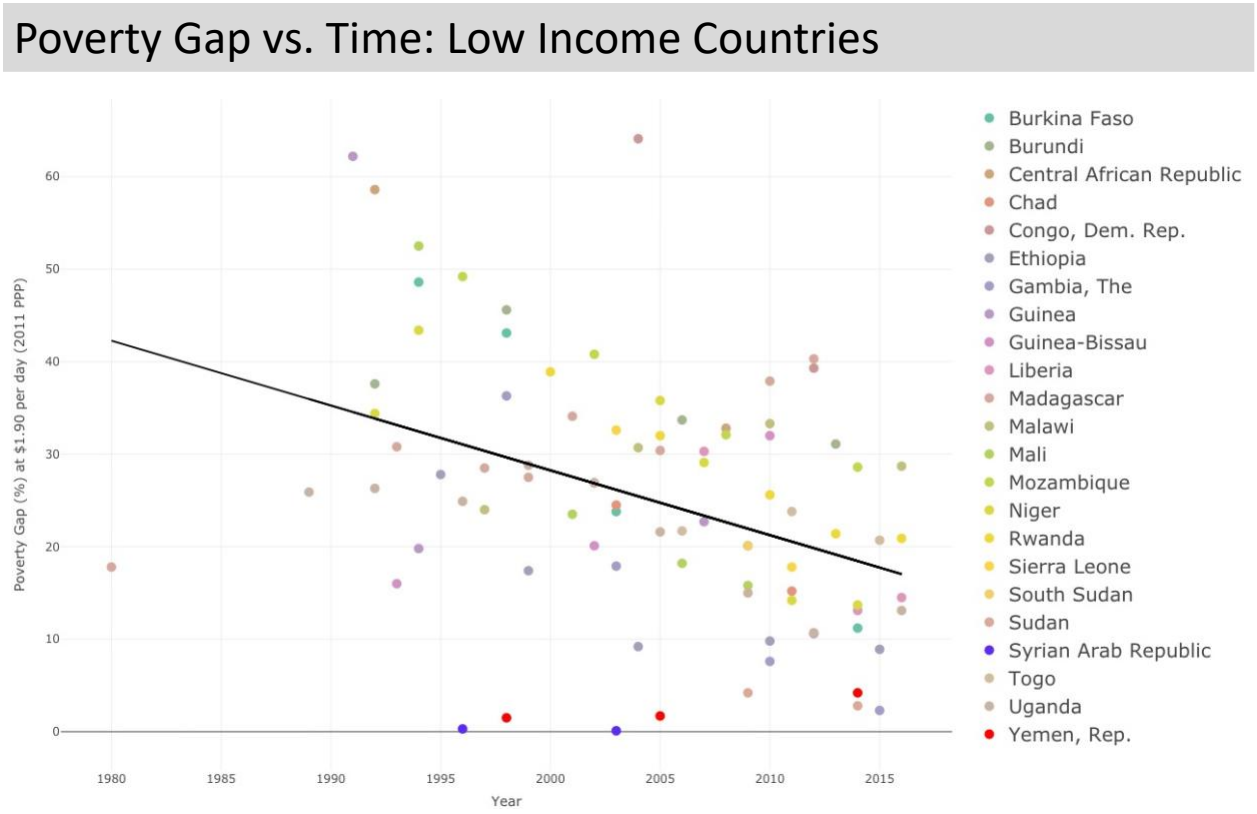

Figure 26

In the lower middle income group, there is a similar level of decline in poverty rates over time, but the decrease is much more pronounced outside of the Sub-Saharan Africa region. Shown again in red in Figure 27 below, the trend line for this region is significantly less steep, and it is particularly noticeable closer to the present where no other geographic region has any country above 8% after 2010. This general trend in both income groups of relatively higher poverty gap percentages in the Sub-Saharan Africa region could be the result of several factors

including economic structures or cultural priorities. It is possible that the purchasing power parity used is not well calibrated for the economic conditions of those countries or uses a market basket that is not representative for the needs in that region. It is also possible that there is less of a cultural mandate to eradicate poverty even at this relatively low level.

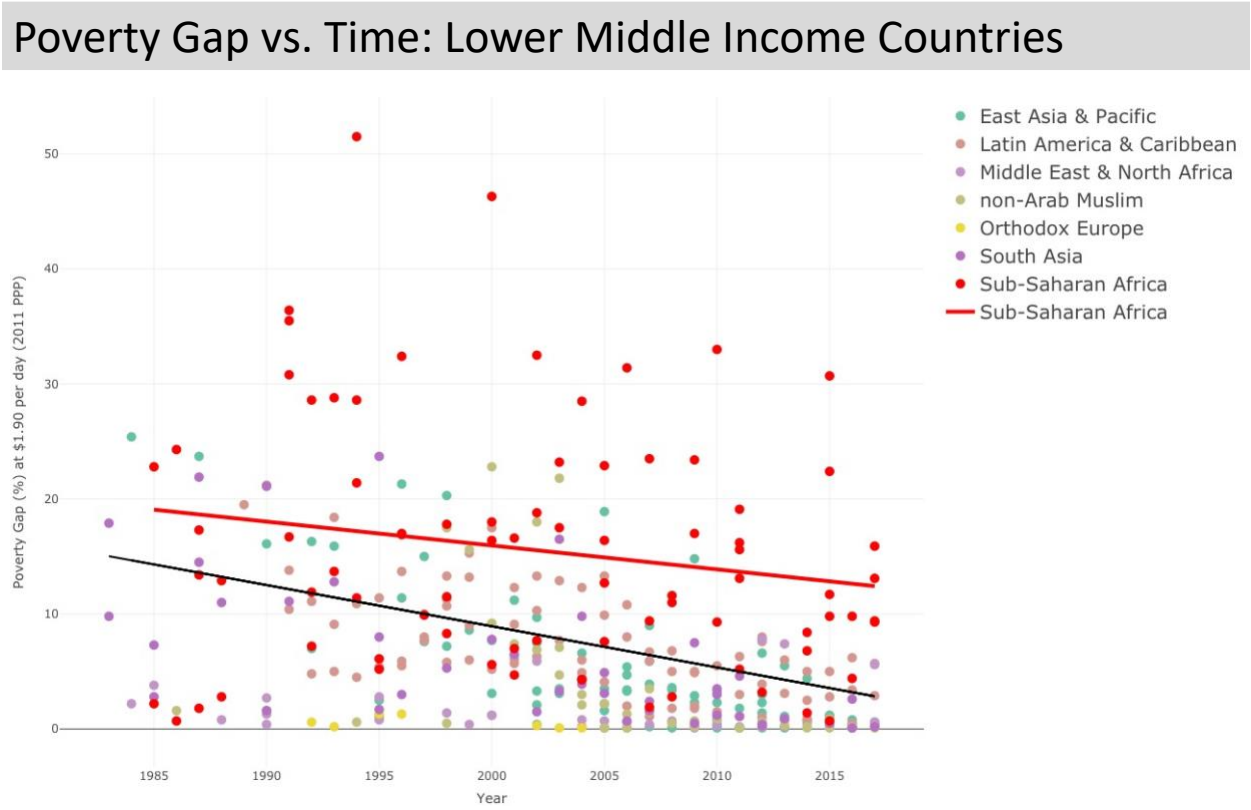

Figure 27

By contrast the Lowest 10% indicator highlights the status of the poorest members of society but because it is measured in a way unique to each particular society, it is mostly independent of the income groups. This is evident in the summary statistics as the overall mean is 2.3% and the means for each income group from high income to low income are 2.7%, 1.8%, 2.4%, and 2.5%. So, while there is a slight deviation in the upper middle income group from the universal mean, there is no trend based on income level, and this is visible in the scatter chart by region in Figure 28 below. When the data are sorted by region, however, the Latin America &

Caribbean region (shown in orange in Figure 29 below) clearly stands out as one with a particularly low percentage of the income share held by the lowest 10%. This fact is also evident from the summary statistics as the mean value of 1.3% is at least 1% lower than nearly every other region.

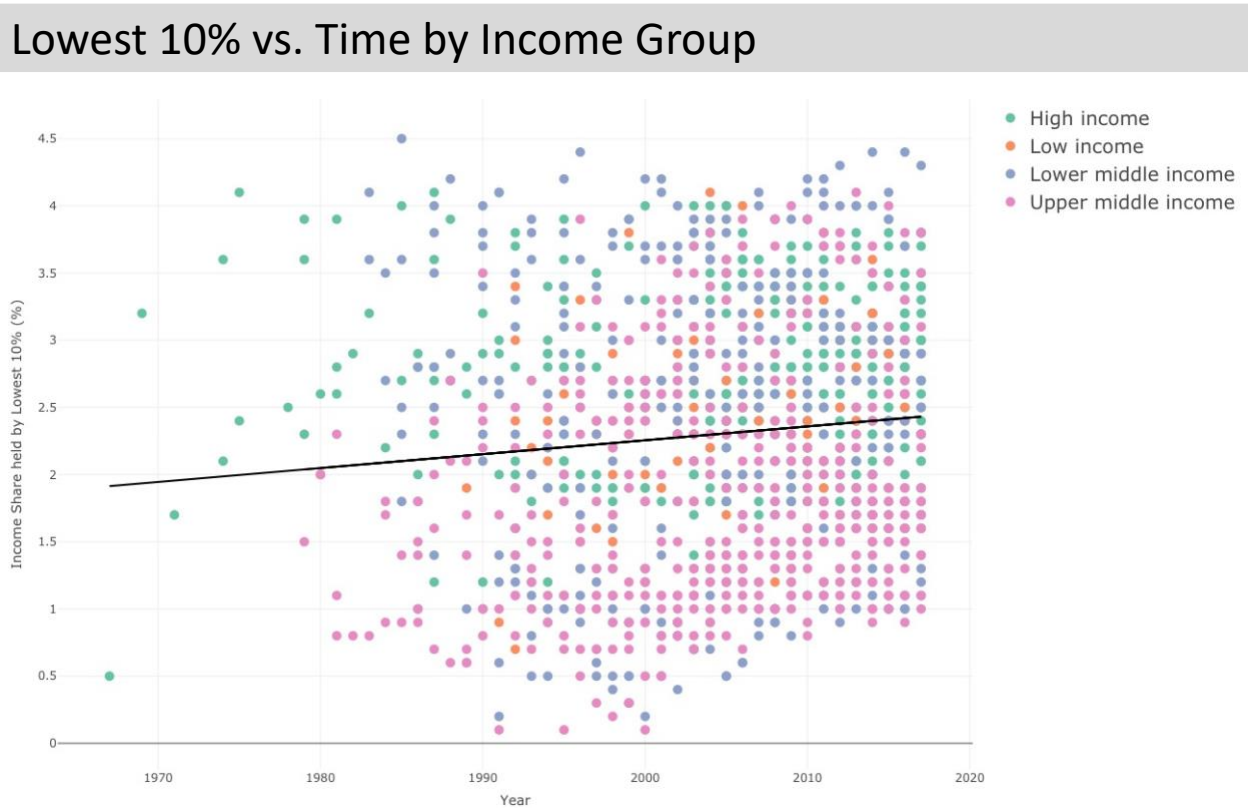

Figure 28

Figure 29

Examining the Latin America & Caribbean region more closely in the chart below, it is clear that both the lower middle income countries (Belize, Bolivia, El Salvador, Haiti, Honduras, and Nicaragua) and high income countries (Chile, Uruguay, and Trinidad and Tobago) show large improvements in this indicator over time relative to the upper middle income countries in the region. This is evident in Figure 30 below as the trendlines for those two income groups are much steeper than the overall trendline or the trendline for upper middle income countries. This runs contrary to the overall dataset where no income group shows a significantly different rate of change over time in this indicator. Furthermore, none of the trendlines in the overall data, particularly for the high income and lower middle income groups, display the same magnitude of coefficient.

Figure 30

The cause of this discrepancy may come partially from the fact that this income group contains seven of the ten most populous countries in the region, and all of the top five. This high population level, particularly as accumulated in large cities such as Sao Paulo and Mexico City, may lead to greater disparities in income level. However, there are many populous cities in upper middle income countries in other geographic regions that do not display this level of income inequality for the lowest 10% of income earners. This may be a result of the political institutions in these countries or a lack of general support for welfare programs.

In a similar manner that the correlations between each variable and the year in which it was collected can reveal inconsistencies in the different supposed welfare metrics, the correlation coefficients between different welfare indicators reveals similar ambiguities. Figure A6 shows the full list of correlation coefficients, but the most apparent trend seems to be the disconnection

between income inequality indicators and GDP/capita and Life expectancy. This is most obvious in the set of correlation coefficients for different subsets of the data between GPD/capita and Gini coefficients, but this trend is also visible in the large range of correlation coefficients for GDP/capita and Lowest 10%.

The largest discrepancies between GDP/capita and the Gini coefficient occur in the non-Arab Muslim, South Asia, and Western Pacific Rim regions, which show correlation coefficients of 0.485, 0.517, and 0.440 respectively. Because GDP/capita in all of these regions is increasing over time, these positive correlation coefficients reveal that the aggregative economic growth has come at the cost of distributional welfare with respect to income. The scatter plots below for the three regions highlight this disconnect between increased aggregative welfare as measured by GDP/capita and decreased distributional welfare as measured by the Gini coefficient. Noteworthy, however, are the different ways in which this discontinuity manifests across the different regions and within certain countries specifically.

As shown in Figure 31 below, in the South Asia region, each country follows a similar relationship between increasing GDP/capita and increasing income inequality with higher levels of income inequality showing greater variation in GDP/capita and lower levels of income inequality showing less variation in GDP/capita as well as generally lower values in magnitude. The countries in the non-Arab Muslim region show a similar pattern in Figure 32; countries with worse income inequality have a greater variation in and large values for GDP/capita. Kazakhstan does present itself as a country in which higher levels of GDP/capita coincide with better income inequality, breaking from the trend of the rest of the region. Also, in this region there are more countries which seem to produce no change in GDP/capita despite changes in

income inequality, including the Kyrgyz Republic, Tajikistan, and Uzbekistan.

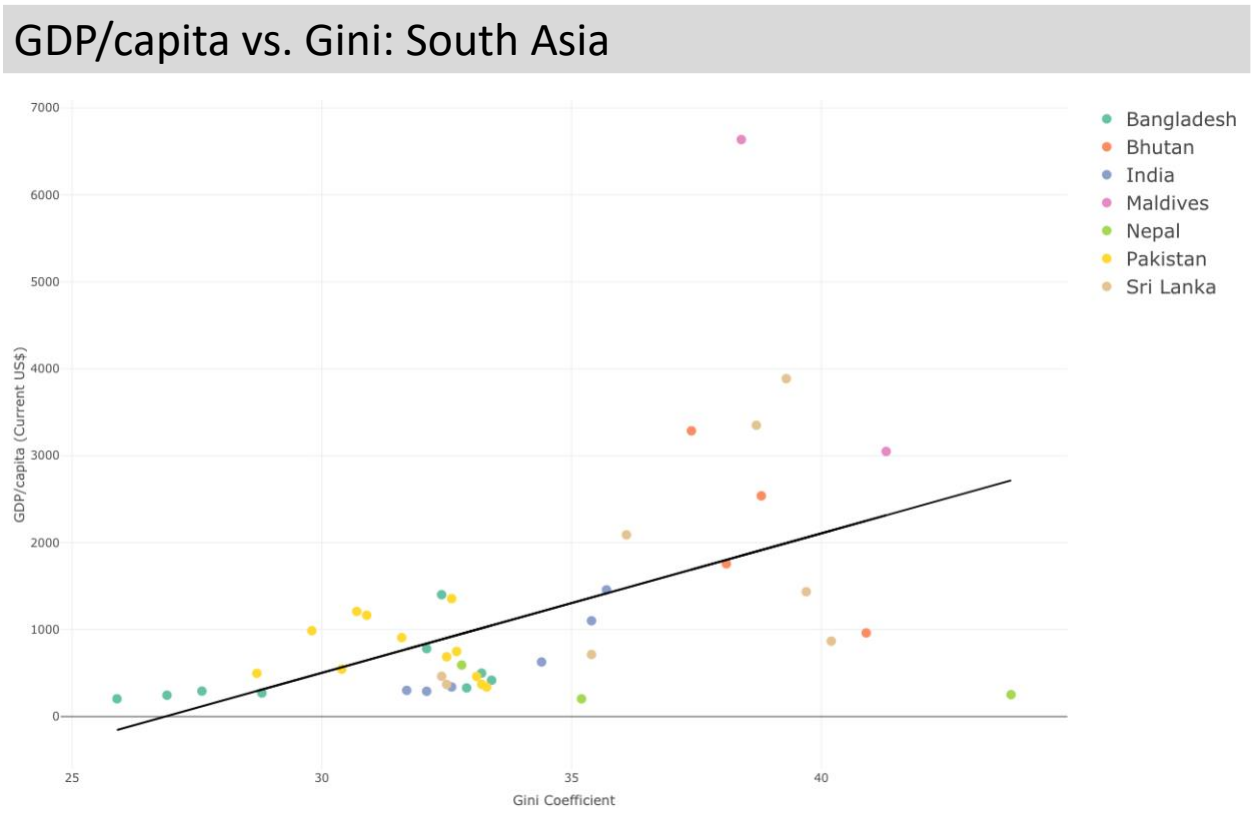

Figure 31

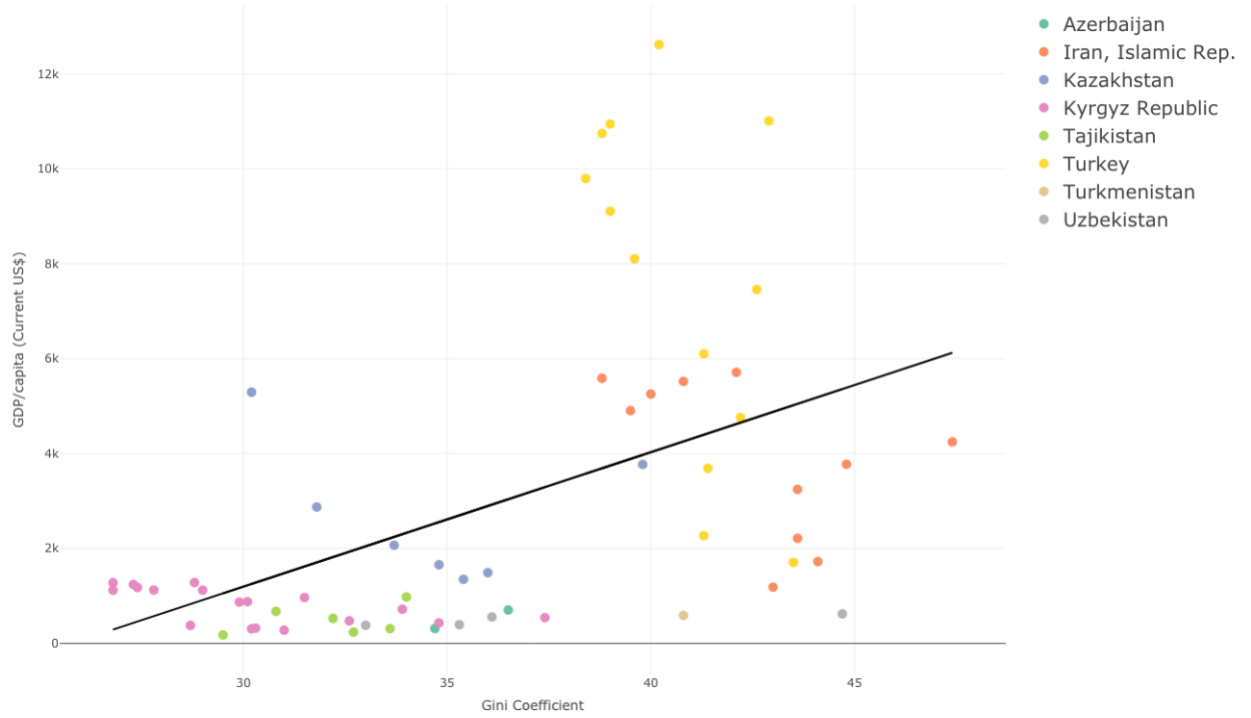

Figure 32

The trend is quite different, however, in the Western Pacific Rim region, although this may partially result from the large disparity in the magnitude of GDP/capita between the countries in this region and the countries in the two regions previously discussed. While the United States separates itself from the other three counties in the region with much higher levels of income inequality, the region as a whole has a much stronger connection between aggregative growth and decreasing distributional welfare. This is most apparent in Figure 33 below because of the separate trend lines for the United States and the rest of the region. The separate trend lines have a much steeper slope than the overall trendline that is flattened by the large gap in the Gini coefficient between the United States and the rest of the region.

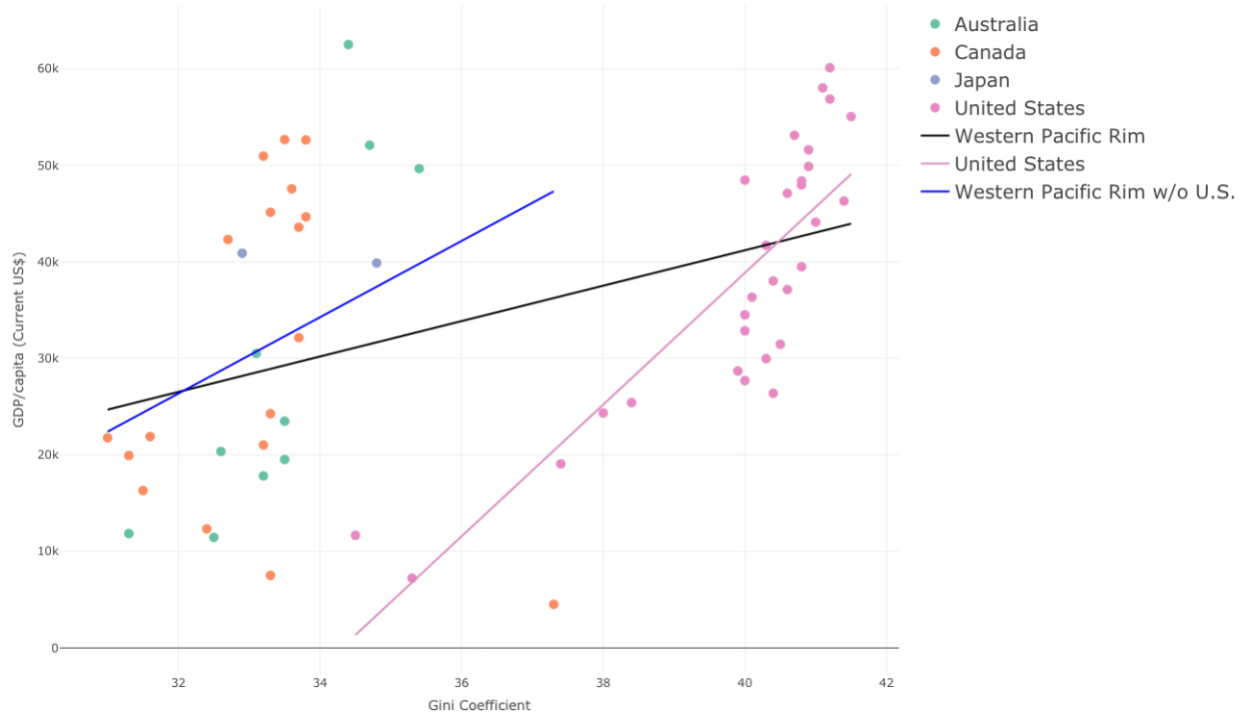

Figure 33

While the examination of the earlier graphs of certain indicators measured over time highlighted the differences in growth trends over time, these three graphs highlight the tension between certain welfare indicators, in this case GDP/capita and the Gini Coefficient, without consideration for growth over time. If both metrics are similarly adequate measures of economic welfare, we should expect a negative relationship between GDP/capita and the Gini Coefficient across cultures and income levels, but that is not the case. Rather than taking this to mean one or both of the indicators does not measure economic welfare in any respect, the dashboard approach highlights the way different countries' cultural and political systems have prioritized different facets of welfare.

Because what would be the ideal "dependent variable", true welfare, is unmeasurable, using correlations will still give some key insights about this collection of indicators for the

dashboard. As shown in the examples above, in there is the potential for a large discrepancy in the descriptive powers of different welfare indicators as applied in different cultural and economic contexts. The analysis of the trends within and relationships between the five welfare indicators collected reveals the inherent tension in their contribution to overall welfare, particularly between distributional welfare indicators and aggregative ones. It is this tension that motivates the creation of the welfare dashboard. This tension cannot be resolved by the argument that some of these indicators do not truly measure overall welfare because to obtain any understanding of overall welfare, we must rely on the assumption that economic welfare is a necessary, if not sufficient, factor. Unlike examining these individual indicators, or utilizing a composite indicator like HDI, the dashboard approach to welfare takes this tension into account and can be utilized to align more facets of a country's welfare towards improvement.

X. Presenting the Dashboard

Now that we have established the need for a dashboard both theoretically through the discussion of the meaning of welfare and concretely through a close examination of the real-world data, the final part of the methodology in this paper will be to consider 4 example dashboard comparisons of counties judged to have similar welfare according to their Income Adjusted Human Development Index (IHDI) for 2019. This composite indicator was chosen because we have already shown the discrepancies in measuring welfare using only one indicator and while HDI is more well-known, the income adjusted version attempts to account for more of the indicators selected in the dashboard.[xxv] Welfare comparisons will be the main point of focus to highlight welfare discrepancies in countries that score similarly using either singular or composite measures of welfare. The four groupings are: i) the United States, United Kingdom,

and Norway (all with an IHDI above .808); ii) Russia, Argentina, and Italy (all with an IHDI between .714 and .768); iii) Bolivia, Egypt, South Africa, and Indonesia (all with an IHDI between .463 and .584); iv) Pakistan, Uganda, and Rwanda (all with an HDI between .331 and .387). While an effort was made to include countries from different regions in the groupings, proximity in IHDI was prioritized most in selecting these groupings.

There were several other factors that would add value to the comparisons or perhaps lead to the selection of different groupings such as categorization by welfare spending or types of policy, but for many countries, that information was not readily available or easily summarized. However, in a broad sense, the thirteen countries of interest here provide a sufficiently diverse sample for the purposes of this project. Furthermore, many countries do not have a sufficient number of years with observations in which measurements existed for all five indicators that make up the dashboard, which limits the list from which to select if one is to further compare of welfare development in the recent past. Country size, both in terms of land area and population, were not considered in these groupings because all the indicators are population independent, but there is a concern that larger countries may have greater policy barriers against increasing welfare.[xxvi]

One final note on the selection of these sample countries is the notable omission of two of the largest countries by GDP, China and India. While there may be large insights to gain from the analysis of the welfare situation in these two large and quickly developing economies, each had to be omitted for its own individual reasons. With respect to China, from a more practical standpoint, there was a lack of countries with similar IHDI measures that had sufficient available data over time. However, there was also a concern about the reliability of the data that the Chinese government provides.[xxvii] While India does not present the same issue over the

reliability of data, it was omitted more due to a scarcity of available data as well as due to a lack of comparable countries with respect to IHDI.

The structure of the dashboard will use the five most recent data points for each country where the time frames are overlapping and will include either four or five indicators (for some countries, the poverty gap indicator will be omitted because it does not capture the welfare conditions in those societies). The benefits of the dashboard in practice will be highlighted through comparison, but on its own, it also functions to describe a country's welfare conditions in a way superior to any individual or composite indicator for the reasons discussed in previous sections.

United Kingdom				
Year	**GDP/capita**	**Gini Coefficient**	**Life Expectancy**	**Lowest 10%**
2013	43,713	33.2	81.0	2.9%
2014	45,404	33.2	81.0	2.9%
2015	47,787	34	81.3	2.9%
2016	41,499	34.8	81.2	2.8%
2017	40,857	35.1	81.3	2.6%

Figure 34

United States				
Year	**GDP/capita**	**Gini Coefficient**	**Life Expectancy**	**Lowest 10%**
2013	53,106	40.7	78.7	1.8%
2014	58,021	41.1	78.5	1.8%
2015	56,863	41.2	78.7	1.8%
2016	60,109	41.2	78.5	1.7%
2017	55,050	41.5	78.8	1.7%

Figure 35

Norway				
Year	**GDP/capita**	**Gini Coefficient**	**Life Expectancy**	**Lowest 10%**
2013	102,913	26.4	81.8	3.7%
2014	97,019	26.8	82.1	3.5%
2015	74,355	27.5	82.3	3.5%
2016	70,460	28.5	82.4	3.2%
2017	75,496	27	82.6	3.3%

Figure 36

The first collection of welfare dashboards (Figures 34-36) to consider is the highest welfare grouping with three countries from Western regions, Norway and the United Kingdom from Western Europe and the United States from the Western Pacific Rim. Furthermore, all three countries are in the high income group. The Poverty Gap indicator was omitted because at the $1.90 per day level, it has no significance in these high income countries. It would have been preferable to have countries from different regions, but there were very few with both a sufficiently high IHDI and the measurements for the dashboard indicators for the corresponding time period necessary for this comparison.[xxviii]

According to the IHDI, Norway provides the best welfare conditions with a score of 0.899, followed by the United Kingdom at 0.856, and then the United States at 0.808. This ranking seems to coincide with the information presented in the dashboards above with Norway having the largest GDP/capita, Life Expectancy, and Lowest 10%, and the lowest Gini Coefficient. The dashboard approach is not meant to overturn the rank order of IHDI, although in certain cases it may, but it is meant to highlight what specific facets of the welfare conditions are better or worse. Also notable is the relatively stagnant welfare conditions in these high

income countries compared with the other groupings we will examine in the rest of this section.

Argentina					
Year	**GDP/capita**	**Gini Coefficient**	**Life Expectancy**	**Lowest 10%**	**Poverty Gap**
2002	2,593	53.8	73.9	0.9%	6.8%
2003	3,350	50.9	74.1	1.1%	2.9%
2004	4,278	48.4	74.3	1.2%	2.0%
2005	5,110	47.7	74.5	1.3%	1.4%
2006	5,919	46.3	74.6	1.3%	1.2%

Figure 37

Italy				
Year	**GDP/capita**	**Gini Coefficient**	**Life Expectancy**	**Lowest 10%**
2003	27,466	34.9	80.0	2.3%
2004	31,260	34.3	80.8	2.4%
2005	32,043	33.8	80.8	2.4%
2006	33,502	33.7	81.3	2.5%
2007	37,823	32.9	81.4	2.5%

Figure 38

Russia				
Year	**GDP/capita**	**Gini Coefficient**	**Life Expectancy**	**Lowest 10%**
2002	2,378	37.3	65.1	2.6%
2003	2,975	40.0	65.0	2.4%
2004	4,102	40.3	65.5	2.3%
2005	5,324	41.3	65.5	2.3%
2006	6,920	41.0	66.7	2.3%

Figure 39

The next grouping of counties (Figures 37-39) gives a greater variety of geographic region and income group. Italy is another high income country from the Western Europe region. Both Russia and Argentina, however, are upper middle income countries from the Orthodox

Europe and Latin America & Caribbean regions respectively. Due to the availability of the data, for these three countries, the welfare statistics from the years 2002 though 2006 were used for the dashboard. This grouping also has the first appearance of the poverty gap metric as during this time period the values were significant in Argentina, but in the following years it has become close to insignificant.

Italy has the highest score on the IHDI rankings with a value of 0.783, followed by Russia at 0.740, and then Argentina at 0.729. Italy seems to earn this higher ranking when looking at the dashboards in three of the four categories for which it presents, GDP/capita, the Gini Coefficient, and Life Expectancy, but the data for Lowest 10% are very similar to those of Russia. It is clear than the difference in Gini Coefficients between the two countries come from the higher end of the distribution, and this makes sense in the context of the large portions of wealth held by Russian oligarchs after the collapse of the Soviet Union. Argentina, when compared against Russia, seems to lag behind significantly in most of the indicators, but shows a surprisingly high level for Life Expectancy averaging almost 10 more years compared to Russia during this time period. This may be one example of the canceling out effect discussed earlier that is a main weakness of composite indicators like the IHDI. Using only the IHDI score, one must assume that Russia and Argentina have very similar welfare conditions, but the dashboard approach reveals this is far from the case, particularly with respect to income inequality, poverty, and life expectancy.

Indonesia					
Year	**GDP/capita**	**Gini Coefficient**	**Life Expectancy**	**Lowest 10%**	**Poverty Gap**
2000	780	28.6	65.8	4.2%	7.7%
2004	1,150	32.7	67.0	3.6%	4.4%
2008	2,167	35.2	68.5	3.4%	3.6%
2011	3,643	39.7	69.5	3.0%	1.8%
2015	3,332	39.7	70.8	3.0%	0.9%

Figure 40

Bolivia					
Year	**GDP/capita**	**Gini Coefficient**	**Life Expectancy**	**Lowest 10%**	**Poverty Gap**
2000	998	61.6	62.5	0.2%	17.5%
2004	967	55.0	64.8	0.9%	6.0%
2008	1,715	50.8	66.9	0.9%	5.0%
2011	2,346	46.1	68.5	1.1%	3.0%
2015	3,036	46.7	70.3	1.1%	2.8%

Figure 41

Egypt					
Year	**GDP/capita**	**Gini Coefficient**	**Life Expectancy**	**Lowest 10%**	**Poverty Gap**
2004	1,062	31.8	69.3	3.9%	0.8%
2008	2,044	31.1	70.0	3.9%	0.7%
2010	2,646	30.2	70.3	4.1%	0.3%
2012	3,230	28.3	70.7	4.3%	0.2%
2015	3,563	31.8	71.3	3.9%	0.2%

Figure 42

South Africa					
Year	**GDP/capita**	**Gini Coefficient**	**Life Expectancy**	**Lowest 10%**	**Poverty Gap**
2000	3,375	57.8	56.0	1.3%	13.0%
2005	6,033	64.8	53.4	1.0%	8.2%
2008	6,351	63.0	55.4	1.0%	4.7%
2010	8,149	63.4	57.7	0.9%	4.8%
2014	6,989	63.0	62.0	0.9%	6.1%

Figure 43

The third grouping of countries (Figures 40-43) shows the most geographic and cultural diversity as all four countries come from different regions with potentially different cultural and political understandings of welfare. Egypt, Bolivia, and Indonesia, from the Middle East & North Africa, Latin America & Caribbean, and East Asia & Pacific regions respectively, are all in the lower middle income group. South Africa, placed in the Western Europe region due to its recent political and cultural history, is the lone upper middle income country in this grouping. As we will also see in the final collection of dashboards, countries in the lower middle income group or low income group have data available less frequently, so the time frame has grown from a five-year period to a fifteen-year period with data from around every four years. This also means that comparing the general welfare trends of a country may be more useful than focusing on any given year shown in the dashboard.

Based on current IHDI scores, Indonesia has the highest welfare levels with a score of 0.590. Next comes Bolivia with a score of 0.546, Egypt with a score of 0.497, and finally South Africa with an IHDI of 0.468. The first note here is the rarity of a country in a higher income group with a lower welfare score. This may be driven by the large difference in GDP/capita, which is the only category for which South Africa shows the welfare benefits usually connected with higher income countries. Furthermore, while Indonesia does display comparable or

superior welfare statistics compared to the other three countries, Bolivia does not compare favorably to the other countries in this grouping despite having the second largest IHDI. Particularly deficient are the GDP/capita, Poverty Gap, and Lowest 10% measures, although all three show significant improvement over this time period. Based on the formula for IHDI, it seems that the educational indicators elevate Bolivia's IHDI, but as discussed earlier in the section on the post-colonial critique, this is a problematic metric to apply across cultures because of differences in education systems and requirements.

A final point of discussion for this grouping is the large inequality difference between Egypt and South Africa which have very similar IHDI scores. The statistical cause of this again appears to a type of canceling out effect that occurs when adjusting for income inequality that makes countries with significantly different health and economic output measures seem similar on the whole. Historically the difference may be rooted in the length of time which the countries were under colonial rule, or at least greatly influenced by it in their culture. This leads to a large class division that manifests itself in the income inequality metrics. So, while by GDP/capita, South Africa appears to have more resources to provide welfare to its citizen, it has failed to do so from a distributive perspective. Conversely, Egypt has not been able to produce the same economic output on a per capita basis, but the benefits of that output are spread significantly more evenly across the population, according to the data available.

Pakistan					
Year	**GDP/capita**	**Gini Coefficient**	**Life Expectancy**	**Lowest 10%**	**Poverty Gap**
2001	544	30.4	63.1	4.1%	6.5%
2005	749	32.7	64.0	3.9%	3.1%
2010	987	29.8	65.3	4.2%	1.2%
2013	1209	30.7	66.1	4.0%	0.9%
2015	1357	32.6	66.6	3.9%	0.5%

Figure 44

Uganda					
Year	**GDP/capita**	**Gini Coefficient**	**Life Expectancy**	**Lowest 10%**	**Poverty Gap**
2002	246	45.2	48.3	2.4%	26.8%
2005	334	42.9	51.7	2.4%	21.6%
2009	800	44.2	56.1	2.3%	15%
2012	790	41.0	59.0	2.5%	10.7%
2016	737	42.8	62.0	2.5%	13.1%

Figure 45

Rwanda					
Year	**GDP/capita**	**Gini Coefficient**	**Life Expectancy**	**Lowest 10%**	**Poverty Gap**
2000	261	48.5	48.6	2.0%	38.9%
2005	332	52.0	55.3	1.7%	32.0%
2010	610	47.2	63.4	2.3%	25.6%
2013	723	45.1	66.2	2.4%	21.4%
2016	745	43.7	67.9	2.4%	20.9%

Figure 46

The final grouping of dashboards (Figures 44-46) consists of countries with some of the lowest IHDI scores, and in the same way that the countries with high scores are concentrated in the Western regions, nearly all of the countries with the lowest scores are in the Sub-Saharan Africa region. Pakistan has the lowest score of countries in the data with at least 5 years of data

that is not in that region, and the other countries in the group are on either side of it in the rankings. Both countries from the Sub-Saharan Africa region, Rwanda and Uganda, are low income countries, while The World Bank places Pakistan in the lower middle income group. Similar to the previous grouping the time period has been increased for these countries due to data availability restrictions and the dashboards here range from 2000 to 2016, again with data approximately every four years.

According to the IHDI, Uganda presents the best welfare conditions with a score of 0.399, followed by Pakistan at 0.384, and lastly Rwanda with a score of 0.382, but clearly this composite metric sees them as very similar, and this is the smallest range for IHDI of any of the four groupings discussed in this paper. However, the dashboards for these three nations reveal significant difference in welfare conditions. The most obvious discrepancy is in the Poverty Gap percentages where Pakistan shows significantly lower rates compared to Uganda and Rwanda and seems to have nearly alleviated poverty at the $1.90 per day level by the end of this time frame through the aggregative economic growth as captured in GDP/capita.

Also noteworthy here is how these three countries show the disconnect between the Poverty Gap percentage and the Lowest 10% metric. Looking only at the Lowest 10% is clearly not a full picture of welfare because it is blind to the total amount of income, but that this distributional equality is on par with higher welfare countries like Russia, Italy, and the United States seems to lend some credence to the idea that economic growth, or at least the most common policy strategies for economic growth, are antithetical to distributional equality and welfare.

After looking at these four groupings, we have shown the advantages in sensitivity of the dashboard approach to welfare over any individual indicator or a composite indicator like the

IHDI. Using multiple indicators without manipulating or combining them gives the fullest picture of a country's welfare conditions and allows for more precise and accurate comparisons between countries. One final note about composite indicators is that they can easily form the basis of a different welfare dashboard. In this project, the post-colonial critique prevented the use of educational metrics in the dashboard, for instance, but one could simply take the different indicators that make up the HDI and IHDI and create a dashboard rather than combining them. And it is often the case that the sources that provide data on the HDI actually give the metrics for the individual indicators as well. Utilizing the metrics individually gives them more context and meaning towards the overall conditions of that country.

Emphasizing these welfare discrepancies by using different indicators in a dashboard format may have strong application potential for policy. This follows from the earlier discussion that different measurements of welfare have different policy implications, particularly the split between what types of welfare policy prioritizes aggregate indicators versus distributional measures. Because the goal of this model is to balance the different types of indicators, it should give a sense of which policy methods have the best effects on welfare from the most wholistic vantage point. However, the goal in this paper is solely to highlight the tension here and not to suggest how it might be remedied through policy.

Conclusion

In this project, we first discussed the history of economic welfare and the ethical shift on the accumulation of goods as coinciding with welfare. We used the works of Aristotle, John Locke, Adam Smith, and Simon Kuznets to explain why the parallel between economic production and societal welfare exists in the literature. However, it quickly became evident that

some measure of output, like GDP, could only function as a strict measure of production because it does not take into account anything besides the value of production goods, ignoring things like consumption trends, class structure, and income inequality.

To attempt to address this issue and present a more coherent mechanism for measuring societal welfare, we then discussed the nature of welfare in society. First, we used the work of Risse and Dworkin to discuss different ways societies might orient themselves, i.e., around goals, rights, or duties, with the implication being that the differences between both the manner and the content of these societal orientations may affect the ways in which those societies understand welfare. In a similar way, we used the work of David Merrill to examine how different ethical frameworks, notably utilitarianism, Lockean ethics, Kantian ethics, and Hegelian ethics, might define welfare, and concluded that only the Hegelian system provided sufficient ethical backings to give rise to a societal understanding of welfare.

We continued this investigation through the work of Franz Fanon and Chantal Mouffe to examine the question of society-specific welfare through the lens of a post-colonial critique. This understanding of cultural identity comes not from adherence to one particular ethical system or from the internal selection of set of rights, duties, or goals around which to organize society, but rather from defining cultural values against some defined other or constitutive outside. The main implication of this discussion is the necessary difference between the societal and cultural values of the West and those of the non-West or formerly colonized and how that would necessarily affect the ways in which those two groups understood welfare and the methods they might use to preserve or increase welfare.

The next question for this project was to better define the relationship between economic welfare and overall welfare, and using the works of Plato and Aristotle, as well as the more

contemporary thinkers David Weissman and John Christman, we concluded that economic welfare is a necessary but not sufficient condition for overall welfare because it allows for actions for the betterment of one's condition and for autonomy. The ancient thinkers focus on the way in which the possession of material goods discourages unvirtuous actions that detract from individual well-being. Aristotle specifically also argues that material goods are often the necessary means for acting towards the betterment of one's well-being. Christman and Weissman expand this understanding to argue that material means are necessary to make any autonomous decision, but this autonomy should still lead to acting in ways to improve an individual's well-being. Following the argument through, a degree of material resources is necessary to act in such a way as to promote individual well-being or for a society to act for its welfare.

The final philosophical question concerning welfare was to discern the relationship between the well-being of the individuals within a society and the overall welfare of that society, and we concluded that the societal welfare was not simply reducible to the sum of individual well-beings. Through the works of John Stuart Mill and Karl Marx, it became clear that the active role society has in the life of the individual meant that individual well-beings alone did not define the welfare of the society. The Personalist school of thought or ideas that understand the community as in the individual and thus reducing the importance of the individual justifies the inclusion of aggregate indicators as well. This conclusion gives reason for considering different types of welfare indicators, specifically both those that consider individuals and those that look at society more holistically.

After discussing the more philosophically minded questions on welfare, we turned to some of the problems with measuring welfare statistically and what types of indicators could be

used for societal welfare. The main focus of this discussion was around different ways of quantifying and ranking income distributions. We discussed how from a Rawlsian perspective it is the minimum, or at least the left-tail, of this distribution that holds the value with respect to comparing different potential distributions. We then compared this to functions like the geometric mean or the Gini Coefficient that take into account the distribution as a whole for ranking purposes. Because of advantages that both methods present, the conclusion from this examination was that any successful welfare dashboard should include indicators that focus on the lower end of the distribution, like the Poverty Gap or the Lowest 10% indicators, and indicators that take into account the distribution as a whole, like the Gini Coefficient.

The next step in the project was to select the set of indicators for the dashboard with the final selection including GDP/capita, the Gini Coefficient, the Poverty Gap, Life Expectancy, and the Lowest 10%. This particular set of indicators work together to cover the shortcomings of one another. The weakness of an aggregative indicator like GDP/capita is balanced against distributional indicators like the Gini Coefficient, the Poverty Gap, or the Lowest 10% measures. The ambivalence to different sides of the distribution in the Gini Coefficient is also counteracted by the focus on the lower end of the distribution in the Poverty Gap and Lowest 10% indicators. Finally, the Lowest 10% indicator allows us to examine the lower end of the distribution in a country specific context unlike the Poverty Gap, which relies on a static poverty line across all countries.

Perhaps more important in this discussion were the indicators that were intentionally left out of the dashboard, including any measures for educational attainment or environmental indicators. Availability of data played a factor in this decision, but for neither of these indicators was it the driving factor in their omission. Educational indicators relied too heavily on certain

cultural assumptions that would break from our conclusions from discussing the post-colonial critique and defining society against an exterior group. Environmental indicators for specific countries can be misleading due to the effects of local geography and the ability of adverse climate effects to spread across international borders.

After settling on this set of five indicators, we conducted an examination of the tension in welfare trends across time for each of the indicators. Important for this process was a reorganization of the geographic regions for each country and increasing the number of regions from seven, as given by The World Bank, to nine. Throughout many of the regions and income groups, it became clear that despite all measuring some facet of welfare, these indicators did not necessarily move at similar rates or even in the same direction. It was particularly important to see the disparities between regions in how the different indicators interacted to reaffirm our earlier understandings of the ways in which some parts of welfare may be culture or society specific.

The final step for this project was to run a series of four example welfare comparisons using the welfare dashboard of these five indicators. The groupings came from countries with close measurements of welfare based on IHDI scores. As we predicted from the analysis of the general trends in the data and the tension between the trends of the different indicators, countries with similar IHDI scores did not present similarly across the dashboard. This was the result both of the canceling out effect and cross-cultural differences, among other potential factors.

The goal of this project has been threefold: to discuss the meaning of societal welfare, to examine the advantages and disadvantages of different types of economic welfare indicators, particularly comparing aggregate against distributional indicators and singular against composite indicators, and to ultimately advocate for a dashboard approach to the measurement of economic

welfare. At the root of this project is an acknowledgement of the complexity of both overall welfare and economic welfare, and furthermore an acknowledgement that the economics community has largely overlooked this complexity. Critical for this later acknowledgement is the use of a more overtly philosophical approach that allows for more possibilities for understanding welfare as well as more methods for helping to define it. Specifically, the philosophical elements brought a greater attention to distributional indicators and to the potential disparities in the understanding of welfare across cultures. With this in mind, an analysis of the statistical data across different indicators and cultural regions confirmed this tension. Therefore, the dashboard approach is the necessary result to best present the tension both between indicators and across regions and cultures. The dashboard presented in this paper functions as a proof of concept for this welfare measurement and comparison strategy as an alternative specifically to composite indicators, but it may not contain the final collection of necessary indicators.

When a philosophical approach works in concert with this economic understanding of welfare, there appears to be a conflict in terms on some level. While in theory a measure of overall welfare (the joining of economic and non-economic welfare components) would be immensely useful and informative, it is certainly beyond the scope of this project, and furthermore, there are some key elements that may elude measurement altogether, or at least measurement in a meaningful way on a society-wide level. For instance, natural temperament (e.g., optimists vs. pessimists, depressive vs. hypomanic) may contribute significantly to an individual's perception of their own welfare. Another major factor may be contributions from the political climate on both a systemic level and from their own perspectives of government and policy decisions. Subjects such as these, while certainly connected to the project presented in this paper, are perhaps better suited for works of psychology or political philosophy. However, I

would certainly recommend interdisciplinary discourse between the research done on welfare in the other fields as economic welfare can only represent on important facet of this overall welfare.

Critical for future interdisciplinary exploration is an understanding of how individuals cannot separate at a perceptible level, or perhaps at all, the discrete effects from changes in economic welfare when compared to changes in non-economic welfare. Welfare, at least on the individual level, is evaluable only at this overall level. While this may initially seem to support a composite indicator to represent overall welfare, this is problematic for the reasons discussed above. Also at issue, however, is the same canceling out effect discussed above but at a level removed. In the same way two economic indicators at opposite ends of the global distribution may balance out in composite economic indicators, a country with higher ranked economic indicators may appear average if these hypothetical political or psychological indicators are on the low end of the global distribution. This presents the same problem for comparing the welfare conditions of different societies as discussed above: that countries with similar rankings on a composite scale may need different remedies for completely different problems, and this will not be captured.

One further consideration for future exploration of this topic might be the ineffectiveness of traditional policy options on non-economic welfare outcomes. What seems at issue here is that policies to remedy this shortcoming would require specifics on nearly an individual-by-individual level and data on a scale and breadth currently unavailable. This gives even further import to projects like this one that seek to give greater clarity in understanding welfare because addressing economic welfare seems to be one of the few available means of access to overall welfare on both an individual and societal level. While this relies on the baseline assumption

that economic welfare is a necessary condition for non-economic welfare, it is a necessary one given the current state of available data, policy strategies, and welfare measurement approaches.

Appendix

Figure A1

Subset of Data	Low Income	Lower Middle Income	Upper Middle Income	High Income	**Total**
Western Pacific Rim	0	0	0	4	**4**
South Asia	0	6	1	0	**7**
East Asia & Pacific	0	13	5	1	**19**
Sub-Saharan Africa	21	18	4	1	**44**
Western Europe	0	0	1	25	**26**
Orthodox Europe	0	1	13	2	**16**
Non-Arab Muslim	0	4	4	0	**8**
Middle East & North Africa	2	6	2	2	**12**
Latin America & Caribbean	0	6	14	3	**23**
Total	**23**	**54**	**44**	**38**	**159**

Figure A2

Subset of Data	**Indicator**	**Min**	**1st Qu**	**Median**	**Mean**	**3rd Qu**	**Max**
All Data	GDP/capita	119	1376	4038	11,875	14,271	123,514
	Gini	22.9	33.2	38.5	40.13	46.7	65.8
	Life Expectancy	42.4	67.8	73.0	71.15	76.6	83.3
	Poverty Gap	0.1	0.1	1.0	4.7	4.9	64.1
	Lowest 10%	0.1	1.6	2.3	2.3	3.0	4.5
High Income	GDP/capita	1760	14,713	25,186	30,448	43,626	123,514
	Gini	22.9	29.7	33.3	33.6	35.8	57.2
	Life Expectancy	68.3	76.0	78.6	78.3	80.9	83.3
	Poverty Gap	0.1	0.1	0.3	0.4	0.5	0.9
	Lowest 10%	0.5	2.2	2.7	2.7	3.2	4.1
Upper Middle Income	GDP/capita	314	2250	4032	4689	6590	15,146
	Gini	26.3	38.0	45.5	44.9	51.5	64.8
	Life Expectancy	50.2	70.1	72.9	72.0	75.0	79.9
	Poverty Gap	0.1	0.5	1.6	2.8	3.7	24.1
	Lowest 10%	0.1	1.1	1.6	1.8	2.3	4.1
Lower Middle Income	GDP/capita	139	715	1169	1554	2142	5710
	Gini	25.9	33.9	40.1	41.29	47.4	63.2
	Life Expectancy	43.4	61.2	67.6	65.3	70.3	76.5
	Poverty Gap	0.1	1.2	5.0	7.6	11.1	51.5
	Lowest 10%	0.2	1.6	2.5	2.4	3.3	4.5

Low Income	GDP/capita	120	286	402	584	660	5494
	Gini	29.8	36.4	42.3	41.9	45.5	65.8
	Life Expectancy	42.4	49.4	55.0	55.0	59.7	74.0
	Poverty Gap	0.1	15.65	24.7	25.2	32.7	64.1
	Lowest 10%	0.7	2.0	2.4	2.5	2.9	4.1
East Asia & Pacific	GDP/capita	139	1023	1978	3274	3486	2925
	Gini	27.8	34.0	37.7	38.2	42.4	48.6
	Life Expectancy	54.3	66.5	69.8	69.4	72.0	81.7
	Poverty Gap	0.1	0.3	1.8	4.3	5.5	25.4
	Lowest 10%	1.8	2.4	2.7	2.8	3.3	4.2
Latin America & Caribbean	GDP/capita	394	2145	3619	4632	6225	15,843
	Gini	34.4	46.6	50.5	50.5	54.5	63.3
	Life Expectancy	57.4	70.3	73.2	72.6	75.3	79.9
	Poverty Gap	0.1	1.1	2.6	4.0	5.7	23.6
	Lowest 10%	0.1	1.0	1.2	1.3	1.6	2.7
Middle East & North Africa	GDP/capita	385	1486	2395	7840	9308	37,848
	Gini	27.6	30.9	35.3	35.6	40.1	45.1
	Life Expectancy	57.2	68.4	71.9	72.1	75.9	82.5
	Poverty Gap	0.1	0.2	0.3	1.1	1.1	7.8
	Lowest 10%	1.3	2.5	3.0	3.0	3.4	4.3
non-Arab Muslim	GDP/capita	178	599	1281	2922	4631	12,615
	Gini	26.8	31.1	35.7	36.1	40.8	47.4
	Life Expectancy	56.8	66.5	68.6	69.1	71.8	76.5
	Poverty Gap	0.1	0.2	0.6	3.0	2.1	22.8
	Lowest 10%	1.1	2.2	2.7	2.9	3.5	4.4
Orthodox Europe	GDP/capita	400	1643	3953	6123	7029	32,109
	Gini	26.3	32.8	35.7	35.2	38.0	48.4
	Life Expectancy	64.9	69.6	72.8	72.7	75.2	81.4
	Poverty Gap	0.1	0.2	0.7	1.6	2.2	12.3
	Lowest 10%	0.8	1.9	2.4	2.6	3.2	4.1
South Asia	GDP/capita	204	362	701	1143	1368	6637
	Gini	25.9	32.0	33.0	34.0	36.4	43.8
	Life Expectancy	54.2	62.0	65.5	65.6	69.4	76.5
	Poverty Gap	0.1	1.2	3.2	6.0	8.5	23.7
	Lowest 10%	2.5	3.2	3.7	3.6	3.9	4.5
Sub-Saharan Africa	GDP/capita	120	373	641	1150	1094	14,766
	Gini	29.8	39.2	43.0	44.3	47.8	65.8
	Life Expectancy	42.4	50.2	55.3	55.5	60.1	73.9
	Poverty Gap	0.1	9.8	17.8	20.0	28..7	64.1
	Lowest 10%	0.2	1.7	2.3	2.2	2.6	4.1

Western Europe	GDP/Capita	2101	14,663	27,466	32,102	45,277	123,514
	Gini	22.9	28.4	32.2	32.3	35.1	64.8
	Life Expectancy	53.4	75.8	78.4	77.8	81.0	83.3
	Poverty Gap	0.1	0.1	0.3	0.6	0.5	14.2
	Lowest 10%	0.5	2.4	2.9	2.9	3.3	4.1
Western Pacific Rim	GDP/capita	4520	21,868	36,734	35,005	48,078	62,512
	Gini	31.0	33.3	35.4	36.6	40.4	41.5
	Life Expectancy	72.0	76.6	78.0	78.1	80.0	83.3
	Poverty Gap	0.1	0.2	0.4	0.5	0.8	1.6
	Lowest 10%	1.7	1.8	2.2	2.3	2.7	3.0

Figure A3

Country	**Region**	**Income Group**	**Years**
Albania	Orthodox Europe	Upper middle income	9
Algeria	Middle East & North Africa	Lower middle income	3
Angola	Sub-Saharan Africa	Lower middle income	2
Argentina	Latin America & Caribbean	Upper middle income	29
Armenia	Orthodox Europe	Upper middle income	18
Australia	Western Pacific Rim	High income	10
Austria	Western Europe	High income	17
Azerbaijan	non-Arab Muslim	Upper middle income	2
Bangladesh	South Asia	Lower middle income	9
Belarus	Orthodox Europe	Upper middle income	8
Belgium	Western Europe	High income	20
Belize	Latin America & Caribbean	Lower middle income	6
Benin	Sub-Saharan Africa	Lower middle income	3
Bhutan	South Asia	Lower middle income	4
Bolivia	Latin America & Caribbean	Lower middle income	19
Bosnia and Herzegovina	Orthodox Europe	Upper middle income	2
Botswana	Sub-Saharan Africa	Upper middle income	5
Brazil	Latin America & Caribbean	Upper middle income	33
Bulgaria	Orthodox Europe	Upper middle income	12
Burkina Faso	Sub-Saharan Africa	Low income	5
Burundi	Sub-Saharan Africa	Low income	4
Cabo Verde	Sub-Saharan Africa	Lower middle income	3
Cameroon	Sub-Saharan Africa	Lower middle income	4
Canada	Western Pacific Rim	High income	18

Central African Republic	Sub-Saharan Africa	Low income	2
Chad	Sub-Saharan Africa	Low income	2
Chile	Latin America & Caribbean	High income	14
China	East Asia & Pacific	Upper middle income	13
Colombia	Latin America & Caribbean	Upper middle income	19
Comoros	Sub-Saharan Africa	Lower middle income	2
Congo, Dem. Rep.	Sub-Saharan Africa	Low income	2
Congo, Rep.	Sub-Saharan Africa	Lower middle income	2
Costa Rica	Latin America & Caribbean	Upper middle income	31
Cote d'Ivoire	Sub-Saharan Africa	Lower middle income	10
Croatia	Western Europe	High income	9
Cyprus	Orthodox Europe	High income	3
Denmark	Western Europe	High income	12
Djibouti	Middle East & North Africa	Lower middle income	4
Dominican Republic	Latin America & Caribbean	Upper middle income	23
Ecuador	Latin America & Caribbean	Upper middle income	18
Egypt	Middle East & North Africa	Lower middle income	9
El Salvador	Latin America & Caribbean	Lower middle income	23
Estonia	Western Europe	High income	15
Eswatini	Sub-Saharan Africa	Lower middle income	4
Ethiopia	Sub-Saharan Africa	Low income	5
Fiji	East Asia & Pacific	Upper middle income	3
Finland	Western Europe	High income	4
France	Western Europe	High income	6
Gabon	Sub-Saharan Africa	Upper middle income	2
The Gambia	Sub-Saharan Africa	Low income	4
Georgia	Orthodox Europe	Upper middle income	22
Germany	Western Europe	High income	3
Ghana	Sub-Saharan Africa	Lower middle income	7
Greece	Orthodox Europe	High income	17
Guatemala	Latin America & Caribbean	Upper middle income	5
Guinea	Sub-Saharan Africa	Low income	5
Guinea-Bissau	Sub-Saharan Africa	Low income	3
Guyana	Latin America & Caribbean	Upper middle income	1
Haiti	Latin America & Caribbean	Lower middle income	1
Honduras	Latin America & Caribbean	Lower middle income	28
Hungary	Western Europe	High income	8
Iceland	Western Europe	High income	5
India	South Asia	Lower middle income	6

Indonesia	East Asia & Pacific	Lower middle income	25
Iran	non-Arab Muslim	Lower middle income	11
Iraq	Middle East & North Africa	Upper middle income	2
Ireland	Western Europe	High income	16
Israel	Middle East & North Africa	High income	6
Italy	Western Europe	High income	22
Jamaica	Latin America & Caribbean	Upper middle income	7
Japan	Western Pacific Rim	High income	2
Jordan	Middle East & North Africa	Upper middle income	3
Kazakhstan	non-Arab Muslim	Upper middle income	7
Kenya	Sub-Saharan Africa	Lower middle income	5
Kiribati	East Asia & Pacific	Lower middle income	1
Korea, Rep.	East Asia & Pacific	High income	5
Kosovo	Orthodox Europe	Upper middle income	9
Kyrgyz Republic	non-Arab Muslim	Lower middle income	18
Laos	East Asia & Pacific	Lower middle income	5
Latvia	Western Europe	High income	14
Lesotho	Sub-Saharan Africa	Lower middle income	4
Liberia	Sub-Saharan Africa	Low income	3
Lithuania	Western Europe	High income	14
Luxembourg	Western Europe	High income	5
Madagascar	Sub-Saharan Africa	Low income	8
Malawi	Sub-Saharan Africa	Low income	4
Malaysia	East Asia & Pacific	Upper middle income	8
Maldives	South Asia	Upper middle income	2
Mali	Sub-Saharan Africa	Low income	4
Malta	Middle East & North Africa	High income	9
Mauritania	Sub-Saharan Africa	Lower middle income	7
Mauritius	Sub-Saharan Africa	Upper middle income	2
Mexico	Latin America & Caribbean	Upper middle income	16
Micronesia	East Asia & Pacific	Lower middle income	2
Moldova	Orthodox Europe	Upper middle income	14
Mongolia	East Asia & Pacific	Lower middle income	8
Montenegro	Orthodox Europe	Upper middle income	5
Morocco	Middle East & North Africa	Lower middle income	6
Mozambique	Sub-Saharan Africa	Low income	4
Myanmar	East Asia & Pacific	Lower middle income	2
Namibia	Sub-Saharan Africa	Upper middle income	3
Nepal	South Asia	Lower middle income	3

Netherlands	Western Europe	High income	11
Nicaragua	Latin America & Caribbean	Lower middle income	6
Niger	Sub-Saharan Africa	Low income	6
Nigeria	Sub-Saharan Africa	Lower middle income	5
North Macedonia	Orthodox Europe	Upper middle income	9
Norway	Western Europe	High income	18
Pakistan	South Asia	Lower middle income	12
Panama	Latin America & Caribbean	Upper middle income	24
Papua New Guinea	East Asia & Pacific	Lower middle income	2
Paraguay	Latin America & Caribbean	Upper middle income	21
Peru	Latin America & Caribbean	Upper middle income	21
Philippines	East Asia & Pacific	Lower middle income	6
Poland	Western Europe	High income	14
Portugal	Western Europe	High income	14
Romania	Orthodox Europe	Upper middle income	12
Russian Federation	Orthodox Europe	Upper middle income	12
Rwanda	Sub-Saharan Africa	Low income	5
Samoa	East Asia & Pacific	Lower middle income	3
Sao Tome and Principe	Sub-Saharan Africa	Lower middle income	2
Senegal	Sub-Saharan Africa	Lower middle income	5
Serbia	Orthodox Europe	Upper middle income	6
Seychelles	Sub-Saharan Africa	High income	1
Sierra Leone	Sub-Saharan Africa	Low income	2
Slovak Republic	Western Europe	High income	12
Slovenia	Western Europe	High income	1
Solomon Islands	East Asia & Pacific	Lower middle income	2
South Africa	Western Europe	Upper middle income	7
South Sudan	Sub-Saharan Africa	Low income	1
Spain	Western Europe	High income	19
Sri Lanka	South Asia	Lower middle income	8
St. Lucia	Latin America & Caribbean	Upper middle income	2
Sudan	Sub-Saharan Africa	Low income	2
Sweden	Western Europe	High income	19
Switzerland	Western Europe	High income	2
Syrian Arab Republic	Middle East & North Africa	Low income	2
Tajikistan	non-Arab Muslim	Lower middle income	6
Tanzania	Sub-Saharan Africa	Lower middle income	5
Thailand	East Asia & Pacific	Upper middle income	12
Timor-Leste	East Asia & Pacific	Lower middle income	3

Togo	Sub-Saharan Africa	Low income	3
Tonga	East Asia & Pacific	Upper middle income	3
Trinidad and Tobago	Latin America & Caribbean	High income	1
Tunisia	Middle East & North Africa	Lower middle income	6
Turkey	non-Arab Muslim	Upper middle income	13
Turkmenistan	non-Arab Muslim	Upper middle income	1
Uganda	Sub-Saharan Africa	Low income	9
Ukraine	Orthodox Europe	Lower middle income	7
United Kingdom	Western Europe	High income	26
United States	Western Pacific Rim	High income	30
Uruguay	Latin America & Caribbean	High income	14
Uzbekistan	non-Arab Muslim	Lower middle income	4
Vanuatu	East Asia & Pacific	Lower middle income	1
Vietnam	East Asia & Pacific	Lower middle income	10
West Bank and Gaza	Middle East & North Africa	Lower middle income	7
Yemen	Middle East & North Africa	Low income	3
Zambia	Sub-Saharan Africa	Lower middle income	9
Zimbabwe	Sub-Saharan Africa	Lower middle income	2

Figure A4

Subset of Data	**Years**
Full Data	1357
High Income	436
Upper Middle Income	476
Lower Middle Income	357
Low Income	88
East Asia & Pacific	114
Latin America & Caribbean	362
Middle East & North Africa	60
Non-Arab Muslim	62
Orthodox Europe	165
South Asia	44
Sub-Saharan Africa	177
Western Europe	313
Western Pacific Rim	60

Figure A5

Subset of Data	Indicator	Correlation Coefficient with Year (1967-2017)
Full Data	GDP/Capita	0.264
High Income	GDP/Capita	0.390
Upper Middle Income	GDP/Capita	0.604
Lower Middle Income	GDP/Capita	0.546
Low Income	GDP/Capita	0.138
East Asia & Pacific	GDP/Capita	0.323
Latin America & Caribbean	GDP/Capita	0.539
Middle East & North Africa	GDP/Capita	0.405
Non-Arab Muslim	GDP/Capita	0.296
Orthodox Europe	GDP/Capita	0.299
South Asia	GDP/Capita	0.566
Sub-Saharan Africa	GDP/Capita	0.304
Western Europe	GDP/Capita	0.339
Western Pacific Rim	GDP/Capita	0.928
Full Data	Gini Coefficient	- 0.174
High Income	Gini Coefficient	- 0.103
Upper Middle Income	Gini Coefficient	- 0.282
Lower Middle Income	Gini Coefficient	- 0.087
Low Income	Gini Coefficient	- 0.271
East Asia & Pacific	Gini Coefficient	- 0.148
Latin America & Caribbean	Gini Coefficient	- 0.316
Middle East & North Africa	Gini Coefficient	- 0.339
Non-Arab Muslim	Gini Coefficient	- 0.381
Orthodox Europe	Gini Coefficient	- 0.073
South Asia	Gini Coefficient	0.433
Sub-Saharan Africa	Gini Coefficient	- 0.136
Western Europe	Gini Coefficient	- 0.005
Western Pacific Rim	Gini Coefficient	0.249
Full Data	Life Expectancy	0.334
High Income	Life Expectancy	0.525
Upper Middle Income	Life Expectancy	0.457
Lower Middle Income	Life Expectancy	0.444
Low Income	Life Expectancy	0.624
East Asia & Pacific	Life Expectancy	0.407
Latin America & Caribbean	Life Expectancy	0.524
Middle East & North Africa	Life Expectancy	0.461
Non-Arab Muslim	Life Expectancy	0.761
Orthodox Europe	Life Expectancy	0.611
South Asia	Life Expectancy	0.714
Sub-Saharan Africa	Life Expectancy	0.538

Western Europe	Life Expectancy	0.336
Western Pacific Rim	Life Expectancy	0.836
Full Data	Poverty Gap	- 0.234
High Income	Poverty Gap	- 0.249
Upper Middle Income	Poverty Gap	- 0.467
Lower Middle Income	Poverty Gap	- 0.374
Low Income	Poverty Gap	- 0.399
East Asia & Pacific	Poverty Gap	- 0.473
Latin America & Caribbean	Poverty Gap	- 0.472
Middle East & North Africa	Poverty Gap	- 0.058
Non-Arab Muslim	Poverty Gap	- 0.315
Orthodox Europe	Poverty Gap	- 0.238
South Asia	Poverty Gap	- 0.638
Sub-Saharan Africa	Poverty Gap	- 0.264
Western Europe	Poverty Gap	- 0.148
Western Pacific Rim	Poverty Gap	- 0.047
Full Data	Lowest 10%	0.099
High Income	Lowest 10%	0.040
Upper Middle Income	Lowest 10%	0.175
Lower Middle Income	Lowest 10%	0.040
Low Income	Lowest 10%	0.270
East Asia & Pacific	Lowest 10%	- 0.034
Latin America & Caribbean	Lowest 10%	0.293
Middle East & North Africa	Lowest 10%	0.095
Non-Arab Muslim	Lowest 10%	0.339
Orthodox Europe	Lowest 10%	- 0.186
South Asia	Lowest 10%	- 0.343
Sub-Saharan Africa	Lowest 10%	0.163
Western Europe	Lowest 10%	- 0.091
Western Pacific Rim	Lowest 10%	- 0.067

Figure A6

Subset of Data	Indicator 1	Indicator 2	Correlation Coefficient
Full Data	GDP/Capita	Gini Coefficient	- 0.427
High Income	GDP/Capita	Gini Coefficient	- 0.355
Upper Middle Income	GDP/Capita	Gini Coefficient	0.080
Lower Middle Income	GDP/Capita	Gini Coefficient	0.116
Low Income	GDP/Capita	Gini Coefficient	- 0.171
East Asia & Pacific	GDP/Capita	Gini Coefficient	- 0.113
Latin America & Caribbean	GDP/Capita	Gini Coefficient	- 0.333
Middle East & North Africa	GDP/Capita	Gini Coefficient	- 0.147
Non-Arab Muslim	GDP/Capita	Gini Coefficient	0.485
Orthodox Europe	GDP/Capita	Gini Coefficient	- 0.012
South Asia	GDP/Capita	Gini Coefficient	0.517
Sub-Saharan Africa	GDP/Capita	Gini Coefficient	0.155
Western Europe	GDP/Capita	Gini Coefficient	- 0.368
Western Pacific Rim	GDP/Capita	Gini Coefficient	0.440
Full Data	GDP/Capita	Life Expectancy	0.585
High Income	GDP/Capita	Life Expectancy	0.664
Upper Middle Income	GDP/Capita	Life Expectancy	0.479
Lower Middle Income	GDP/Capita	Life Expectancy	0.476
Low Income	GDP/Capita	Life Expectancy	0.586
East Asia & Pacific	GDP/Capita	Life Expectancy	0.627
Latin America & Caribbean	GDP/Capita	Life Expectancy	0.651
Middle East & North Africa	GDP/Capita	Life Expectancy	0.820
Non-Arab Muslim	GDP/Capita	Life Expectancy	0.629
Orthodox Europe	GDP/Capita	Life Expectancy	0.746
South Asia	GDP/Capita	Life Expectancy	0.689
Sub-Saharan Africa	GDP/Capita	Life Expectancy	0.449
Western Europe	GDP/Capita	Life Expectancy	0.622
Western Pacific Rim	GDP/Capita	Life Expectancy	0.673
Full Data	GDP/Capita	Poverty Gap	- 0.321
High Income	GDP/Capita	Poverty Gap	- 0.248
Upper Middle Income	GDP/Capita	Poverty Gap	- 0.357
Lower Middle Income	GDP/Capita	Poverty Gap	- 0.429
Low Income	GDP/Capita	Poverty Gap	- 0.460
East Asia & Pacific	GDP/Capita	Poverty Gap	- 0.330
Latin America & Caribbean	GDP/Capita	Poverty Gap	- 0.566
Middle East & North Africa	GDP/Capita	Poverty Gap	- 0.316
Non-Arab Muslim	GDP/Capita	Poverty Gap	- 0.371
Orthodox Europe	GDP/Capita	Poverty Gap	- 0.261
South Asia	GDP/Capita	Poverty Gap	- 0.501
Sub-Saharan Africa	GDP/Capita	Poverty Gap	- 0.426
Western Europe	GDP/Capita	Poverty Gap	- 0.252

Western Pacific Rim	GDP/Capita	Poverty Gap	0.107
Full Data	GDP/Capita	Lowest 10%	0.277
High Income	GDP/Capita	Lowest 10%	0.370
Upper Middle Income	GDP/Capita	Lowest 10%	- 0.223
Lower Middle Income	GDP/Capita	Lowest 10%	- 0.161
Low Income	GDP/Capita	Lowest 10%	0.155
East Asia & Pacific	GDP/Capita	Lowest 10%	- 0.212
Latin America & Caribbean	GDP/Capita	Lowest 10%	0.344
Middle East & North Africa	GDP/Capita	Lowest 10%	- 0.201
Non-Arab Muslim	GDP/Capita	Lowest 10%	- 0.541
Orthodox Europe	GDP/Capita	Lowest 10%	- 0.182
South Asia	GDP/Capita	Lowest 10%	- 0.620
Sub-Saharan Africa	GDP/Capita	Lowest 10%	- 0.144
Western Europe	GDP/Capita	Lowest 10%	0.432
Western Pacific Rim	GDP/Capita	Lowest 10%	- 0.279
Full Data	Gini Coefficient	Life Expectancy	- 0.308
High Income	Gini Coefficient	Life Expectancy	- 0.265
Upper Middle Income	Gini Coefficient	Life Expectancy	- 0.151
Lower Middle Income	Gini Coefficient	Life Expectancy	- 0.097
Low Income	Gini Coefficient	Life Expectancy	- 0.342
East Asia & Pacific	Gini Coefficient	Life Expectancy	0.210
Latin America & Caribbean	Gini Coefficient	Life Expectancy	- 0.393
Middle East & North Africa	Gini Coefficient	Life Expectancy	- 0.303
Non-Arab Muslim	Gini Coefficient	Life Expectancy	0.120
Orthodox Europe	Gini Coefficient	Life Expectancy	- 0.104
South Asia	Gini Coefficient	Life Expectancy	0.624
Sub-Saharan Africa	Gini Coefficient	Life Expectancy	- 0.148
Western Europe	Gini Coefficient	Life Expectancy	- 0.619
Western Pacific Rim	Gini Coefficient	Life Expectancy	- 0.267
Full Data	Gini Coefficient	Poverty Gap	0.320
High Income	Gini Coefficient	Poverty Gap	0.402
Upper Middle Income	Gini Coefficient	Poverty Gap	0.465
Lower Middle Income	Gini Coefficient	Poverty Gap	0.366
Low Income	Gini Coefficient	Poverty Gap	0.534
East Asia & Pacific	Gini Coefficient	Poverty Gap	- 0.284
Latin America & Caribbean	Gini Coefficient	Poverty Gap	0.628
Middle East & North Africa	Gini Coefficient	Poverty Gap	0.521
Non-Arab Muslim	Gini Coefficient	Poverty Gap	- 0.070
Orthodox Europe	Gini Coefficient	Poverty Gap	0.488
South Asia	Gini Coefficient	Poverty Gap	- 0.189
Sub-Saharan Africa	Gini Coefficient	Poverty Gap	0.224
Western Europe	Gini Coefficient	Poverty Gap	0.715
Western Pacific Rim	Gini Coefficient	Poverty Gap	0.653
Full Data	Gini Coefficient	Lowest 10%	- 0.892

High Income	Gini Coefficient	Lowest 10%	- 0.860
Upper Middle Income	Gini Coefficient	Lowest 10%	- 0.876
Lower Middle Income	Gini Coefficient	Lowest 10%	- 0.951
Low Income	Gini Coefficient	Lowest 10%	- 0.877
East Asia & Pacific	Gini Coefficient	Lowest 10%	- 0.860
Latin America & Caribbean	Gini Coefficient	Lowest 10%	- 0.829
Middle East & North Africa	Gini Coefficient	Lowest 10%	- 0.884
Non-Arab Muslim	Gini Coefficient	Lowest 10%	- 0.945
Orthodox Europe	Gini Coefficient	Lowest 10%	- 0.822
South Asia	Gini Coefficient	Lowest 10%	- 0.926
Sub-Saharan Africa	Gini Coefficient	Lowest 10%	- 0.891
Western Europe	Gini Coefficient	Lowest 10%	- 0.820
Western Pacific Rim	Gini Coefficient	Lowest 10%	- 0.950
Full Data	Life Expectancy	Poverty Gap	- 0.737
High Income	Life Expectancy	Poverty Gap	- 0.242
Upper Middle Income	Life Expectancy	Poverty Gap	- 0.395
Lower Middle Income	Life Expectancy	Poverty Gap	- 0.628
Low Income	Life Expectancy	Poverty Gap	- 0.534
East Asia & Pacific	Life Expectancy	Poverty Gap	- 0.507
Latin America & Caribbean	Life Expectancy	Poverty Gap	- 0.588
Middle East & North Africa	Life Expectancy	Poverty Gap	- 0.624
Non-Arab Muslim	Life Expectancy	Poverty Gap	- 0.357
Orthodox Europe	Life Expectancy	Poverty Gap	- 0.245
South Asia	Life Expectancy	Poverty Gap	- 0.718
Sub-Saharan Africa	Life Expectancy	Poverty Gap	- 0.460
Western Europe	Life Expectancy	Poverty Gap	- 0.631
Western Pacific Rim	Life Expectancy	Poverty Gap	- 0.382
Full Data	Life Expectancy	Lowest 10%	0.088
High Income	Life Expectancy	Lowest 10%	0.225
Upper Middle Income	Life Expectancy	Lowest 10%	- 0.086
Lower Middle Income	Life Expectancy	Lowest 10%	0.073
Low Income	Life Expectancy	Lowest 10%	0.315
East Asia & Pacific	Life Expectancy	Lowest 10%	- 0.418
Latin America & Caribbean	Life Expectancy	Lowest 10%	0.326
Middle East & North Africa	Life Expectancy	Lowest 10%	0.015
Non-Arab Muslim	Life Expectancy	Lowest 10%	- 0.150
Orthodox Europe	Life Expectancy	Lowest 10%	- 0.189
South Asia	Life Expectancy	Lowest 10%	- 0.569
Sub-Saharan Africa	Life Expectancy	Lowest 10%	0.153
Western Europe	Life Expectancy	Lowest 10%	0.393
Western Pacific Rim	Life Expectancy	Lowest 10%	0.428
Full Data	Poverty Gap	Lowest 10%	- 0.190
High Income	Poverty Gap	Lowest 10%	- 0.559
Upper Middle Income	Poverty Gap	Lowest 10%	- 0.425

Lower Middle Income	Poverty Gap	Lowest 10%	- 0.317
Low Income	Poverty Gap	Lowest 10%	- 0.556
East Asia & Pacific	Poverty Gap	Lowest 10%	0.354
Latin America & Caribbean	Poverty Gap	Lowest 10%	- 0.683
Middle East & North Africa	Poverty Gap	Lowest 10%	- 0.481
Non-Arab Muslim	Poverty Gap	Lowest 10%	- 0.010
Orthodox Europe	Poverty Gap	Lowest 10%	- 0.427
South Asia	Poverty Gap	Lowest 10%	0.127
Sub-Saharan Africa	Poverty Gap	Lowest 10%	- 0.224
Western Europe	Poverty Gap	Lowest 10%	- 0.536
Western Pacific Rim	Poverty Gap	Lowest 10%	- 0.686

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End Notes

[i] Aristotle's main point of differentiation between property acquisition and wealth acquisition is the way in which a piece of property is used, either properly or not. Proper use is to use a piece of property for the purpose for which it came to exist, e.g., the proper use of a shoe is to wear it. Underlying this argument for Aristotle is the understanding that the household should be self-sufficient and not rely on commercial activity to do so. See chapters 8 and 9 of *Politics* I for a complete explanation.

[ii] Locke's theory of property acquisition has its basis in the idea of property as the congealed value of labor. Locke begins his discussion from the biblical idea that God gave the Earth to all people for them to take advantage of its benefits for their convenience in life. The fundamental point of property is the individual's own person, his or her physical body. For Locke, this implies that the work of that body, i.e. the labor of the person, must also be that individuals own. Initially, Locke's understanding of property faces the same restriction as Aristotle's: the ability of the individual to utilize and enjoy it before it spoils. But the invention of money allows individuals to take ownership through his or her labor of a larger percentage of the fruits of the Earth. Therefore, the property comes to represent the labor put into it because that is the main element that differentiates it from the common stock of all of mankind. This is effectively identical to the understanding of property later taken up by Karl Marx. For more on Locke's understanding of property, see Chapter V of his *Second Treatise on Government*.

[iii] Kuznets gives a complete list of industries considered in this production in Section II of the congressional report. He does not mention government payments directly here but does make mention of its inclusion elsewhere including in "National Income and Industrial Structure". Later, John Maynard Keynes will build on the understanding of the role government efforts can have in growing GDP.

[iv] Relief checks sent out during the Covid-19 pandemic as part of the American relief plan was a single payment $1,400 from the IRS. In March 2021, these checks were sent out to over 90 million Americans.

[v]The Supplemental Nutrition Assistance Program (SNAP, formerly Food Stamps) provides a small amount of money monthly based on the income of the individual and the household size. These funds can only be used at certain stores and on certain items as determined on a per state basis. According to the USDA, in November 2021, over 40 million Americans received some amount of SNAP benefits.

[vi] Dworkin's understanding of these three terms is relatively standard and intuitive, but he offers full definitions in the context of this discussion on page 241 of his work *Taking Rights Seriously* (2013).

[vii] Consequentialism is an ethical theory that judges the morality of a given action solely based on the consequences of that action. From the perspective of a consequentialist, the best action is the one with the best outcome.

[viii] The Categorical Imperative is the guiding rule of moral action in Kant's philosophy. In the *Groundwork for the Metaphysics of Morals*, Kant provides three formulations for this rule, but the most appropriate for our discussion here is the second formulation, which states that one should always "act in such a way that you treat humanity, whether in your own person or in the person of another, always at the same time as an end and never simply as a means." (429)

[ix] Merrill takes the strong position in this paper that traditional economic theories of markets trending towards equilibrium are not true and instead argues in line with thinkers like Keynes and Minsky that markets trend towards disequilibrium. In this paper, I do not necessarily adopt this perspective, but it is useful for understanding the foundations of welfare in a world where market disequilibrium is present.

[x] Consensus theory, here, refers to the works of thinkers like Jürgen Habermas or John Rawls. For each, political communities rely on consensus, and they argue that differences only lead to division. Mouffe sees this as untenable and argues that we must seek to understand political community in light of our differences and disagreements. The

consensus theories of these thinkers are strongly distinct. For Habermas' theory, see *Between Facts and Norms*, chapters 1 and 3. For Rawls' theory, see *Political Liberalism*, chapter 2. For Mouffe's treatment Habermas, see *The Democratic Paradox*, essays 1, 4, and 5. For Mouffe's treatment of Rawls, see *Agonistics: Thinking the World Politically*, chapter 1.

[xi] Environmental indicators (like air quality), for similar reasons as those listed for economic and health indicators, could also be included in the dashboard, but they are not included because their close relation to health outcomes renders them somewhat redundant. Further, some environmental indicators are troubling to include in the welfare analysis of an individual country because of the global nature of environmental events like extreme weather phenomena or climate change and stock pollutants like CO_2. Environmental indicators also present a challenge because there is much less historical data, particularly in lower income countries.

[xii] To further expand on the math that Fleming is implying here, take D as the measure of individual welfare where D is a function of momentary well-beings r = (x,y,z…). The fourth requirement states that $D_r' > 0$ where D_r' is the partial derivative of D with respect to r. As an example, take the complex situation where three well-beings make up an individual's overall welfare. These three are the t, r, and s and the individuals welfare is represented by the function D(t, r, s) = 2t + 4r + s. Because the partial derivatives with respect to all of t, r, and s are positive, this fits in Fleming's requirements.

[xiii] Cost-benefit analysis functions generally to approximate the aggregation of personal utilities under some standard comparison strategy and uses monetary value to measure any losses or gains in utility. The Pareto standard is the most common, and it states that a policy, action, or state of the world is preferable to another if it improves the conditions of at least one individual without making any other individual worse off. This is a very strict standard that on a practical level can rarely be met, but it often serves as the foundation for CBA applications. A common alternative standard to consider is Kaldor-Hicks, which states that one project is preferable to another "if it makes the winners better off by an amount sufficient to overcompensate the losers, if the losers could be compensated through a costless lump-sum transfer" (Adler, 21). Important to note is that actual compensation is not required, just the possibility for it to occur at that level. Again, the strictness of this standard makes it difficult to apply or even approximate through CBA practices, but it does provide an alternative way of considering the net-benefits of a project. The specifics and issues with these standards as they apply to CBA is outlined more fully in Chapter 1 of Adler and Posner's work.

[xiv] Analytically, this can be done by setting marginal benefits equal to marginal costs, i.e., taking the first derivative of each function and finding the quantity level at which they are intersect.

[xv] What Rawls actually focuses on as the product of the original position are his two principles of justice as fairness, and this thought experiment allows him to argue for them as independent of circumstances and thus applicable to all societies. While this initially faced post-colonialist critiques about attempting to sneak Kantian deontology in through the back door, he does well to account for these issues in the formulation as articulated here in *Political Liberalism*.

[xvi] Alternatively, the Gini coefficient can be calculated without considering each area individually using the formula $G = 1 - 2\int_0^1 L(x)dx$ such that L(x) represent the Lorenz curve for the distribution.

[xvii] While the example will consider these distributions as holding only ten individuals, if these were taken as deciles, the mathematics would be nearly identical. So, for simplicity's sake they will be treated as only 10 individuals. The point of this example is to expand the logic to country sized distributions.

[xviii] For example, a higher GDP per capita with an equitable distribution affords the possibility to enjoy more nutritious diets or better access to healthcare. These advances should allow the children to enjoy a higher degree of individual well-being than their parents over their lifetimes. When applied across an entire society this would lead to a higher level of welfare.

[xix] The formula for the poverty gap index is $PGI = \frac{1}{N}\sum_{j=1}^{q}\frac{z-y_j}{z}$ where N is the total population, q is the number of individuals below the poverty line, z is the poverty line, y_j is the income of the jth individual below the poverty line.

[xx] While the Rawlsian principles discussed prior led us to focus specifically on the lower end of the distribution, we have selected the 10% level as a sufficient cut off regardless of the data limitations. This is because in small countries, or countries with relatively few income earners, a lower percentage, like 5% or 1%, may skew the measurements and over emphasize the income gap.

[xxi] The breakdown by region is as follows: North America – 2, South Asia – 7, East Asia & Pacific – 21, Europe & Central Asia – 48, Latin America & Caribbean – 24, Middle East & North Africa – 13, Sub-Saharan Africa – 46. The breakdown here is more a result of the physical size of the countries in certain regions so the uneven split is to be expected.

[xxii] While the focus of this paper is on the government style, it is important to acknowledge that the election and shift in government structure of 1994 in South Africa is closely connected with race and the practice of apartheid. This horrific practice that the National Party put into law in the 1950s separated South Africans by race in essentially all facets of life. This allowed the white minority to concentrate financial and government power and maintain the colonial values. This inhibited the development of a post-colonial South African identity in the way Mouffe and Fanon describe for other nations.

[xxiii] The mean values from Western Pacific Rim may be less notable as there are only four countries in that region in the dataset (Australia, Canada, Japan, and the United States). The second-best welfare mean values are found in Western Europe for GPD/capital, Life Expectancy, and Poverty Gap.

[xxiv] The Patent Cooperation Treaty, which, as of November 2021, was recognized by 155 countries worldwide, ensures the protection of intellectual property around the world. This also allows producers to file patents in all of these countries simultaneously.

[xxv] The income-adjusted human development index (IHDI) is, like the standard HDI, comprised of three types of indicators: health, education, and standard of living. Each of these types of indicators is combined into a dimensional index through the calculation of weighted means and standardization on a zero-to-one scale. These dimensional indices are then standardized for income using the Gini coefficient and are finally combined into one composite indicator.

[xxvi] Larger countries may have greater barriers to providing welfare for several reasons. The most practical is that it takes more resources to provide the same level of welfare to more people. Furthermore, larger countries may include a wider variety of conditions that require different welfare remedies, particularly a greater divide between rural and urban communities.

[xxvii] While the evidence that the data the Chinese government publishes about its economy may not be an accurate representation, this project has used it in the general analysis for two reasons. First, it is arguably the world's largest economy, and using some data seems better than ignoring it entirely. Second, the data that they do release may give us insight into what they perceive to be the best welfare conditions, and we can examine if even their ideal perception has flaws that the dashboard approach may expose or highlight. However, the inclusion of China in the specific dashboard samples is not necessary and the potential risks did not outweigh the benefits of its inclusion in the sample.

[xxviii] In the IHDI rankings for 2019, only three of the top thirty countries were not in either the Western Europe or Western Pacific Rim regions. Two of those countries, Singapore and Hong Kong did not have available data for the dashboard analysis. The third country, South Korea, which had an IHDI of 0.815, slightly higher than that of the United States, would have been a good candidate for comparison, but there were not enough data points from recent years.