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Analysis

Genuine Economic Progress in the United States: A Fifty State Study and Comparative Assessment

Mairi-Jane V. Fox[a], Jon D. Erickson[b,c,*]

[a] Regis College, Regis University, Denver, CO 80221, USA
[b] Rubenstein School of Environment and Natural Resources, University of Vermont, Burlington, VT 05405, USA
[c] Gund Institute for Environment, University of Vermont, Burlington, VT 05405, USA

ABSTRACT

The Genuine Progress Indicator (GPI) was designed to reveal the economic, social, and environmental trade-offs associated with conventional economic growth as traditionally measured by Gross Domestic Product (GDP). Although originally designed for use at the national scale, an interest has developed in the United States in a state-level uptake of the GPI to inform and guide policy. This study presents the first fifty-state estimate for U.S. GPI in order to address questions over its design, implementation, and ultimate potential as a tool to guide state-level economic policy. Following a review of the current state of analysis and critique of GPI, we provide an overview of methodology and database development. Results are then presented, including discussion of lessons learned through a fifty-state application. The paper concludes with suggestions for further research and next steps to consolidating a consistent methodology.

1. Introduction

Gross domestic product (GDP) has long been the primary metric used by national and state governments to gauge standard of living and help guide economic and social policy. Prior to the development of national income accounting in the 1940s, governments had sparse and incomplete data on the size and direction of the macroeconomy, contributing to uncertainty about the role and impact of policy (BEA, 2000). Today, national income and product accounts are sacrosanct to policy-making, declared as the "achievement of the century" by the U.S. Department of Commerce (BEA, 2000). However, as an artifact of the mid-20th century, the usefulness of GDP as a metric of progress in the 21st century has been subject to much discussion, debate, and proposals for both modifications and alternatives.

In recent decades multiple environmental and social critiques of GDP as a measure of economic welfare have emerged (e.g., Ayres, 1996; Daly and Townsend, 1993; Daly, 1977, 1996; Hamilton, 2003; Jackson, 2011; Schor, 2010; Speth, 2008) including a high profile Commission on the Measurement of Economic Performance and Social Performance (2009) chaired by Nobel prize winning economists Joseph Stiglitz and Amartya Sen. Much of the criticism revolves around a lack of differentiation of costs from benefits of economic growth, including the costs of inequality, regrettable defensive expenditures, uncounted environmental externalities, depletion of natural resources, and trade-offs with non-work uses of time. One composite indicator that addresses many of these issues is the Genuine Progress Indicator (GPI).

Developed at both the national and sub-national level, GPI provides a general assessment of the quality of economic activity through a series of 24 adjustments to personal consumption expenditures which composes a significant fraction of GDP. GPI developed as an extension of the earlier work of Daly and Cobb (1989) on the Index of Sustainable Economic Welfare. Initial studies were conducted for the U.S. at the national scale (Anielski and Rowe, 1999; Talberth et al., 2007) and have since spread to over 17 international applications (Kubiszewski et al., 2013). However, due to a lack of federal policy uptake, recent attention of both the academic and advocacy communities has turned to state-level application and adoption. In the US, following the lead of Maryland and Vermont, there are now over a dozen state estimates of GPI, and an informal network of practitioners is working towards standardizing accounting procedures and sharing policy applications (e.g., Bagstad and Shammin, 2012; Erickson et al., 2013; McGuire et al., 2012; Talbreth and Weisdorf, 2017).

As GPI accounting has moved from development and advocacy to implementation and policy application, there is a growing need to reassess theoretical foundations and standardize estimation procedures. In this vein, this study provides the first estimate of GPI for each of the fifty states in the US for one year using a consistent methodology. The goal is not to provide commentary on specific states or promote a

* Corresponding author.
E-mail address: jon.erickson@uvm.edu (J.D. Erickson).

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winners-versus-losers analysis. Rather, this paper seeks to provide insights that can arise from fifty case studies of GPI that use the same data and methodology to support a richer understanding of the "design artifact" of GPI, leading to a deeper potential for a "design intervention" (Brown and Martin, 2015).

Following a review of the current state of analysis and critique of GPI, with particular focus on U.S. state applications, we provide an overview of methodology and database development for the fifty-state study. Results of the study are then presented, including discussion of lessons learned through a fifty-state application. The paper concludes with suggestions for further research and next steps to consolidating a consistent methodology.

2. Genuine Progress in the States

GPI, and its pre-cursor the Index of Sustainable Economic Welfare (ISEW), were designed to reveal the trade-offs of conventional economic growth (Daly and Cobb, 1989; Neumayer, 2000). Daly (1987) refers to "uneconomic growth," when marginal costs outweigh the marginal benefits of the next increment of growth, as a phenomenon that is now occurring in many developed nations. This is seen in numerous GPI studies at national and state levels as a widening 'well-being gap' between GDP and GPI with a turning point of maximum GPI achieved as early as the 1970s in nations such as the U.S. (Anielski and Rowe, 1999; Talberth et al., 2007). The strength of GPI has been this comparability with GDP, providing an avenue of inquiry on the desirability and quality of growth. Ultimately, one of the ambitions of the GPI is to gauge the interrelatedness of economic, social, environmental dimensions of economic welfare, an indicator of "weak sustainability" that admittedly allows for full substitution between monetized variables (Neumayer, 1999).

Originally designed as a national composite indicator and policy lens, in recent years GPI has been estimated and adopted at sub-national levels in the U.S. and Canada. The first U.S. state-level study was conducted for the state of Vermont (Costanza et al., 2004). The state of Maryland became the first government-sanctioned GPI effort with a 2010 executive order of Governor Martin O'Malley. In 2012, the Vermont state legislature passed "An Act Related to the Genuine Progress Indicator," which mandates yearly updates to Vermont GPI in cooperation with the University of Vermont's Gund Institute for Environment. A loosely cohesive "GPI in the States" initiative (GPIinthestates.com) was launched by representatives from 20 states at a series of meetings convened by the Governor of Maryland in October 2012 and June 2013 with assistance from Demos, a progressive policy organization. A follow-up meeting with GPI practitioners was convened at the Gund Institute for Environment in Spring 2014. For this meeting, an initial GPI estimate for fifty states was produced by a graduate ecological economics class to be used as the springboard for innovation towards a new standard, often referred to as "GPI 2.0" (see Talbreth and Weisdorf, 2017).

The GPI is a composite index of the quality of economic activity arrived at through mixed methods from environmental economics (e.g., pollution and climate change costs), natural resource economics (e.g., depletion costs), and various heterodox approaches to other social and economic adjustments. These methods are detailed in several publications, including the original ISEW proposed by Daly and Cobb (1989), national-level GPI studies (Talberth et al., 2007), and the original state-level GPI method (Costanza et al., 2004). In summary, the GPI is a linear equation in which 7 benefits and 18 costs sum to a single monetary measure of economic welfare. GPI is grounded in a Fisherian concept of income; a net "psychic income" that deducts harmful aspects of consumption from useful components (Lawn, 2003). Each of the components is reflected in monetary terms which facilitate the simplicity of the equation and the ultimate single monetary output enhancing the metric's comparability to GDP. The costs and benefits are then often grouped as six economic, nine social, and ten environmental components.

These components of GPI were first established in national level studies, then modified for state-level estimates beginning with the decadal estimates for Vermont from 1950 through 2000 (Costanza et al., 2004). Since then many disparate GPI U.S. state-level studies have been completed using diverse methodologies often reflecting local datasets, local geographies, or to catalyze relevance for local policy. GPI estimates have been published for subnational levels for at least seven other locales, including Vermont, Chittenden County, Burlington (Costanza et al., 2004); Northern Vermont (Bagstad and Ceroni, 2007); Northeast Ohio (Bagstad and Shammin, 2012); Baltimore City, Baltimore County, and Maryland (McGuire et al., 2012; Posner and Costanza, 2011); Oregon (Kubiszewski et al., 2015); Hawaii (Ostergaard-Klem and Oleson, 2014); and Utah (Berik and Gaddis, 2011). There are also state-level GPI studies written by researchers or state employees that have not been published in peer reviewed journals, including for Minnesota (Minnesota Environmental Quality Board, 2000), Michigan (Michigan State University), Colorado (Stiffler, 2014), Missouri (Zencey, 2015), Washington (Results Washington, 2013), Massachusetts (Erickson et al., 2014; Assumption College), and Alberta (Anielski, 2002).

Each state-level study has resulted in modifications to the GPI methods, reducing comparability between studies. Initial studies followed the "Vermont/Maryland" method (e.g., Bagstad and Ceroni, 2007; Costanza et al., 2004; Erickson et al., 2013; Posner and Costanza, 2011), with some recent modifications made in the "Ohio/Utah" method (Bagstad and Shammin, 2012; Berik and Gaddis, 2011). Based on insights from this variance in state-level methods, Bagstad et al. (2014) published suggested updates for a new GPI 2.0 standard. Talbreth and Weisdorf (2017) provide a full comparison between methods, including new Maryland and U.S. estimates incorporating 2.0 recommendations.

As an initial basis of state comparisons, the Vermont/Maryland methodology as summarized for the Vermont state legislature in Erickson et al. (2013) was used as the basis for this study. This method is comparable to most previously published GPI studies, requires less data than the emerging GPI 2.0 method, and avoids the need for private data sources. The year with the most complete dataset was 2011, including new state-level estimates for Personal Consumption Expenditure by the Bureau of Economic Analysis (Awuku-Budu et al., 2013). Monetary units were converted into 2011 U.S. dollars using regional Consumer Price Indices (CPI) from the U.S. Bureau of Labor Statistics for the Northeast, South, Midwest, and West. There are no comparable national estimates for U.S. GPI using the Vermont/Maryland method for 2011. However, data would have considerable differences given differences in state specific data and national aggregates. Data incorporated for each sub-indicator, including data ranging from all state-level, to partially state-level, to fully national-level scaled by state population, are summarized in Fox (2017).[1]

3. Fifty State GPI Estimate

Fig. 1 highlights the estimates of GPI per capita by state, with Alaska as the highest GPI, Wyoming the lowest, and a range of $97,218 per capita. Seven states have negative GPIs (Arizona, Arkansas, Louisiana, Mississippi, North Dakota, West Virginia, Wyoming) suggesting that

[1] An initial fifty state GPI assessment was produced as part of a graduate student course supported by the Gund Institute for Environment held at the University of Vermont in the spring semester of 2014 under the supervision of Professor Jon Erickson and Daniel Clarke, a visiting scholar from the United Nations Statistic Division. The full data set, methodological descriptions, and additional analysis are available in Fox (2017) and can be downloaded from the University of Vermont at: http://scholarworks.uvm.edu/graddis/679/. The full excel spreadsheet of the 50-state results, including detailed descriptions of assumptions and secondary data sources, is available for download at: http://www.uvm.edu/gund/gpi.

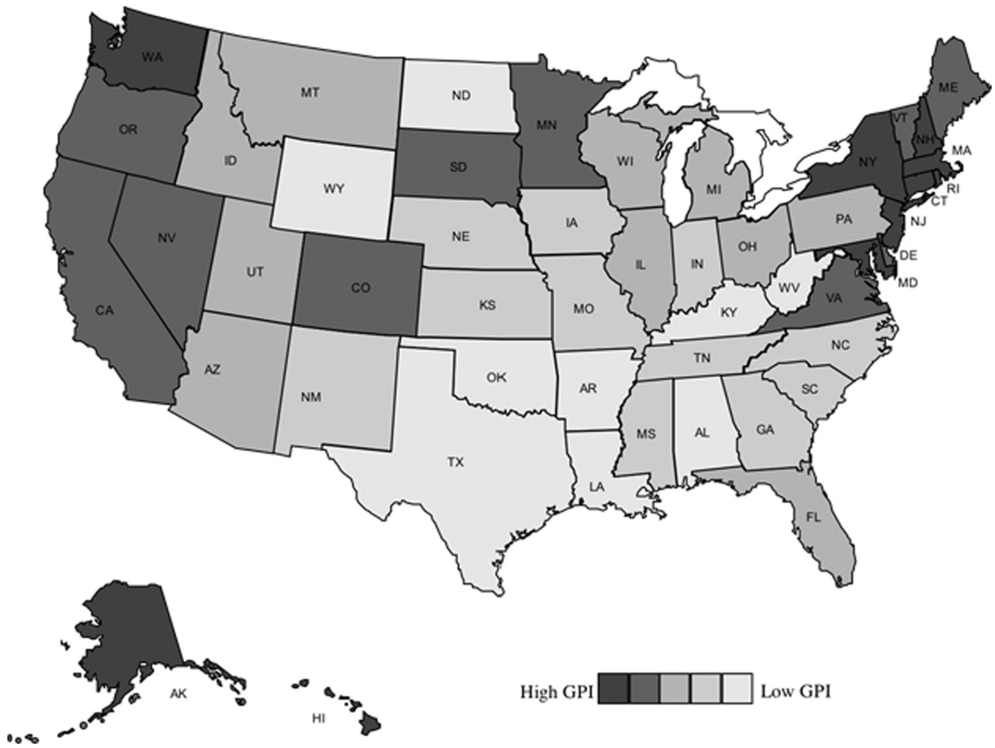

Fig. 1. Fifty state genuine progress indicator.

total costs of annual consumption in those states outweigh the benefits. The mean GPI per capita is $15,953, the median is $16,965, and the standard deviation is $14,284. It should be noted from the outset that Alaska's GPI is a significant outlier as the only state with negative costs for wetlands, i.e., the cost of wetland change component switched from a cost to a benefit for Alaska.

Per capita GPI state rank results are, not unexpectedly, positively correlated with per capita GSP state rank (r = 0.51); however, the standard deviation of per capita GPI ($14,284) is 58% higher than that of per capita GSP ($9057). Despite the correlation, analysis of individual states demonstrates some interesting divergences. No state has higher GPI than GSP, but while a state like Alaska is ranked number 1 in both GSP and GPI per capita, Wyoming is number 4 in GSP but 50 in GPI. This difference illustrates that the costs of economic growth in Wyoming are offsetting much of the benefits. A pattern of high GSP and low GPI continues with other energy extraction based states, for example, with North Dakota being ranked 3rd in GSP and 48th in GPI.

Fig. 2 summarizes state GPI and GSP per capita rankings according to a high/low analysis, where the bottom half of states are placed in the "low" category and the top 25 states placed in the "high" category for each indicator. States with low GPI and high GSP are shaded in white, including Iowa, Louisiana, Nebraska, North Dakota, Texas, and Wyoming. In other words, this group performs well when measured as total state output per capita, however deducting environmental and social costs tells a different story. Meanwhile the states that have high GPI and low GSP are in the darkest shade, including Arizona, Florida, Idaho, Maine, Vermont, and Wisconsin. These states over perform in GPI terms given their comparatively low economic output per capita. States shaded in the lightest gray perform well regardless of selected metric, and those in the next shade of gray perform poorly also regardless of GSP or GPI.

Exploring this variance between the states and the components, or sub-indicators, of the GPI helps explain the relative importance of the components of GPI as a composite indicator. Fig. 3 illustrates the range of the 'middle 80%' of each of the states' GPI components by removing the top 10% (up to rank 5) and bottom 10% (from rank 46 to 50) states' results for each component. The two components that used purely U.S. data scaled by population size, benefit of net capital investment and cost of ozone depletion, are not included since per capita results were the same for each state. Looking at this 80% range across each component demonstrates the cross-state variability of each component without the results being skewed by outliers. The left side of the figure shows how much less than the median each component's 5th lowest score lies and the right how much higher than the median each component's 5th highest score lies.

This analysis illustrates clear dominance by the nonrenewable energy depletion component for the difference between the states' GPIs. In fact, over 90% of the difference can be accounted for by the combination of nonrenewable depletion, personal consumption expenditure, and motor vehicle crashes. Among the components that are relatively uniform across the states, and therefore contribute very little to the difference between the states, are included noise pollution, cost of family change, personal pollution abatement expenditures, air and water pollution, volunteer labor, and cost of crime. The OECD handbook for composite indicators suggests that such components be deleted as "individual indicators that are similar across counties [states] are of little interest and cannot possibly explain differences in performance" (OECD, 2008, p. 26). Given the challenges of data collection, using less data would allow more efficient GPI calculation and perhaps greater comparability.

Another way to understand the relative importance of the components of GPI is to analyze which components, on average, provide the biggest boost or serve as the biggest drag on GPI. Fig. 4 includes data for the components of all states added together and then divided by U.S. population to get a population weighted average for the US for each component. On average, the biggest boost comes from personal consumption expenditure and benefits of housework, while the biggest drag comes from the cost of nonrenewable energy depletion and the cost of inequality. Individually most of the environmental components contribute very little to the GPI.

Key drivers of GPI can further be revealed by assessing patterns within the leader and laggard groups. For instance, the difference in inequality statistics between states is striking. The state with the most equal income distribution (lowest cost), Wyoming, has the lowest GPI,

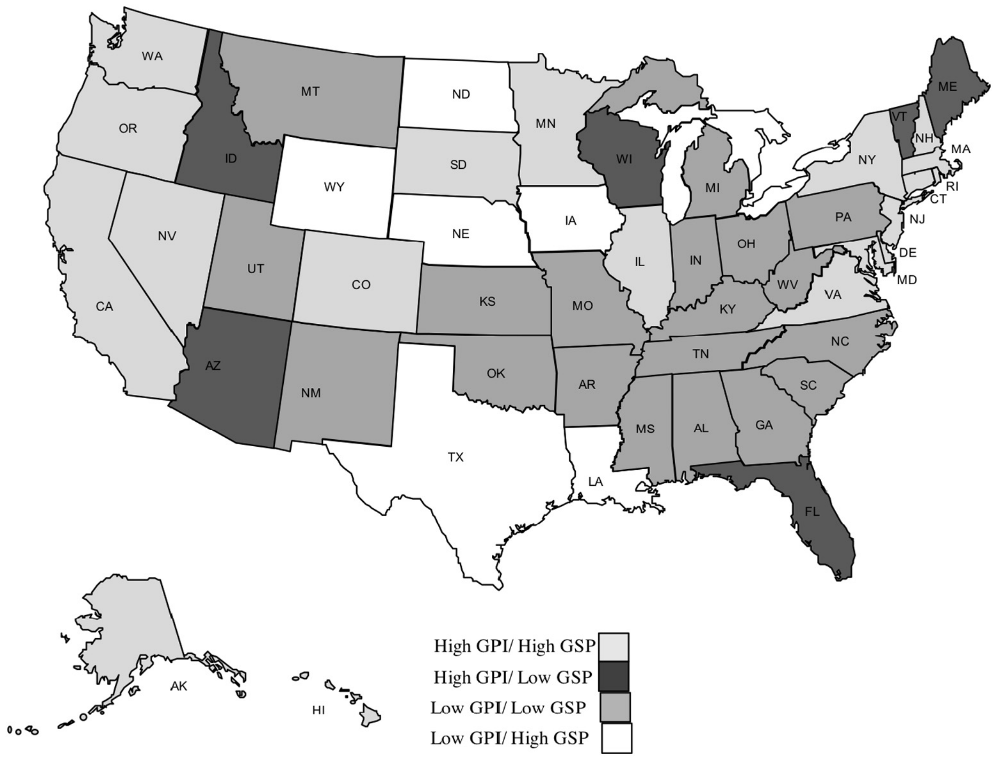

Fig. 2. Four high and low GSP and GPI groupings.

while the state with the highest cost of inequality, New York, has the sixth highest GPI. Massachusetts and Connecticut are also ranked high (number 2 and 3) for the cost of inequality, yet also ranked number 2 and 3 for GPI per capita. This may be a reflection of the significance of large consumption in the high inequality states, serving as a counterbalance to the cost of inequality (and also may be directly related to the large inequality). This result may be of concern as GPI and its pre-cursor was designed "to replace the GNP with a measure that does not encourage the growing gap between the rich and the poor" (Daly and Cobb, 1989, p. 379). Ultimately, this outcome points to the possibility that good performance in one indicator (especially personal consumption expenditure, the largest component of both GSP and GPI) can mask poor performance in another, so-called "weak sustainability."

The grouping of GPI components into economic, social, and environmental categories helps to illustrate such substitution effects along differing economic development pathways. For example, it is possible to deplete natural or social capital while expanding consumption and increasing GPI. While all environmental components are framed as "costs" it is noteworthy that some states have positive environmental components. For example, Alaska, Arizona, California, Colorado, Hawaii, Kansas, Montana, Nebraska, New Mexico, Nevada, North Dakota, South Dakota, Texas, and Utah all have positive forest cover

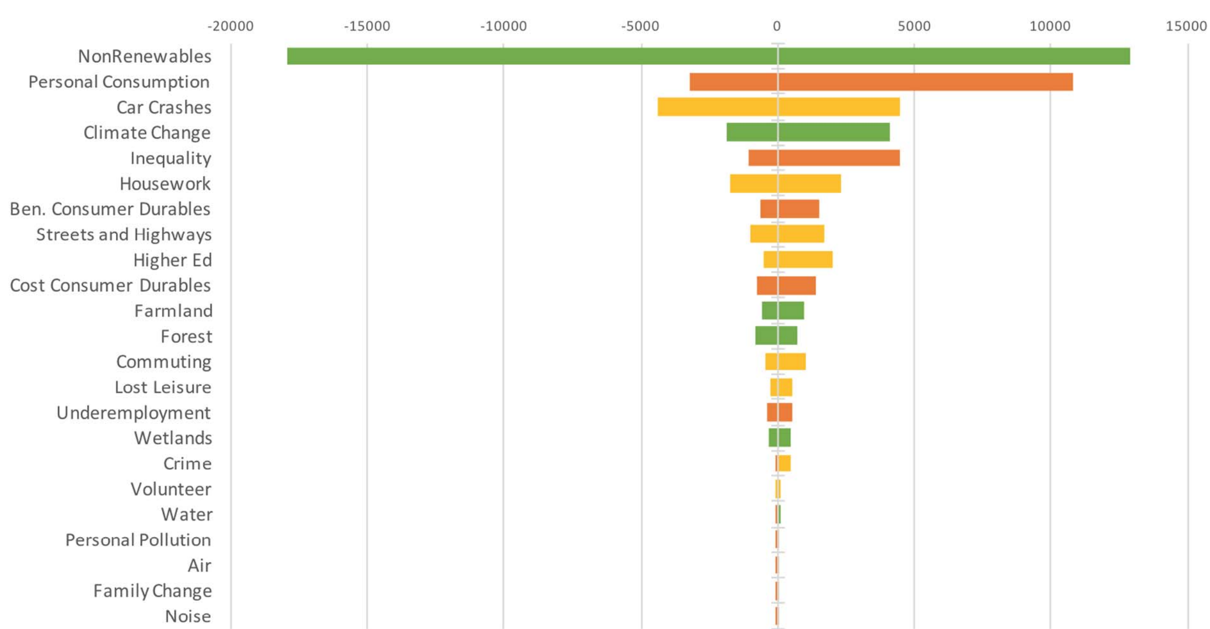

Fig. 3. Component 10th and 90th percentile component ranges across states, color coded by environmental (green), social (yellow), and economic (orange) categories. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

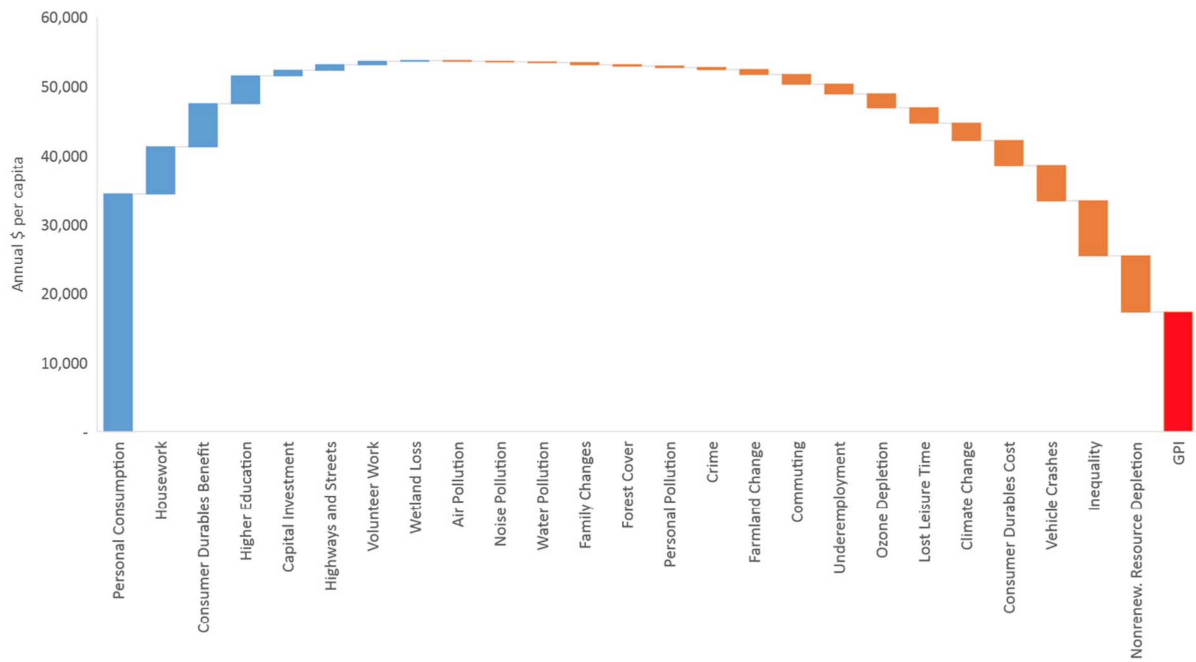

Fig. 4. Component quantitative significance of U.S. population average GPI (net additions colored in blue, net subtractions colored in red). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

change, meaning that each state has more forest cover now than it did during the pre-colonial baseline. However, overall, Alaska stands out as the only state to have a positive aggregate environmental category due to the net benefits of wetland change. The social category holds a collection of costs and benefits. Overall, ten states end up with more social component costs than benefits, including Alabama, Arkansas, Kentucky, Louisiana, Mississippi, Oklahoma, South Carolina, Tennessee, West Virginia, and Wyoming. These states also rank among the lowest 15 GPIs meaning that in order to rank highly states cannot ignore social costs.

To help visualize differences in state performance along environmental, social, and economic dimensions, Fig. 5 displays green for the top third in the category, yellow for the middle third, and red for the bottom third. Generally, if a state scores well on economic components then it likely scores well on environmental and social as well. In other words, economically depressed states also tend to rank poorly in social and environmental attributes.

The general pattern of high economic performance coming with high social and environmental performance may point to an externalization of consumption impacts to other states (or outside the U.S. altogether). It also suggests an environmental Kuznets curve relationship, absent of trade considerations, where higher state incomes might demand greater social and environmental attributes. The states that break with the Kuznets pattern include North Dakota and Wyoming which have high economic components but low environmental and social components. In these states, economic growth may occur at the cost of the environmental and social outcomes, as the designers of GPI hypothesized. Montana also has a high economic and low environmental performance, but mid-range levels on social components. All three of these states' economies rely on extractive industry practices.

Overall, the environmental group of components has the largest range at $91,074, driven by Alaska's wetland outlier, with a standard deviation of $11,154. Without the wetland sub-indicator included, the range drops to $52,524. The economic category has the next greatest range at a substantially lower amount of $13,597, with a standard deviation of $3361. The social grouping is the least variable at a difference of $10,989 between the highest and lowest states, with a standard deviation of $2768. None of the highest individual social indicator ranges are higher than the top three environmental ranges.

The divergence in environmental deductions highlights the consequence of choice of environmental assets included in state accounts, and whether to focus on accumulated costs from loss or degradation of assets, or instead calculate the benefits from ecosystem services of existing assets. Specifically, Alaska's extreme wetland component points to the questions of choice and accuracy of baseline. Should GPI be based on historic, pre-settlement baselines of environmental assets, and thus forever carry costs for staying below those baselines? Or should GPI instead be based on annual flows of benefits from diverse ecosystems? The Utah and Ohio methods have veered towards considering the value of ecosystem services from a range of environmental assets, beyond just wetlands, forests, and agriculture (Bagstad and Shammin, 2012; Berik and Gaddis, 2011). In this case, states that have other types of ecosystems may get a boost in GPI in addition to the general increase that would result from the inclusion of ecosystems services as benefits. The question over human-made environmental systems versus natural states is also debated. For example, western states with arid ecosystems such as Arizona, California, Colorado, Nebraska, Nevada, New Mexico, and Utah have all increased their forest cover from pre-colonial times. GPI as it is designed now may encourage them to increase forest land in a way that is unsustainable.

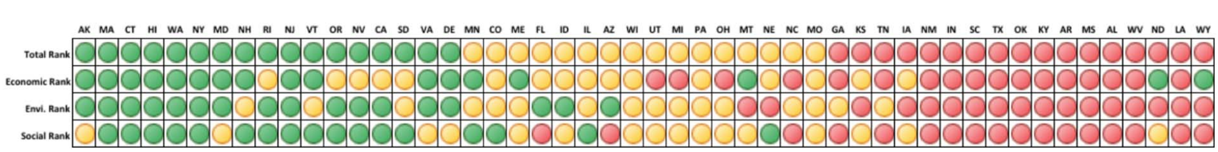

Fig. 5. Economic, environmental, social state rank traffic light diagram.

4. Discussion

The OECD handbook for composite indicators recommends that the most compelling indicators have a clear objective or desired direction of change. Perhaps the objective for GPI could be interpreted in relation to GSP – the divergence between the metrics indicating uneconomic growth. An alternative GPI driven goal for the states is to view the results as an optimization challenge aiming for larger 'benefits' and smaller 'costs' driven by state policies. In this case, reducing the high environmental costs, particularly fossil fuel dependence, would take precedence. Ultimately though, change in GPI overtime would likely witness non-linear changes and tradeoffs which are challenging to model. Further analysis of the data variables and values, relationships with other indicators, and key assumptions that influence the results are provided in Fox (2017).

Another challenge of the state-scale GPI output is how to accurately account for resource and waste imports and exports. For example, one state may bear the costs of depleted natural capital (lowered GPI) while another state may count the benefits of this natural capital in their consumption expenditures as a positive contribution to their GPI (as described in Lawn, 2005). In essence, one state's higher GPI may be artificial because it is externalizing costs to another state. As Posner and Costanza (2011, p. 1976) commented, "The failure to properly account for resource and waste imports and exports creates indicator bias in GPI toward exporting the costs of economic growth to other locations — not a sustainable outcome." This conundrum is partially addressed in the national-level GPI methodology by the inclusion of "net exports," but this was not actionable at the state scale.

As a state policy driver, GPI requires state level data to produce an accurate reflection of the consequences of state-level policy. Data that has been scaled down from the national level (e.g., benefits of net capital investment and costs of ozone depletion) dilutes or distorts impacts of state-level policy and thus does not provide direct feedback or precise insights to state policy. In order to empower or support sustainable policy changes at the state scale, legislators must be able to enact policy that directly impacts either the GPI variable or valuation. Specifically, since 90% of the variance between the states can be accounted for by the combination of nonrenewable depletion, personal consumption expenditures, and motor vehicle crashes, it is particularly important to identify whether state differences on these components are policy driven. This leads to questions such as whether the variables and valuations of the datasets used to calculate these components can be modified by state level policy action or are they simply privileging fixed attributes of the states (e.g., land mass, water surface area, forest productivity, etc.)? Fox (2017) further explores the power of selected values and weights through a sensitivity analysis.

To analyze the effect of state policy choices in GPI, a space-for-time substitution could be pursued by using the fifty case studies in one year to test for the impact on GPI of different policies. For example, the impact on GPI could be evaluated along a suite of state policy differences such as: presence or absence of state renewable portfolio standards on the cost of nonrenewable energy depletion and cost of greenhouse gas emissions; impact of state minimum wage rates on income inequality, the labor/leisure trade-off, and value of household work; or the influence of transportation policy on road safety and traffic accidents.

Another area of potential research would be the comparison of GPI to other alternatives to GDP for welfare analysis, such as subjective well-being polls. For example, Fox (2017) found a weak correlation of both GPI and GSP to state results of the Gallup Well Being poll. Additionally, there may be political differences that can partially explain the outcome of high versus low GPI states. It's interesting to note that the states that perform better than average with a GPI metric are the so-called "blue states," or Democrat voting states based on recent U.S. presidential elections. This brings up questions over design artifacts of the GPI designed with progressive, left-leaning priorities in mind. Or are these simply high consumption, high income states that perform well in both GSP and GPI metrics as highlighted in Fig. 2. The states that overperform in GPI compared to their small per capita incomes (such as Vermont), and ones that underperform in GPI compared to their large per capita incomes (such as Texas), that are perhaps most interesting to explore further.

5. Concluding Remarks

The results of this fifty state GPI study point towards opportunities for improvement for the indicator and further questions about implementation and policy relevance. Policy makers may be interested in exploring what types of policy levers are available to drive changes in GPI such as changes in taxes, infrastructure investment, land use planning, and minimum wage. The GPI research community now has fifty case studies using consistent methodology to investigate how sensitive the GPI is to various assumptions about variables, quantities, and values. Hypotheses about what type of attributes may be privileged by the GPI methodology can be explored by testing state characteristics against GPI results. Fundamentally, fifty case studies also provides the opportunity to test the welfare measuring credentials of GPI by comparing the results to other quality of life or well-being metrics.

The availability of fifty GPI cases across fifty diverse state economies, environments, and political systems is also highly valuable from a "policy window" perspective. According to Kraft (2015), for a policy window to open three streams must converge: (1) The problem stream where attention shifts towards evidence of a problem; (2) The politics stream where policymakers have the motivation and willingness to act to solve the problem; and (3) The policy stream where an acceptable solution to the problem is available for policy makers. If both the problem and political conditions arise, GPI could fulfil the policy stream condition and complete the policy window. To quote an unlikely ally, Friedman (2009, p. xiv): "When crisis occurs, the actions that are taken depend on the ideas that are lying around. That, I believe, is our basic function: to develop alternatives to existing policies, to keep them alive and available until the politically impossible becomes the politically inevitable." Therefore, an alternative to GDP that is thoughtfully designed, politically palatable, and straight-forward to adopt, ought to be "lying around" when a policy entrepreneur (those who see or help create policy windows) is seeking a policy stream solution. GPI may be this alternative, but its current iteration may need further work on theoretical foundations, as well as broader legitimation of a stakeholder-driven design process (Fox, 2017).

At the center of the theoretical debate over GPI has been the weak sustainability critique, a recognition that depletion of natural or social capital remains a viable economic development strategy due to the substitution of expanding income and consumption to produce rising per capita GPI. By bridging to GDP as the foundation to the Index of Sustainable Economic Welfare (the pre-cursor to GPI), Daly and Cobb (1989) relied on the basic assumptions of welfare economics. Other scholars, including Lawn (2003) and Talberth et al. (2007), have described their perspectives about the theory on which GPI is based post factum, however, no clear, strict inclusion or exclusion criteria were developed for the initial components which, due to an academic form of path dependency, have mostly remained the components parts of GPI. For example, explanation is needed for why income inequality is included and gender inequality is not; it seems arbitrary without clarification of criteria. It appears that the collection of components was pulled from the preferences, values, data availability, and context of the creators. This lack of transparency and clarity is particularly troubling when trying to justify the choice for the 6 economic, 9 social, and 10 environmental components or defend the balance of 7 benefits and 18 costs. Ideally, the next phase of GPI development should be informed by a theoretical foundation, diverse stakeholder input, and robust statistical standards.

Acknowledgements

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