



## Analysis

# Estimates of the Genuine Progress Indicator (GPI) for Oregon from 1960–2010 and recommendations for a comprehensive shareholder's report



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## ABSTRACT

The Genuine Progress Indicator (GPI) is a significantly more comprehensive approach to assessing economic progress than conventional measures, such as Gross Domestic Product (GDP). We estimated the GPI for the state of Oregon from 1960–2010. We found that it tracked the Gross State Product (GSP) for the period 1970–2000, but began to diverge and flatten out in 2000. The major reasons for this divergence were increasing inequality, loss of farmland, and decreasing personal consumption expenditures as a fraction of GSP. Oregon GPI/per capita leveled off in 2000, while the US GPI/capita leveled off in 1975. The GPI is not the perfect indicator of economic and social well-being, but it is a better approximation than GDP. As more states and countries begin to recognize the inappropriateness of GDP as a policy goal we can expect to see much more emphasis on and use of alternative indicators like GPI. We recommend extending these indicators to include a comprehensive shareholder's report that reflects all the state's capital assets, including built, human, social, and natural capital.

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## 1. Introduction

A reliable yardstick for evaluating the overall performance of nations, subnational regions, and the planet as a whole, is an essential tool for rational policymaking. The gross domestic product (GDP) has long been one of the most common proxies used to measure economic performance. GDP is an appropriate, though imperfect, metric to use when calculating the market value of goods and services produced within a selected geographic area during a selected interval in time (Leamer, 2009). However, it is frequently and erroneously interpreted as a measure of the social and economic welfare, or well-being, in a country. While upward GDP trends may correlate with perceived well-being for a period, the 'threshold hypothesis' suggests that there may be a point beyond which continued growth in GDP ceases to contribute to improvements in the quality of life within a society (Max-Neef, 1995; Kubiszewski et al., 2013; Costanza et al., 2014). This divergence is thought to occur because GDP was never designed to measure societal well-being and as the components it does not measure become more important, GDP becomes less useful as a proxy. The components of

GDP (consumption expenditures, capital formation, and net exports) do not include goods or services that are not bought and sold in market transactions. It also counts many market transactions as benefits, which are actually better thought of as costs. For example, although spending on security and crime prevention are costs to be minimized as they decrease human well-being, they increase GDP. Consequently, the widespread interpretation of GDP as a measure of economic welfare is quite problematic and produces misleading results around well-being.

A growing number of scholars, as well as policymakers, are aware that GDP growth is inappropriate as an overall national policy goal. Over several decades, economists have identified serious deficiencies in following the policy of endless growth in GDP, and have stressed the importance of using GDP only within the context of its intended, technical purpose. An extensive scientific literature drawing on insights from not only economics but also a wide array of environmental and social sciences has documented many shortcomings of GDP growth as a national policy goal (Kuznets, 1934; Nordhaus and Tobin, 1972; Daly and Cobb, 1989; Costanza et al., 2009; van den Bergh, 2009; Stiglitz et al., 2010).

The State of Oregon's commitment to alternative metrics for evaluating its citizens' quality of life extends back to 1989, when the Oregon

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Progress Board was created to oversee the collection and reporting of data to measure progress in categories very similar to those included in the GPI. Support for this work waxed and waned with the political tides over the next 20 years until, in 2009, funding for the Oregon Progress Board was eliminated entirely.

In the meantime, other national and sub-national governments are looking for new metrics that incorporate those goods and services that greatly influence the well-being of a population, but operate outside the confines of the market such as volunteerism, housework, inequality, and environmental degradation (Talberth et al., 2007; Wilkinson and Pickett, 2009).

Three different groups of well-being indicators exist (Costanza et al., 2014):

1. Adjustments to economic measures to reflect social and environmental factors (e.g., Genuine Progress Indicator and Inclusive Wealth Index);
2. Subjective measures of well-being drawn from surveys (e.g., World Values Survey and Bhutan's Gross National Happiness);
3. Weighted composite indicators of well-being including housing, life expectancy, leisure time and democratic engagement (e.g., United Nations' Human Development Index and Happy Planet Index).

The Genuine Progress Indicator (GPI) (Cobb et al., 1995; Talberth et al., 2007), was developed as a variant of the Index of Sustainable Economic Welfare (ISEW) originally proposed by Herman Daly and John Cobb (Daly and Cobb, 1989). GPI utilizes Personal Consumption Expenditures (PCE), a major component of GDP, as a starting point, but makes adjustments based on the added values or costs associated with monetized estimates of social and environmental elements unaccounted for in the GDP. For example, various indicators of natural resource degradation are subtracted from the GDP, and the value of household labor is added to it.

The GPI has been calculated at multiple scales, from state to national to global level (Hamilton, 1999; Pulselli et al., 2006; Nourry, 2008; Wen et al., 2008). On the state level, seven states in the United States (Colorado, Hawaii, Maryland, Massachusetts, Ohio, Utah, and Vermont) have calculated their GPI (Costanza et al., 2004; Berik and Gaddis, 2011; Posner and Costanza, 2011; Bagstad and Shammin, 2012; McGuire et al., 2012; Erickson et al., 2013; Stiffler, 2014; Erickson et al., 2015), as have a few provinces in Canada (Anielski, 2001). However, as of 2014, Maryland (Posner and Costanza, 2011; McGuire et al., 2012) and Vermont (Costanza et al., 2004) were the only two states that have officially adopted GPI as a tool in policy analysis and regularly report results (Bagstad et al., 2014). On the national level, the GPI has been estimated for approximately seventeen countries, including Australia, Austria, Belgium, Chile, China, Germany, India, Italy, the Netherlands, New Zealand, Poland, Sweden, Thailand, the United Kingdom, the United States, and Vietnam (Kubiszewski et al., 2013). GPI was also calculated on the global level, using the 17 countries stated above (Kubiszewski et al., 2013).

There are many issues related to using GPI, including subjectivity in distinguishing costs from benefits, subjectivity in which non-market values to include, as well as ongoing debate surrounding the methodology (Lawn, 2003; Costanza et al., 2009; Bagstad et al., 2014). There are also several key advantages to using the GPI. It is easily compared to the state GDP, and in comparing Oregon to other states and countries that already measure GPI. Additionally many other indicators, especially survey-based indicators like subjective well-being, are expensive to track over time and impossible to analyze before the year they were implemented (McGuire et al., 2012).

## 2. Methods

The methods employed in this analysis were adopted from the Maryland GPI report (McGuire et al., 2012) to facilitate meaningful comparison. Maryland adopted the framework provided in the national

Genuine Progress Indicator (Talberth et al., 2007), but applied specific adjustments to reflect indicators relevant to a state approach. This resulted in 26 indicators among three domains: Economic, Environmental, and Social. The Maryland study provided methodological notes and data sources for each of their 26 indicators, which were duplicated as closely as possible in this analysis for Oregon. Where necessary data did not exist for estimating the Oregon GPI, interpolation and extrapolation were employed, or the equations derived by the Maryland GPI group were used. Interpolation and extrapolation of data reduces the precision of some of the data. However, it allows for the completion and extension of time-series, which allows for better identification of patterns over time, a major use of GPI studies.

The calculation of GPI begins with personal consumption expenditures (PCE), a major component of GDP, measured in Indicator 1. Next, because unequal distribution of income has detrimental effects on economic and social welfare (Wilkinson and Pickett, 2009), income inequality is included through the use of the Gini coefficient, which measures the differences between actual distribution and equal distribution. By adjusting PCE figures (Indicator 1) with the income inequality (Indicator 2) we get Indicator 3: Adjusted Personal Consumption Expenditures. Indicator 3, provides the base number from which all remaining indicators of economic activity in the GPI are either added or subtracted, depending on whether they have enhancing or diminishing effects on welfare. Posner and Costanza (2011) summarizes the methodology using the following equation:

$$\text{GPI} = C_{\text{adj}} + G_{\text{nd}} + W - D - E - N.$$

In this equation, “ $C_{\text{adj}}$ ” represents personal consumption expenditures adjusted for income inequality (Indicator 3), “ $G_{\text{nd}}$ ” represents non-defensive government expenditures (such as Indicator 24: Services of Highways and Streets), “ $W$ ” represents non-monetized contributions to welfare (such as Indicator 17: Value of Housework),  $D$  represents defensive private expenditures (such as Indicator 20: Personal Pollution Abatement),  $E$  represents the costs of environmental degradation (such as Indicator 11: Net Wetlands Change), and  $N$  represents the depreciation of natural capital stocks (such as Indicator 16: Cost of Nonrenewable Resource Depletion).

Table 1 summarizes methodology used in calculating Oregon's GPI, and is closely adapted from the methodology summary table produced by Posner and Costanza (2011) in their detailed report on methodology and findings in the Maryland GPI study.

## 3. Results

### 3.1. Status of Baseline Measurements

Fig. 1 shows the basic results for Oregon GPI compared to Gross State Product (GSP) and Personal Consumption Expenditures (PCE). A spreadsheet and appendix with the full results for each component of the Oregon GPI and a sensitivity analysis is in Supplementary information.

GPI for Oregon was relatively flat in the 1960–1970 decade, even though GSP and PCE were expanding rapidly. This was due largely to the impact on GPI of the large net loss of farmland that occurred during this period (see sensitivity discussion). From 1970 to around 2000, GPI, GSP, and PCE were highly correlated. The period from 1973–75 and 1979–1982 showed declines in GSP, probably due to the Arab oil embargos and recessions. This caused a smaller decline in PCE in the 1979–1982 recession, due to declines in government spending and net exports relative to declines in PCE. In the period from 2000 to 2010 GPI leveled off, even though GSP and PCE continued to increase. This was due in part to increasing inequality.

Looking at the individual costs and benefits that are added to adjusted consumption expenditure, the remaining indicators are split into

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