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Estimating the Genuine Progress Indicator (GPI) for Brazil from 1970 to 2010

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ABSTRACT

This paper estimates the Genuine Progress Indicator (GPI) for Brazil from 1970 to 2010 as an alternative indicator to the Gross Domestic Product (GDP). After a growing disparity between these two indicators in the 1980s, when Brazil's per capita GPI featured a 35% decline, there was a relative catch-up in per capita GPI, but not one sufficiently strong enough to reduce the historical GPI–GDP gap. The recent trend of rapidly increasing environmental and social costs, along with the decline in unpaid labour and infrastructure services, poses concerns about the sustainability of an increasing GPI for Brazil into the future. Policies aimed at reducing environmental costs are necessary if Brazil is to enjoy a sustainable pattern of non-declining economic welfare. Brazil must pursue a higher rate of productivity in material and energy consumption in order to keep environmental pressures to a minimum level.

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1. Introduction

According to Haq (1976, p. 24), "the most unforgivable sin of development planners is to become mesmerised by high growth rates in the Gross National Product and to forget the real objective of development". Although the Gross Domestic Product (GDP) statistic was not created to measure national well-being, it has been used for such purpose, which some economists claim is justified due to the lack of better indicators. Ecological economists, however, believe that measuring true and sustainable progress depends on developing alternative indicators that take into account the negative social and environmental externalities of a growing economy (Lawn, 2007).

The Genuine Progress Indicator (GPI) is intended to embrace the challenge of a better understanding of the side-effects of the physical expansion of economic systems. Nonetheless, its calculation has not been well spread among countries, especially in the developing world. In Latin America, the GPI has only been estimated for Chile (Castañeda, 1999). Within the BRICS countries, only the Chinese and Indian economies have been assessed using GPI estimates (Lawn, 2008; Wen et al., 2008). In order to foster the application of GPI in the developing world, this paper is aimed at estimating the GPI for Brazil from 1970 to 2010.

The increase in GDP experienced by Brazil throughout the twentieth century enabled the Brazilian economy to be among the ten largest economies in the world. However, this growth was not sufficient to increase the welfare of most Brazilians to the same level enjoyed by people in the developed world. Whilst Brazil has the seventh largest GDP in the world, the country ranks just 72nd in terms of per capita GDP (World Bank, 2014), and features in 85th position with respect to Human Development Index rankings (UNDP, 2013).

The fact that Brazil's GDP growth has not increased the living standards of the majority of its population entices us to ask the following question: to what extent Brazil has experienced genuine progress over 1970–2010? We argue that estimating the GPI can provide useful guidelines to answer this question. Moreover, our main assumption is that GPI results are more reliable as a development parameter, and should therefore be used to assist in the formulation of policies aimed at achieving sustainable economic welfare.

2. From GDP to GPI

To overcome the deficiencies of GDP, the GPI comprises a set of indicators (items) that are monetarily valued and divided into three domains: economic, social, and environmental. Its rationale is to add or subtract from private consumption expenditures – the foundation item of the GPI – the benefits and costs that effectively increase or decrease people's welfare. In doing so, the GPI is calculated not just to measure the evolution of economic activity, but to estimate the

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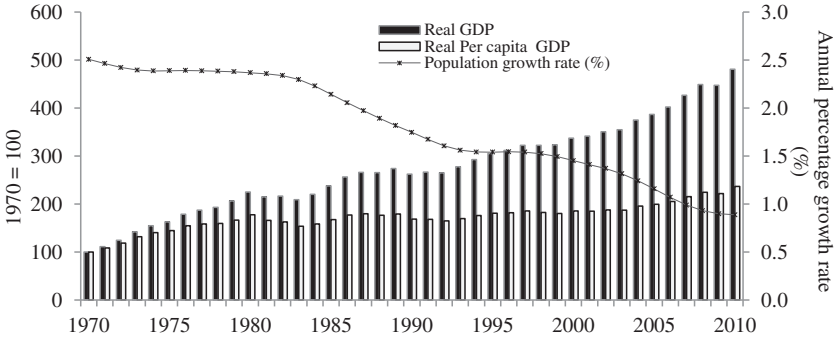

Fig. 1. Index of real GDP, real per capita GDP, and population growth rate: Brazil, 1970–2010.
Source: World Bank (2014).

sustainable economic welfare of a nation, state, or province at a given point of time (Lawn, 2003; Lawn and Clarke, 2008).

Lawn (2003) argues that the theoretical superiority of GPI over GDP derives mainly from its Fisherian roots regarding the concepts of income and capital. In the case of the GPI, income constitutes the 'net psychic income' generated from economic activity (less various environmental costs), whereas the current production of durable physical goods constitutes an addition to the stock of physical capital that generates future psychic benefits. In the Fisherian tradition, the GPI includes the former but excludes the latter in the measure of current economic welfare, unlike GDP. Adopting a strict Fisherian perspective does not mean that the GPI is free of shortcomings. However, these are best resolved by improving the valuation methods used to obtain the various items included in the GPI, which we wholeheartedly welcome.

From a theoretical standpoint, ecological economists have repeatedly pointed to the limitations of visions of progress based solely on the GDP growth objective (Daly, 1996). In particular, ecological economists have cast serious doubts about the capacity of continuous GDP growth to deliver ever-increasing human prosperity, let alone prosperity that can be sustained indefinitely (Jackson, 2009). As a consequence, ecological economists recognise the possibility of an 'uneconomic growth' phenomenon, which happens when the marginal costs of the GDP expansion (social and environmental externalities) outweigh its marginal benefits (Daly, 1999). The point beyond which the physical expansion of an economy becomes "uneconomic" is commonly referred to as the "threshold hypothesis" (Max-Neef, 1995).

Costanza et al. (2014) believe that it is "time to leave GDP behind"[1] and put forward alternative indicators like the GPI. The general call to reject GDP is receiving even greater support in the form of a global GPI study showing that the aggregate welfare of 17 countries for which the GPI has been estimated has not been improving since 1978, despite aggregate GDP growing more than three-fold (Kubiszewski et al., 2013).

3. An overview of the Brazilian economy from 1970 to 2010

Throughout the 1970–2010 period, Brazil's real GDP increased by 381.2% or at an average annual rate of 4.0%. Over the same period, per capita real GDP grew by 136.8% or at an average annual rate of 2.2% (Fig. 1). According to Mortatti (2011), the main conditioning factors behind the growth in Brazil's per capita real GDP from 1970 to 2010 were high levels of gross fixed capital formation, human capital improvements, and an increasingly open Brazilian economy with respect to international trade.

It is worth mentioning, however, that this 40-year period comprised at least four distinct stages in Brazilian socioeconomic history, indicating that it is unwise to jump to general conclusions about the GDP growth pattern in Brazil from 1970 to 2010. Each of the four decades within this period had its own particular economic features that should be taken into account when analysing Brazil's economy.[2] The peculiar characteristics of each decade resulted in a highly fluctuating real GDP-trajectory with similar implications for per capita real GDP growth (Fig. 2).

The most striking feature of the real GDP growth experienced in Brazil is the lack of improvements in the distribution of income among the general population. Despite progress towards a stable macroeconomic environment and remarkable advances in the educational system, income inequality is still very high, ranking Brazil as one of the most unequal societies in the world (Sotomayor, 2008). However, in the last decade of the study period (2000–2010) considerable progress was made towards a more just society. The percentage of the population living under the extreme poverty line dropped from 18.4% in 1976 to 6.8% in 2010, and the Gini index also fell from 0.62 in 1976 to 0.54 in 2010 (Fig. 3).

The social outcomes achieved in Brazil in the first decade of the 21st century were mainly due to improvements in income distribution. In October 2003, the *Bolsa Família* Program (Family Grant Program) was launched as the result of the merger of four pre-existing cash transfer programs (Buainain et al., 2014). The program is now recognised as the largest conditional cash transfer mechanism in the developing world, and is aimed at reducing current poverty and inequality by providing a minimum level of income to extremely poor families (Lindert et al., 2007; Buainain et al., 2014).

Not unlike other countries – and despite increasing environmental awareness – the GDP growth in Brazil has come at a price. Brazil's per capita biocapacity decreased by 48% in the 1970–2010 period, whilst its per capita ecological footprint increased by 19.5% over the same period (Fig. 4). Notwithstanding the fact that Brazil still enjoys a per capita 'ecological surplus' (an excess of biocapacity over ecological footprint), this figure in 2010 was 58.2% smaller than in 1970. In terms of average annual rates of change over the 1970–2010 period, Brazil's per capita biopacity decreased by 1.6% per annum; the per capita ecological footprint increased by 0.4% per annum; and the per capita ecological surplus declined at the rate of 2.2% per annum.

Traditional GDP accounting ignores the social and environmental costs just described. Indeed, as we shall see in the next section, once the social and environmental side-effects of GDP growth are taken into account, a vastly different picture of Brazil's genuine progress emerges.

4. Material and methods

The GPI calculated in this study for Brazil comprised 17 items distributed into the three main domains (economic, social, and environmental).

[1] The Stiglitz-Sen-Fitoussi Comission (2009) has drawn attention to the many limitations of the use of GDP as an indicator of progress.

[2] A sample of studies that analysed the Brazilian economy during this period is as follows: Malan and Bonelli (1977), Bacha (1977), Valença (1998), Barbosa (1998), Amann and Baer (2000), Cinquetti (2000), Bresser-Pereira (2003), Amann (2005), Carneiro (2007), Baer (2008), and Fonseca et al. (2013).

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