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Abolishing GDP

Jeroen C.J.M. van den Bergh

Vrije Universiteit Amsterdam, and Tinbergen Institute.

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The Tinbergen Institute is the institute for economic research of the Erasmus Universiteit Rotterdam, Universiteit van Amsterdam, and Vrije Universiteit Amsterdam.

Tinbergen Institute Amsterdam
Roetersstraat 31
1018 WB Amsterdam
The Netherlands
Tel.: +31(0)20 551 3500
Fax: +31(0)20 551 3555

Tinbergen Institute Rotterdam
Burg. Oudlaan 50
3062 PA Rotterdam
The Netherlands
Tel.: +31(0)10 408 8900
Fax: +31(0)10 408 9031

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Abolishing GDP [1]

Jeroen C.J.M. van den Bergh

Faculty of Economics and Business Administration
& Institute for Environmental Studies
Free University
De Boelelaan 1105
1081 HV Amsterdam
The Netherlands

Phone +31-20-5986 164/090
Fax +31-20-5986 004
jbergh@feweb.vu.nl

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Abstract

Expectations and information about the growth of GDP per capita have a large influence on decisions made by private and public economic agents. It will be argued here that GDP (per capita) is far from a robust indicator of social welfare, and that its use as such must be regarded as a serious form of market and government failure. This article presents an update on the most important criticisms of GDP as an indicator of social welfare and economic progress. It further examines the nature and extent of the impact of GDP information on the economy, revisits the customary arguments in favour of the GDP indicator, and critically evaluates proposed alternatives to GDP. The main conclusion is that it is rational to dismiss GDP as an indicator to monitor economic progress and to guide public policy. As is clarified, this conclusion does not imply a plea against growth, innovation or national accounting.

Key Words: distribution; externalities; genuine savings; happiness; HDI; informal sector; ISEW; status goods.

JEL code: D31, D63, E01, I31, O15.

1. Introduction

It is not original to criticize GDP (or GNP[2]) as an indicator of welfare or progress. But it turns out to be necessary to repeat the critique, as well as update it to reflect the most recent theoretical and empirical insights. For the critique is only fully accepted within a small circle of academics, while it insufficiently seeps through to economists working in businesses and government, to economic teachers at various levels of education, to policy makers, politicians and journalists. As a result, obvious conclusions and policy implications are not being picked up.

Gross domestic product (GDP) is the monetary, market value of all final goods and services produced in a country over a period of a year. The real GDP per capita (corrected for inflation) is generally used as the core indicator in judging the position of the economy of a country over time or relative to that of other countries. The GDP is thus identified, or considered even synonymous, with social welfare – witness the substituting phrase 'standard of living'). This approach does not follow from a thorough theory about GDP as a welfare measure, but has grown to become like this in the course of time. What is perhaps most striking is that many journalists and politicians, regardless of their political preferences, express critiqueless statements about GDP. Not surprisingly, then, one can observe a strong urge for GDP growth worldwide. This is being reinforced by international organizations like the IMF and the OESO, where (macro)economists play first fiddle. But these same economists should know better than anyone that GDP (per capita) is not an adequate beacon for steering the economy, at least when the ultimate goal is to serve social welfare.

It so happens that there is a quite extensive theoretical and empirical literature in which the use of GDP per head as a measure of welfare and progress is being criticized. Closely related is a growing literature that proposes corrections and alternative indicators. In spite of this, the influence of GDP information on the economy – through the decisions of firms, financial institutions, consumers and governments – has by no means declined. On the contrary, with the formation of the EU GDP growth has become an even more explicit and important goal, witness the unconditional 3 percent growth objective of the Lissabon strategy.

It is pertinent that economists express themselves clearly about the shortcomings of the GDP indicator and the implications of these. For the longstanding critique on GDP as a welfare indicator is either correct, in which case the inevitable conclusions is: we have to get rid of GDP as a welfare measure, because policy and economic decisions guided by it lead to lower than feasible social welfare. Or the critique is incorrect, in which case the counter arguments need to be made explicit and clear. So far, the latter has not occurred. Indeed, the economic literature does not offer any serious efforts to refute the critiques of GDP per capita as a welfare indicator. With this article I intend to invite my fellow economists to arrive at a clear position on what to do with the GDP indicator.

The organization of the remainder of the text is as follows. Section 2 discusses the arguments of the various critiques, which are divided into eight categories. Section 3 illustrates that the influence of GDP information on the economy is easily underestimated. Section 4 analyses the customary arguments in favour of GDP. Section 5 critically reviews the main alternative social welfare or progress indicators that have been proposed. Section 6 derives policy implications of abolishing GDP as a macroeconomic indicator. Section 7 concludes.

2. Shortcomings of the GDP indicator

Since the 1960s, the implicit and explicit interpretation of GDP (per capita) as a proxy of social welfare has received much criticism. Moreover, criticism has come from some of the most respected economists of the 20th century, including various Nobel laureates. Among the most well-known critics are Kuznets (1941), Galbraith (1958), Samuelson (1961), Mishan (1967), Nordhaus and Tobin (1972), Hueting (1974), Hirsch (1976), Sen (1976), Scitovsky (1976), Daly (1977), Hartwick (1990), Tinbergen and Hueting (1992), Arrow et al. (1995), Vellinga and Withagen (1996), Weitzman and Löfgren (1997), Dasgupta and Mäler (2000), and Dasgupta (2001). The many arguments of the critique are organized into the following eight categories.[3]

[2] Gross domestic product (GDP) is the market output generated within a country's boundaries by both its citizens and foreigners. Gross national product (GNP) is the output that is generated by the citizens of a country, irrespective of where production takes place. For most countries the difference between GDP and GNP is not very large (a notable exception is Ireland). Moreover, the conceptual difference does not matter for our discussion here: all the weaknesses of GDP as a welfare indicator discussed hereafter apply equally to GNP.

[3] Some of the criticism of the GDP indicator coincides with criticism of economic growth, which is not surprising as this growth is traditionally equated with an increase of GDP over time. Nevertheless, for the sake of clarity, it should be

2.1 Principles of proper accounting

The use and calculation of the GDP indicator is inconsistent with three principles of good bookkeeping: (i) divide clearly between costs and benefits; (ii) correct for changes in stocks and supplies; and (iii) use accurate measures for all social costs (= private + external costs). If a commercial company were to employ the method that is the basis for calculating GDP, its accounts would not be legally approved. The fact that the GDP calculation method continues to coexist with institutionalised, legal rules for financial accounting of firms is somewhat of a mystery.

Firms employ separate accounts for benefits (revenues) and costs (outlays). The GDP, however, adds benefits and costs together. A company that would function as such, would quickly go broke (countries, however, face another type of competitive environment than firms). According to Stiglitz (2005) "No one would look at just a firm's revenues to assess how well it was doing. Far more relevant is the balance sheet, which shows assets and liabilities. That is also true for a country." In addition, a decline in stocks that represent value or welfare is not taken into account (e.g. natural gas in the earth). An additional shortcoming is that GDP covers the costs of the provision of certain public goods, such as national defence, even though it is evident that the costs of public goods cannot serve as an adequate measure of the benefits associated with these goods. Finally, many private goods show diverging private and social costs because of all kinds of market failure, including imperfect competition, price agreements and technical-physical externalities.

Mishan (1967) and Daly (1977) conclude that GDP must be considered as an estimate of the total cost of all market-related economic activities in a country. Their actual benefits or real welfare effects are unobserved, that is, not measured by means of GDP.[4] As an implication, GDP growth should not be considered as an indicator of progress, but as a reflection of increasing costs of economic change (whether progress or decline). This explains why GDP and welfare growth do not necessarily coincide. At a certain moment, GDP growth creates more costs than benefits, so that an optimal scale of economic activity will be surpassed (Daly, 1992). Economists are happy to argue in favour of cost-benefit analysis as a general method for policy evaluation and support. When it comes to the direction of the economy as a whole, many of them suddenly are satisfied with only information about costs, that is, GDP information.

Finally, the correction of GDP for inflation is required to make estimates comparable over time. This leads to the particular problem that the correction is based on an average consumption basket, which is regarded as representative for the entire population. However, the more skewed is the income distribution or the more heterogeneous in terms of consumption (purchase) behaviour is the population, the more inaccurate and thus less representative this procedure will be.

2.2 Intertemporal considerations

Macroeconomics, and within it especially economic growth theory, is concerned with the dynamic aspects of the economy as a whole. Macroeconomics does not offer any support for the idea that GDP can serve as a measure of social welfare. Quite the contrary, optimal (normative) growth theory proposes models that explicitly use social welfare as an objective function (based on continuous or overlapping generations), and certainly not a GDP type of criterion.[5]

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noted that the rejection of the GDP indicator does not imply a rejection of GDP growth in general. This article can be interpreted as drawing attention to the problem that the correlation between GDP growth and welfare growth is not generally positive and high.

[4] Daly (1977) has proposed the notions of "ultimate means" and "ultimate ends". He considers economic activity as an intermediate end (or an intermediate means), so that it is best regarded as a cost factor from the perspective of ultimate ends.

[5] Weitzman (1976) has shown that, under certain restrictions, the national product can serve as a proxy (stationary equivalent) of a utilitarian intertemporal welfare function formulated as a net present value of future consumption flows. Vellinga and Withagen (1996) have generalized this result. Three objections can be raised against the approaches adopted by these authors. In the first place, a specific intertemporal function is posed, without any empirical support, as a suitable representation of social welfare (an egalitarian or Rawlsian welfare function, for example, would render an entirely different outcome). Furthermore, the instantaneous utility function is approximated by consumption (Weitzman) or by a Taylor series in the arguments of utility – consumption and capital (Vellinga and Withagen). Last but not least, it needs to be assumed that there is no pure time dependence in the form of, for instance, exogenous technical change or exogenously changing world prices; time can only enter in the form of a time preference rate. All these choices imply a serious deviation from actual social welfare.

Apart from this, it should be realized that, although an intertemporal welfare function is usually posed as a truth in theoretical economic growth analyses, it lacks any basis in empirical studies (Section 2.4). One can, of course, claim that people take expected future own-welfare effects of their actions into account. For example, they may respond to uncertainty about the future by creating sufficient financial reserves (wealth). But this is not the same as saying that individuals maximize some intertemporal welfare function, usually utilitarian welfare defined as the aggregation (sum or integral) of a discounted future stream of instantaneous or momentary utilities.

Finally, the fact or belief that GDP growth in certain periods or regions has correlated positively with progress (however measured) should not be confused with the idea that GDP (growth) is a good measure of social welfare (progress) in general. In other words, the correlation may be low or even negative in certain periods and regions. If, by way of thought experiment, one extrapolates a constant tempo of real GDP growth towards the distant future, one will end up with an incredibly high GDP. But it is very unrealistic to suppose that social welfare will reach a comparably high level. Somewhere in time the two need to be de-linked (assuming that they are closely connected during an initial period). To illustrate this, using 2 percent as a conservative estimate of the average yearly GDP growth rate over the past decades, extrapolation of this rate 1000 years into the future gives a GDP that is $(1.02)^{1000} \approx 400$ million times as high as the current GDP. Surely, no one can believe – if only on the basis of introspection – that individual and social welfare can increase to such an extent. This shows that, in the long run, GDP can not serve as a good indicator or even rough approximation of social welfare. Definitely, at some point a de-linking of GDP and welfare must occur. In fact, it is very well possible that such de-linking has already occurred for many rich countries in the world. On the basis of pure theoretical reasoning one can not decisively conclude on this issue. Empirical analysis is required (see Section 2.4).

2.3 Lexicographic preferences

People have various basic needs, such as air, water, food, sex, shelter, company, respect and freedom. These cannot be traded off against luxury services and material goods – in fact, the latter often serve as a sublimation of the basic needs themselves (e.g. a fancy car to gain respect from peers). In other words, substitution in consumption is very limited. This is the core of the notion of lexicographic preferences, which is closely connected with the Maslow pyramid. Lexicographic preferences can be defined as having two characteristics: (i) individuals have limited needs in certain goods or services, as feelings of satisfaction occur after consumption reaches a certain level; (ii) 'lower' needs (e.g. the removal of thirst and hunger) need to be fulfilled before 'higher' needs (e.g. recreation) can appear. Within this framework, income growth and the associated growth of material consumption, notably in urban and polluted environments, is an imperfect compensation for a lack of satisfaction of basic needs, such as relaxation, space, serenity, clean air and water, and direct access to nature. As a result, one cannot exclude that, despite GDP and individual income growth, (individual and social) welfare remains constant or even declines.

The previous point does not mean to suggest that GDP growth always implies more material consumption. It is quite possible that it comprises an increase in services. What this in turn yields in terms of welfare is difficult to say in general. Sen's (1999) concept of individual 'capabilities' may be useful here. This tries to bring goods and services into a single denominator by emphasizing freedom and opportunities to choose, as well as context-dependent functionality of goods and services, based on taking into account the peculiarities and environments of individuals. Examples of the latter are being disabled versus being perfectly healthy, and living in a dense, busy city versus living in the countryside: different goods and services may be needed to realize the same level of welfare in these alternative circumstances. Income indicators do not correlate well with capabilities and opportunities in these various welfare-relevant dimensions.

2.4 Empirical analysis of individual happiness and social welfare

A growing field of subjective well-being analysis on the basis of empirical data has produced many insights about the determinants of welfare and happiness.[6] Studies of this type are being undertaken by economists,

[6] No sharp distinction is made here between notions like utility, welfare, well-being and happiness. As a rule, they are used to denote roughly the same thing. Disciplines such as economics, sociology, and psychology seem to have developed their own jargon in this respect. More importantly, empirical research does not (and cannot) make a sharp

psychologists and sociologists. This research has first of all delivered the insight that, somewhere in-between 1950 and 1970, the increase in welfare stagnated or even reversed into a negative trend in most western (OECD) countries, despite a steady pace of GDP growth. Blanchflower and Oswald (2004) offer such an analysis for the UK and the USA.[7] This insight is supported by the 'Eurobarometer surveys', the half-yearly opinion polls of the inhabitants of the EU Member States, as well as by corrections of GDP that seem to point more in the direction of social welfare (e.g. the ISEW indicator of Daly and Cobb, 1989; see Section 5 on this). The income level at which de-linking occurs between GDP and (subjective) social welfare has been estimated to approximate $15,000 (Helliwell, 2003). This has been referred to as a 'threshold hypothesis', reflecting that the costs of growth exceed the benefits (Max-Neef, 1995: p.117): "... for every society there seems to be a period in which economic growth (as conventionally measured) brings about an improvement in the quality of life, but only up to a point – the threshold point – beyond which, if there is more economic growth, quality of life may begin to deteriorate." It seems wise to consider any estimates of the threshold point as a rough indication, which may not hold generally for all countries and cultures. Nevertheless, the various empirical findings provide evidence for a stabilization of social welfare in spite of continued GDP growth.

Subjective well-being studies also show that, at the individual level, income does not perfectly correlate with welfare – indeed much less than is often taken for granted – so that individual income is not a good proxy of individual welfare (Easterlin, 2001; Frey and Stutzer, 2002; van Praag and Ferrer-i-Carbonell, 2004; Ferrer-i-Carbonell, 2005). Relative income turns out to be critical (see Section 2.5). In addition, other – income-independent – factors influence individual welfare or happiness. Important ones are: being employed, having a stable family (and having a partner), being healthy, personal freedom (political system), having friends, and belonging to a tight social community. This type of research further shows the relevance of unobservable or not easily observable factors, notably a pessimistic or optimistic attitude towards life in general. A recent empirical study by Ferrer-i-Carbonell and Frijters (2004) concludes, on the basis of an analysis of the effect of this attitude, that the belief that "being rich makes people happy" can better be replaced by "happy people are more likely to be rich". For it appears that optimistic individuals are on average relatively happy and successful in life (ceteris paribus), and on the basis of the latter enjoy a relatively high average income. In addition, this type of research indicates that the well-being of men on average responds differently to income changes than that of women. Responses also differ among income brackets. Now if income does not render a reliable and robust measure of happiness at the micro-level, then it is extremely unlikely that the aggregation of individual incomes in a GDP provides a good indicator of social welfare at the national level.

Another important insight of this literature is that individuals adapt or get used to changed circumstances, such that their subjectively felt well-being does not increase (Frederick and Lowenstein, 1999). This relates to the fact that our senses can only handle a limited amount of stimuli, so that beyond a certain threshold a feeling of satisfaction or boredom arises. A change in circumstances can of course create a one-off or ephemeral welfare effect that quickly fades away. Since people do not realize the phenomenon of adaptation they keep striving for 'more'. Terms like 'addiction', 'hedonic adaptation' (Helson 1964), 'hedonic treadmill' (Brickman and Campbell, 1971) and 'preference drift' (van Praag, 1971) are used in this respect.

Utilizing subjective well-being indicators for a large number of countries – on the basis of World Values Surveys data (www.worldvaluessurvey.org) – Layard (2005) concludes that, whereas countries with high incomes show little variation in average reported happiness, this is quite different for countries with low incomes. The first group is dominated by countries of Protestant origin, which may point to a religious factor at stake. But, on closer inspection of both groups, it appears that one cannot exclude a serious influence of climate conditions and political systems (communism versus enlightened capitalism) on happiness (see also Boersema, 2004). This illustrates that there is no simple relationship between GDP and happiness or welfare. In addition, the country comparison clarifies that happiness is characterized by diminishing returns of increases in GDP per capita.

Happiness evidently depends on leisure. But leisure is not captured by GDP. Quite the contrary, it has an opportunity cost of not being productive in terms of contributing to GDP. A recent study by the

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distinction between these various notions, and, not surprisingly, one finds conflicting interpretations of them. As is clarified later, this is not meant to deny the existence of different interpretations of happiness.

[7] The original influential study is Easterlin (1974).

OECD (2006) makes adjustments of GDP by valuing leisure at GDP per hour worked (somewhat debatable), and finds that the result (in per capita terms) leads to a different ranking than according to GDP per capita. In this ranking, The Netherlands scores best of all OECD countries, for two reasons: the inactive part of the working force is relatively large, and part-time working is very common (cf. de Groot et al., 2004).[8]

2.5 Income distribution, relative welfare and rivalry

Sen (1976, 1979) considers the implicit treatment of income distribution as the main objection against GDP as a measure of welfare. The GDP per capita indicator emphasizes average income. An unequal distribution implies unequal opportunities for personal development and well-being.[9] Furthermore, individuals or families with low incomes benefit relatively much from an income rise, because of the diminishing marginal utility of income. GDP per capita does not, however, distinguish between the expenditures of the poor on basic goods and of the rich on luxury (and often status) goods. In fact, given the higher prices of the latter these implicitly receive a relatively high weight. Of course, GDP growth can occur with a decrease in income inequality, but this is not a general fact. The Kuznets (inverted U) curve is often considered as indicative of the temporal relationship between income level and income inequality as countries undergo economic development (Kuznets, 1934). Nevertheless, it is not so relevant for describing countries beyond a certain income level. Then, complex interactions between economic and political cycles will affect the income distribution. For example, a higher GDP or national income can offer more financial room for public expenditures that redistribute income, such as social security, which in turn contributes to a higher social welfare (ceteris paribus).

A related but more subtle aspect of distribution is that individual welfare cannot be separated from the welfare of other individuals in the relevant social environment, also known as the 'peer group'. Therefore, the term relative welfare or context dependent preferences is used (Tversky and Simonson, 2000). Such preferences are characterized by an urge to compare oneself with others and rivalry ("keeping up with the Jones's") or "reference drift" (Kapteyn et al., 1978). This is (also) a finding of empirical studies on the basis of subjective well-being. The relevant social context of individual welfare does not need to be fixed, but can change over time as a result of information and the media. Globalization means that the media transfer consumption images across the planet, with possible consequences for peer group size and relative welfare of people. Consistent with the notion of relative welfare is the idea that poverty has a relative dimension (here Sen's notion of 'capabilities' is relevant too). Subjective well-being research has shown that poverty often means that individuals are unhappy because they can consume much less than the majority of individuals in their social environment. Consumption surely is not only driven by (basic) needs but also by imitation and search for status.

The striving towards conspicuous consumption (Veblen, 1899), "positional goods" (Hirsch, 1976) and "status goods" (Howarth and Brekke, 2003) are at the core of rivalry in consumption. On the basis of experiments and surveys, Alpizar et al. (2005) find that relative consumption not only plays a role in the case of goods like houses but also holidays and even insurance.[10] Earlier, Solnick and Hemenway (1998) assessed that a majority of respondents would rather opt for being poor in absolute terms and rich in a relative sense than vice versa.[11] Ever since Darwin, biologists have known that the function of conspicuous

[8] For a discussion of different interpretations of happiness (short-term feelings of euphoria or long-term feelings of satisfaction), see, for example, the introductory chapter in Bruni and Porta (2005). They note a fundamental distinction between subjective hedonism ("seeking pleasure and avoiding pain") and objective eudaimonia ("striving for perfection that represents the realization of one's true potential").

[9] Stiglitz (2005) notes that median rather than average GDP serves a better job in capturing inequality. He emphasizes that average GDP per capita in the US has been steadily rising whereas median (household) income has been falling over the last decades.

[10] The study also assesses an absolute welfare effect. A derived question, the answer to which is not easy, can be formulated as: To what extent does technological change, in particular product innovation, contribute to happiness through an increase of absolute (as opposed to relative) welfare of consumers? The relationship between GDP growth, technical change and welfare or happiness deserves critical examination. But even if technological change turned out to always be welfare enhancing (which has not been proven), one should not *ex ante* assume that the best technological and therefore welfare-enhancing strategy would be 'GDP growth no matter what'.

[11] The analytical-theoretical work starts with Duesenberry (1949). Recent contributions are Arrow et al. (2004) and Hopkins and Kornienko (2004).

and extravagant features of animals is to attract sexual partners and repel competitors.[12] Humans are no exception – we are animals after all. Moreover, it is confirmed by studies across time and cultures (e.g. Buss, 1989). The fact that individuals who already have a partner and offspring still keep seeking for status through consumption is the mere result of the automatic nature of this type of behaviour, which became fixed in our genes through repeated sexual selection within our species and its predecessors. Striving towards individual income growth is thus completely understandable but will not necessarily lead to an increase in happiness when others aim at the same goal. In fact, more inequality will tend to lead to a happy few relatively rich people and a large majority of less happy relatively poor ones, suggesting a negative effect on social welfare. The GDP completely omits the relative income aspect of welfare.

Relative welfare is closely related to changes in preferences. Consumer preferences are to a large extent formed by the media that in turn is steered by commercial (business) interests. Here ample use is made of individuals' feelings of rivalry. In other words, advertising (mis)uses our sensitivity to status and imitation or fashion. Children show the utmost sensitivity to advertising aimed at fostering rivalry, but adults do not behave fundamentally differently. The rivalry in the striving towards individual growth of income and consumptive outlays is referred to as the "rat race" and the "affluenza virus" (e.g. Layard, 2005). Income growth almost always goes together with new products and related changes in preferences, but no one guarantees that creating new preferences contributes to people's happiness. Reference drift can then ultimately result from a combination of advertising and comparing with, as well as imitating, others.

The phenomenon of relative welfare does not just explain why humans strive for income rises. It also clarifies that an increase in relative income can improve the welfare of the respective individual, whereas social welfare is not being served by it. The reason is simple: rises in relative income and welfare are a zero-sum game: one individual loses what another gains (Layard, 2005).[13] In other words, you cannot make everyone increase in relative welfare. The relatively rich are generally happier than the relatively poor; this has always been so, and GDP growth will not change it. The rise of the relative income of an individual can be regarded as a negative external effect (external cost) on the welfare of the one whose relative income drops as a result of it. As is well known, externalities are harmful to social welfare, and need to be corrected.[14] The important conclusion of the foregoing for our purpose here is that GDP entirely leaves out considerations of relative welfare and rivalry in consumption.

2.6 Formal versus informal economy

In general, GDP just covers activities and transactions that have a market price and thus completely neglects informal transactions between people that occur outside formal markets. The formal market dimension of human activities can comprise a large or small part of total human activity, depending on whether one observes OECD countries (a large part), economies in transition (medium) or less developed countries (small). The fact that the informal economy is left out of consideration explains why GDP per capita for many countries in the latter group can be so extremely low. At the same time, it can easily give a wrong picture of how (un)happy people really are.[15] This is amplified by the problem that the size of the informal economy relative to that of the formal economy may change considerably over time, both in developing and developed countries. For the Netherlands, for instance, the variation in the estimates of unpaid household services as a percentage of GNP has changed between 1975 and 1990, i.e. over a period of only fifteen years, from [67-108 percent] to [51-91 percent] (Bos, 2006).

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[12] In biology the fact that only individuals with a high physical or mental quality can carry the costs of extravagance is denoted by the term "handicap principle". That one can waste means to seemingly useless – but certainly not 'fitness-less' or 'function-less' – consumption provides a signal of superiority and quality, which increases the social status, as a result of which the probability of finding a suitable sexual partner and therefore fitness increase.

[13] Empirical studies even suggest asymmetry in the sense that the 'poor' lose more happiness than the 'rich' gain (Ferrer-i-Carbonell, 2005). This would imply a *negative*-sum game. This asymmetry was already suggested a long time ago (Duesenberry, 1949).

[14] In addition, the attention for 'market consumption', including search, gathering information about (new) products, spending much time in shops and malls, and buying things that are hardly ever used, can divert adults as well as children from activities that contribute much more to happiness, such as more leisure (less working, less spending), playing with your kids, taking time for the extended family (grandparents), friends and neighbours, etc. (Schorr, 1998).

[15] For a large number of African and a small number of Asian countries, GDP has been regularly subject to corrections and adaptations based on estimates of the value added of the informal agricultural sector. Such corrections are less common for Latin-American countries (Charmes, 2000).

Actual GDP growth often comes down to a transfer of existing informal activities (unpaid labour) to the formal market. This means that the benefits were already enjoyed but the market costs were not yet part of GDP. This clearly illustrates the earlier point by Mishan and Daly (Section 2.1) that GDP reflects the costs of reaching a certain, unknown welfare level and not that welfare itself (i.e. the benefits). With transfer of existing activities from the informal to the formal circuit, economic growth means that the costs increase more rapidly than the benefits, and in the worst case only the costs rise. This holds, for instance, when informal activities like subsistence agriculture in developing countries, voluntary work, household work, and child care disappear. Such activities originally took place within the informal family circle and the local community. Transfer from the informal sphere to the formal market also occurs when people are born, die or are nursed in a hospital instead of at home.

The GDP therefore does not recognize the value of all kinds of informal activities and services. As a result, public policy is often aimed at cutting back and discouraging informal activities. This can be interpreted as a strongly normative goal that is not entirely without risks for social welfare. The transition from an informal to a formal economy in itself offers no guarantee for a rise in happiness or welfare. For example, local social contacts – that form the basis for stable and happy lives – are much stronger and occur more frequently within informal than formal economies. In other words, 'society' in the strict meaning of the term has a value that is not captured by GDP.

Obviously, it is not my intention to defend the extreme position that a transition from an informal to a formal economy automatically works out badly for social welfare. It is evident that labour division and specialization can be carried through more extensively in a formal than in an informal economy. It is possible, though not certain, that as a result productivity increases, labour conditions improve and the choice spectrum (diversity of products) for consumers is widened.[16] These advantages do not neutralize the earlier mentioned negative welfare consequences of a transition to a formal market economy. Indeed, many other negative aspects should be taken into account. For example, if the labour market grows in scale, it stimulates commuting (distances), as well as people changing their house for a job. This erodes local community structures, with negative effects on individual happiness. In developing countries, the trajectory towards the formal economy often goes together with a large-scale migration of 'subsistence' farmers with big families to the slums of large cities.

The main message here is that GDP cannot serve as a measure to judge the welfare impact of fundamental changes that involve transitions of the informal to the formal economy. The expansion of markets to include informal activities is not always good for social welfare, even if GDP is raised. One might suspect that a certain combination of informal and formal (market) relationships between people would render the best of both worlds. With the GDP indicator, however, one cannot judge this in any way, since GDP omits the informal dimension of the economy. In the light of the continuous, idealistic public debate on the (un)desirability of expansion of the market domain it is therefore of utmost importance to not rely on GDP but to use adequate, real welfare indicators.

2.7 Environmental externalities and depletion of natural resources

The previous point is a specific case – through conceptually a very important one – of the more general criticism that GDP omits the value of non-market goods and services. Another example of unpriced effects relates to the natural environment and resources. This involves negative external effects as well as goods and services delivered by nature. The presence of externalities means that the current set of market prices insufficiently reflects the total (private + external) costs, which makes these prices unreliable signals in whatever calculation aimed at producing a social welfare indicator. Moreover, if air, water, or a natural area are being polluted any damage does not enter GDP, but when pollution is being cleaned this increases GDP. In addition, the (capital) depreciation associated with environmental changes (fish stocks, forests, biodiversity) and depletion of resource supplies (fossil energy, metal ores) is missing from the GDP

[16] According to recent field and experimental studies by psychologists a larger choice set may have a direct negative effect on individual motivation and welfare because of "choice overload", caused by incomplete information, search costs, and too much dependence on information offered by experts (Iyengar and Lepper, 2000). Herbert Simon's notion of bounded rationality, i.e. limited brain capacity to process information and 'satisficing' behaviour , offers an additional, complementary explanation of this phenomenon (Simon's famous statement "…a wealth of information creates a poverty of attention …" is also relevant here).

calculation.[17] As a result, we are considering ourselves 'richer' than we really are (Atkinson et al., 1997). It makes sense to define real, meaningful income as sustainable income: namely, as the maximum amount of income (or consumption) in one period without depleting capital or without harming the capacity to generate the same or higher level of income in future periods (Hicks, 1948). Maintaining this capacity requires sustainable capital utilization, regardless of the type of capital: human capital, machinery, and natural capital (natural resources and ecosystem services). Here we focus on sustaining the latter.

A fundamental consequence of neglecting sustainability of natural capital has already been mentioned: namely, that the use of GDP as an indicator of welfare and progress means regarding substitution of basic conditions – like space, serenity, and direct access to nature and water – by market goods – like large houses, roads, cars, sewage systems and water purification, and expensive holidays in exotic locations – as progress. This in turn will unnecessarily stimulate the replacement of 'nature' by the 'market economy'. A correct economic welfare approach would only characterize changes as real progress (welfare improvement) if they are accompanied by a sustainable use of environment and nature. Hueting (1974) already recognized this early on, and his elaboration of a measure of a green or sustainable income is based exactly on this insight (Gerlagh et al., 2002).[18]

2.8 Aggregation of information

A general shortcoming of GDP as an indicator of social welfare has to do with its aggregated character. Aggregation of information always leads to information loss. The advantage could, of course, be improved overview. Searching for an unambiguous indicator will, however, always be problematic because weights for different components are not always evident. Moreover, it is very ambitious to require any resulting indicator to be usable in all time periods, countries and development phases. Given the discussions in Sections 2.4 and 2.5, a basis for it would have to be looked for in the information and insights generated by studies on subjective well-being, since individuals are to be regarded as the best judges of their own happiness. This would also do justice to the statistical variation in relationships between individual income and happiness. Nevertheless, even though one can believe in empirical (subjective) measures of ordinal or even cardinal well-being, the aggregation of these over individuals to arrive at social welfare seems overly ambitious.

2.9 Synthesis

The above list of arguments is surely non-exhaustive.[19,20] Nevertheless, it makes flagrantly clear that defending GDP as a social welfare indicator is futile.[21] An effort to summarize all the arguments provides a quite general picture of GDP per capita growth: namely, as consisting of five main elements. (1) real individual and social welfare growth when unsatisfied basic needs are being fulfilled; (2) a transfer of activities from the informal to the formal (market) circuit, with an often neutral or possibly negative effect

[17] Non-renewable resource depletion presents a special problem. It is widely agreed upon that the method proposed by El Serafy (1989) should be followed here. This transforms the finite income stream from a non-renewable resource stock into a (lower) infinite stream of income from other types of capital (manufactured and human capital). The method computes the difference between these two income streams and deducts the resulting cost. The latter is referred to as the 'user cost' of non-renewable resource extraction. This approach thus assumes that (and works only if) one can sustain an infinite stream of income by substituting the non-renewable resource by other types of capital. Hartwick (1977) provides the theoretical basis for this line of thought.

[18] For that matter, the growth of GDP is chiefly generated by the ±30 percent economic activities that cause the major part of total environmental pressure (Hueting, 1996).

[19] For example, Dasgupta (2001) suggests that expenditures on defence, a significant part of GDP, in many countries contributes to GDP overestimating social welfare. He notes: "But in poor countries the machinery for warfare is all too frequently used by governments against their own people ... This means we can ignore defence expenditure ..." (p.53). Laband and Sophocleus (1988) and Dougan (1991) further draw attention to the enormous rent-seeking costs of modern economies which boost GDP (e.g. through the activities of lawyers). Clark et al. (1988) use hedonic price techniques (based on income compensation) to assess the impact of urbanization on social welfare. Their findings suggest a GNP-as-welfare deflator in the order of 6 to 7 percent, which steadily increases at a rate of half a percent per decade.

[20] Neither have I tried to be complete in terms of studies into the correction of GDP. It is unlikely that improvements which would neutralize the above critique will come available as part of the international standard of GDP construction at short notice.

[21] Even *The Economist* (11 February 2006, p.70) characterises GDP as "badly flawed as a guide to a nation's economic well-being".

on social welfare; (3) adaptation to a higher income; (4) a change in the income distribution, implying a rise in relative welfare for some and a fall for others, and rivalry with regard to individual income growth and consumer expenditures, with largely negative consequences for social welfare; and (5) damage done to the environment and nature, with negative impacts on social welfare. Adaptation and rivalry may together mean that a major part of increases in income (70-80 percent) is not translated into improvements in happiness or well-being (van Praag and Ferrer-i-Carbonell, 2004).

A difficult but important question is: To what extent do elements 2-5 cancel out welfare gains arising from element 1. Corrections of GDP try to answer this question in a sort of empirical manner. A general theoretical outcome is unlikely here. Nevertheless, limits to welfare gains in terms of element 1, largely neutral effects in terms of elements 2-3, neutral to negative effects in terms of element 4, and negative effects in terms of element 5, all together suggests the existence of a maximum level to social welfare. That is, beyond a certain per capita income level, persistent GDP growth will be completely disconnected from trends in welfare. In other words, social welfare will stabilize beyond a certain income threshold.

3. How serious is the influence of GDP information on the economy?

3.1 Mechanisms of influence

Despite the fundamental and many critiques, GDP is still being considered as an important source of information to measure economic progress. A not unusual response to the critiques is that one should not worry too much about the shortcomings of GDP as it does not actually have so much influence on the real economy. Many signs, however, point to the opposite. In the first place, one can wonder why then do governments invest structurally in calculating and predicting GDP.

Furthermore, one can identify concrete influences of GDP information on economically-relevant decisions. Banks and financial markets have made the prediction of GDP a core indicator of their dealings. Central banks adjust their interest policy when expectations about growth are beyond or below certain thresholds or do not become true. Private companies regard GDP growth as an important element of the general investment climate. And the trust of consumers, which determines their purchasing behaviour, is easily influenced by expectations of GDP growth.

The conclusion is clearly that the influence of GDP information should not be underestimated. It runs through multiple channels – government, politics, private businesses, financial markets and consumers. This influence is reinforced as all kinds of public and private research institutes and advisory councils give much attention to GDP information. The consequence is a large effect of GDP information on consumption, savings and investment decisions, with evident repercussions for economic structure and the social environment.

3.2 A self-fulfilling prophecy

GDP growth and economic stability are characterized by a 'self-fulfilling prophecy' mechanism. If everyone believes that GDP has a large influence on economic reality and this belief induces pessimistic and optimistic responses by individuals, firms, and governments to low and high GDP growth (predictions), respectively, then the belief is translated into reality. GDP information in this way creates a pro-cyclic effect. National governments, advisory boards, central banks, and international organizations such as the IMF and the OECD reinforce this phenomenon. The newspaper reader is indoctrinated by the media – and the economics student also by his education – with the idea that GDP growth is relevant. GDP can thus be seen as an abstraction invented by humans without direct physical meaning. The GDP concept is active in the domain of perceptions, theories and beliefs. Only in this way does it influence the real economy.

The 'self-fulfilling prophecy' character of GDP growth resembles the way in which behaviour in financial markets is steered by perceptions. The majority of small investors are responsive mainly to general information about the market and the economy (including GDP) that is publicly available, rather than to private information about specific investment opportunities obtained through their own in-depth research. This herd behaviour causes expectations to become true. Likewise, general information about GDP can lead to large market responses. This is in effect because individuals imitate one another and act on the basis of the same, and unfortunately misleading, information that GDP represents.

Politicians are worried about low GDP growth because they fear negative voter responses.[22] To some extent this is motivated by the belief that insufficient growth will lead to a recession (instability) with much unemployment (see the discussion on 'self-fulfilling prophecy' below). In addition, GDP growth allows for rising tax revenue – as a result of which public expenditures can increase – a nice prospect for politicians in power. But 'no growth' should not be confused with 'no GDP'. There is no reason to fear that without GDP the economy would end up in a recession; indeed, no single study supports this worry. In fact, the chance of recessions is very likely much smaller because the 'self-fulfilling prophecy' of negative GDP growth expectations disappears once GDP is abolished.

4. Does GDP convey any useful information?

Are there advantages of using the GDP indicator that compensate for its discussed shortcomings? Here I review a number of common defences. A possible advantage might be that GDP growth creates trust and economic stability. But the previous discussion has shown that the reverse side of economic stability on the basis of GDP growth expectations is that instability results from negative expectations. Moreover, expectations become reality through the perceptions and information about GDP. Without them, expectations would not be influenced this way so that the specific cause of instability would no longer exist (this does, of course, not remove all causes of economic instability).

That GDP only has an effect on the real economy through the domain of perceptions is consistent with the fact that it is an aggregated, macro-level indicator, while the real economy is the outcome of micro-level processes scaled up. This does not, of course, mean that one cannot design abstract macro-level models in which the GDP indicator occupies a central role, through mechanisms that generate aggregate consumption, savings, investments, trade volumes, and tax revenues. The current critique is not inconsistent with letting GDP play this role of model variable (even though it is contrary to the micro-foundations project). Nevertheless, it is an entirely different issue to assign to GDP the role of a central macro-indicator with an implicit or explicit welfare interpretation.

A regular defence in oral discussions with colleagues is that GDP per capita conveys information about productivity. But this is not correct. It is often thought that average labour productivity of a country is identical to GDP per capita. But a correct productivity measurement needs to be related to the number of hours worked, which varies between countries, as well as over time. GDP per hour is a more useful indicator of productivity than GDP per capita. It might be interpreted as an indication of freedom, power, or even potential welfare (somewhat comparable with Sen's capabilities). Nevertheless, increase of labour productivity cannot be an ultimate goal that supersedes all other goals. Another problem with national productivity indicators is that they hide the diversity of productivity levels among sectors. It is much more useful to know which sectors perform relatively well and poorly, both in a national and international context. Aggregating across very different sectors does not serve any (welfare) purpose.

An often-mentioned advantage of GDP is that it can serve as a basis to roughly estimate tax revenues. This can in turn be useful to predict taxes in the future, to evaluate creditworthiness in the case of providing loans to countries (as done by the IMF and the World Bank), or to determine fair financial contributions of member states to a federation of states (e.g. USA, EU). In this case, GDP functions not as a performance indicator but more modestly as a model variable.[23] Of course, estimates based on disaggregated information (e.g. value added per sector) will be required in order to arrive at a sufficiently accurate estimate of tax revenues. In other words, for such tax calculation purposes, there is no need to aggregate national accounts into a GDP.

In addition, one can point to the importance of economic growth for developing countries. Indeed, one would expect welfare growth here to show a higher correlation with GDP growth than in rich countries (especially because of the arguments in Section 2.3).[24] In fact, however, this correlation turns out to be

[22] A common defence against the critique of GDP is that it is just one of various goals of macroeconomic policy (besides stable prices, low unemployment, an acceptable income distribution, etc.). However, adding indicators cannot undo or compensate the imperfect nature of the GDP indicator. The same objection holds, for example, for the Human Development Index (HDI), which incorporates GDP as a component, as well as life expectation and education (Dasgupta, 2001). See further Section 5 below on this aspect.

[23] A corrected GDP – to accommodate the critiques documented here – would lack the pure financial (cash flow) interpretation ('taxable income'), which would be disadvantageous from the perspective of this tax revenue prediction goal (unless taxable income were redefined in line with the corrections undertaken).

[24] Even so, I have been unable to find a thorough study that supports this doubtlessly widely held belief.

unstable, meaning that the advantages of growth are not automatically and consistently realized (possibly explained by the arguments presented in Section 2.6).[25] The ultimate goal is, of course, welfare improvement through economic development, not GDP growth itself. There is therefore a need for concrete welfare indicators, notably for poor countries where development aimed at welfare growth is a complex issue.

Finally, one can regard the international standard for national accounts and GDP as a guarantee for uniformity of data on GDP. This contributes to a clear economic comparison of countries. This is, however, a necessary but insufficient condition for useful international comparisons. Indeed, one can search for a lost key in the light of a lantern (= guided by GDP), but when the key lies elsewhere a more effective strategy is to grope in the dark (not guided by GDP) (Meadows et al., 1981). A disadvantage of the international GDP standard is, moreover, that it will not be easy to implement improvements in the GDP calculation method to neutralize the critiques documented here (assuming that such improvements are in principle feasible). Many proposed improvements have met a lot of resistance from various organisations and countries, often for strategic reasons (presently in the EU because all kinds of redistribution decisions are linked to GDP).

The foregoing suggests a number of non-welfare information features of GDP. Of course, GDP can reflect certain aspects of reality in which one may be interested. Examples are the size of the formal versus the informal economy, prognoses of tax revenues, and increases in productivity. None of these, however, even comes close to completely capturing social welfare. Moreover, in many cases better indicators or more disaggregate income type of indicators are available at sector levels. It is thus important to realize that GDP can still serve a useful role in providing information to construct non-welfarist economic indicators, but that for this purpose it does not need to play any central or public role.

5. Alternatives to GDP

It is wise to remove an indicator that is seriously misleading, irrespective of whether an acceptable alternative is available. Hence, the removal of GDP information would be an enormous improvement because a structural information failure is being eliminated that is without precedent. In other words, abolishing GDP should be unconditional. Moreover, one of the conclusions of Section 2.9: namely, that social welfare will stabilize beyond a certain income threshold, suggests that beyond this threshold there is no need to measure social welfare, as the latter will have reached its maximum value. But it is true that until this threshold is reached, welfare improvement in principle is still feasible, so that one may wish to measure it. For this purpose, the main alternatives for GDP as an indicator of social welfare are briefly reviewed in this section.

There are three types of alternative indicators available now. A first type is based on rather pragmatic, accounting adjustments to GDP, such as the Index of Sustainable Economic Welfare (ISEW: Daly and Cobb, 1989), derived indicators like the Genuine Progress Indicator (GPI)[26], and the Sustainable Net Benefit Index (SNBI) (Lawn and Sanders, 1999). These indicators represent a correction of the regular GDP by repairing important deficiencies through adding or subtracting certain partially-calculated money amounts to/from GDP.[27] The ISEW is aimed at measuring the (consumption related) services that directly influence human welfare. This is accomplished by adding to GDP services that it omits, while deleting GDP categories that do not directly render services to consumers. The ISEW can thus be considered as a measure of the benefits of economic activity (see Section 2.1). In addition, the ISEW includes corrections to neutralize income inequality and the unsustainability of production and consumption. In particular, the

[25] Kenny (2005: p.10) concludes on the basis of empirical data: "There has been convergence across a wide range of indicators of the quality of life. Given that there has not been convergence in the standard income indicator, this may suggest that income is only one among a number of factors in determining quality of life outcomes. In turn, this suggests some hope that improvements can be sustained even in the absence of sustained income growth."

[26] See http://www.rprogress.org.

[27] A predecessor of this approach is Nordhaus and Tobin (1972). A theoretical basis was created by Hartwick (1977, 1990) and Asheim (1994). For an overview, see Aronsson et al. (1997) and Asheim (2000). The theoretical literature shows that there are many fundamental problems with calculating a welfare measure based on GDP. Not only does it require valuation of non-market goods and services, but also it runs into fundamental problems regarding technological progress and changing prices due to open economies (international trade and relocation of activities). Another fundamental issue, neglected in most of this literature, is that status goods and rivalry in consumption cannot be addressed. This in itself would suggest a welfare-maximizing level of income rather than unlimited welfare growth. The calculation of income-based social welfare indicators is further hampered by the difficulty of translating certain basic needs into individual willingness-to-pay or accounting prices.

ISEW approach adapts GDP for non-market goods and services (housework), defensive costs of social and environmental protection and repair (health expenditure, costs of road accidents, costs of urbanization), reduction of future welfare caused by present production and consumption (loss of natural areas, loss of soil, depletion of non-renewable resources, air and water pollution, greenhouse effect), the costs of efforts to obtain the present welfare level (commuting, advertising, duration and intensity of work), and the distribution of income and labour (inequality among workers, between employed and unemployed, between males and females). The GPI deviates slightly from the ISEW in terms of the specific categories of corrections included. Important additional categories that the GPI corrects for are voluntary work, criminality, divorce, (loss of) leisure time, unemployment and damage to the ozone layer.

The ISEW has been calculated – using slightly distinct methods – for a range of regions and countries, including Australia, Austria, Chile, Denmark, Germany, Italy, the Netherlands, Scotland, Sweden, and the UK (an overview of studies is given in Lawn, 2003). The various applications show that, whereas GDP follows a rising trend, the ISEW shows a constant or even decreasing pattern after a certain time. The temporal breakpoint varies with the country, but lies somewhere in-between the late 1960s and the 1980s. Important reasons for this de-linking of GDP and ISEW have been a substitution of informal household production by services provided by the market (e.g. child care), increased inequity, natural resource depletion, and the emergence of global environmental problems (global warming, acid rain, biodiversity loss). For example, the GPI for the USA increased during the 1950s and 1960s, but has declined by about 45 percent since 1970. Moreover, the rate of decline in per capita GPI has increased from an average of 1 percent in the 1970s to 6 percent in the l990s. Both ISEW and the GPI suggest that the costs of economic growth now outweigh the benefits, leading to "growth that is uneconomic" (paraphrasing Herman Daly).

Neumayer (2000) questions the general findings of the ISEW and GPI studies. Using sensitivity analysis he suggests that the widening gap between ISEW (GPI) and GDP – supporting the 'threshold hypothesis' (Section 2.9) – might be an artefact of debatable methodological assumptions with regard to the valuation of non-renewable resource depletion (resource rent or replacement cost) and cumulative long-term environmental damage. In addition, Neumayer notes that the way inequality (changes) is addressed is ad hoc and should be replaced by making a preference for income equality – or aversion to inequality – explicit. For example, Jackson et al. (1997) use an Atkinson index (Atkinson, 1970). Lawn (2003) emphasizes that ISEW and GPI require more robust monetary valuation in order to arrive at acceptable indicators of social welfare.[28]

A second type of indicator also starts from GDP but focuses entirely on environmental externalities and natural resource depletion. Corrections here give rise to 'sustainable' or 'green(ed)' GDP type of indicators. 'Sustainable income' denotes a level of income that can be sustained, i.e. that is based on a reproducible economic and environmental base. The concepts or indicators of green and sustainable GDP are rooted in welfare economics. Important externalities are noise, air and water pollution, soil erosion, resource exhaustion, desiccation, fragmentation, biodiversity loss, radioactivity, and various health-affecting toxins. Recalculation of a GDP with externalities 'internalized' is not a simple matter, as it implies a completely different set of prices in the economy. It is not surprising, then, that there have been few empirical exercises aimed at calculating a green or sustainable income.

The best known of these is Hueting's Sustainable National Income (SNI), which has been developed for the Netherlands (Gerlagh et al., 2002). It is based on the conceptual work by Hueting (1974) and can be seen to reflect the basic notion of 'sustainable income', as expressed by Hicks (1948). The SNI approach uses a general equilibrium model that calculates the impact on national income of imposing sustainability constraints for the nine most important environmental themes (for the Netherlands): climate change; depletion of the ozone layer; acidification; eutrophication; fine air-borne particles (PM10); volatile organic compounds; dispersion of heavy metals and PAKs/PCBs to water bodies; dessication; and soil contamination.[29] In particular, data on abatement costs associated with these environmental themes are integrated within an existing and somewhat adapted general equilibrium model. This approach not only

[28] Atkinson (1995) and Neumayer (2000) also express criticism.

[29] Gerlagh et al. (2002) note that the number of environmental themes might be extended. For the Netherlands, land use and waste disposal seems of high relevance as well. They further observe that the list of chosen environmental themes is biased to 'sink' (rather than 'source') functions of the environment. If the calculations were repeated for other countries, one might want to consider including source functions related to forests, mineral deposits, topsoil, fish stocks and water resources.

implies a strong sustainability framework (preservation of all types of natural capital), as it allows for neither trade-offs between environmental themes nor substitution of natural by economic capital. But also the approach comes down to regarding the value of environmental degradation as being equal to the conservation costs. El Serafy (2001) has criticized this, arguing instead in favour of a 'user cost method', which would lead to a higher sustainable income value, where the difference would depend on the speed of natural resource depletion. The (static) general equilibrium approach is required as some of the sustainability constraints on the nine environmental themes are so tight that technical measures alone cannot realize them, so that economic restructuring is inevitable. The policy interpretation of this SNI approach is that an economy is subjected to a strong sustainability policy with a tremendous impact on national income: the calculations for the Netherlands show that the SNI is roughly half the size of GDP (Gerlagh et al., 2002). In itself, this is not very informative. Differential time patterns for SNI and GDP would be of more interest. Hofkes et al. (2004) have therefore analysed the development of SNI for the Netherlands over the period 1990–2000, for 1990–1995 and 1995–2000. They find that not only did SNI increase substantially in this period, but moreover SNI growth rates exceed GDP growth rates for both sub-periods. Over the whole period 1990–2000, the enhanced greenhouse effect appears to be the binding environmental constraint that determined most of the developments for the SNI. Nevertheless, the gap between NNI and SNI remains considerable.

Comparing SNI with ISEW (and GPI), it becomes clear that the first has the advantage of taking into account general equilibrium effects of corrections, but the disadvantage of restricting itself to environmental and natural resource issues. ISEW and GPI correct for a much wider array of GDP imperfections, even though in a partial manner that is likely to involve mutually inconsistent corrections. Furthermore, the SNI results are sensitive to the exact specification of the sustainability condition for each environmental theme, since the marginal abatement costs are sharply rising for low values of pollution or resource use. It is, however, fair to say that the arbitrariness of sustainability conditions also affects the ISEW value, but in a less extreme way.

A third type of indicator relates to distinguishing between measures of current well-being and measures of well-being over time. The latter, however, turn out to be largely theoretical in nature (see also Section 2.2). Dominant approaches here are net present value type or discounted utilitarian intertemporal or multi-generational welfare functions (e.g. Weitzman, 1976), and Rawlsian or fairness-biased maxmin functions (Rawls, 1972; Arrow, 1973; Solow, 1974). A pragmatic indicator that focuses on intertemporal issues is genuine savings (or genuine investment). It means maintaining or increasing wealth, opulence or total capital – the sum of economic, human and natural capital – by sufficiently saving in a broad sense (Hamilton and Clemens, 1999; Dasgupta and Mäler, 2000). Recently, genuine savings (GS) has been adopted as a central indicator by the World Bank, under the name of 'adjusted net savings'. GS can be defined as traditional net savings subject to a number of corrections (Bolt et al., 2002): (i) the value of depletion of natural resources is deducted; (ii) the costs associated with pollution damage, including economic and health effects, are deducted; (iii) expenditures on education are treated not as consumption but as savings/investments in human capital and thus added; (iv) net foreign borrowing is deducted, while net official transfers are added; (v) capital depreciation (capital consumption) is deducted. The result represents a weak sustainability indicator, in that it allows for substitution of nature and natural resources by produced and human capital (Hartwick, 1977). Categories (i) and (ii) are the most difficult to estimate. Nevertheless, the World Bank has produced estimates for most countries in the world. The outcome is that, as a general rule, GS are less than half the gross savings. Moreover, genuine savings are negative for the Middle East and North Africa, and Sub-Saharan Africa regions, positive for OECD countries, and the highest for the East Asia/Pacific region (World Bank, 2006).

A main disadvantage of the GS indicator is that losses of natural capital are not regarded as worrisome as long as they are compensated by economic and human capital (weak sustainability). However, a positive value of GS does not always imply environmental sustainability. The advantage of the GS approach is that it evaluates rapid growth that goes hand-in-hand with consuming, rather than with investing the revenues of unsustainable resource exploitation as negative (i.e. a negative value of GS). But a disadvantage of the approach is that it adopts a partial perspective with respect to time, as it neglects historical contexts. For instance, a country that has depleted all its natural resources can hardly score negative on genuine savings afterwards. At a more fundamental level, one can criticize the approach for assuming that changes in wealth or investment are a good proxy for changes in well-being and social welfare. However, there is no high and stable correlation between wealth and well-being or happiness, apart

from the relative income effect discussed earlier in Section 2.5.[30] Against the background of the various criticisms of GDP in Section 2, however, the main shortcoming of the GS approach is that it mainly addresses the problem of capital depreciation (Section 2.7), and may partially cover valuation of informal activities (Section 2.6). Pillarisetti (2005) illustrates that GS is both conceptually and empirically an imperfect indicator for policy, regardless of whether it focuses on environmental sustainability or human well-being. Dasgupta (2001: Section 9.4) shows that neither can net national product (NNP) as the sum of consumption and GS serve as an indicator of welfare.

A fourth and final type of indicator of social welfare is a composite index that combines indicators that are considered to capture relevant aspects of human well-being. Unlike the previous types of indicators, this does not generate a monetary value. The best-known example of this type is the Human Development index (HDI) of the United Nations, which aggregates a number of indicators: GDP per capita (in PPP), life expectancy at birth, adult literacy rate, and combined primary, secondary, and tertiary gross enrolment ratios. The incorporation of GDP reflects, through a log-transformation and a maximum income limit, a decreasing marginal utility of income. This already means an improvement over GDP. Nevertheless, the HDI approach carries an element of arbitrariness, in the sense of selecting arbitrary components, as well as an arbitrary aggregation procedure. The latter generates normalized values for each component based on defined upper and lower bounds, and then calculates an arithmetic mean; this results in an index with a value between 0 and 1. Publications on the HDI argue that potential extensions of HDI with additional components are hampered by measurability problems. But income inequality is in any case measurable and clearly an important criterion for evaluating the position of, and changes in, developing countries. Moreover, it would in principle be feasible to develop quite objective indexes of political freedom[31], time use (work, leisure, commuting), and available public health services. Not surprisingly then, various proposals have been done to extend or adjust the HDI, so as to address some of the omissions (e.g. Hicks, 1997; Noorbakhsh, 1998). In addition, other approaches to aggregate the components of the HDI are available, such as the Human Poverty Index (similar components as the HDI but differently weighted) and the Borda ranking. Dasgupta (2001: chapter 5) uses the latter procedure to extend, for illustrative purposes, the HDI with per capita private consumption and indexes of political and civil rights. In spite of its aforementioned deficiencies, the HDI is considered to be an improvement over GDP, especially for evaluating changes in developing countries. A main disadvantage of the HDI in comparison with the other indicators is a complete neglect of (environmental) sustainability. Dasgupta (2001, Section 5.8) notes that the HDI can be seen as "one-third intertemporal" because of the inclusion of adult literacy; but he adds the shortcoming that, although this reflects a capital asset, the HDI does not cover all relevant types of capital and is therefore inadequate to provide information useful for addressing intertemporal concerns. Neumayer (2001) proposes to combine the HDI and GS indicators to arrive at a more complete picture of sustainable development, notably of poor countries. He does, however, not arrive at a really integrated (composite) indicator.[32]

Comparing the aforementioned alternative indicators of social welfare in light of the main points of criticism of GDP as noted in Section 2, it turns out that, at present, there is no perfect alternative available.[33] All available approaches are far from perfect and do not succeed in systematically repairing the list of shortcomings of GDP as a social welfare indicator noted in Section 2. In particular, the dynamic aspects, lexicographic preferences (basic needs), subjective well-being basis, and relative welfare and rivalry are neglected. Nevertheless, one can expect all of these alternatives to serve as a much better approximation of social welfare than GDP. ISEW (and GPI) are perhaps the most complete in that they try to repair multiple

[30] The World Bank has recently published *Where is the Wealth of Nations* (2006), which suggests that it regards wealth as important, but mainly as a basis for future welfare. In other words, wealth then serves as an indicator of potential future welfare.

[31] In fact, the UN published a Human Freedom Index (HFI) in 1991 and a Political Freedom Index (PFI) in 1992 (Johansson, 2004).

[32] Sen (2000: p.318, note 41) states: "Indeed, getting public attention has clearly been a part of UNDP's objective, particularly in its attempt to combat the overconcentration on the simple measure of GNP per head, which often serves as the only indicator of which the public takes any notice. To compete with the GNP, there is a need for another – broader – measure with the same level of crudeness as the GNP. This need is partly met by the use of the HDI ...". He adds that the HDI has attracted much more attention than often more informative, less aggregated information on diversity at the micro level.

[33] Other alternatives are mentioned in the literature, but these have not proceeded beyond the stage of conceptualization. Bleys (2006) offers an overview.

shortcomings as opposed to SNI and GS. A disadvantage of ISEW, however, is that is based on partial corrections. Finally, all alternatives except HDI address environmental (capital) sustainability in one way or another, while ISEW and SNI adopt a strong and GS a weak sustainability perpective. HDI is the least attractive from a methodological viewpoint, and certainly unsuitable to subtly evaluate richer countries.

In conclusion, an ideal indicator of social welfare is not available. This would require an approach that takes its starting point in the findings of research on happiness and subjective well-being. ISEW can be regarded as the most balanced alternative available right now, which is a clear improvement over GDP. Still, if GDP is replaced by ISEW or another measure then there is a risk that growth fetishism – i.e. striving for growth under all circumstances – will be directed at this alternative. Evidently, this would be undesirable if such a measure would still be far from perfect.

6. Policy implications

Removing an information failure

We have seen that GDP not only provides misleading information about social welfare but also exerts a large influence on economic reality, and therefore on the daily life and well-being of all of us. One can frame this phenomenon as a serious form of information failure, which is an instance of the general case of market failures, or given the fact that the government generates GDP information, as an instance of government failure. GDP information influences all agents in the economy: consumers, savers, investors, banks, stock and option markets, private companies, the government, central banks and international organizations.[34] Because of the misleading nature of GDP information economic agents take wrong decisions from the perspective of social welfare. Given the many shortcomings of GDP as a measure of social welfare and the economy-wide effects, one has to expect a large loss of social welfare, certainly in the long run – when repeatedly and cumulatively false information steers economic decisions. Currently, economists are insufficiently aware of this potentially huge cumulative negative impact of GDP over time. In fact, I am inclined to think that there is no larger information failure in the world than that caused by the GDP indicator.

Economists and their schooling play a central role in maintaining the idea that GDP information matters, in a positive sense. Economic studies should pay due attention to the shortcomings of GDP information, and the entire curriculum (notably macroeconomics) should be screened for the use of GDP information. This will inevitably imply a thorough revision of many textbooks.[35] Economists should also inform and convince politicians, banks and financial markets that they should no longer let their decisions be influenced by GDP information. Research and publications by economists should be filtered for use of GDP information. By including GDP indicators in economic studies the myth that GDP matters is kept alive.

The 'self-fulfilling prophecy' character of the influence of GDP information on the economy means that this phenomenon can, in principle, be avoided. Hence, the government can consciously choose to no longer supply aggregate GDP information, without threatening concrete economic mechanisms. Of course, this view does not mean the refutation of useful economic growth, that is, welfare growth, quite the opposite. But GDP growth not offer any guarantees for this. Moreover, unlimited welfare growth is very unlikely, if only because of the phenomenon of relative welfare and rivalry in income and consumption.

A better world without GDP

Without the availability of a GDP indicator decisions will be more aimed at welfare improvement, since the systematic error resulting from economic behavioural responses to misleading GDP information will be gone. Such a systematic error means that the economy follows a trend away from a situation or path that is desirable from a social welfare perspective. The removal of GDP information will more likely lead to white

[34] What I sketch here is not a 'straw man', as one critical reader suggested to me. And if one is unwilling to accept that GDP has so much influence on our economic reality, in spite of the arguments offered in Section 3, then one can hardly object to the removal of the GDP indicator from the public domain.

[35] To take just one example: the textbook by Weil (2005), which is entirely devoted to the theme of economic (GDP) growth, does not contain a single reference to the many criticiques of GDP as an indicator of (welfare) progress. Only on the very last pages (pp.508-510) a box is presented in which the question is addressed: "Will growth make us happy". The answer given is twofold: "Income is not the only determinant of happiness, but clearly happiness rises with income ..." and "Thus, although growth will not make us as happy as we expect it to, it will still make us happier than we would be if there were no growth". Unfortunately, neither statement is convincingly supported with data or arguments.

noise type of errors (random drift), rather than systematic, cumulative and trend-like errors. Panic responses and recessions due to the threat of stagnating GDP growth are no longer possible. In addition, certain aspects of public policy will have to be adapted. Monetary policy, for example, can focus on more useful things than GDP growth. One will less dogmatically deal with stimulating developing countries to enter a transition to a formal economy (for that matter, the World Bank and UNDP has already moved a long way in this direction but do not seem to dare taking the step to discard GDP entirely). There will also be less resistance against policies – notably environmental policies – which improve welfare (partly of future generations) at the cost of GDP growth. This is especially relevant to the case of climate policy. All current economic studies focus entirely on the development of GDP under alternative climate (policy) scenarios, and therefore on the trade-off between GDP growth and climate change related risks (Kelly and Kolstad, 1999). But this trade-off is misplaced as GDP is not a good welfare measure. Moreover, this trade-off concerns a period of 50 to 100 years in the future, during which GDP of the rich countries will certainly have grown far beyond any welfare-maximizing level.[36] See further Frank (1985), Ireland (2001) and Layard (2005) for a number of examples of alterations in economic policy that are in line with replacing the GDP indicator by information obtained from the subjective-empirical welfare literature: e.g. extra taxation of working overtime, extra taxes on status goods, limiting commercial advertising; and restricting flexible labour contracts. Although from an economic growth perspective these look like bad measures, they will be more positively evaluated from a real happiness perspective.

Abolishing GDP should not be confused with 'anti-growth', 'anti-innovation' or 'anti-accounting'

Many people responding to an early draft of this paper have concluded that I must be against GDP growth. But they seem to confuse 'no GDP indicator' with 'no GDP growth'. It is important to realize that, without a GDP indicator, GDP growth cannot be measured at all. This merely reflects the irrelevance of GDP growth rather than anti-growth. Given that GDP is not a good welfare indicator, one should not be in favour of 'always GDP growth' (which is not the same as being against growth). To strive under all circumstances for GDP growth ('growth fetishism') puts an unnecessary constraint on the space within which we search for welfare growth. In fact, it means that GDP growth cannot be traded-off against something else (better). History, moreover, shows that, with a GDP indicator, structurally striving for (GDP) growth is not just a risk but inevitable. Evidently, the temptation is too large.[37]

My plea to abolish GDP as a macro-indicator should nor be confused with a plea to restrict individual income growth. I am very well aware of the fact that income growth can mean satisfaction of more (basic) needs or more happiness due to an improved relative income position (Sections 2.3 and 2.5). From an individual perspective it can therefore make sense to strive towards income growth. Moreover, even if individuals do not get happier from individual income growth (e.g. through adaptation, or a constant or decreasing relative income position), then still status-seeking, imitation and habits make them strive for more. However, as argued in Section 2, from a social perspective continued income growth ultimately results in what is at best a zero sum game and – due to social and environmental problems – at worst a negative sum game. For this reason, amongst other things, a society and its government should not uncritically and unconditionally foster economic growth.

In addition, it is good to realize that abolishing GDP does not imply any position against innovation. It is true, however, that it will result in attaching more value to innovations that as a net effect improve or at least do not harm social welfare than to innovations that promote or are strongly correlated with GDP growth pur sang. Innovations with a postitive welfare effect and negative growth effect are perhaps the most interesting to consider. Possibly, examples can be found in the areas of renewable energy, energy-efficient houses, car-sharing systems, and energy-efficient technologies. It is of course difficult *ex ante* to provide evidence for the positive net welfare effect of certain innovations. What is important is that this does not need to be planned or regulated. Instead, removal of GDP growth incentives is likely to shift net innovations

[36] Azar and Schneider (2002) show that the costs of reaching what the IPCC considers "safe" concentrations of CO_2 in the atmosphere, for the world as a whole, fall in the range US$1 tot US$20 trillion. Although these are impressive figures, they imply less than 3 years delay of reaching a certain income level 100 years from now (given 2 percent GDP growth). Interpreted this way, the costs of a stringent climate policy are marginal in economic terms in the long run.

[37] But neither is there a good reason to be generally against GDP growth. Growth surely does correlate positively with welfare growth in many situations. In fact, growth critics should seriously consider shifting to oppose GDP as an indicator of progress instead of to oppose GDP growth in general (i.e. under all circumstances, in all countries, at all times).

in the direction of welfare improvement. Moreover, less 'growth-fetishism' should go together with increasing attention and incentives for welfare-enhancing innovations.

Finally, in response to my critique on GDP as a welfare indicator, various commentators have noted that the system of national accounting serves a useful role. It should therefore be stressed that my critique of GDP – as a welfare indicator and how it is used in public debates and policy preparation – should not be misinterpreted as a critique of the system of national accounts. Perhaps the most important distinction that can clarify this is the level of aggregation. Whereas GDP is the most aggregated description of the economy, the national accounting system provides a detailed, disaggregated picture of the flows of goods and services along with complementary monetary flows. As a result, the national accounts can support economic modelling, analysing productivity growth of sectors, and financial planning by the government. Interestingly, accounts are being transformed and extended to eliminate various shortcomings related to informal markets, natural resources and environmental damage. On the other hand, the method of GDP calculation has remained largely the same.

Different implications for developing, middle income, and rich countries

Does GDP per capita serve a more useful function in evaluating processes and policies in developing countries – defined by the World Bank as having an average GDP per capita of less than US$6000 – than in developed countries? It is often believed that it is especially poor countries which require GDP growth in order to improve the well-being of their citizens. In Section 2.6 it was suggested, however, that in many cases income growth here just represents a shifting of activities from the informal to the formal sector. Particularly in very poor countries this may be accompanied by a loss of local community and subsistence agriculture, as well as migration to urban slums, with predictable negative consequences for food availability, health and quality of life. Moreover, income inequality may increase during the process (the initial part of the famous Kuznets curve). Such very poor countries dominate among those that the World Bank classifies as 'low income countries' and the UN as 'low human development countries' (according to the HDI). Once countries have moved onto a track leading to a formal market economy, there does not seem to be a way back. Middle income countries may then often see a positive correlation between income growth and welfare growth. However, negative impacts on welfare and health may result there from severe environmental pollution and resource degradation. This is illustrated by the current development of China. Finally, moving on to the high income countries, the results reported in Section 2.4 support the idea that GDP growth there does not contribute much to welfare growth (the 'threshold hypothesis': Section 2.9). Indeed, welfare seems to have stagnated for the richest countries in the world, despite continuing GDP per capita growth. This is not surprising given that in these countries all basic needs are more than satisfied, so that the consumers in these countries are mainly involved in a zero-sum rivalry game of income and status consumption (Section 2.5). Combining all development stages, a non-monotonic relationship appears between well-being and GDP per capita, where for low incomes GDP growth is accompanied by decreasing welfare, for middle incomes with increasing welfare, and for high incomes with – at best – stabilized welfare.

7. Conclusions

Economists are in strong support of the idea that public policy should be based on rational arguments. They should therefore no longer delude themselves and others by allowing simplistic indicators like GDP to exert any serious influence on economic reality, and public policy in particular. In this article I have tried to make clear that the elimination of GDP from the set of macroeconomic indicators is rational. Economists can improve the world by pleading in favour of this, and thus clear the way for economic policies aimed at improvements in human happiness instead of assuming that GDP growth is necessary and sufficient for this.

Economists who support the GDP indicator or do not want to abolish it need to realize that they in fact make the assumption that there exists a structurally positive (and high) correlation between GDP and social welfare. This is an (unrealistic) assumption because there is no study which presents convincing evidence of such robust correlation. In fact, on the basis of theoretical and empirical arguments I have shown that GDP growth is compatible with decreasing or constant social welfare, that is, a negative or zero correlation. Moreover, given the satisfaction of (basic) needs, adaptation (preference drift) and a zero-sum game type of rivalry in consumption beyond a certain income (reference drift), one can only hope for a correlation that is on average, if positive, very low. All things considered, a rigid GDP growth objective will often act as a constraint on realizing social welfare growth.

The most common, almost instinctive response of macroeconomists to advice to remove GDP from the set of macroeconomic indicators has been to point to the uniform, consistent character of the GDP calculation worldwide, which allows the 'economic performance' of countries to be compared (of course, all measurements can then easily be consistently wrong). This pragmatic view raises the important question: How many substantial points of criticism are required to counter balance a pragmatic 'consistency of measurement' argument? Suppose that GDP was not measured at all but that the welfare-economic criticism on a hypothetical GDP indicator was known (published). Who would then be willing to support an initiative to implement such an indicator, knowing that it was going to play the role of a central welfare or progress indicator? A supporter would have to be heroic, as he would very likely be accused of exemplifying bad economics.

Another not uncommon response is that happiness and well-being are beyond economics. This opinion is often motivated with the suggestion that aiming at maximum happiness through public policy is overly ambitious. At the same time, economists do not worry about giving a central place to utility and welfare (maximization) in positive and normative theories of economic agents. However, utility and welfare are nothing more than the economist's jargon for happiness.

It is a well-known and often repeated fact that the GDP indicator was never developed for the purpose of welfare measurement.[38] In the absence of a better indicator, it has taken up this role. Every well-trained economist should be a warm supporter of removing market failures, in this case misleading information, from the public sphere. This holds especially when such information is generated on a structural basis and has a large influence on the real economy. From a microeconomic welfarist perspective, GDP information represents a situation of persistent market failure, namely on the grounds of imperfect information. In addition, a 'self-fulfilling prophecy' holds, that is, GDP information influences the economy only because people believe it matters. No (other) micro-level physical cause-effect mechanisms play a role. This means that the role of GDP information in the modern economy should not be considered as inevitable (a law of nature). The positive policy lesson is that there are no fundamental barriers against undoing the current type of market failure.

Evidently, it is easy to underestimate the resistance against such a scenario. Despite the fact that many respected economists have expressed or support the severe criticism of GDP as a welfare indicator, the majority of economists, journalists, investors, civil servants and politicians are not concerned at all about the imperfections of GDP information. Moreover, the usual arguments in defence of the GDP indicator consistently come down to the unproven belief that GDP structurally correlates strongly and positively with social welfare. The support for the GDP indicator thus turns out to be rather dogmatic instead of well thought over and reasoned. This is the result of subtle indoctrination by endless repetition in (economic) education and the mass media. In addition, an immense intellectual effort over time has gone into perfecting a standardized GDP calculation suitable for all the countries in the world. This has created large vested interests to continue calculation of GDP by (national) statistical offices and related governmental activities, even though many national income accountants will accept the shortcomings and misuse of GDP as a welfare indicator.

Because of these realities, we are in fact facing a situation known as 'lock-in' of a non-optimal configuration, in this case of the erroneous idea that GDP growth means progress. By definition, it is extremely difficult to escape from a lock-in situation. At least a large shock is needed. Economists could cause such a shock, by pleading together for the removal of the GDP indicator from the public sphere. Such a strategy is evidently not a plea against welfare growth, quite the contrary. Neither should it be confused with being against economic growth under all circumstances or against innovation. Indeed, abolishing GDP would imply being disinterested in whether GDP grows or not.[39] For innovation it would mean that

[38] In 1665 Sir William Petty produced the first estimate of a national income: namely, for England. His work aimed to determine which outlays on warfare could be supported by means of tax revenues. Work by Nobel Laureates Simon Kuznets (for the USA) and Richard Stone and James Meade (for the UK) in the early twentieth century allowed for the rapid diffusion of the GDP indicator in economic research and politics. Again, war acted a stimulating factor, as with so many innovations. For there was a need to determine the production capacity of the Allied Forces just before and during World War II.

[39] Neither can we expect GDP to converge to a close to perfect welfare indicator through a series of marginal improvements. One reason is that in deciding about which changes to incorporate in the GDP calculation procedure, countries may act strategically. For example, currently, EU members may be motivated to show such strategic behaviour, given that their contributions to the EU budget are to a large extent determined by the size of their economy,

innovations which increase GDP but not welfare will receive less support, while innovations which increase welfare (regardless of their effect on GDP) would receive more support.

With regard to alternatives for GDP, it is good to repeat that adding (welfare) indicators, such as in the case of the HDI, does not solve the problem of misleading information that GDP represents. The replacing of GDP by a corrected GDP or another (either or not monetized) aggregate welfare indicator means effectively the elimination of GDP as such. We should not, however, wait until a perfect alternative welfare indicator is available. It is unlikely that a single indicator can be constructed to undo the long list of objections against GDP. It is, however, true that each well-thought alternative will represent a better approximation of social welfare than GDP. It would therefore be a good strategy to first strive towards less misleading information and subsequently magnify the amount of correct and useful information.

My proposal here was to discard GDP regardless of a good alternative being available. Nevertheless, if we choose to use a single index of aggregate human well-being – which is not necessarily required – then we should try to come up with much better alternatives than have been proposed thus far, and better sooner than later. For the moment, the ISEW and derived indicators seem to offer the best starting point in terms of the coverage of items that need correction. Nevertheless, their calculation methods should be much improved, notably to undo the partiality and inconsistency of corrections. In order to neutralize the critiques relating to lexicographical preferences, relative welfare, status and rivalry it seems inevitable that a basis is sought in the literature on subjective well-being and happiness (see Sections 2.4 and 2.5). In particular, subjective indicators obtained from (international) studies and comparisons of happiness via surveys can form the basis for social welfare indicators. This would suggest a role for (economic) psychologists in macroeconomic policy preparation and advice. Given the findings of the happiness literature, one should also be prepared to accept that welfare can reach a maximum, so that welfare growth has its limits. Beyond any point of stable welfare, (costly) measurement of welfare aimed at assessing or discovering welfare improvements will then, of course, become quite useless.

It is easy to discard my plea as unorthodox. However, given the consistency of my position with mainstream microeconomics and welfare theory, and in view of the long list of illustrious economists that have criticized the GDP indicator (see especially the first paragraph of Section 2), my position should really be regarded as entirely orthodox. The problem is that the majority of economists have up till now been too silent, pragmatic or defensive on this issue, and therefore unwilling to draw the evident conclusion: it is perfectly rational to abolish the GDP indicator from the public sphere.

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measured in terms of GDP. Countries that would see their GDP go up (relative to other countries) as a result of an altered GDP calculation method might therefore vote against a proposal to implement such an alteration.

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