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Policy Forum: The Measurement of Well-Being

Constructing the Herald/Age – Lateral Economics Index of Australia's Wellbeing

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Abstract

In recent years, economists and others have returned to the question of how best to measure a country's level of well-being. This article summarises a contemporary attempt to construct an Australian index of well-being and discusses the key conceptual and methodological tradeoffs faced when seeking to be rigorous, engaging and useful in considering policy alternatives.

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1. Introduction

The debate on human well-being goes back to at least the beginning of philosophy and has preoccupied the minds of some of the earliest economists, such as Adam Smith and the founder of modern utilitarianism, Jeremy Bentham. Since at least the 'marginal revolution' in economics in the 1870s, debate has raged as to how best to conceptualise economic well-being. Ironically, as economists debated whether or not it was legitimate to compare well-being or utility between individuals or whether to adopt the more fastidious Pareto criterion in which welfare cannot be said to improve if anyone is made worse off, an alternative means of measuring well-being came into existence—by default as it were—from the emerging practice of national accounting.

Today, gross domestic product (GDP) is routinely taken as a touchstone of economic progress and is used as a short-hand measure for economic well-being by politicians, economic commentators and the media. Yet, measures of GDP were conceptualised and built as a measure of economic activity, rather than well-being, and as is well understood, for that reason it can be misleading.

Three key inadequacies with the GDP as a measure of economic well-being are that it:

- measures production but not consumption, which is the point of production;
- captures production within but not outside the market (for example, counting the labour used to make sandwiches sold at milk bars but not of those made at home); and

- fails to account for the accumulation or running-down of capital, whether that be physical, natural, social or intellectual.

Even if some or all of these inadequacies with the way GDP measures well-being are corrected, it still fails to account for well-being beyond the material. Yet, 'man does not live by bread alone'. In fact, these debates were alive as national accounting was being established in the middle part of the twentieth century and were certainly well established as a point of complaint by the 1970s. They were a major theme of Stretton's (1974) Boyer lectures and of Hirsch's (1977) *Social Limits to Growth*, which pointed to the increasing extent to which consumption becomes 'positional' as income rises. Around the same time, Nordhaus and Tobin (1972) proposed a series of re-arrangements to items in the national accounts to create what they called a primitive and experimental measure of economic welfare. At the same time that the Easterlin (1974) paradox was documented beyond a certain relatively modest point in economic development, the effect of further increases in incomes on increasing reported happiness encountered severely diminishing returns.

Interest has intensified again in the last half-decade, with major initiatives to measure national well-being in France (Stiglitz, Sen and Fitoussi 2009), the United Kingdom (Office for National Statistics 2011, 2012) and Canada (Canadian Index of Wellbeing, or CIW) (Michalos et al. 2011) and with the release of the Organisation for Economic Co-operation and Development's Better Life Index (OECD 2011), allowing people to measure well-being across its member countries. In addition, mainstream media regularly reports (Ferguson 2011) on the results of various 'liveability' surveys ranking cities and towns based on various criteria.

Despite this interest, there is no agreed 'off-the-shelf' methodology for constructing a broader measure of well-being. Any attempt to construct an index for Australia needs to make a number of decisions which will profoundly affect the results generated. These decisions are:

- how economic well-being will be measured;
- what other dimensions of well-being will be included; and
- how each dimension will be weighted.

2. Well-Being Index Methodologies

Broadly speaking, five strategies are typically employed in building well-being indices:

- National accounting data can be augmented to address the weaknesses of GDP as a measure, as occurred, for instance, with the Australia Institute's Genuine Progress Indicator (GPI) (Hamilton and Denniss 2000).
- An index can measure subjective well-being (SWB) by aggregating people's answers to surveys on how they feel and how their society is faring, as with the Australian Unity Wellbeing Index (AUWI) (Cummins 2010; Weinberg and Cummins 2012).
- A composite index can be constructed which aggregates measures over a wide number of domains into a single number, as is the case with the CIW or Bhutan's gross national happiness (GNH) (Bates 2009; Ura et al. 2012).
- The same approach can be taken, but with users being invited to vary the weightings given to the index according to their own values, as with the Better Life Index.
- A 'dashboard' approach can collect data over a range of dimensions whilst discouraging any definitive aggregation of the information therein into a summary index, as used by Measures of Australia's Progress (MAP) (ABS 2011c).

2.1 Augmented National Accounting Measures

The accounting framework (ABS 2012b) that underpins the national accounts does not only

generate values for GDP. It is possible to use the national accounts to construct other metrics of economic progress. In particular, rather than focusing on the gross value of goods and services produced in Australia, one can look instead at the net value of national income (NNI)[1] that this production creates. The NNI represents the income earned by Australian households, businesses and the government, less the depreciation of physical capital. As NNI does not include returns to production that are sent overseas, it more accurately measures the available income Australians have, which ultimately supports higher rates of consumption and living standards. Such a shift was recommended by the Commission of the Measurement of Economic Performance and Social Progress (Stiglitz, Sen and Fitoussi 2009).

Having done this, we are nevertheless left with a measure of economic well-being that remains far from comprehensive. Like GDP, NNI measures only the market sector of the economy, so the impact on well-being of time available for leisure or time spent in non-market activities, such as caring for children, are not accounted for. It also does not account for changes in non-physical capital, such as the discovery or depletion of natural resources or the generation and atrophy of human capital.

One prominent alternative measure of well-being to GDP, the GPI, begins with GDP and corrects it for items which should arguably be included in any comprehensive measure of well-being but which tend to reduce measured well-being. However, as Gruen (2006a, 2006b) argues, while the GPI takes most opportunities to deduct some of the less-attractive things about recent economic growth from its measure of economic well-being, it pays almost no attention to the positives that have come our way as well. This is well illustrated by the GPI's deducting mineral depletion but not adding new mineral discoveries. Moreover, it makes no positive adjustment for improved life expectancy, better road and workplace safety, accretions of human capital or the know-how embodied in Australia's people and the technologies to which they have access.

While the recurrent return to human capital is captured in GDP and NNI in people's wages, human capital itself is not directly tracked in the national accounts. Wealth-accounting exercises conducted by the World Bank (2011) have confirmed that intangible capital, which includes human capital, technological progress and other forms of social and institutional capital, accounts for 60–80 per cent of total wealth gains during the 1990s and 2000s—many times the wealth from natural, physical or financial assets. While recurrent income and capital are distinct, where one is accounting for changes in well-being, *changes* in capital produce changes in expected future well-being. Therefore, just as changes in physical capital are netted out of NNI, it seems sensible to extend the methodology for augmented GDP measures to account for changes in the stock of human and natural capital.

2.2 Subjective Well-Being Indices

A critical concept for the architects of the 'marginal revolution' in economics from the 1870s until the turn of the twentieth century was the concept of the 'utility' of various goods and services to consumers. The new and burgeoning field of SWB revives the spirit of the early marginalists, putting empirical flesh on the metaphysical bones of 'utility' by asking people about their SWB (Headey and Wooden 2004).

Unfortunately, SWB measures have important limitations. Although asking people what they think about their own well-being makes obvious sense, plenty of questions and inadequacies remain. If two people rate their SWB as seven out of ten, is their well-being really equivalent? Some may be calibrating their self-reporting against a stoical standard, whilst others are self-indulgent. The contrast may reflect personal idiosyncrasies or cultural factors. General measures of well-being tend to hover at around 75 out of 100 for most people and over large numbers are very stable and so are a poor indicator of changes in satisfaction.

2.3 Composite Indices

Canada's now fully operational CIW and the Kingdom of Bhutan's famous measure of GNH

both aggregate a variety of indicators, producing a composite measure of well-being. Other attempts to present a richer, more multi-faceted exploration of well-being include the United Nations' Human Development Index (HDI) (UNDP 2011). Rather than attempting to adjust GDP figures themselves to account for unvalued or erroneously valued elements of economic well-being, the HDI creates a new indicator from weighting existing measures of health (life expectancy) and education levels (mean years of schooling) with gross national income.

This approach can present a richer array of data and avoid the need to place monetary values on non-economic aspects of well-being. However, composite indices still require value judgements about which indicators to include and how to weight them in constructing an overall index. While value judgements ultimately cannot be avoided in this area, as the Commission of the Measurement of Economic Performance and Social Progress (Stiglitz, Sen and Fitoussi 2009) complained, the authors of existing composite indices seldom made these normative implications explicit or put forward a rationale justifying their decisions.

2.4 Weighted Indices

'Splitting the difference' has obvious appeal as an anchor in bargaining between two people or two perspectives. Nevertheless, the process is ultimately arbitrary. Somewhat alarmingly, very often in the construction of composite indices, something similar occurs. Potentially incommensurable components of well-being are aggregated, simply by splitting the difference with the final composite index comprising the sub-indices that measure different domains, such as 'environmental' and 'social' well-being, equally.[2]

2.5 Unweighted Indices

Where the Canadian and UK governments have moved towards single indices of well-being that make such valuations and tradeoffs explicitly, the Australian Bureau of Statistics (ABS) has been a leader in the development of satellite welfare measures to augment the national accounts (Salvaris 2009). The MAP reduces various aspects of these welfare measures into indices over specific domains (ABS 2011c). However, the ABS has explicitly chosen *not* to attempt the consolidation of information into a single composite index. Instead, MAP offers a 'dashboard' which displays whether Australia is progressing, standing still or regressing in a range of areas under three general themes: society, economy and environment. In 2011, MAP showed that, where headline indicators were available, social and economic indicators had generally improved over the last decade, but that environmental indicators had deteriorated.

Clearly, a dashboard approach is the safest option methodologically, being the least likely to attract legitimate criticism. Yet, given that policy decisions constantly make tradeoffs, there is some merit in seeking to specify precisely how such tradeoffs should be made. This requires some summary index of community well-being.[3]

3. Methodology and Key Features of the Herald/Age – Lateral Economics Index of Australia's Wellbeing[4]

The Herald/Age – Lateral Economics Index of Australia's Wellbeing (HALE Index) is informed by each methodology above, though it ultimately seeks to adjust the national accounts to arrive at a single dollar-denominated measure of well-being. The initial building block is real net national disposable income (RNNDI), as calculated by the ABS from the national accounts (ABS 2012a), 'corrected' to account for human and natural capital. The index is then topped-and-tailed to bring in considerations that national accounting measures cannot. Evidence from SWB surveys is used to adjust the well-being impact of income growth based on its distribution, in accordance with the Easterlin paradox and with diminishing marginal utility. Other non-economic domains of health and employment-related satisfaction are assessed by using a small number of indicators with the domains weighted using monetarised values that are derived largely from SWB surveys. Although

money is far from the measure of all things, it provides a yard stick by which we might get some approximate bearings on the relative importance of each domain and sub-domain within the index. Figure 1 compares trends in the HALE Index to GDP and RNNDI from 2005 to 2012 (in billions of dollars).

Both the HALE Index and RNNDI generally track lower than GDP, reflecting depreciation of plant and equipment. The HALE Index is also more volatile than GDP, mostly due to variability in the HALE Index's measurement of human capital components. These show up as large year-long swings because much of the data underlying human capital is annual.

3.1 Capital-Adjusted Net Value of National Income

Like GDP, NNI measures the *flow* of economic value creation from year to year. However, though it measures depreciation of physical capital, it makes no specific allowance for accretion or depreciation of natural or 'human' capital or know-how.

3.2 Natural Capital

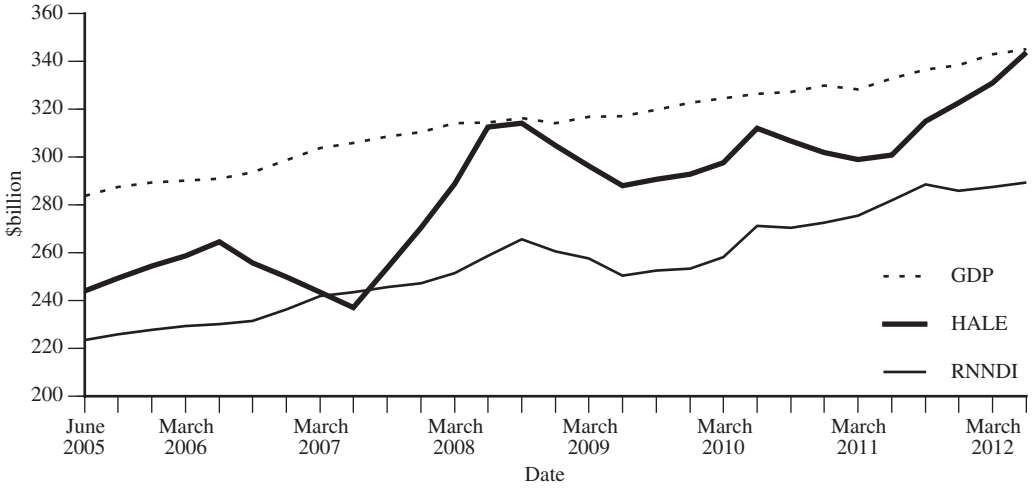
Natural capital includes the positive value of renewable and non-renewable resources, such as land and minerals. The HALE Index replicates the ABS's (2003) methodology to calculate net resource depletion: the net effect of our activities on our natural capital by taking into account rural land degradation[5] and both the depletion of natural resources through mining and the discovery of new assets (and the changing profile of viable mines, given the current price of minerals and the state of mining technology). In 2009–10, net resource depletion was actually positive and worth $1.05 billion or the equivalent of 0.1 per cent of NNI in that year.

Natural capital also incorporates the value of the environment as a public good, not just for our enjoyment, but as a sink for our wastes. As carbon emissions increase, the scientific evidence suggests that they degrade our environment in ways that detract from well-being; however, the effects cannot be predicted with certainty. Accordingly, the HALE Index includes a risk-weighted net present value of the likely negative value of climate change, based on the assessed likelihood of three scenarios from mild to extreme warming from now to 2100.

3.3 Human Capital and Innovation

Given the magnitude of human capital, a large part of the story is missing if we do not bring it to account in our measurement of well-being.

Figure 1 Herald/Age – Lateral Economics Index of Australia's Wellbeing (HALE Index), Gross Domestic Product (GDP) and Real Net National Disposable Income (RNNDI), 2005–2012



Australia's human capital stock accumulates through formal education, on-the-job training and the attraction of skilled migrants from overseas. Similarly, skills are lost due to emigration, unemployment, retirement from the workforce and death. While NNI indirectly captures expenditure on education services and the private return to higher human capital through higher wages, it does not account for the total change in our ability to generate well-being into the future. It also does not account for the known correlation between higher levels of education and other social goods, such as volunteering, civic engagement and tolerance (Norton 2012). Given this and the fact that the HALE Index is primarily concerned with changes in well-being over time (see the Appendix on Method in Gruen and Lancy 2011), rather than absolute levels, we believe that the additional explanatory power of explicitly accounting for human capital accumulation outweighs the risk of double-counting some of the benefits of higher levels of educational attainment.

While satellite human capital accounts are not currently produced for Australia, experimental estimates by ABS (2004) valued Australia's human capital stocks at almost $5.6 trillion in 2001 and growing by around 18 per cent during each 5 year period between censuses. This is 85 per cent of the World Bank's estimate of the total value of Australia's intangible capital for around the same time period.[6] The World Bank (2011) estimates that Australia's intangible capital has continued to grow rapidly, with total capital stocks by 2005 being worth $12.1 trillion (in constant 2008–09 Australian dollar terms).

Using this World Bank's starting value, we measure human capital accretion and destruction, looking at early childhood development (Centre for Community Child Health and Telethon Institute for Child Health Research 2009), school performance (OECD 2010) and retention (ABS 2011d),[7] post-secondary school education and training (ABS 2011b), as well as destruction of human capital through longer term unemployment (Jacobson, LaLonde and Sullivan 1993; Couch and Placzek 2010). To account for other informal methods of learning and innovation, we also monitor changes in capitalised average multi-factor productivity growth (ABS 2011a).

Together, the measures of recurrent and capital economic value discussed thus far consist of around 75 per cent of our proposed index.

3.4 Income Distribution

The SWB literature provides us with a way of observing, and thus calibrating, the diminishing marginal utility of income. The AUWI (Cummins 2010) shows that, on average, it takes $6,000 of additional annual income to improve the self-reported well-being of someone earning less than $15,000 per year by 1 per cent point. By contrast, the same increment in happiness would require over $100,000 for a household already earning over $100,000 per year.

In order to use this information to adjust income for its usefulness in promoting people's SWB, we must also know the extent to which people gain in SWB from the items that money can buy, as opposed to the extent to which they value its ability to improve their status relative to others. The latter effect is a zero-sum game, with any gains enjoyed by one being offset by losses from another moving down.[8] A survey of international literature (Clark, Fritjers and Shields 2008) concluded that around two-thirds of the marginal utility of income is due to the status effect. We are unaware of strong direct evidence from SWB studies that this proportion varies greatly between people with relatively low or high incomes. However, correlations between increased income and SWB do appear to be stronger in poor, compared with rich, nations (Diener and Biswas-Diener 2002), suggesting that the absolute value of an additional dollar is more powerful for people on lower incomes.

This insight, together with information on any changes in distribution of income over some period, enables us to adjust the aggregate income growth for its efficacy in improving the SWB of the population. When lower income households expand their share of national income, the adjustment is up; whereas, where

the movement is in the other direction, the adjustment is down.

3.5 Non-Economic Domains

Anchoring our index in the national accounts provides us with a base upon which to calibrate the relative importance of other non-economic aspects of well-being. This is an imperfect—indeed, biased—way to calibrate these weightings, but the alternative, it seems to us, is no alternative at all. For, as we have seen, pure composite indices appear to have made negligible progress in dealing with the incommensurability of the various aspects of well-being, leading most of them to simply posit that each aspect is equally important.

Instead, our starting assumption is that the amount of resources that a democratic polity expends in various domains (say, in health or education) by way of its own private and public democratic choices offers some clue as to its relative importance to that population in providing for its well-being. In addition, evidence from SWB studies on the reduction in reported life satisfaction from poor health or unemployment vis-à-vis differences in income allows us to estimate an average dollar value for the reduction in well-being from these non-economic factors.

Where there were robust, significant and timely measures of aspects of our well-being that were not properly captured in our national accounting framework, we added them to our index of well-being, as summarised in Table 1. There is no adjustment for education because it is represented firstly in RNNDI and then again (more strongly) in human capital.

3.6 Aspects of Well-Being Not Included to Date

The HALE Index does not include dimensions that many people may consider strongly affect individual well-being, including social capital, leisure time, political freedoms, congestion or crime. Other well-being measures, such as the MAP or the Better Life Index, include such metrics and allow the users to decide how much weight they put on the relevant domains.

However, in each case, we did not include such indicators for one or more of the following reasons:

(i) We could locate no plausible methodology for measuring impacts in monetary terms.

(ii) On any plausible conversion to monetary values, the indicator would have had an insignificant role in the index, dwarfed by the magnitude of the index.

(iii) It was not possible to obtain timely data (as, for instance, in the case of congestion; see BTRE 2007) which would lead to a

Table 1 Summary of Non-Economic Domains Included in the Herald/Age – Lateral Economics Index of Australia's Wellbeing

Dimension	*Sub-indicators*	*Weighting*
Health		
Physical health		Health expenditure as a percentage of GDP[a]
	Life expectancy	
	Preventable hospitalisations	
Significant disease burdens		Impact of subjective well-being
	Obesity	
	Mental illness	
Employment-related satisfaction		Impact of subjective well-being
	Unemployment	
	Under-employment	
	Over-work	

Note: (a) GDP denotes gross domestic product.

step change in the index once every few years.

Furthermore, for reasons explained in Gruen and Lancy (2011), our index was designed for our clients to measure *changes* in well-being through time, rather than absolute levels of well-being.[9]

4. Conclusion

Despite the re-invigorated push in recent years to move away from GDP alone as a measure of economic well-being, little real progress has yet been made. Attempts to adjust standard national accounting measures for consumption and investment outside the measured sector are hampered by lack of recent data on environmental and social activity, while indices that abandon the rigour of the national accounting framework run into problems of aggregation and incommensurability that are generally either ignored or addressed through arbitrary assumptions.

The HALE Index attempts to address some of these difficulties, but it is hardly the last word. Nevertheless, it has already proven its worth in identifying the significance of human capital to our national well-being and in illustrating this in a way that has received attention in two of our daily newspapers. Also, it provides a platform for further discussion and development.

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Endnotes

1. In our index, we actually take real net national disposable income, or RNNDI. However, the terms NNI and RNNDI are used interchangeably in this article.

2. Ostensibly, this has been done 'in order to avoid bias' (<http://grossnationalhappiness.com/gnhIndex/intruductionGNH.aspx>), but this simply substitutes the bias of a default for the bias of design. More substantively, should 'time use' really be given equal weight to education or 'standard of living'? Would not extreme poverty or illiteracy be a worse fate than a bad time imbalance in one's life? Furthermore, if weightings are equal, the introduction of an additional measure which is given equal weighting then downgrades the significance of the original measures. Thus, the number of sub-indices, which comprise each of the nine domains of Bhutan's GNH, ranges from three to 11 sub-domains. Thus, these various dimensions are counted equally within sub-domains but unequally within the global GNH. Even in indices which assign uneven weights to different indicators, a closer look suggests that these are, in fact, just a variant on the 'split the difference' approach. For example, the Yale Environmental Performance Index includes 25 performance indicators across 10 policy domains, which have a relative weight of between 0.694 and 25 per cent of the total index. However, though they have tried to reflect the consensus of environmental scientists and policy-makers, their weightings are more art than science.

3. Amatya Sen, whose work on capabilities forms the theoretical backbone of the HDI, is himself wary of summarising the wealth of data into a single index. Yet, he relented in his view, having been persuaded that only a single index could shift policy-makers' attention from material output to human well-being as a real measure of progress (Fukuda-Parr 2003). His judgement appears correct in hindsight, with the HDI being highly influential in steering development policy towards a broader definition of welfare than is dreamt of in the philosophy of national accounting.

4. For a more detailed discussion of the methodology behind the HALE Index, including results from 2005 to 2010, see Gruen and Lancy (2011).

5. Ideally, we would also include augmentation of the economic value of land, which may offset the detrimental impacts of land degradation, but current ABS statistics do not allow us to do this in a robust way. We have removed changes in urban land values from this calculation as they do not measure changes in natural capital. Indeed, it is not clear how to handle changes in urban land values. On the one hand, land values measure the economic utility of the land, but one might also look upon them as measuring the economic disutility of urban development, with the highest land values measuring the limit of people's preparedness to pay to avoid the disutility of using the least attractive land.

6. The World Bank (2011) calculated intangible capital in 2000 to be worth $10.5 trillion in 2008–09 constant dollars. This is equivalent to $6.4 trillion in 2001 dollar terms. The ABS's estimate of human capital stocks in 2001 dollar terms was $5.6 trillion or 85 per cent of the World Bank's estimate of total intangible capital stocks.

7. See ABS (2011d). The years 7/8 to Year 12 apparent retention rate (ARR) is a measure of the number of school students in their final year of school education, expressed as a percentage of their respective cohort group in their first year of high school. The year of commencement varies between jurisdictions (states and territories) and over time. These variations are incorporated into calculation of ARRs at the Australia level.

8. Indeed, given evidence of 'loss aversion', downward movements have a disproportionate effect on welfare by

imparting more detriment to well-being than upward movements impart well-being.

9. Where we have sought to build 'non-economic' considerations into the index (like obesity or mental health), we have typically done this by *deducting* amounts from our index for phenomena like obesity, mental illness or overwork that are associated with substantially reduced well-being. As these conditions change over time, if circumstances improve (for instance, if the rate of obesity falls), the index will measure the improvement because the negative adjustment to the index becomes *less negative*, in just the way that lower depreciation of capital, for instance, would increase NNI. We could have done the converse by calculating how much the *absence* of such conditions is associated with *above*-average well-being and then *adding* that to our index. Both methodologies produce similar results in measuring the change in well-being from period to period, but they do so by producing equal and opposite changes as adjustments to the economic index at a given time. In fact, to properly integrate our approach into the national accounting methodology in such a way that it produces a dollar-denominated measure of well-being in the base year would involve methodological complications that were well beyond the scope of our brief and resources and any move to redress this problem would be subject to a variety of objections in any event.

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