
# Measuring Social Impact

## The Technical Reference Paper

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ALLIANCE
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# 1 Introduction

This paper sets out the methodology underlying the social impact measurement work presented in the Australian Social Value Bank (ASVB). The broad aim of the ASVB is to:

**"Support Australian companies and social organisations to assess and measure value creation within their communities as a result of their investment"**

Australian organisations impact on society through their actions and investments. This includes, for example, initiatives aimed at crime reduction, local regeneration projects, employment assistance, mental health interventions and community projects. These interventions (referred to in general terms as programmes) can improve people's lives and impact on government expenditure and revenue.

The ASVB contains metrics that apply monetary values to 62 outcomes which can be affected by programmes related to crime, drugs and alcohol, education, employment, health, home, sport, and social and community[1]. An outcome can be thought of a change in someone's life which could impact on their wellbeing; examples in the ASVB include gaining full time employment or having increased confidence. The monetary values for the 62 outcomes allow organisations to measure their social value in a straightforward and standardised way using a robust and consistent method in an easy to use online tool. It allows organisations to:

- quantify the social difference they make as an organisation;
- conduct rapid appraisals that compare the social impact of their different projects;
- make quick and informed decisions about social investment, rather than needing to base decisions on, for example, what simply 'feels right'.

The methodology used follows best practice guidance on policy evaluation techniques used by OECD countries (OECD, 2013) and international organisations like the World Bank and United Nations (Food and Agricultural Organization of the United Nations, 2014). It is consistent with Australia's Cost-Benefit Analysis Guidance Note (Office of Best Practice Regulation, 2016) and the UK's HM Treasury Green Book[2] and Magenta Book which outline the theory of policy evaluation in the context of cost-benefit analysis. The valuation techniques employed follow the UK's supplementary guidance on valuation methodology (Fujiwara and Campbell, 2011[3]) and OECD guidance (OECD, 2013).

[1] 'Home' refers mainly to housing and bills. 'Social and community' refers mainly to neighbourhood conditions and community engagement.

[2] https://www.gov.uk/government/publications/valuation-techniques-for-social-cost-benefit-analysis

[3] *Valuation Techniques for Social Cost-Benefit Analysis* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/209107/greenbook_valuationtechniques.pdf

Using a consistent methodology across all the outcomes measured allows full comparability of different types of programmes. The values are also fully consistent with the strict economic theory and principles underlying cost-benefit analysis (CBA) and social return on investment (SROI) analysis, and use statistical methods at the forefront of valuation methodology. In this respect they provide a level of rigour which allows the analyst to use the values in these types of analysis. The values derived are unparalleled in terms of their robustness and so represent the best source of information on the social value of investments in Australia.

The values produced through this process have been developed using the optimal techniques and data available to date. The values inevitably come with some limitations (acknowledged where relevant), and any knowledge of this sort is subject to revision and updating as time goes on. However, at the time of publication we are confident that the set of values have been developed using techniques that make them both robust and internally consistent.

We measure both the **primary benefits** (also referred to as **primary values**) to individuals through improvements in their wellbeing and changes in their income as a result of achieving an outcome and **secondary benefits** (also referred to as **secondary values**), which consider the wider impact on government spending and revenue. However, it is noted that there are inevitably some gaps in the data, which lead to gaps in these assessments. The methodological discussions below set out clearly what we have been able to evaluate using the data available.

**Primary benefits** accrue directly to individuals. First, we value every outcome using the Wellbeing Valuation approach, which identifies the average differences in people's subjective wellbeing associated with changes in an outcome using large, nationally representative datasets. These datasets include the **Household, Income and Labour Dynamics in Australia (HILDA)** and **Journeys Home: A Longitudinal Study of Factors Affecting Housing Stability (JH)** which is representative of the population group it studies. The approach then calculates the equivalent amount of money that would bring an individual to that same level of wellbeing had the outcome not changed and holding all other factors equal. A discussion of the role of Wellbeing Valuation in social impact measurement can be found in Section 2.2.

Second, we estimate the Australian average post-tax income change for outcomes where people find employment (and add it to the wellbeing value for employment). For example, we estimate that the average annual post-tax income for a person in full time employment in wave 13 in HILDA was $65,653 and the annual post-tax income for a person who is unemployed to be $21,914. The income value for full-time employment is $45,648 which is the difference between the inflation adjusted full-time employed and unemployed.

**Secondary benefits** accrue to society more widely and represent indirect benefits for individuals. This includes outcomes such as government cost savings and increased

tax revenues, which are an indirect benefit to individuals now or at some stage in the future. Calculations of secondary benefits are derived from Australian governmental data and academic reports. They provide estimates of fiscal savings and impacts associated with different outcomes.

Secondary benefit values are estimated for outcomes within the following five areas:

1. Employment
2. Crime
3. Health
4. Education and Training
5. Sports Participation

The majority of the outcomes considered by the ASVB produce both primary and secondary benefits. For example, in the case of an improvement in health this leads to a direct improvement in the individual's wellbeing (primary benefit) and will also have a positive value to society more widely in the form of reductions in health care expenditure (secondary benefit). If an outcome can produce both primary and secondary values, the overall social value of a programme related to this outcome is thus derived from adding together the primary and secondary benefits of the outcome.

# 2 Primary Values

Welfare economic theory sits at the heart of valuation methods used in cost-benefit analysis (CBA) and Social Return on Investment (SROI). These methods are the dominant frameworks for valuation in public policy in OECD countries. In its most basic form, the theory of value states that the monetary value which individuals attach to a good or service, is the amount of money that would be required to leave the individual just as '*well-off*' as he would have been had he consumed or experienced the good/service. In other words, it is the equivalent amount of money that would have the same effect on the individual's life as the good or service being valued.

There are two ways to think about this. We could think about someone's willingness to accept (WTA), which is the amount of money we need to compensate someone for having a bad outcome or we could think of their willingness to pay (WTP), which is the amount of money we would need to receive from someone if they benefited from a good outcome[4].

For the purposes of valuation, '*well-offness*' needs to be defined so that it is measurable. In this instance, we are talking about someone's **quality of life** in the broadest sense of the term, and are therefore, fundamentally interested in people's welfare. We can measure this in two different ways for valuation:

[4] In technical terms, this relates to notions of *compensating surplus* and *equivalent surplus.*

**(i)** Preference satisfaction. This method is based on the premise that welfare is reflected in people's preferences and choice. In this context, we can infer welfare from people's choices because "*what is best for someone is what would best fulfil all of his desires*" (Parfit, 1984). This method requires that people's preferences adhere to the axioms of revealed preference (Samuelson, 1948), which state that people have well-informed, stable and coherent preferences. Preference-based valuation approaches use market price proxies for value where they exist (Revealed Preference), or surveys to ask individuals their willingness to pay (Stated Preference) and have been the standard method used in economics for the past 40 years.

However, in recent years, preference methods have come under increasing attack and scrutiny from psychologists and economists alike, who have found evidence that people may not always choose what's in their best interests; they may make choices with poor information and are easily susceptible to reversing preferences. This means that it may be difficult to get an accurate description of someone's welfare based on what they choose or what they say they want.

**(ii)** Self-reported wellbeing. An alternative way of measuring someone's welfare is to ask them directly about how they feel. These are measures of subjective wellbeing (SWB) and can take many different forms. Typical questions include asking people "all things considered" how happy they are or how satisfied with life they are and respondents rate their answers on numeric scales (usually 1-7 or 0-10). This data is then matched to the conditions in the respondent's life in order to assess how different things can impact on their welfare.

The preference satisfaction and subjective wellbeing accounts of welfare represent different ways of thinking about human welfare. If we wanted to know how much somebody values living in a safe and quiet area in the preference satisfaction account we would, for example, ask them directly about how much they want or desire the safety and quietness. However, in the SWB account we would look at how area safety and noise impact on people's self-reported wellbeing, say their life satisfaction.

## 2.1 The theory of social impact measurement and the role of Wellbeing Valuation

The dominant approaches to social impact measurement used by governments, international organisations and the not-for-profit sector are what is known as **welfarist** approaches. This means that social impact is measured in terms of the impact that programmes have on people's welfare[5], where welfare is taken to be a broad measure of quality of life.

[5] Can also be referred to as wellbeing

**Cost-benefit analysis** (CBA), the dominant form of policy evaluation in government and the basis of Australia's policy evaluation, the UK's HM Treasury Green Book manual and the OECD guidance, and **social return on investment** (SROI), the growing form of evaluation in the not-for-profit sector, are fundamentally welfarist approaches. Other well-documented welfarist approaches to social impact measurement are **cost-effectiveness analysis** (CEA), **cost-utility analysis** (CUA) and **multi-attribute utility analysis** (a branch of **multi-criteria analysis**). Non-welfarist approaches to social impact also exist (e.g. the **capabilities approach**), but in practice they are less frequently employed in the public policy arena.

Welfare is at the centre of methods like CBA and SROI[6]. Broadly speaking welfare can be measured in one of three ways (Parfitt, 1984):

### 2.1.1 Desire satisfaction account of welfare

The desire satisfaction account is based on the premise that we can infer wellbeing from people's choices because *—what is best for someone is what would best fulfil all of his desires"* (Parfitt, 1984: 494). Economic theory is based on this account of wellbeing (usually termed *preference satisfaction* in economics). The underlying assumptions in the desire satisfaction account are that people's preferences are consistent and well-informed (known as *rational preferences* in economics). This assumption is required to use preferences to reveal something meaningful about someone's quality of life. If preferences are inconsistent in the sense that someone prefers A to B but then suddenly prefers B to A, or that they prefer A to B, B to C but C to A (known as intransitivity), then it is hard to infer whether that person's life is better when they have A, B or C. Here A, B and C could be outcomes related to different programme and hence we would not know which programme is best for the individual. Preferences also need to be well-informed such that an individual chooses A over B because he knows that his life is better with A than with B. These requirements on preferences were mainly derived from Paul Samuelson's work in the early twentieth century and are summarised in Samuelson's axioms of revealed preference.

### 2.1.2 Mental state accounts of welfare

Mental state accounts refer to people's subjective experiences of their own wellbeing, which is usually measured through self-reports in a survey. There is a large range of wellbeing questions and these include questions on happiness, emotions, life satisfaction, purpose in life, sadness, anxiety and goal attainment. Each one taps into

[6] CBA makes this explicit as it is developed from microeconomic theory, which has a long history of welfarism. SROI does not have an explicit philosophical foundation, but a welfarist approach can be interpreted from the valuation methods it uses that are derived directly from microeconomic theory. For all intents and purposes therefore SROI is a welfarist approach to social impact.

different theoretical concepts of wellbeing[7]. These measures can be used in policy by assessing the impacts of different outcomes on self-reported wellbeing.

### 2.1.3 Objective list accounts

Objective list accounts of wellbeing are based on assumptions about basic human needs (Dolan et al., 2011a). Wellbeing is measured in terms of a set of pre-determined indicators such as mortality rates, health, and literacy rates. These indicators are deemed to be essential determinants of wellbeing for any individual. Policies would be measured in terms of how they fare against these indicators.

CBA and SROI are distinct from other social impact methods because they involve monetary valuation of the outcomes. In theory, valuation should measure impacts on people's welfare in monetary equivalent terms. This is the theory of compensating surplus and equivalent surplus (Hicks and Allen, 1934), which broadly align with the notions of willingness to pay and willingness to accept. Traditionally, monetary values have been measured using the desire satisfaction account of welfare in economics. These are the methods of revealed preference and stated preference. In revealed preference methods, values are derived from people's market behaviour. In stated preference, survey respondents state a (hypothetical) willingness to pay value for the outcome (or a willingness to accept a bad outcome).

Valuation can also be undertaken using subjective measures of wellbeing (the mental state account of welfare). The **Wellbeing Valuation** method does just this, basing values on how the outcomes of a programme impact on people's self-reported wellbeing (usually life satisfaction). In Wellbeing Valuation, we assess the impact of the programme on life satisfaction and then derive through further analysis the amount of money that would produce the equivalent effect on life satisfaction. Wellbeing Valuation, therefore, offers an alternative way of valuing policy outcomes to feed into CBA and SROI, basing values on the mental state rather than the desire satisfaction account of wellbeing.

In this project, we look at the impacts of a range of different outcomes related to community investments and attach a monetary value to these outcomes from the perspective of the stakeholders. This is achieved through statistical analyses of large national Australian datasets that contain data on subjective wellbeing and demographics. The values estimated in this project represent the monetary equivalent value of the welfare impacts of community investments on stakeholders and they are hence fully consistent with economic theory and can be used directly in CBA and SROI analyses. We use the statistical methods for the Wellbeing Valuation as set out in Fujiwara (2013). The results can be used to attach values to the positive outcomes of different programme in order to compare back to the costs of the programme and assess value for money using CBA, which is the recommended method in most OECD governments, or SROI.

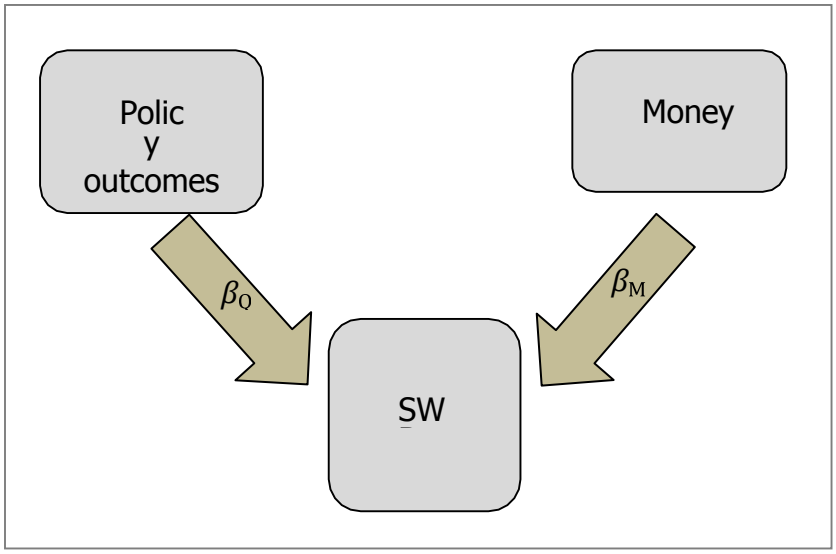
[7] Although strictly speaking mental state accounts often refer to hedonic wellbeing (emotions and affect), we include global/evaluative measures such as life satisfaction in the mental state account here since they fit best in this category out of the three.

We produced the first government-level guidance on the wellbeing method for the UK's HM Treasury as part of the Green Book (Fujiwara & Campbell, 2011). The Wellbeing Valuation method is used by a wide range of UK Government central departments, including the Department for Business Innovation and Skills, the Department for Culture, Media and Sport, the Department for Work and Pensions, HM Treasury, the Cabinet Office, the Department for Communities and Local Government (their work in this area can be found online). It is also a firm part of OECD recommendations on wellbeing analysis in public policy.

## 2.2 Wellbeing Valuation

In response to the criticisms aimed at preference-based valuation methods, a new set of methods have been developed that use SWB data to attach values to different goods and services. The **Wellbeing Valuation** (WV) approach uses econometric techniques to estimate the life satisfaction created by a particular non-market good, and converts this into a monetary value by combining it with an estimate of the effect of income on life satisfaction. This is depicted in Figure 1 below:

*Figure 1 – The Wellbeing Valuation approach*




The method requires us to measure the impacts on SWB of the goods and services we want to value (outcomes) and of income or money. These effects are measured as $\beta_Q$ and $\beta_M$ respectively. In the WV framework, the standard measure of SWB is life satisfaction, which as we discuss in more detail below has been validated as a robust measure of wellbeing.

We now discuss a more concrete example of the methodology behind the Wellbeing Valuation approach. Let us assume we are interested in the value of volunteering - that is the value that people place on doing voluntary work. In statistical analysis, we would use data on life satisfaction to estimate the impact that volunteering once per week has on the volunteer's life satisfaction. As an example, we could find that

volunteering leads to a 5% increase in people's life satisfaction perhaps because of the enjoyment and sense of purpose that they get out of volunteering (this is our estimate of $\beta_{\mathrm{Q}}$). We then want to know the exact amount of money that would induce the same 5% positive impact on life satisfaction and this can also be estimated using the same types of statistical methods. Let us assume that the analysis finds that AUS$2,000 per year in extra income would also induce a 5% change in life satisfaction (we would derive this result from our estimate of $\beta_{\mathrm{M}}$). We can then conclude that the value of volunteering to the individual is on average AUS$2,000 per year for the sample of people we looked at.

In effect, the value of an outcome can be estimated from the ratio of the impact of (i) an outcome on life satisfaction and (ii) income on life satisfaction. In economics this ratio is known as the *marginal rate of substitution* (MRS):

$$MRS = -\frac{\beta_Q}{\beta_M}$$

The technical details of the Wellbeing Valuation method employed for the ASVB can be found below in Section 2.3.

### 2.2.1 Advantages of Wellbeing Valuation

A key distinguishing feature of Wellbeing Valuation is that individuals are not asked about how much they think they value different outcomes and services. This brings with it a lot of advantages. Much of non-market valuation (i.e., valuation of goods which do not have a market price, such as health, education and environmental quality) relies on stated preference methods, whereby respondents are given a description of the good (e.g., the policy will reduce $CO_2$ emissions by x%) and asked how much they would be willing to pay for this good or outcome through, say, higher taxes.

These methods are problematic because people often do not have any experience of or adequate information about the outcomes or goods. This makes it difficult for them to imagine the value they would derive from it. Survey respondents may also succumb to cognitive biases when answering. For example, the biggest problem with preference-based measures comes from what is known as the focusing illusion. This is the well-established psychological finding that, when asked about their preferences for something, people focus only on the salient aspects of the outcomes or goods, and this often does not reflect how people would actually experience these outcomes in real life. In other words, we may think that we really want something and hence would be willing to pay a lot of money for it (and report so in the survey), but in reality, when we actually experience our lives, the object in question actually plays a very trivial role. This type of phenomenon is common when we try to value environmental issues. For example, one study found that people (who do not live near wind farms) would be willing to pay large sums of money to avoid having wind farms near their homes, but if we look at how similar people in general actually experience their lives, we see that wind farms actually have very little if any impact on how satisfied or happy

we are (Dolan, 2013).

Common phenomena in Stated Preference work include, for example, the finding that people tend to anchor their WTP amounts on random numbers presented to them in the environment (Klose, 1999; Smith, 2000; Venkatachalam, 2004; Whynes, Wolstenholme, & Frew, 2004). In other words, if someone were to propose higher levels of default payments (presented as a slide bar) on an online flight-booking platform, this would significantly increase the amount of carbon-offset payments (Szekely et al, 2016). Open-ended questions (which avoid the anchoring and range effect) can produce erratic answers (Arrow et al., 1993). People also tend to be insensitive to the scale of the good or outcome, and when asked to value two goods separately pay more in total than if they were valuing them together (Baron, 1997). Often, WTP values are reflective of what the person thinks the market value should be rather than how much value they would derive personally (Baron & Maxwell, 1996). People may also deliberately state very high (or low) values to influence policy in the knowledge that they are not usually asked to pay the amount they stated in the surveys (Donaldson, Thomas, & Torgerson, 1997; O'Brien & Gafni, 1996).

The survey design of stated preference studies has developed significantly to mitigate some of these biases; however, they do not overcome them completely. That the Wellbeing Valuation approach uses data on people's actual experiences is still a key advantage. In Wellbeing Valuation, we do not need to ask people about how much they value something and so there are no issues related to whether they have good information about the outcomes, there are no survey-related biases and it is impossible for people to strategically influence the results. Most importantly, though, we are able to estimate the value of different goods and outcomes as people experience their lives rather than from data about their hypothetical preferences, which are affected by focusing illusion. In sum, we can value outcomes like reduced crime, cleaner air, better schools and improved health in terms of how people experience these things in real life.

The WV approach requires that people's reports of their life satisfaction are accurate measures of their overall welfare. Life satisfaction can be seen as being made up of a balance of affect (positive and negative emotions and feelings) together with a cognitive assessment of how well one's life measures up to aspirations and goals (Diener, 1984; Kahneman and Krueger, 2006). The summation of momentary affective states is known as "experienced wellbeing" whilst assessments of one's life is known as "evaluative wellbeing". To some extent, life satisfaction responses will incorporate a retrospective judgement of one's life together with how one feels now (Kahneman and Krueger, 2006).

There is some evidence that this can be problematic as people do not always correctly remember past experiences and their current feelings can be influenced by contextual factors present at the time of the interview (Bertrand and Mullainathan, 2001; Kahneman and Krueger, 2006; Schwarz, 2010; Schwarz and Strack, 1999). Biases can also arise in the stage of verbally reporting life satisfaction scores (Schwarz and Strack, 1999). For example, life satisfaction can be affected by the order of questions in

surveys (Deaton, 2011), people may provide socially desirable answers (so as not to look too happy or too sad) (Ralph et al., 2011) and life satisfaction responses can be affected by factors that we would expect to be too insignificant to really have any meaningful impact on how our lives are going overall, such as the weather on the day of the interview (Schwarz and Clore, 1983). It is also worth noting that correlations of various outcomes with experienced wellbeing measures differ in systematic ways to correlations of various outcomes with evaluative measures. For example, Dolan et al. (2016) found no differences in measures of happiness and negative affect between the employed and unemployed, but found differences in the evaluative Cantril Ladder measure[8]. This may be because evaluative measures could represent more what people think should make them happy, and do not necessarily capture feelings experienced (Clark, 2001; Hirschberger et al., 2009). The wellbeing measure usually used in Wellbeing Valuation and the one we use in this project is life satisfaction, a more evaluative measure.

Taking these caveats into account, there is also a variety of evidence to suggest that overall life satisfaction is a good measure of wellbeing. Pavot and Diener (1993), Eid and Diener (2004), Fujita and Diener (2005) and Schimmack and Oishi (2005) find mood and contextual effects to be limited. Sandvik et al. (1993) and Shizgal (1999) demonstrate that there is a strong positive correlation between wellbeing ratings and displays of emotions such as smiling and frowning. Research shows that Duchenne smiles (i.e. a type of smiling that involves a muscle near the eye called orbicularis oculi, pars laterali, which can distinguish between true and feigned enjoyment) are correlated with subjective wellbeing (Ekman et al., 1990). Urry et al. (2004) show that reports of life satisfaction are correlated with activity in the left pre-frontal cortex of the brain, which is the area associated with sensations of positive emotions and pleasure. Furthermore, wellbeing is a good predictor of health, such as heart disease (Sales and House, 1971) and strokes (Huppert, 2006). Cohen et al. (2003) find that people who report higher life satisfaction were less likely to catch a cold and would recover more quickly if they did. Kiecolt-Glaser et al. (2002) find that people with higher life satisfaction heal more quickly from wounds. Krueger and Schkade (2008) assess the test-retest reliability of life satisfaction responses and conclude that retest reliability levels are sufficiently high to yield informative estimates for research. Finally, we should note that life satisfaction, a global measure of wellbeing, that respondents usually take only a minute to answer in large surveys, is highly responsive to the things in life we would expect to be impactful. Life satisfaction, even measured on simple 7 or 11-point scales, varies in the direction and at the kind of magnitude we would expect with, for example, marital status, income, employment, housing conditions, environment and crime levels and even at a more micro-level with cinema visits and levels of the pollutant PM10 in the air. On balance, we therefore believe that life satisfaction responses provide useful information about how a person's life is going for them and ultimately about their welfare, and so that they are robust measures for valuation work.

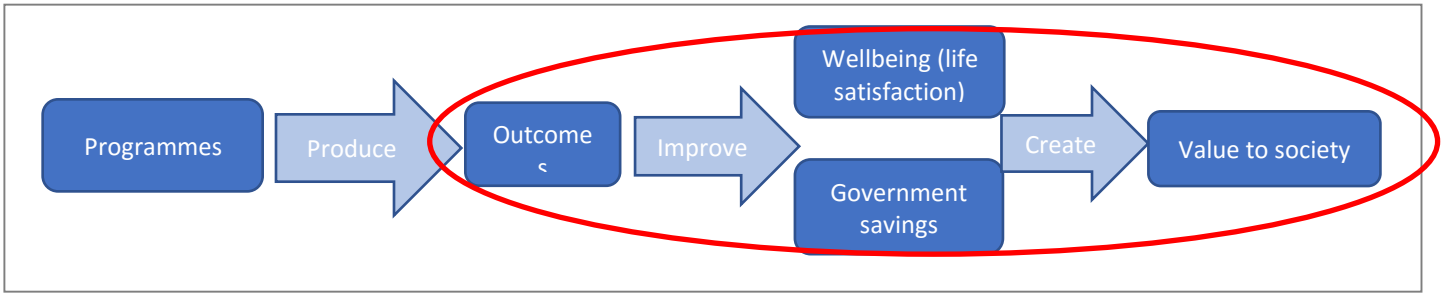
[8] "Please imagine a ladder with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. If the top step is 10 and the bottom step is 0, on which step of the ladder do you feel you personally stand at the present time?"

In sum, Wellbeing Valuation is a recently developed method for valuing goods and services that are not traded in markets (non-market goods). Because it relies on people's actual experiences, it overcomes a large number of serious problems related to preference-based valuation methods. The key issue is that when people are asked about how much they will like and value something, they are often poor at predicting how much those things will actually matter in reality and hence their willingness to pay responses are often very misleading. The Wellbeing Valuation method values outcomes and non-market goods according to how they impact on people's lives as they live them.

### 2.2.2 Wellbeing Valuation of programmes

The applicability of Wellbeing Valuation work grows as more data on wellbeing and its determinants becomes available. The process of value creation for community investment programmes can be depicted as in Figure 2.

*Figure 2 - How programmes create social value*




**Programmes** lead participants to achieve a diverse set of **outcomes** such as increased employment, reduced crime and better health. These outcomes are important because they improve individuals' **wellbeing** and this in turn has **value to society**. There are two approaches we could use in this project:

**Option 1**. We could assess the full value creation process. Here we would look at the impacts of specific community investment programmes on people's wellbeing (life satisfaction) and value the associated outcomes. This would require that we have data on whether respondents in the survey participated in the community investment programmes we are valuing. This would require a new survey for every community investment programme as this level of data detail is not available in large national datasets.

**Option 2.** This method instead looks at the value process below:

OUTCOMES ⇨ VALUE TO SOCIETY

This is the area highlighted by the red ring in Figure 2. We derive a matrix of values from large national datasets that are associated with a large set of different outcomes, such as increased employment, reduced crime and better health, for people that resemble those who participate in community investment programmes. With knowledge of the outcomes delivered by different programmes, we can attach values to these programmes. The advantage of this approach is that one does not require a new survey with wellbeing questions for every programme valued, and small-scale initiatives which will otherwise be unlikely to find statistically significant results due to sample size, can still be valued. The disadvantage of this approach is that it is difficult to very accurately compare the effectiveness of specific programmes. **Option 2 is the approach taken for the ASVB.**

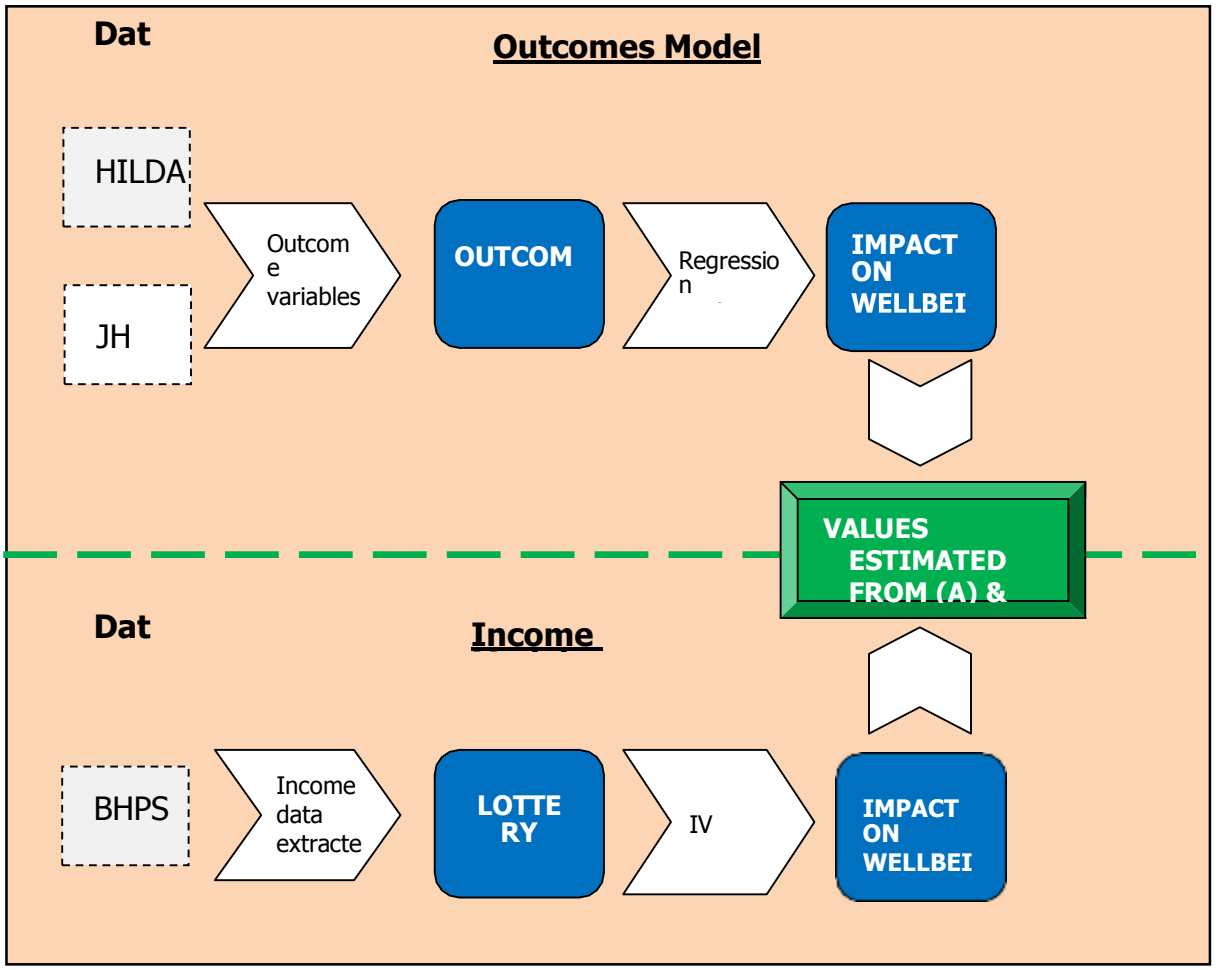
Through **Option 2,** we estimate values associated with 62 distinct outcomes. These outcomes are estimated for the general sample population and also broken down by the factors of age and region (see Section 2.3.4).

Armed with knowledge of the value to people of different outcomes like better health or participation in sports and employment, we can assess the overall social value created by programmes. For example, we find frequent moderate exercise to be worth $1,727 to the individual and $248 to society (per individual) through government savings. If a programme helped 100 people to exercise frequently, this would represent the creation of $197,500 of overall social value from the programme. This is important because we can assess the overall social value created by the programme and run cost-benefit analysis (or SROI) by comparing the value created against the costs of programme implementation.

## 2.3 Statistical Framework for Wellbeing Valuation

**This section provides an outline of the statistical methodology used in the Australian Social Value Bank. The methods are based on the London School of Economics Publication: Fujiwara (2013) '*A General Method for Valuing Non-Market Goods Using Wellbeing Data: Three-Stage Wellbeing Valuation'*. For a more in-depth discussion of the**

*Figure 3 – Statistical methodology for Wellbeing Valuation of program*




### 2.3.1 Background

The Wellbeing Valuation (WV) approach requires us to estimate the impact of social outcomes and income on subjective wellbeing. We use life satisfaction measured on a 0-10 scale with 0 being "Totally dissatisfied", 5 being "Neither satisfied nor dissatisfied" and 10 being "Totally satisfied".

To estimate the impact of an outcome on life satisfaction, we use a mix of multivariate regression and fixed effect estimator methods. To estimate the impact of income on life satisfaction, we use a control function approach rather than more typical IV estimators such as the Wald estimator or two-stage least squares using UK data which has the exogenous lottery wins variable, and compare it to the OLS estimate. We then multiply the OLS estimate from HILDA by the same order of magnitude of the difference between the UK control function analysis and OLS estimates. This is based on the assumption that if HILDA did have lottery wins, the control function analysis would produce a coefficient of the same magnitude (as found in UK data) larger than the OLS estimate. We explain the reasoning behind these choices in more detail below. We follow the framework set out in Fujiwara (2013) 'A General Method for Valuing Non-Market Goods Using Wellbeing Data: Three-Stage Wellbeing Valuation ', which represents the latest developments in WV methodology in line with the UK's Green Book recommendations (2011) and the OECD guidance.

### 2.3.2 Three- Stage Wellbeing Valuation (3SWV)

3SWV runs two separate models: one for the impact of outcomes on life satisfaction and one for the impact of income on life satisfaction as follows:

Income Model

$$(1)\ LS_i = f(\ln(M_i))$$

Outcome Model

$$(2)\ LS_i = g(Q_i)$$

where $LS$ = life satisfaction, $Q$ = the outcome (e.g., improved health) and $M$ = income. Income enters as a logarithmic function to acknowledge the diminishing marginal utility of income. Further explanatory variables can be added to models (1) and (2) where required.

3SWV separates the estimation process into two models in order to estimate the full effects (total derivative) of income. Single equation methods that have been customarily used in WV cannot derive total derivatives, which means that estimates of compensating and equivalent surplus are biased. In the third stage of the process, values are derived from the results of the income and community investment models. 3SWV derives value estimates which are more robust than those from previous Wellbeing Valuation methods and which are in line with welfare economic theory.

From models (1) and (2) the value of outcomes from a programme ($Q$) can be estimated from the derivatives as follows:

$$(3)\ Value\ of\ Q = -\frac{\partial LS}{\partial Q}\cdot \Delta Q \Big/ \frac{\partial LS}{\partial M}$$

Equation (3) is specifically the compensating surplus of $Q$. There are two theoretical concepts of value in economics known as compensating surplus (CS) and equivalent surplus (ES), which broadly align with lay definitions of willingness to pay and willingness to accept. Technically, CS and ES are what we should measure for CBA (and consequently for SROI too since SROI replicates CBA valuation methodology). We can measure both CS and ES in WV as shown in Table 1. We adjust equation (3) to use the same terms as set out in equations (1) and (2) and to explicitly account for the log function of income.

*Table 1 – Estimating CS and ES in Wellbeing Valuation*

| | Compensating Surplus (CS) | Equivalent Surplus (ES) |
|---|---|---|
| Welfare Gain | $CS = M^0 - e^{\left[\ln(M^0) - \frac{g'Q}{f'M}\right]}$ | $CS = e^{\left[\frac{g'Q}{f'M} + \ln(M^0)\right]} - M^0$ |
| Welfare Loss | $CS = e^{\left[\frac{-g'Q}{f'M} + \ln(M^0)\right]} - M^0$ | $CS = M^0 - e^{\left[\ln(M^0) + \frac{g'Q}{f'M}\right]}$ |

In general, we estimate the compensating surplus for community investment outcomes, which is the left-hand column in Table 1.

Although SROI is silent on this issue CBA is usually undertaken using CS. So, for positive effects or outcomes we estimate value as:

$$(4)\ CS = M^0 - e^{\left[ln(M^0) - \frac{g'Q}{f'M}\right]}$$

And for negative effects or outcomes we estimate value as:

$$(5)\ CS = e^{\left[\frac{-g'Q}{f'M} + \ln(M^0)\right]} - M^0$$

For the outcomes related to individuals gaining employment, $M^0$ is set at the reference level of the average inflation-adjusted personal income of an unemployed individual. For the rest of the outcomes, the $M^0$ depends on the dataset used to estimate the impact of an outcome on life satisfaction. For the remaining wellbeing outcomes valued based on the HILDA data set, $M^0$ is set at the reference level of annual household earnings which is **$34,980**[9] and for all outcomes valued using the JH

[9] Based on the pre-tax national minimum wage weekly income for an individual working a 38-hour week, multiplied by 52. Source: https://www.fairwork.gov.au/how-we-will-help/templates-and-guides/fact-

dataset it is set at **$27,175**.[10] We set different incomes for the outcomes valued using these different datasets as we assume the programmes valued impact on different population sub-groups. This is because the outcomes considered in JH are primarily delivered to the most vulnerable groups in Australia.

CS and ES relate to the common notions of willingness to pay (WTP) for a good outcome and willingness to accept (WTA) a bad outcome as follows:

*Table 2 – The relationship between ES, CS, WTP and WTA*

| | Compensating Surplus | Equivalent Surplus |
|---|---|---|
| Welfare gain | *WTP for the positive change* | *WTA to forego the positive change* |
| Welfare loss | *WTA the negative change* | *WTP to avoid the negative change* |

These measures matter because for a given good or outcome one can derive different values based on CS and ES. For example, for an outcome (or a welfare gain) WTP for the positive change will often differ from the WTA to forego the same positive change. There are many reasons for this such as WTP being constrained by one's ability to pay or level of income, whereas WTA is not.

Cost-benefit analysis (CBA) is usually based on CS measures of value (this is known as the Kaldor version of the potential compensation test in CBA). That is, good outcomes are assessed in terms of WTP and bad ones in terms of WTA. We take this same approach in the Social Value Bank and measure all values in terms of CS. Thus, for good outcomes (e.g., employment and hobbies) we estimate a value akin to the WTP for the outcomes. For bad outcomes (e.g., anti-social behaviour and poor health) we estimate a value akin to the WTA the outcomes, which resembles a monetary compensation.

In the ASVB, we define all outcomes as positive, which means that we assume that there will be a positive relationship between the outcome and wellbeing. This is conducted by generating a dummy variable which is zero when an individual does not have the positive outcome (i.e. not being employed, or having diabetes) and one when the individual has the positive outcome (i.e. being employed or not having diabetes). As a result, all of wellbeing valuations in the ASVB relate to the WTP for a good outcome. We do this to reflect the fact that the organisations which use the ASVB will tend to be helping individuals to achieve positive changes in their lives.

sheets/minimum-workplace-entitlements/minimum-wages#who-determines-minimum-wages

[10] Which is the inflation adjusted and population weighted average weekly income for respondents in wave 4 of JH multiplied by 52.

### 2.3.3 The Income Model

The income model is used to estimate $f'_M$ (the impact of income on life satisfaction) in equations (4) and (5). To estimate this, we use exogenous changes in income in order to derive robust *causal* estimates. Our preferred method, as per the UK Social Value Bank model, is to use changes in income due to lottery wins. Lottery wins are by law randomly assigned and therefore provide a natural experiment for assessing the impact of income. The HILDA data set, however, does not include lottery wins data in the format we require and for a large enough sample, and therefore instead we use a conversion of the UK results for lottery wins with supporting evidence from HILDA.

Using data from the British Household Panel Survey (BHPS) (this data set contains lottery wins data) we find that the coefficient on the log of household income in an ordinary least squares (OLS) model for life satisfaction is 0.074 (on a scale of 1-7). This is based on changes in household income which are likely to be endogenous and so we would expect this coefficient estimate to be biased. We would expect it to be biased *downwards* due to measurement error in the income variable and due to the fact that earning more income comes with various negative spillover effects, such as more stress and longer working hours, which are not controlled for in the model. When using lottery wins as an instrumental variable (IV) in the BHPS data the coefficient on log of household income increases to 1.103. This is our best estimate of the *causal effect* of income on life satisfaction. The results from the BHPS IV analysis are set out in Table 3 (note that the lottery wins IV was estimated using a control function approach). The income coefficient in the lottery wins model is 14.9 times greater than the income coefficient in the OLS model.

*Table 3 – The causal effect of income on life satisfaction using the BHPS:*

*First stage regression*

Dependent variable: Log (household income)

| **Independent variables** | **Coefficient** | **S.E.** |
|---|---|---|
| Lottery win | 0.102*** | (0.015) |
| Previous lottery wins | 6.82e-06*** | (0.000) |
| Constant | 9.999*** | (0.007) |
| Observations | 10,461 | |

*Control Function*

Dependent variable: life satisfaction

| **Independent** | **Coefficient** | **S.E.** |
|---|---|---|
| Log (household income) | 1.103*** | (0.252) |
| Previous lottery wins | -0.00001*** | (0.000) |

| | | |
|---|---|---|
| $\hat{\vartheta}_2$ | -1.108*** | (0.260) |
| $\hat{\vartheta}_2 \cdot \ln(M)$ | 0.011* | (0.006) |
| Constant | -5.777** | (2.530) |
| Observations | 10,328 | |

Notes: * = significance at 10%, ** = significance at 5%,
*** = significance at 1%. Heteroscedascity-robust standard errors used. Source: Fujiwara (2013).

We conduct the same form of OLS analysis for life satisfaction in the HILDA data using a range of models with slightly different variable definitions and find that the average value of the coefficient on log of household income is 0.061. This compares very closely with results found by Ambrey and Fleming (2014) who use the HILDA dataset and run similar OLS models (they found the coefficient on log of household income to be 0.056). The average coefficient size for log of household income from our analysis and Ambrey and Fleming (2014) and Headey (2008) which is another study that uses similar models in the HILDA data set, is 0.06. However, it should be noted that the life satisfaction variable in HILDA is measured on an 11-point scale (i.e. 0-10), whereas it is measured on a seven-point scale in the BHPS. We therefore need to convert the HILDA results to make them comparable to the UK. On a seven-point scale the HILDA coefficient on income for the OLS analysis works out to be 0.038.

Whilst there is a difference in the size of the income coefficients across the BHPS and HILDA data sets for the OLS analysis (once we have rescaled the HILDA results) we will apply the same magnitude of multiplicative uplift (14.9) to the HILDA results. By doing this we are in effect assuming that if the HILDA data set did contain lottery wins data an analysis based on this variable would produce a coefficient size 14.9 times greater than 0.06. This would be **0.894 (i.e. 0.06 x 14.9)**. We make this assumption based on two considerations.

First, it assumes that the factors that bias the income coefficient in an OLS model of life satisfaction do not differ materially between the Australian and UK populations. This is a reasonable assumption to make and is not contradicted by the available evidence.

Second, we also run two models in the HILDA data set using income variables that could, under certain assumptions and circumstances, be assumed to be exogenous in a similar way to lottery wins and we find supporting evidence for a 14.9 magnitude uplift from this analysis. In particular, we use unexpected inheritances and shock redundancies as IVs in a two stage least squares model in the HILDA data. Inheritances would represent exogenous changes in income if they were unexpected (if they were expected they could change behaviour in the lead-up period, which could mean that levels of wellbeing and income for people who do and do not receive inheritance windfalls would be different to begin with and so inheritances would no longer be random). Similarly, redundancies would create exogenous changes in income if they were unexpected and if they could happen to anyone regardless of that person's performance, health and other factors beforehand. Whilst there are limitations to these assumptions, and in addition redundancies may affect wellbeing

in other ways than through their impact on income (thus reducing the reliability of the IV estimates), our results for inheritances and redundancies provide *indicative supporting evidence* for our converted income coefficients.

**In the HILDA analysis the coefficient on log of household income estimated from the 2SLS model with inheritance income as an IV is 0.701 and from the 2SLS model with shock redundancy as an IV is 0.874.**

In the HILDA analysis, the results for inheritance income represents an 11.7 magnitude increase in the income coefficient compared to the OLS models and the results for redundancy represents a 14.6 magnitude increase in the income coefficient compared to the OLS models. These results are in line with our estimate converted from the UK data (0.894). We therefore use a value of 0.894 for our estimate of the coefficient on log of household income in Australia and use the analysis of the inheritance and redundancies variables as supporting evidence. It is our preference to use the converted value for the coefficient on log of household income because of some of the potential problems associated with the validity of the inheritances and redundancy IVs (as discussed above). Using the converted value (0.894) will also provide conservative estimates of monetary value in the WV approach since $f'M$ enters as the denominator in equations (4) and (5) (the larger the size of $f'M$, the smaller or more conservative are the values derived).

**In sum, therefore, we set $f'M$ = 0.894 and we use this estimate for the effect of income on life satisfaction in all of the value estimations.**

### 2.3.4 The Outcome measurement model

The outcome measurement models provide estimates of the effect of an outcome on people's life satisfaction ($g'Q$ in Table 1 and equations (4) and (5)). The outcome models (equation (2)) are estimated using the following type of multivariate regression analysis for one outcome at a time[11].

$$(6)\ LS_i = \alpha_i + \beta_1 Q_i + \boldsymbol{\beta_2 X_i} + \epsilon_i$$

where $\alpha_i$ is the constant term, $\boldsymbol{X_i}$ and $\epsilon_i$ are respectively a vector of other determinants of life satisfaction for individual $i$ and the error term. Depending on the dataset used equation (6) may be run on panel data over time which would mean that there is an

[11] Exogenous changes or valid instruments were not available for the community investment variables and hence we used multivariate regression as the next-best option. Regression analysis will provide results that are useful and robust enough for use in policy.

additional time ($t$) subscript and wave fixed effect $\theta_t$ which are excluded here. $\beta_1$ from equation (6) equals $g'Q$ in valuation equations (4) and (5). In cases where panel data is available and (i) the survey question used to define an outcome requires a subjective judgement by the respondent and/ or (ii) there are likely to be time invariant unobservable factors which bias the estimate of $\beta_1$ we adapt equation (6) into a model with a fixed effects estimator:

$$(7)\ LS_{it} = \alpha_i + \beta_1 Q_{it} + \beta_2 \boldsymbol{X_{it}} + \theta_t + c_i + \epsilon_{it}$$

Where $c_i$ is the time-invariant individual fixed effect.

We also derived differentiated values for different sample groups. We derived an overall value based on equation (6) and the following differentiated values:

i. Age: Values by different age groups (in HILDA 16-25/26-64/65+ and in JH 16-25 and 26+ due to a low number of people aged 65+ responding to the survey). This was done by restricting the sample to those within the age group in equation (6) and (7). This produces three (two) extra values for outcomes produced in HILDA (JH). Please note that the surveys do not include children (<16). The values are most appropriate to the ages specified.

ii. State capital city: Values by region (i.e. state capital city or state non-capital city). This was done by restricting the sample to those within the region in equation (6) and (7). This produces two extra values per outcome. (Please note that this is for the primary values. The secondary values are differentiated by state, and not by capital / non-capital).

iii. Age & Capital city: Values by age and region (combinations of the above categories – e.g., 16-25 & capital city, 26-64 & non-capital city etc.). This produces six (four) extra values for outcome produced in HILDA (JH).

This results in a total of 12 values per outcome produced in HILDA and nine values per outcome produced in JH.

In terms of the other determinants of life satisfaction we use a set of variables that are included as standard in most wellbeing research and as are recommended in the supplementary guidance for the UK's Green Book guidance on Wellbeing Valuation. These are[12]:

- Income
- Age
- Gender
- Marital status
- Educational status
- Employment status

[12] Note that we did not include religious affiliation and personality traits (which are sometimes used in wellbeing analysis) in the models as there were no data on these variables

- Health status
- Number of children and other dependents (including caring duties)
- Geographic region
- Housing and environmental conditions and crime levels in the vicinity
- Social relations

### 2.3.5 Data

The following two datasets were analysed:

**Household, Income and Labour Dynamics in Australia (HILDA)**

The Household, Income and Labour Dynamics in Australia (HILDA) survey is a household-based panel study. This means it follows the same individuals over time – this allows for greater capacity to model the complexities of human behaviour than surveying a cross-section of the population. HILDA collects information about economic and personal wellbeing, labour market dynamics and family life. The survey started in 2001 (15 waves have been completed) and is nationally representative of the Australian population.[13]

The HILDA survey is funded by the Australian Government through the Department of Social Services, while the Melbourne Institute is responsible for the design and management of the survey.[14]

**Journeys Home: A Longitudinal Study of Factors Affecting Housing Stability**

Journeys Home is the largest and most comprehensive longitudinal survey of homelessness in Australia. It is a national survey of almost 1,700 Australians who were either homeless or at high risk of becoming homeless. The survey was launched in September 2011, and collected information on the complexities of homelessness by tracking the same people over a two-and a half year period in six waves.[15] The survey explored living and housing challenges in a range of areas, which include:

- Personal circumstances – Participants' physical and mental health, their participation in the workplace, their education and training.
- Family circumstances – Participants' family status and living arrangements, support networks, experiences of domestic and family violence.

[13] Due to data availability at the time of starting the research we use waves 1-13 of HILDA

[14] For more information pleases see: http://melbourneinstitute.unimelb.edu.au/hilda

[15] In order to be consistent with previous research conducted using the Journey's Home dataset we use waves 1-4. For more information on this previous research, please see:

- Use of support services – Types of assistance sought and used, including healthcare and support services.

Journeys Home was funded by the Australian Government through the Department of Social Services, while the Melbourne Institute was responsible for the design and content of the survey. The Journeys Home survey consisted of six waves, and was completed in 2014. It was designed to be representative of the group it covers, but not the general Australian population.[16]

Both of these datasets include people's life satisfaction responses, and questions on a large number of aspects and circumstances of their lives such as employment status, marital status, health status, whether they volunteer, whether they play sports, whether they live in a safe area, and so on, resulting in a wide range of values.

### 2.3.6 Models and statistical inference

In total, we assessed **62 different outcomes**. For nearly every outcome we estimated the age, state capital city/non-capital city and age & capital city/non-capital city differentiated models (some of the differentiations were not applicable to some outcomes – e.g., youth related outcomes did not have an age differentiation). As a result, each outcome could have up to **12 primary values** (1 (average) + 3 (age-differentiated) + 2 (region-differentiated) + 6 (age & region-differentiated)) associated with it if all coefficients are statistically significant.

We used heteroscedascity-robust standard errors in all OLS regressions. In general, the $R^2$ values were in line with the wellbeing literature (around 10%-35%). Multicollinearity as tested through the variance inflation factor (VIF), was not a problem in the OLS models. All variables had a VIF score under 4 (except age and $age^2$ which is acceptable as they are functions of each other) and VIFs for most variables were around 1, which represent no inflation of standard errors. Dropping the age variables resulted in a mean VIF of 1.52.

Analysis of kernel density of the residuals from the OLS models shows that they were normally distributed. This analysis was conducted for the core model (i.e. an OLS regression of life satisfaction on the standard set of control variables).

We also check for the necessity for population weighting regressions by comparing the OLS results for two models which both regress life satisfaction on the controls specified in 2.3.4, with and without the relevant population weight available in the HILDA data. We conduct a Z-test which compares the weighted and unweighted coefficients for each independent variable and found no significant difference between the weighted and unweighted models. Based on this analysis, all models are run as unweighted regressions.

Any outcome coefficient ($\beta_1$ in (6) and (7)) that was significant at the 10% level in the

[16] For more information, please see: http://melbourneinstitute.unimelb.edu.au/journeys-home

full model was used to attach values to the outcome[17]. The values represent the average value per person per year for the sample (for Australia for values from HILDA, and for vulnerable Australian populations for the values derived from JH). Values from the differentiated models represent the value per person per year for the average person in that specific sub-category of the population (e.g., under 25s).

### 2.3.7 Caps on Differentiated Values

Having established a set of statistically significant average values from the full model, we adopted a process for capping the values derived from the differentiated models. This ensures that all values are within a moderate band of the values derived from the full model since the information contained in the full model represent the most valid estimates as sample sizes are maximised. As the samples are differentiated into smaller categories, individual outlying respondents (e.g. someone who has poor health but is very happy) have more of an effect on the value. The capping process helps to mitigate this risk. The selection of the boundaries used in the process inherently creates a trade-off between accepting outlying results that are artefacts of individual outliers and rejecting ones that are due to genuine variation between categories of people. Consequently, an empirical approach was taken to the setting of boundaries. There are several steps to this process including capping the values and taking into account significance of the coefficient on the outcome variable, the expected direction of the effect of the outcome on life satisfaction, and the sample size.

To derive the caps, we examine the degree of variation that the age-differentiated values displayed around the value derived from the full model. For each outcome, we estimated the ratio of the largest coefficient amongst the models differentiated by age and region to the full value, and the ratio of the smallest coefficient to the full value. This gave an estimation of how much the differentiated models varied from the full model. We then took an average of these ratios over the different outcomes which had at least three (two) out of five (four) significant and positive coefficients in Hilda (JH) amongst the models differentiated by age and region, and used these as the lower and upper bounds. As a result, the bounds implied that a coefficient which is less than 84% of the full model is capped at 84% of the full model coefficient, and a coefficient which is greater than 220% of the full model is capped at 220% of the full model coefficient. Further, if the sample size of the regression used to generate a value is less than 100 we take the full model coefficient. In summary, the differentiated models are capped by the average amount of variation of the age and region differentiated models from the full model across the outcomes.

### 2.3.8 Example

As an example, we assume that there is a programme that supports participants in finding full-time permanent employment. The coefficient for 'full-time permanent employment' of 0.220 is our estimate of the annual impact of full-time permanent employment on life satisfaction. In other words, those who are employed full-time in

[17] We accept outcomes that are marginally insignificant at the 10% level. These are "Social housing in good condition" (p = 0.16), "family violence services" (p = 0.11) and "Being treated for drug and alcohol problems in the last year" (p = 0.11).

a permanent role are, on average, 0.220 more satisfied with their lives on a 0-10 scale with 0 being "Totally dissatisfied", 5 being "Neither satisfied nor dissatisfied" and 10 being "Totally satisfied". It is significant at the 1% level so $\beta_1$ = 0.220, which equals $g'_Q$ in equation (4) (we use equation (4) since employment is a positive outcome).

We know from the control function results in Table 3 that $f'_M$ = 0.894 and $M^0$= £34,980. Thus equation (4) becomes:

$$(8)\ CS = \$34{,}980 - e^{\left[ln(\$34{,}980) - \frac{0.220}{0.894}\right]} = \$7{,}616$$

Therefore, the compensating surplus for (i.e., the value of) **full-time permanent employment is AUS$7,616 per person per year** in addition to the wage income. This is the estimate of the wellbeing value of employment for the average person. It may include a sense of purpose or confidence through work, for example.

## 2.4 Income values associated with changes in employment

Primary financial (income) impacts are valued by assessing the increase in income due to people finding employment. We refer to them in this paper as **income values**. Income values are calculated by subtracting the average post-tax income of an unemployed person from the average post-tax income of a person employed in a given category (e.g. full-time employment). For example, we estimate that the population weighted and inflation adjusted average annual post-tax income for a person in full time employment in wave 13 in HILDA was $65,653 and the population weighted annual post-tax income for a person who is unemployed to be $21,914.[18] The income value for full-time employment is $45,648 which is the average difference between the full-time employed and unemployed income adjusted for inflation.

The income values are calculated from HILDA using personal income and comparing the following employment status to the unemployed:

- Full time employed
- Part time employed
- Self-employed
- Casually employed – working at least 38 hours a week
- Casually employed – working less than 38 hours a week

We ensure that the income values are post-tax. This is in order to avoid double-counting the tax proportion in the pre-tax income as a primary and a secondary benefit. Instead, the tax revenue is seen as a transfer from the individual to the government, and counted as a secondary benefit. The average income values

[18] The responding person weight is the cross-section population weight for all people who responded in the relevant wave (i.e. they provided an individual interview).

estimated use population weights to ensure they are representative of Australia as a whole.

# 3 Secondary Values

## 3.1 Introduction

Whilst our methodology assumes that the main purpose of community investments is to benefit the welfare of individuals, it acknowledges that there are also secondary benefits that often accompany these primary effects. Secondary benefits are those that accrue to the federal and state governments in the first instance. They typically arise from increased tax returns, reduced benefit spending by government, for example a reduction in unemployment benefits paid following a training scheme, or due to resource savings, for example the freeing up of hospital beds or clinical time following a change in health policy. Although they accrue to government in the first instance, secondary benefits impact wider society ultimately, as they allow government funds to be used elsewhere benefiting people indirectly.

We calculate secondary values by analysing what the secondary benefit of an outcome is worth to the government in monetary terms. The value calculated is per individual affected and where possible differentiated by state in Australia. We thus prioritise data sources which give such a value per individual, and where such data is not available we calculate it from national level data or transfer values from other states. We consult a number of Australian (mostly government) data sources and academic reports to derive the values.

## 3.2 Conceptual framework

The main determinants of government costs, and so of possible secondary benefits, are:

- **Public sector wage rates:** A reduction in working time spent by public sector staff on a policy area means that this time can be spent on other policy areas to benefit society more widely. The wage rate is seen as a proxy for the value that staff can provide in other policy areas working with other people. For example, a reduction in police time will be valued at the saved wage costs for police who would otherwise have been working during this period. Wages of public servants may differ between states.
- **Replacement/repair costs**: In some cases we are able to include replacement/repair costs which, as a result of the policy intervention, government no longer needs to pay. Relevant cost savings might include, for example, a reduction in costs to remove graffiti, or make good damage done to buildings or the environment due to anti-social behaviour.

- **Non-labour resource costs:** These are the costs associated with use of materials or other goods in the delivery of the public service. In the case of healthcare, for example, they are likely to include costs of medication and

overhead costs of hospitals.

- Tax revenue: Secondary benefits also arise from increases in government net revenue. The first type of benefit here is through increases in tax revenue. For example, by helping an individual into employment there will be increased income tax for the government.
- Benefit payment reductions: The second type of government revenue impact is through reductions in benefit payments. For example, the individual moving into employment will no longer receive certain types of welfare benefits, which will lead to reduced expenditure for government.

In contrast, there are unlikely to be secondary benefits in relation to the **depreciation** of public buildings or other assets due to a policy intervention. Similarly, as most interventions are likely to amend rather than completely close a government service, we do not consider **stranded assets**.

## 3.3 Calculation methodology

### 3.3.1 Policy areas and outcomes of interest

The Social Value Bank includes estimates of the **secondary values** for the following five policy areas, as these are the areas where data is available and an impact on government would be expected:

1. Employment
2. Crime
3. Health
4. Education and Training
5. Sports Participation

In particular, the Social Value Bank distinguishes a range of specific outcomes under each policy area (detailed in full in section 3.3.3 below) and estimates one value of benefit per person for each outcome.

### 3.3.2 Methods available to measure secondary benefits

The approach taken to estimate the secondary value per person for each outcome varies according to the outcome concerned and the level of aggregation at which data is available. This section sets out how we estimate the values set out in section 3.2.

Our preference is to use a direct cost per person figure wherever available (see 1. below). Where this was not available for an outcome, we sought state-level total cost data and divided this by the population affected to estimate cost per person (see 2. below). If neither was available we sought federal-level total cost data and divided this by the number of people affected in Australia (see 3. below), with the caveat that this approach applies a national average cost figure to individual states which may in reality differ somewhat. Where it was more relevant to analyse fiscal impact than cost, we estimated tax revenue impact per person (see 4. below).

Across methods 1-3, we used data published by government sources where possible, and otherwise data from published academic papers or, failing that, third-parties (e.g. NGOs). All third-party data was assessed for quality by identifying the categories of government activity it covered, for example the types of health work included in a total health cost figure, and checking that these were relevant to assessing secondary benefits. Also, once the benefit per person estimates had been produced we checked them against values for other states in Australia or figures for a similar type of cost in the UK.

Our four broad approaches to the measurement of secondary values are:

1. Direct measure of cost per person affected: This is the average cost per individual related to the outcome. For instance, in the case of crime we use per person prison costs, e.g. the average expenditure and operating costs for a single prisoner in New South Wales is $90,102 at 2016 prices. This type of value is taken directly from government administrative data or academic papers when value data is available at the person level for the state of interest.

2. Per person total state costs: Figures for total state costs were taken directly from government administrative data or academic papers and divided by the number of people in that state to whom the total cost applies (i.e. those affected), thereby estimating state-level average cost per person. To estimate the number of people affected we used data from the HILDA or Journeys Home datasets on the proportions of people affected, which we multiplied by the state population size. The overall method is summarized in equation (9):

$$\frac{Total\ cost\ in\ state}{Total\ population\ affected\ in\ state} \quad (9)$$

   For example, an economics consultancy report for Diabetes Australia estimated the costs of obesity for each state. In 2008, the direct healthcare costs associated with obesity were estimated to be $391 million in Queensland. These costs were divided by the number of obese people in Queensland, yielding an annual cost of $357 per obese individual in that state.

3. Per person total federal-level costs: Figures for total federal-level costs were taken directly from government administrative data or academic papers and divided by the total population of people in Australia to whom the figure applies. For example, the net health care costs attributed to smoking were $318.4 million in 2005 for the Australian national government. This was divided by the total estimated population of smokers in Australia to get the cost per smoker. This gives the mean cost per person affected across all of Australia, as set out in equation (10):

$$(10)\ \frac{Total\ cost\ in\ Australia}{Total\ Australian\ population\ affected}$$

4. Tax revenue impact per person: The HILDA and Journeys Home datasets contain information on individuals' income and taxes payments. We used these values to calculate the tax benefits to government arising from those who moved into employment or improved their employment and for those who had completed an educational level.

    a. In HILDA, we use net tax and welfare payment data to estimate the value to government of an individual moving from unemployment to employment (permanent or casual, full-time, part-time, or self-employed), and separately of commencing or completing a given level of education. The mean additional tax paid by the employed compared with the unemployed is calculated for the state of interest using the latest wave of data we had available (wave 13, year 2014).
    b. In Journeys Home, there is data on estimated weekly income but not on tax directly. We multiple weekly income by 52 to get a yearly income and then use a tax calculator to calculate the potential additional tax revenue. The mean additional tax is calculated for the state of interest using the most recent wave available to us (wave 4, year 2013). Where sample sizes are low (N<100), the national mean value is applied. A caveat in relation to the approach is that it assumes that survey respondents are paying taxes, which may be a less robust assumption for the homeless and vulnerably housed than for other groups.

As the primary values are derived from survey data given by adults aged 15 and above, we estimate the secondary values for adults aged 15 and above for consistency. This is relevant in calculation methods (2) and (3) when calculating the total population affected. These population figures are set out in Table 4:

*Table 4 – Australia national and statewide population figures*[19]

| State | Working age & 65+ population[20] |
|---|---|
| New South Wales | 6,255,892 |

[19] http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0

[20] The working age population consists of individuals who are aged 15-64. In 2015, the proportion of Australia's population aged 15-64 was 66.2% of the total population, whilst the proportion of people aged 65 years and over was 15% in the same year. Therefore, 81.2% of the Australian population in 2015 were considered of working age or 65+ years old.

| | |
|---|---|
| Victoria | 4,903,749 |
| Queensland | 3,919,524 |
| South Australia | 1,385,678 |
| Western Australia | 2,122,324 |
| Tasmania | 421,022 |
| Northern Territory | 198,128 |
| Australian Capital Territory | 320,902 |
| Australia | 19,527,220 |

### 3.3.3 Preferred measurement method for each outcome

Using the approaches described above we identified a preferred measurement method for estimating secondary benefits per person for each outcome. These are described in Table 5.

*Table 5 – Preferred measurement method for each outcome*

| Policy area (with corresponding outcomes) | Calculation Method |
|---|---|
| ***Employment*** | |
| Obtained full-time employment | Net tax impact/benefit savings per person associated with obtaining full-time employment (HILDA) |
| Obtained part-time employment | Net tax impact/benefit savings per person associated with obtaining part-time employment (HILDA) |
| Became self-employed | Net tax impact/benefit savings per person associated with becoming self employed (HILDA) |
| Obtained casual employment - equivalent full-time hours | Net tax impact/benefit savings per person associated with obtaining casual (full-time) employment (HILDA) |
| Obtained casual employment - equivalent part-time hours | Net tax impact/benefit savings per person associated with obtaining casual (part-time) employment (HILDA) |
| People with injuries, illness or disability obtained employment | Tax impact per person (suffering from an injury, illness or disability) associated with obtaining employment (JH) |
| ***Crime*** | |
| Prevented reoffending | Average expenditure and operating costs per person affected |
| Reduced problems with vandalism/graffiti | Per person total state costs for cleaning up vandalism[21] |
| Reduced problems with teenagers hanging around | Per person total state costs for policing anti-social behaviour by teenagers[22] |

[21] We use figures from the Australian Capital territory as an average for all other states, due to inadequate data sources.

[22] We use figures from New South Wales as an average for all other states, due to lack of available data.

| | |
|---|---|
| Reduced problems with anti-social behaviour | Per person total state costs for policing anti-social behaviour |
| Reduced litter problem | Per person total federal-level costs for cleaning up litter |
| Accessed family violence services | Per person total state costs for supporting victims of domestic violence |
| Accessed support for people who were sexually assaulted | Per person total federal-level costs for providing medical support to victims of sexual assault |
| ***Health*** | |
| Ceased smoking (social and full-time smoker) *[23] | Per person total federal-level health costs attributed to smoking |
| Relief from depression or anxiety | Per person total state costs associated with treating depression or anxiety |
| Improved diet | Per person total federal-level health-care costs associated with a poor diet |
| Improved overall health | Per person total state costs of public hospital services |
| Free from sleeping problems | Per person total federal-level health-care costs associated with poor sleep |
| Relief from Type 2 Diabetes | Per person total federal-level health costs associated with Type 2 diabetes |
| No longer obese | Per person total state health-care costs associated with obesity |
| Ceased using cannabis* | Per person total federal-level costs associated with marijuana |
| Ceased injecting illegal street drugs* | Per person total federal-level costs associated with drug misuse |
| Freedom from alcohol problems* | Per person total federal-level costs associated with alcohol misuse |
| Treated for drug and alcohol problems* | Per person total federal-level costs associated with alcohol/drug misuse |
| Relief from Post-Traumatic Stress Disorder (PTSD) | Per person total federal-level mental health-care costs associated with PTSD |
| ***Education and Training*** | |
| Completed Year 12 | Tax revenue impact per person associated with completing Year 12 (HILDA) |
| Adequate computer skills | Tax revenue impact per person associated with acquiring computer skills (HILDA) |
| Improved numeracy | Tax revenue impact per person associated with improved mathematical skills (HILDA) |
| Commenced education - Certificate level I or II | Tax revenue impact per person associated with studying for a Certificate level I or II (HILDA) |
| Commenced education - Certificate level III or IV | Tax revenue impact per person associated with studying for a Certificate level III or IV (HILDA) |

[23] All outcomes marked with an * originally belonged in the "Drugs and alcohol" category, however given that the secondary values are constrained to 5 policy areas, they are moved to the "Health" category.

| | |
|---|---|
| Qualification obtained - Certificate levels III and IV | Tax revenue impact per person associated with acquiring a Certificate level III or IV (HILDA) |
| ***Sports Participation*** | |
| Participates in frequent moderate exercise | Per person total federal-level health costs attributable to physical inactivity |
| Increased levels of walking | Per person total federal-level costs attributable to physical inactivity |

### 3.3.4 Adjusting benefit per person for inflation

As the data used to calculate the secondary values were compiled from various sources produced at different points in time, we adjusted them for inflation to ensure their applicability to current policy interventions. All the secondary values are currently stated in 2016 prices and will be uprated annually. Updates for each year will be made when data for that year is available. For outcomes where the data is available at state level we used the state inflation rate; for outcomes where the data is at the national level, we used the national inflation rate.

### 3.3.5 Aggregating to total benefit

The secondary benefits values are calculated on a per person basis and can thus be added to the primary values to estimate the **total annual benefits per person**. It is important to note that unlike the primary values, the secondary values do not benefit the individual directly or on their own; rather they benefit society as a whole. The total benefits per individual therefore reflect individual and public gains, both of which must be accounted for in cost-benefit analysis and social impact measurement. We do not estimate values for other stakeholders, such as businesses in the Social Value Bank.

The total per person benefits figures are then combined in the Social Value Bank tool with assumptions about the number of people likely to be impacted by the policy of interest and how long the impacts last for to estimate the total benefit of the intervention, which includes the total primary benefits and total secondary benefits. Please note that, whilst the tool outputs total benefit figures individually for states, some of the secondary benefit recorded against particular states may in fact accrue to federal government in the first instance. For example, increased income tax revenues accrue at federal level, as it is federal government which collects this tax and then allocates receipts to the state governments.

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