Wellbeing and Society:

Towards quantification of the co-benefits of wellbeing

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Abstract:

The objectives of this paper are twofold. First, it reviews the empirical evidence showing the existence of a link between wellbeing and several life outcomes, investigating in particular the positive effect that happiness and life satisfaction can have on health, social outcomes, employment, education and environmental behaviours. Second, it presents the evaluation methods that have been proposed in the literature to place a monetary value on these outcomes. With wellbeing having become more and more relevant for individuals and policy makers, the full understanding of the co-benefits of wellbeing is central for the design and development of wellbeing interventions. As a consequence, the evaluation of the co-benefits of wellbeing is of crucial importance for the appropriate allocation of resources and to avoid undervaluing policies that promote non-market outcomes, such as health or volunteering, usually not captured in national accounts statistics.

Keywords: life satisfaction, co-benefits of wellbeing, non-market outcomes, evaluation

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1. Intro

There is an increasing awareness of the importance of happiness and satisfaction with life, both among individuals and policy makers. The Stiglitz-Sen-Fitoussi Commission (2009) has for example pointed out that the way the individual perceives how well his life is going should be considered alongside other observable objective indicators of economic and social wellbeing. Wellbeing is not only "intrinsically" but also "instrumentally" important for the individuals (Alkire 2015; De Neve et al. 2013): enhanced wellbeing has been shown to be associated with a number of better life outcomes, such as better health status, more satisfactory social relationships, higher productivity and increased educational achievements.

A comprehensive evaluation of wellbeing should therefore take into account not only the direct benefit of wellbeing – i.e. its intrinsic value – but also the effect of wellbeing on other dimensions of life. While there has been increasing attention paid to the valuation of the intrinsic value of wellbeing (e.g. Cox et al. 2012), it is probably the assessment of the co-benefits[1] of wellbeing improvements (in terms of health, social relationships, education etc.) which is of more interest from the point of view of policy-makers. These co-benefits are usually more tangible to policy-makers than wellbeing in and of itself, and so it is important that they are properly assessed. This is very relevant for policy-makers working in these fields, as it enables the design of new - and possibly innovative - policies and the comparison of costs and benefits of different interventions. The evaluation of co-benefits of wellbeing is in fact likely to yield potentially significant gains over and above the direct benefits to individuals.

This paper aims at presenting a review of the empirical evidence analysing the link between wellbeing and the following life outcomes: health, social outcomes, employment, education and environmental behaviours. While several authors have already explored this evidence (e.g. De Neve et al. 2013 and Quick and Abdallah 2015), the evaluation of these co-benefits has not been the focus of much attention. A special focus will therefore be dedicated to the evaluation methods commonly used or developed in the literature to value these outcomes in monetary terms.

The paper is organised as follows: Section 2 clarifies the importance of wellbeing evaluations for policy makers. Section 3 reviews the literature analysing the link between wellbeing and life outcomes. Section 4 focus on evaluation methods used to place a monetary value on these outcomes. The last Section draws conclusion.

2. Why value wellbeing

To ensure the appropriate allocation of resources towards wellbeing, it is important to be able to value the benefits of enhanced wellbeing in monetary terms. This enables a clear comparison with the costs of interventions, and enables decision makers to compare the benefits of wellbeing based actions against those for other policy objectives. Robust valuation is central to cost-benefit analysis and to avoid undervaluing policies that promote non-market services such as volunteering which are not obviously reflected in GDP. In the absence of market prices a traditional approach to ascertain value is to assess decisions people make through revealed or stated preference which relies on the assumption of rational consumer behaviour. The life satisfaction approach is considered a more robust and consistent measure of social impact, which estimates the increase in wellbeing linked with a specific good or service and subsequently calculates the equivalent amount of money needed to improve wellbeing (Fujiwara 2013).

Wellbeing data needs to be gathered longitudinally to offer meaningful evaluation of interventions and although physical health measures of wellbeing are more accessible, abstract mental states of wellbeing such

[1] The term "co-benefits" is used in this case as the outcomes are not the main objective of the intervention – the main or primary outcome targeted is taken to be that of wellbeing. Benefits to education may occur, and be considered by schools, but these are secondary or co-benefits.

as ‘sense of purpose’ are inherently problematic to quantify. The difficulty often lies in the mismatch between cycles for gathering wellbeing data and shorter policy-making cycles, resulting in cost-saving analysis of wellbeing interventions inaccurately representing ‘true’ value for any given year. In the next section we attempt to scope out the benefits of wellbeing. Despite promising developments in wellbeing research, the concept of wellbeing has been notoriously challenging to define. Many researchers have described the dimensions of wellbeing such as positive affect, low negative affect, sense of purpose and satisfaction with life but a universal *definition* has been less tangible. Valid and reliable assessments of wellbeing rely on clarifying the specific construct being measured and how the proceeding data should be interpreted. Today it is generally agreed that wellbeing is: multidimensional (incorporating all aspects of our lives essential for happiness e.g. social, physical, psychological) and a positive concept (consideration of both an absence of negative aspects of life and the presence of things needed to live a good life, e.g. healthy relationships, self-esteem).

The terms wellbeing and happiness are often used interchangeably, and we do so in this paper. Although happiness is a central component of wellbeing, it refers to the affective element of subjective experience. The feeling of happiness in contrast to having all the things that should theoretically make someone happy (e.g. money, good health) is the difference between objective and subjective wellbeing. Resilience is often linked with wellbeing and refers to capacity to recover from difficulty. Whereas wellbeing varies in different contexts and between individuals, resilience is dynamic and can be ‘built’ to increase ability to cope with future stressful situations.

Happiness economics is concerned with the quantitative and theoretical study of wellbeing and other related concepts and combines economics with other fields such as psychology, health and sociology. Substantial evidence indicates that wealth fails to be an effective generator of wellbeing beyond a level of subsistence, which poses significant challenges to traditional financial measures of successful policy such as GDP. Although the importance of happiness in society is not a new concept, the emergence of positive psychology and development of methods, surveys and indices to measure happiness and other related concepts means wellbeing is gaining traction as an alternative measure of prosperity.

Wellbeing is the focus of a number of policies and projects at all levels – from international level actions including the Millennium Ecosystem Assessment to actions at a local level, with wellbeing facilitators being used by local doctors in an attempt to reduce burdens on health services. In this context, measures of wellbeing have been developed to estimate the “stock” of wellbeing in societies and how wellbeing changes in response to interventions. Wellbeing interventions can take a number of forms – these can include city wide schemes to improve green infrastructure to improve wellbeing or more localised actions to address issues in particular neighbourhoods. Interventions may include actions to address health, outdoor environments, workplace conditions and educational needs.

3. Empirical evidence of the link between wellbeing and life outcomes

Improving well-being can have a number of impacts on individuals and society, and these will be reviewed in this section (see Table 1 for a summary).

The evidence comes from a range of studies, some based on representative sample surveys, ideally following the individuals over time, or on experimental studies, in which the emotional state of the participants is exogenously affected in order to detect casual relationships. In other cases, however, the empirical literature draws upon cross-sectional data and does not fully address the causality issue, ending up measuring mainly correlations among variables rather than causal relationships. The overall association between wellbeing and its co-benefit is in fact very likely to go in both directions. It has been shown for example that higher wellbeing levels give the confidence and motivation to do better at school (see for example Gutman and Vorhaus 2012),

while feeling stressed and unhappy often leads to adverse health practices (Grant et al. 2009). However, at the same time, doing well with our life makes us feel happy and more satisfied.

3.1 Health

The relationship between health status and wellbeing has probably been the most investigated, given the central position health has in our life[2].

Given the multidimensional nature of health, the literature assessing the link between health and wellbeing has focused on different health outcomes (Howell et al. 2007). In a review of the literature, Pressman and Cohen (2005) distinguish among studies examining the effect of wellbeing on "longevity", "morbidity", "survival", "self-assessed health status" and "severity of diseases". Even the very perception of pain may be influenced by emotional style.

A common finding in the scientific literature analysing the link between subjective wellbeing and physical health is that the positive effect of well-being and positive emotions is independent from the harming effects of negative emotions. For example, in an analysis on mortality carried out by Steptoe et al. (2015), the positive effect of positive indicators of wellbeing on health is confirmed even after controlling for symptoms of depression. This result is supported also by the work by Mukuria et al. (2015) which analyse and compare several wellbeing measures (looking at both single items and composite scales) using correlations and factor analysis. Mukuria et al. find a strong correlation between different wellbeing measures, this being higher among positive measures. Their results from factor analysis suggest that positive and negative items are linked to different latent constructs, which are only weakly correlated. This suggests that positive and negative emotions are not simply "the opposite ends of a continuum" (Cohen et al. 2003, p. 652) and therefore can have an independent effect from each other.

Moreover, the literature commonly recognised that there may be a simultaneous relationship between wellbeing and health (Howell et al. 2007, Chida and Steptoe 2008, Diener and Chan 2011) but this issue is not always appropriately addressed in empirical studies, in terms of study design and empirical strategy.

3.1.1 Mechanisms explaining the health-wellbeing linkage

With regards to the mechanisms through which wellbeing can affect health, the literature has identified several possible pathways (Ong 2010)[3]. First, it has been shown that individuals with higher levels of wellbeing are more likely to have a healthier lifestyle. Higher wellbeing levels are found to be associated with not smoking, doing more physical exercise, using solar screen and eating healthy (Grant et al. 2009), improvements in sleep quality (Steptoe et al. 2008 and Cohen et al. 2003), and higher adherence to treatment regimes (Pressman and Cohen, 2005, p. 957).

The second mechanism explaining the effect of wellbeing on health is represented by the biological and physiological responses of the human body to wellbeing. Some studies have found evidence that higher levels of wellbeing are associated with lower levels of cortisol (Cohen et al. 2003), and, more generally, with better neuroendocrine, inflammatory, and cardiovascular responses (Steptoe et al. 2005) which can increase resistance to illness (Ong 2010).

Third, a psychological pathway also exists. Fredrickson et al. (1998 and 2000) suggest that positive emotions can offset ("undo") the negative reactions generated by negative emotions. Furthermore, Fredrickson (2001, p.10) suggests that positive emotions can help people increasing their "personal resources" and "psychological resilience" with long-term effects on a number of life outcomes[4].

[2] Complete reviews of this literature can be found in De Neve et al. (2013), Diener and Chan (2011), Ramussen et al. (2009), Veenhoven (2008), Chida and Steptoe (2008), Howell et al. (2007), Cohen and Pressman (2006), Pressman and Cohen (2005), Lyubomirsky et al. (2005).

[3] see also Boehm and Kubzansky (2012), Pressman and Cohen (2005), Diener and Chan (2011), Kielkot-Glaser et al. (2002), De Neve et al. (2013), Sabatini (2014), Steptoe et al. (2005).

[4] See also Quick and Abdallah (2015) for a discussion.

In the following we will review studies focusing on the effect of wellbeing on mortality, health behaviours, prevention of new diseases, and survival from serious illnesses.

3.1.2 Mortality

A large part of the literature has analysed the link between wellbeing and mortality, with happier people being found to live longer. However, it is difficult to generalize these results, as they come from studies carried out using different wellbeing measures, statistical techniques, as well as focusing on different populations (Veenhoven 2008; Diener and Chan 2011).
In a recent review of this literature, Diener and Chan (2011) quantify the effect of wellbeing on mortality in 4 to 10 additional life years, when comparing individuals with high levels of subjective wellbeing with people with low levels of wellbeing. Diener and Chan also report the results of a meta-analysis carried out by Howell et al. (2007), suggesting a 6-year difference in longevity for individuals with two standard deviation difference in wellbeing.

It is important to stress the fact that in examining this relationship, most of these studies have taken into account also the individuals' health practices, such as physical exercise, smoking and drinking habits. This demonstrates that happiness affects health directly, not only via a more healthy lifestyle.

A particularly interesting result emerging from this literature is that the protective effect of happiness is particularly felt by the elderlies – although it should be pointed out that some studies have shown the importance of happiness on mortality also for the general adult population (e.g. Lawrence et al. 2015).
In two distinct follow up studies using data for the US (Moskowitz et al. 2008) and Germany (Wiest et al. 2011), positive affect is found to significantly decreases risk of death among individuals aged over 65, even controlling for negative affect and lifestyle. The results of these two studies also suggest that for younger adults the relationship between subjective wellbeing and mortality is mainly mediated by physical exercise (with happier individuals living longer thanks to higher levels of physical exercise).
Along these lines, other studies have measured the impact of wellbeing on mortality risks among elderlies. Steptoe et al. (2015) use ELSA (English Longitudinal Survey for Ageing) data on elderlies and show a 30% lower risk of death for the highest respect to the lowest wellbeing quartile over a 8-year period. Similarly, Steptoe and Wardle (2011) find a 35% lower risk of death using the ELSA sub-sample that completed the Ecological Momentary Assessment on the day before the survey. This has the clear advantage of having several "real-time" assessments of emotional states, rather than only a recollective one.
Ostir et al. (2000) analyse a sample of Mexican American aged 65-99 followed over a 2-year period finding that a high positive affect score reduces mortality risk, this being only partially mediated by medical conditions at baseline.

Some studies also show a stronger association between wellbeing and mortality among healthy individuals than among non-healthy. As suggested by Veenhoven (2008), "happiness does not cure illness but it does protect against becoming ill" (p. 449). Among others, Xu and Roberts (2010) examine longitudinal data for the Alameda County in California showing that an increase in wellbeing (measured using several indicators) is associated with lower mortality, this association being much stronger among healthy individuals than among the non-healthy.

3.1.3 Healthy behaviour

As already pointed out, wellbeing can result in increased exercise and healthier lifestyle, this leading to better health outcomes (Reiner et al. 2013). Several studies have analysed the relationship between wellbeing and health behaviours. Grant et al. (2009) use information collected on young adults in the International Health and Behaviour Study and find for example that higher wellbeing levels are associated with higher likelihood of being non-smokers, of doing physical exercise, of using sun protection and eating more healthy. Similarly, Allgöwer et al. (2001) find that depression is correlated to having number of negative behaviours in a cross-country sample of university students, such as being a smoker, doing little physical activity, having poor sleeping habits and not using seat belts. The Copenhagen City Heart Study (Schnohr et al. 2005) finds a

significant association between level of physical exercise (categorized as "low", "moderate", "high" or "joggers") and life dissatisfaction (being not satisfied vs. being either very or somewhat satisfied), with lower probability of being dissatisfied among more active individuals.

It should pointed out that the mechanism behind these associations is likely to be quite complicated and probably better described in terms of a simultaneous relationship between wellbeing level and type of lifestyle. Such evidence is found for example in the analysis of the role played by physical activity in the risk of developing depression symptoms by Azavedo et al. (2012).

3.1.4 Prevention of new diseases

A number of studies have focused also on the direct effect of wellbeing on the development of new diseases. Some research has assessed the link between wellbeing and cardiovascular diseases, such as stroke and heart attack.

Ostir et al. (2001) analyse the link between positive and negative wellbeing states and the risk of stroke over a 6-year follow-up, controlling also for blood pressure, smoking habits and BMI. Results suggest a protective effect of positive affect, while no significant effect is found for negative affect. Negative affect has instead been found to increase stroke incidence in a study by Everson et al. (1998), showing that depressed persons (i.e. having at least 5 out of 18 symptoms of depression) are 1.5 times as likely to experience a stroke compared to non-depressed persons, after accounting for health practices and presence of other diseases.
Similar results are found in a study on the incidence of ischemic heart disease (IHD), showing that depressed subjects have 1.6 times the risk of experiencing nonfatal IHD and 1.5 times the risk of experiencing fatal IHD compared to subjects with no depression (Anda et al. 1993).

Some research has also analysed the link between wellbeing during pregnancy and birth outcome, finding that prenatal depression is associated with premature birth (Orr et al. 2002), lower birthweight, alterations in the newborn's biochemical and physiological profile (Field et al. 2006), as well as live birth delivery and multiple gestation in case of IVF (Klonoff-Cohen et al. 2001).

In a well-known experimental study by Cohen et al. (2003), positive wellbeing is found to be protective against the development of a cold, and, distinguishing between three categories of positive emotional style, a risk ratio of 2.9 is found for those in the lowest category respect to those in the highest.

3.1.5 Survival

The literature has also analysed the effect of wellbeing on survival for people suffering from certain illnesses or chronic conditions. Pressman and Cohen (2005) suggest that positive emotions can be beneficial for individuals affected by diseases characterised by low mortality rates, while in case of advanced or more dangerous diseases, individuals with high levels of positive emotions may be too optimistic about their real chances of overcoming the illness, this leading to lower survival due to inappropriate lifestyle and lower treatment persistence.

Wellbeing is found to reduce mortality and increase survival for example among patients with diabetes (Moskowitz et al. 2008) and among people with chronic conditions (Howell et al. 2007). Bush et al. (2001) suggest that depression increases mortality after myocardial infarction. Moskowitz (2003) also finds that positive affect reduces mortality among HIV+ men. This result may be mediated by better care and higher adherence and persistence to antiretroviral therapy in patients with higher positive affect (Carrico and Moskowitz 2014).

3.1.6 Health service use

The linkage between wellbeing and health service is currently being explored in a number of health services contexts. GP surgeries have established "wellbeing coordinators" to link those who they feel would benefit from a range of community activities, including volunteering, conservation and sporting activities. Waters et al. (2010) examine a range of "wellness services" – finding significant psychosocial benefits arising from such

services. They also examine the evidence on cost-effectiveness and conclude that, although there is limited evidence and uncertainty due to the assumptions that need to be made, such services can provide significant value for money.

3.2 Social outcomes

The literature has found an association between wellbeing and a number of social behaviours (for reviews, see Aspinwald 1998; Lyubomirsky et al. 2005; De Neve et al. 2013; Quick and Abdallah 2015). In this section, we will focus on the empirical evidence showing a link between wellbeing on one side and criminal behaviour, prosocial behaviour and social interactions on the other side.

3.2.1 Prevention of criminal and antisocial activities

A number of studies have investigated the linkage between crime and wellbeing – with the focus being largely on the impacts on wellbeing of crime. For example, Cornaglia et al. (2014) use data for Australia and conclude that an increase in violent crime in an area leads to a significant reduction in community wellbeing, this being much higher than the effect of property crime. Similar results are found also for Germany by Krekel and Propawe (2014).

In this study, we are more interested in the impacts that wellbeing can have on crime rates. A number of studies have examined the determinants of the crime rate, but few have focussed on wellbeing. However, elements of the determinants of wellbeing also arise in the studies on the determinants of crime. For example, in the case of German municipalities, factors such as employment, the divorce rate, poverty and inequality are shown to be important factors in determining the crime rate (Buettner and Spengler, 2003). Lorenc et al. (2014), following a systematic review of the evidence on interventions to address the linkages between crime, fear of crime and health and wellbeing, suggest that broader social interventions may be better than crime focussed environmental interventions in reducing fear of crime and improving health and wellbeing.

Some papers have also examined the link between wellbeing and criminal behaviours, with a particular focus on adolescents and young adults. Caldwell et al. (2010) analyse for example a sample of young Mexican American (aged 11 to 17) and find a negative correlation between their degree of delinquency (capturing both their opinions and their actual engagement in anti-social activities) and their level of self-esteem and psychological wellbeing, though only the former result is statistically significant. Buunk et al. (2016), examine life satisfaction in a sample of Spanish criminal offenders aged 16 to 24 and find that life satisfaction is lower among those held in correctional institutions than those on probation. According to the authors, however, type of punishment is not casual and the rationale behind this may be to avoid recidivism among individuals with lower levels of wellbeing.

3.2.2 Prosocial behaviours

The empirical research has shown that happy people are more willing to do something for others, such as to work for charities or to engage in other types of voluntary work. In particular, the literature has shown that happy and satisfied people are more likely to be blood donor and to donate money to charities (Priller and Schupp, 2011), devote more hours to voluntary activities (Thoits and Hewitt 2001 and Griep et al. 2015) and also engage in an higher number of types of unpaid voluntary activities (Oishi et al. 2007).

It is also widely recognised that volunteering and wellbeing are actually linked in a simultaneous relationship (Liu and Aaker 2008; Chiang-Ming et al. 2014; Aknin et al. 2012; Thoits and Hewitt 2001): helping people is beneficial, and not just for the others.

3.2.3 Social relationships and social activities

A large empirical research body has investigated the link between wellbeing and social interactions. However, given the little use of experimental and longitudinal studies in this field, causality issues still need to be fully investigated. It has been shown that happy people like spending time with others; however, at the same time,

spending time with other people makes us happy. Also, the literature has suggested that people enjoy spending time with happy and extrovert people (Mehl et al. 2010), while contact with depressed subjects can have a detrimental effect on our mood as well (De Neve et al. 2013).

A relevant paper in this area is represented by the experimental study by Cunningham (1988) in which the author exogenously influences subjects' feelings using a "mood induction" technique to assess whether being in a good or in a bad mood can have an influence on type of activities we engage in. Cunningham observes that induced joy increases the willingness to engage in social, vigorous and leisure activities with respect to the neutral group. The opposite is found for the subjects assigned to negative mood induction. It is also shown that this difference is partially the result of a different perception of the individuals in the two groups about the effort needed to carry out energetic activities as well as a different perception in terms of the positive consequences of engaging in social activities.

A large literature has focused on the link between wellbeing and the quality and quantity of social relationships, making wide use of data collected on university students. Diener and Seligman (2002) distinguish between three levels of happiness (very high/medium/very low) and show that "very happy" subjects rate the quality of their social contacts very highly, spend significantly more time with other people and less time alone. Similar results are also found by Berry and Hansen (1996) with reference to the role of "positive affect and extraversion". Waugh and Fredrickson (2006) analyse a sample of college freshmen and show that positive emotions help developing better relationships with roommates, both in terms of closeness and in terms of deeper understanding. Mehl et al. (2010) find that individuals with higher levels of happiness and satisfaction spend more time talking to others and also have deeper conversations. In particular, when distinguishing between individuals in the highest and in the lowest level of happiness, the former are found to spend twice as much time in deep conversations respect to the latter.

Also Lucas et al. (2008) find a positive association between having positive feelings and time spent in social relationships with friends and family member. However, they analyse the relationship going from social interactions to wellbeing. In particular, they use a structural equation model to investigate the relationship between extraversion, positive affect and engagement in a number of social activities for a group of college students. Results show that extraversion increases positive affect directly, as well as indirectly, through increased time spent with family and friends and time spent helping others.

3.3 Employment

The literature has highlighted that wellbeing can have a positive impact on several labour market outcomes, for example in terms of better work history, increased income and productivity and lower job turnover (reviews of this literature can be found in Lyubomirsky et al. 2005; Boehm and Lyubomirsky 2008; Barsane and Gibson 2007; De Neve et al. 2013; Quick and Abdallah 2015). This may be the result of good social relationships. However, positive emotions seem to affect also the problem solving process thanks to increased creativity and better cognitive capabilities (Isen et al. 1987; Isen 2001; Rego et al. 2014; Paterson et al. 2016; Yuan 2015). In turns, this can influence also the bargaining process and the resolution of conflicts (Forgas 1998; Baron et al. 1990; Kanske and Kotz 2011; Morris and Keltner 2000).

3.3.1 Turnover and absenteeism

The Chartered Institute of Personnel and Development (2010) carries out an annual survey with employers on workplace absence. The reported annual average absence is 6.8 days per employee, with two thirds being short term (up to 7 days). Minor illnesses are the most common cause followed by muscular and stress related. The report notes that 60% of employers say they are taking steps to reduce stress. This seems to be training/management related and more flexible working options (rather than working environment which would include any green infrastructure elements). This study suggests the public sector is most likely to

promote wellbeing through benefits to facilitate healthy lifestyles whilst the private sector is more likely to provide insurance for employees.

The relationship between wellbeing, absenteeism and voluntary job withdrawal has been analysed in several studies. Job withdrawal and absenteeism are the likely result of dissatisfaction with the job one is doing. A meta-analysis carried out by Bowling et al. (2010) investigates the relationship between wellbeing and job satisfaction and suggests that the two concept are linked in a simultaneous relationships: higher levels of job satisfaction increase life satisfaction, and higher levels of life satisfaction positively affect job satisfaction. Moreover, although both effect are statistically significant, the latter effect prevails.

Along these lines, Credè et al. (2007) examine a large sample of workers holding non-academic positions in a university and estimate a structural equation model on the determinants and consequences of job satisfaction. Their results show that individual dispositional characteristics, including personality traits and emotional states, influence job satisfaction, and this in turn reduces job withdrawal. These results are in line with Waters and Roach (1971), which find a significant correlation between the degree of satisfaction with the job and both absenteeism and job turnover measured one year later.

Pelled and Xin (1999) collect data on a sample of employees and examine the extent to which wellbeing at baseline influences hours of work absence and job withdrawal five months later. Their findings suggest that, even controlling for satisfaction in the workplace, positive emotional states predict lower hours of absence while, to a lesser extent, negative emotions predict both higher absence and job withdrawal. Similarly, Iverson and Deery (2011) analyse the role of positive and negative affect on a number of work-related behaviours in a sample of bluecollars working in the automotive sector: absenteeism, arriving late and leaving early. Controlling also for job satisfaction, absenteeism is found to decrease with increasing positive affect.

3.3.2 Work performance and productivity

Recent research suggests that there is a significant linkage between happiness and worker productivity. For example, Oswald et al. (2015) use a range of experiments to test the relationship in a lab based setting and find that those who undergo what were framed as "happiness treatments" (in this case the enjoying of a comedy movie clip or provision of chocolate, fruit and drinks) respond with a 10 to 18 percent increase in productivity.

Some studies have analysed the prospective effect of wellbeing on the performance of the worker measured later in time. Staw et al. (1994) show that positive affect predicts the performance of the worker approximately 18 months later, both in terms of wage level and manager assessment. This is a composite measure capturing several characteristics of the worker, such as creativity, sociability and quantity and quality of work. More recently, Peterson et al. (2011) specifically address the issue of causality in the relationship between positive psychological wellbeing and work performance in a sample of 179 employees working in the financial sector. Work performance is measured using manager performance evaluation and sales data. Using data collected in three different moments in time, the authors find evidence that wellbeing determines work performance, and not vice versa.

A relevant study by De Neve and Oswald (2012) uses data drawn from the National Longitudinal Study of Adolescent Health to analyse the causal relationship between happiness and income in the US. The data collect information on wellbeing at age 16, 18, 22 and 29 together with income at age 29. Two different model specifications show that higher levels of wellbeing experienced throughout life are associated with higher future earnings. Moreover, it is found that the effect of wellbeing on income is partially mediated by the fact that happy people are more likely to get a university degree, to find a job and to show higher self-esteem. Estimates suggest that this indirect effect of wellbeing counts for about 68%-78% of the total effect.

Bryson et al. (2015) use data drawn from the Workplace Employment Relations Survey to analyse the association between job satisfaction and work performance in the UK. Although this study does not focus on

the effect of overall life satisfaction, it is quite relevant as it investigates the issue of causality by analysing the panel component of the survey. In the analysis, job satisfaction is a variable ranging from -18 to +18 covering several aspects of the job, while work performance is a variable ranging from 0 to 9 capturing "financial productivity", "labour productivity" and "quality of product and service". The authors show that a 1-point increase in job satisfaction leads to a 0.7 points increase in the worker's performance. Moreover, the analysis of the longitudinal data rules out the existence of reverse causality between job satisfaction and performance.

3.4 Education

A number of wellbeing interventions have been conducted in educational settings. Some wellbeing interventions focus on students who are "at risk" of exclusion or who may benefit from increased confidence and motivation. Students may also benefit from improved health and wellbeing in terms of educational attainment, and vice versa. It has been in fact pointed out that depression and other mental problems are linked in a simultaneous relationship with poor academic performance (Patel et al. 2007). Strong interrelationships between health, wellbeing and school outcomes exist, as it has also been suggested in a recent review of the literature by Public Health England (2014).

The relationship between children wellbeing and academic outcomes is a complicated issue, as the wellbeing of children at school reflects not only their life satisfaction, but also social and behavioural elements of their life (Gutman and Vorhaus 2012). Gutman and Feinstein (2008) analyse for example child wellbeing using several indicators. These include emotional and mental health indicators, such as suffering from depressive symptoms and child "locus of control", i.e. his perception of being able to control and to influence what happens in his life and his school outcomes. Gutman and Feinstein point out that also social behaviours are relevant child wellbeing indicators, such as the quality of the interactions with peers (including experiences of bullying or being bullied), the interaction with teachers as well as school enjoyment.

3.4.1 The empirical evidence on the role of life satisfaction and emotional wellbeing

The relationship between life satisfaction and educational outcomes has been analysed in several studies, although this relationship needs to be investigated further in order to draw conclusions about the causality issue. For example, Gilman and Hueber (2006) collect data on a sample of US students enrolled in grades 6 to 12, and distinguish between three levels of life satisfaction. Descriptive statistics suggest that students with higher wellbeing are more likely to perform better at school in terms of engagement in extracurricular activities and grades. Similarly, Leung and Leung (1992) find that life satisfaction is significantly correlated with perception of academic competence when analysing a sample of students aged 11-16 in Hong Kong. As for the UK, the research shows that life satisfaction at age 19 is positively correlated with previous education achievements (Department for Education 2011). In particular, 29% of young people that have achieved at least five GCSEs awarded A*- C grades are "very satisfied" with their life and 53% are "fairly satisfied with their life". This is against respectively 25% and 46% of young people with lower educational achievements. The same study also finds that young people who are still in education at age 19 are more likely to be "very satisfied" with their life (32%) with respect to people who are the same age but in employment (25%) or neither in employment nor in education (18%). These figures obviously suggest only correlations: a higher level of life satisfaction may be the result of good school achievements and of a stimulating academic path, and at the same time higher wellbeing gives the motivation to do better at school and the confidence to embark on tertiary education. Moreover, life satisfaction is measured at age 19, while GCSEs are taken at age 16.

Other emotional and psychological wellbeing indicators play an important role in children educational development, which has been extensively analysed by the literature. The meta-analysis carried out by Haney and Durlak (1998) suggests that some wellbeing interventions can have a greater effect than others in improving children performance at school. In particular, their study finds that children particularly benefit from interventions aimed at enhancing their self-esteem and self-concept. Challen et al. (2011) analyse the

effect of the UK Resilience Programme - a programme aimed at developing children psychological wellbeing. The authors collect data for students in three different Local Authorities and follow them over time. The study shows that students benefit from the programme and, compared to children that did not undergo the programme, they perform better, especially in English, both in the year of treatment and the year after.

Gutman and Vorhaus (2012) use data from the Avon Longitudinal Study of Parents and Children to analyse the relationship between child emotional wellbeing – capturing the extent to which the child worries and is anxious about things that may happen in the future or have happened in the past – and his subsequent academic performance, measured in terms of value-added Key Stage test scores. Comparing children with the highest level of emotional wellbeing at age 7 (i.e. having no problems) with children with the lowest level of emotional wellbeing (i.e. having a lot more problems than other children), the former have a better performance at age 11 in Key Stage 2, with higher value-added from Key Stage 1 to Key Stage 2.

3.4.2 The empirical evidence on the role of the relationship with peers and of school enjoyment

Several studies have focused on child satisfaction with social relationships with peers, this being considered an important driver of school attachment and consequent school performance (Public Health England 2014). This is a relevant issue for children, given that a research by Gutman and Brown (2008) using data from the Avon Longitudinal Study of Parents and Children has shown that around 25% of children aged 8-10 experience poor relationships with peers.

Flook et al. (2005) collect longitudinal data on a sample of primary school children followed over three years, including information on performance in math and reading and the quality of the social relationship with the other students. Their findings show that low levels of social relationships have long-term negative effects on school performance and explain around 25% of school performance. Along the same line, Delgado et al. (2016) carry out an analysis focusing on Latin American adolescents living in the US. Using a Structural Equation Model, they find that having close friends increases the sense of school belonging, this having in turn a positive effect on school attainment.

The wellbeing of children at school has been recently analysed by Gibbons and Silva (2011) using data of the Longitudinal Study of Young People in England. The study concludes that a positive association exists between wellbeing at school and academic achievement, these being measured in terms of happiness at school, teachers' appreciation and enjoyment of lessons on one side and pupil and school value-added from Key Stage 2 to Key Stage 3 on the other side. An empirical analysis by Pittman and Richmond (2007) shows that also college students with higher sense of attachment to university tend to perform better and to be more confident in their academic abilities.

However, the literature results are not univocal. Among others, Gillen O-Neill and Fuligni (2013) find that school attachment significantly affects school enjoyment and sense of school usefulness, but it little explains school performance.

Foreman-Peck and Foreman-Peck (2007) analyse data drawn from the Longitudinal Study of Young People in England to study the extent to which being bullied can harm student performance. In particular, the authors distinguish between different types of child victimization (i.e. being hit, being called offensive names, or having money or other things stolen) and between bullying experiences reported by the parent and by the student himself. Student performance is measured in terms of pupil's value-added from Key Stage 2 to Key Stage 3. Results suggest that bullying experiences reported by the parents have a significant and negative effect on academic achievements. Vignoles and Meschi (2010) use the same dataset and find that being bullied has a weak but long-term negative effect on scholastic achievements, this being measured in terms of GCSE scores.

3.5 Environment

To the best of our knowledge, the empirical evidence has mainly focused on the effect that the environment can have on individual wellbeing (e.g. Rehdanz and Maddison 2008; Cunado and de Gracia 2013), while the literature analysing the positive impact of wellbeing on the environment is quite scant. It has been shown for example that prosocial oriented individuals are more likely to have a greener lifestyle (Cameron et al. 1998). Given that the literature has shown an association between wellbeing and social behaviour, one may claim that high levels of wellbeing may result also in changes in lifestyle and environmental behaviours. Very recently, Sulemana (2016) has concluded that people with higher wellbeing are more likely to be in favour of giving up money for environmental purposes in both developed and Sub-Saharan African countries. Similarly, Duroy (2008) finds evidence of a positive association between subjective wellbeing and a number of activities connected to the environment, such as choosing environmentally friendly household products, recycling and donating money to environmental organizations.

Table 1 - Empirical evidence of the co-benefits of wellbeing

Co-benefit dimension	Empirical evidence of key linkages between wellbeing and:
Health	Mortality (4 to 10 additional life years) Prevention of new diseases (particularly stroke, ischemic heart disease, cold, pregnancy outcomes) Survival from illnesses (mixed results, depending on seriousness of illness) Doing physical exercise (in turn having a protecting effect against development of illnesses)
Social	Criminal and antisocial activities: higher delinquency is associated with lower wellbeing levels Prosocial behaviours: blood donation, voluntary work and money to charities Social activities: more time spent with other, more quality time, higher enjoyment of social interactions
Employment	Lower levels of absenteeism and work turnover Better worker performance in terms of manager assessments, income and productivity
Education	Better educational achievements: better results in Key Stage tests and GCSEs exams
Environment	Environmental-friendly household behaviours More money to charities for environmental purposes

4. The economic evaluation of wellbeing and life outcomes

Wellbeing and the life outcomes discussed so far are certainly very valuable for the individual. However, given that these are mainly non-marketed outcomes, one must rely on other methods to estimate their value. In the absence of market prices, a traditional approach to ascertain value is to assess decisions people make through revealed or stated preferences. Another approach is the "life satisfaction approach", which has been developed in recent years. This approach uses survey based methods to estimate changes in life satisfaction and, using the relationship between life satisfaction and income as a reference, it allows to value changes in provision of a range of non-marketed goods (HMT 2011; Fujiwara 2013). Following this approach, HACT and Fujiwara have developed the Social Value Bank (see Fujiwara et al. 2014 for details). This is a valuable tool which offers robust and comparable estimates of the value a range of activities and outcomes across several life domains, such as employment, health, social activities and local environment. These estimates are produced using data from several national surveys and can be used in cost-benefit analysis.

The What Works Centre for Wellbeing is currently exploring the use of life satisfaction measures compared to the costs – in a way this is similar to the methods used by the UK National Institute for Health and Care Excellence (NICE) for decisions on treatment provision in the health setting, where a cost per Quality Adjusted Life Year is used to estimate whether a particular treatment is "cost-effective" or not.

In this section, we will reviews the methods that can be used to assign a price to wellbeing and its co-benefits.

4.1 Wellbeing

Monetary valuation of wellbeing is still in its relative infancy (Cox et al., 2012). The life satisfaction approach described above can be used to measure the "stock" of wellbeing of individuals and societies. Another method that has been used is to equate a loss of wellbeing with a level 3 mental health problem (i.e. severe problem) and use Quality Adjusted Life Year (QALY) weights assessed by health economists (Centre for Mental Health, 2010). QALYs are one way economists use to estimate the varying types of health outcomes in a common metric – with a value of 1 indicating a year in full health and 0 indicating death. Taking the loss of QALYs from a severe mental health condition (0.352) and multiplying by the NICE Cost Effectiveness threshold of £30,000 gives a value of £10,560 per year for overall wellbeing. There is some evidence in the literature that children's health is value more highly than that of adults. OECD (2006) suggest that a factor of 2 should be applied – so this might imply a value of overall children's wellbeing of £21,120 per annum.

4.2 Health

4.2.1 Mortality

A range of methods exist to value changes in mortality risk. These include transfer of values from existing studies using contingent valuation methods, where people are asked in a survey to state their willingness to pay to reduce particular risks (e.g. Alberini et al. 2006), or revealed preference methods, where for example wages and the relative mortality risks associated with different professions can be analysed. These studies derive either a value of a statistical life or, in some cases, can be used to attempt to derive a value of a life year.

One common metric to evaluate benefits to health is that of quality adjusted life years (QALYs). This brings together both mortality and morbidity outcomes in a common metric – so accounting for both changes in life expectancy and quality. This measure is used by NICE in evaluating the cost-effectiveness of outcomes – and seeing if a threshold for cost-effectiveness is met (£30,000 per QALY being a common "threshold"). To value QALYs in monetary terms, the social value of a quality adjusted life year can be used – work on valuing QALYs is less developed than that for valuing statistical lives, but some estimates do exist. For example, Mason et al (2009) compare the value for life years and the value of QALYs and find that the QALYs may be worth between £34,925 to £70,896 and life years £29,691 to £57,569.

4.2.2 Increased exercise

Leading a healthy life carrying out physical activities on a regular basis is beneficial for the individual and the society both in terms of enhanced quality of life as well as in terms of reduction is the costs for health services. However, measuring the health benefits of increased exercise is not straightforward, as physical exercise carried out at different intensity levels may have a different impact on different types of illnesses. Some tools exist to derive economic values of the health benefits of increased exercise. The WHO-Europe (2014) have developed the Health Economic Assessment Tool (HEAT), measuring of the health benefits of walking and cycling via estimation of effects on mortality. The MOVES tool[5] has instead been developed by Sport England to help estimate the return on investment for sporting activity. This tool helps in estimating the QALY gains and cost savings through avoided disease, accounting for the fact that physical activity can be more protective against some types of illnesses than others, and for the different treatment costs of different diseases. Beale et al. (2007) have instead analysed the relationship between level of physical exercise and perceived health using the Health Survey for England, estimating in this way the gains in QALY of increasing physical exercise for the adult population. Following this evaluation approach and assuming a value of £20,000 per QALY, White et al. (2016) evaluate that the QALYs gained through physical exercise carried out in natural environments in

[5] http://www.northyorkshiresport.co.uk/files/12339/guide-to-the-model-for-estimating-the-outcomes-and-values-in-the-economics-of-sport.pdf

England may be worth over £2bn a year. Along the same lines, Papathanasopoulou et al. (2016) suggest that increasing marine physical activity in the UK is worth between £176m and £746m a year.

4.2.3 Health service use

Health service use can be valued using "cost-of-illness" type approaches. For instance, in the UK the cost of one GP visit avoided thanks to improving wellbeing can be valued at approximately £45 (Personal Social Services Research Unit 2015). This does not include drugs and other costs associated with illnesses.

4.2.4 Valuing health using the life satisfaction approach

The value of several health outcomes can also be estimated using the life satisfaction approach. The Social Value Bank developed by HACT and Fujiwara show for example that being in good health may be worth £20,141 per year, stopping smoking around £4,000 per year and overcoming depression problems even £36,766 per year. Doing regular physical exercise can be valued between £3,500 and £4,200 per year depending on the level of the activity.

4.3 Social outcomes

4.3.1 Economic valuation of criminal and antisocial activities

Potential values that can be placed on changes in crime and antisocial behaviour include the cost of policing and the social impact of crime. Studies have attempted to value the impact of crime to society. For example the UK Home Office (2005 – cited in Cox et al. 2012) estimate that the social impact of crime, reflecting the Physical and Emotional Impact on Direct Victims of different types of crime is around £1,480 per crime incident. Instead, £118 is the cost per incident of antisocial behaviour – reflecting the lowest value of crimes for which the social impact has been calculated (theft – non vehicle).

4.3.2 Economic valuation of voluntary work

Haldane (2014) points out that voluntary work is valuable at three different levels: for the "economic output" it produces through the unpaid work of the volunteers; for the "private" benefits the voluntary workers derive in terms of increased satisfaction with their life and also for example development of new skills; for the "social" benefits derived by the whole society.

Foster and ONS (2013) suggest that the economic value produced by volunteer work should be evaluated using the "replacement cost" approach, and they provide some figures for "professional", "clerical" and "personal" activities using the UK Annual Survey of Hours and Earnings. The life satisfaction approach or the "opportunity cost" approach should instead be used to value the "private" benefits of voluntary activities.

Using the life satisfaction approach to value voluntary work, Fujiwara et al. (2014) show that people engaging frequently in volunteering (i.e. at least once a month) estimate their activity at £2,357 per year , while attending regularly voluntary organisations is valued £1,773 per year. According to Haldane (2014) the private benefits of the entire voluntary sector could be worth £40 billion per year at the national level in the UK. However, the value of voluntary work is actually higher, as it affects not only the volunteers but also the life of all the individuals they get in contact with: he suggests a social multiplier between 2 and 10 for every pound invested in the sector.

4.3.3 Economic valuation of social relationships and social activities

Fujiwara et al. (2014) have also estimated the value of social relationships using the life satisfaction approach. They show that being a regular member of a social group is worth on average £1,850 per year, but with big differences by age group. Social relationships are particularly important for young people and people aged over 50. Following a similar approach, Powdthavee (2008) uses BHPS data to value the time spent with friends and non-cohabiting relatives. Using a panel data technique to control for fixed unobservable individual

characteristics, Powdthavee finds that getting together with friends and relatives almost every day respect to "less than once a month (or never)" is worth on average £85,000 per year. Meeting friends less frequently – once or twice a week or once or twice a month – is estimated to be worth respectively £69,500 and £57,500 per year.

4.4 Employment

While the effect of wellbeing on income can be measured directly, as it is expressed in monetary terms, monetarizing other productivity measures, such as manager evaluations of the worker's performance or job withdrawal is more challenging.

The Chartered Institute of Personnel and Development (CIPD 2010) estimates the average annual cost of absence per employee is £600 (median), this being much higher in the public (approximately £900) than in the private sector (£400). Allen (1983) values the cost of absence in terms of wage loss as well as productivity loss. As for wage loss, he estimates that a 10% increase in absence is associated with a 1.3% to 3.1% decrease in wages, depending on industry and type of job. A similar increase in absenteeism would instead reduce productivity by 1.6%-3.1%, depending on the model specification.

According to CIPD (2009), the average cost of labour turnover may be around £6,100 on average, Moreover, one should consider the time needed to fill a post, going from 6 weeks in the case of manual workers to 17 weeks for more senior positions.

Bevan (2010) highlights the significant range of benefits that can be derived from improved workplace wellbeing, including: reduced accidents at work, improved retention rates (with examples including BT's work-life balance policy yielding a £3mn saving in recruitment costs), higher labour productivity and greater employee resilience.

4.5 Education

In a study for Barnardos, Evans (undated) highlights the range of costs of exclusions. These include:

- Costs to the individual – with those being permanently excluded from schools being three times more likely to leave school with no qualifications and being more likely to be unemployed;
- Costs for the state: which includes:
    - Costs to Local Education Authorities of alternative provision;
    - Costs for social services and the criminal justice system;
    - Costs for the NHS
- Costs to the community, with anti-social behaviour leading to impacts.

4.5.1 Increased educational attainment

Increased educational attainment can be valued in a number of ways. It is common to distinguish between the "marginal" ad "average" effect of education: the former looks at the return of an educational achievement which is hold as the highest attainment, the latter looks at its return regardless of whether this is the maximum educational level achieved (Hayward et al. 2014). The return to education is the result of both a wage and employment effect.

In a study by the British Department of Education, Hayward et al. (2014) use LFS data to estimate the productivity gain derived from higher educational achievements. The average effect on lifetime productivity from having achieved more than five good GCSEs is around £60,000. The marginal effect on the individual lifetime productivity of having 5-7 GCSEs at grades A*-C including English and maths compared to any lower achievement is around £100,000. It is around £60.000 if compared to being in possession of 3-4 good GCSEs. In a recent study for the Department for Education, Hunt and Vernoit (2014) estimate that such an improvement

in GCSEs performance would lead to a return of £1,300 million between 2010 and 2014 at the national level. Productivity estimates do not take into account the wider benefits of education.

Another recent study by Conlon and Patrignani (2015) of London Economics uses data from the British Cohort Study to focus on the returns to A-levels, distinguishing by gender and STEM vs. Non-STEM subjects. Their findings suggest, among other results, that the marginal benefit of attaining an A level in a STEM subject awarded A-C is around £7,000 per year for men, and £4,500 for women.

4.6 Environment

There is a vast literature on the valuation of environmental change – with recent examples in the UK including the National Ecosystem Assessment, which used a mixture of methods from environmental economics to estimate the value of ecosystem services in the UK. Examples of different environmental changes that can be valued in monetary terms include:

- Changes in greenhouse gas emissions/carbon sequestration – which can be valued either using estimates of the "social cost of carbon" or market values for carbon. The UK government has moved towards using more the traded value of carbon in policy assessment. The short-term traded sector carbon values are presented in DECC (2015), which shows the current value of carbon to be between £5 to £20.79/tCO_{2e} for emissions in 2015 and between £39.23 and £117.68/tCO_{2e} for emissions in 2030;
- Changes in recreational provision – which can be valued using either studies that have used revealed preference methods (e.g. travel costs) or stated preferences (e.g. surveys using contingent valuation).

5. Conclusions

The measurement of wellbeing has become increasingly important as society moves away from measures of GDP as the target for growth towards enhancing the benefit for society as a whole. Efforts to value wellbeing to date have focussed on the estimation of the income compensation approach – where the amount of income needed to substitute for a decrease in wellbeing is used. However, the co-benefits of increased wellbeing have attracted less attention – with the benefits of wellbeing through improved health, reduced antisocial behaviours, improved social relationships, improved productivity and improved environments getting less attention. This paper attempts to bring together the evidence on the co-benefits of wellbeing and to provide the basis for the valuation of these benefits in monetary terms.

The literature is in its infancy – but important lessons and gaps can be identified. Relatively more has been done to estimate the impact on health than other co-benefits, especially in terms of increased longevity and lower incidence of diseases. Benefits have also been identified in terms of increased productivity, both in the workplace and in other settings, and in the social dimension. The literature is relatively more scant in terms of the impact of wellbeing on the individual's tendency to delinquency or on his behaviour towards the natural environment.

Moreover the existing empirical evidence on the relationships between wellbeing and the wider benefits to society is made up of quite heterogeneous studies. In a number of cases the empirical evidence comes from experimental studies, in which the wellbeing of the individuals is exogenously influenced, or from longitudinal studies, where the same individual is followed over time and which also allow to control for a number of confounding factors - hence reducing their influence in the relationship. In other cases instead, given the use of cross-sectional datasets or the lack of appropriate empirical techniques, associations rather than causal relationships are measured.

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