

Muffels, Ruud; Headey, Bruce

Working Paper

Capabilities and Choices: Do They Make Sen'se for Understanding Objective and Subjective Well-Being? An Empirical Test of Sen's Capability Framework on German and British Panel Data

SOEPpapers on Multidisciplinary Panel Data Research, No. 385

Provided in Cooperation with:

German Institute for Economic Research (DIW Berlin)

Suggested Citation: Muffels, Ruud; Headey, Bruce (2011) : Capabilities and Choices: Do They Make Sen'se for Understanding Objective and Subjective Well-Being? An Empirical Test of Sen's Capability Framework on German and British Panel Data, SOEPpapers on Multidisciplinary Panel Data Research, No. 385, Deutsches Institut für Wirtschaftsforschung (DIW), Berlin

This Version is available at:

<https://hdl.handle.net/10419/150930>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

SOEPpapers

on Multidisciplinary Panel Data Research

385

Ruud Muffels • Bruce Headey

**Capabilities and Choices: Do They Make Sen'se
for Understanding Objective and Subjective Well-Being?**

Berlin, June 2011

SOEPpapers on Multidisciplinary Panel Data Research at DIW Berlin

This series presents research findings based either directly on data from the German Socio-Economic Panel Study (SOEP) or using SOEP data as part of an internationally comparable data set (e.g. CNEF, ECHP, LIS, LWS, CHER/PACO). SOEP is a truly multidisciplinary household panel study covering a wide range of social and behavioral sciences: economics, sociology, psychology, survey methodology, econometrics and applied statistics, educational science, political science, public health, behavioral genetics, demography, geography, and sport science.

The decision to publish a submission in SOEPpapers is made by a board of editors chosen by the DIW Berlin to represent the wide range of disciplines covered by SOEP. There is no external referee process and papers are either accepted or rejected without revision. Papers appear in this series as works in progress and may also appear elsewhere. They often represent preliminary studies and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be requested from the author directly.

Any opinions expressed in this series are those of the author(s) and not those of DIW Berlin. Research disseminated by DIW Berlin may include views on public policy issues, but the institute itself takes no institutional policy positions.

The SOEPpapers are available at
<http://www.diw.de/soeppapers>

Editors:

Georg **Meran** (Dean DIW Graduate Center)

Gert G. **Wagner** (Social Sciences)

Joachim R. **Frick** (Empirical Economics)

Jürgen **Schupp** (Sociology)

Conchita **D'Ambrosio** (Public Economics)

Christoph **Breuer** (Sport Science, DIW Research Professor)

Elke **Holst** (Gender Studies)

Martin **Kroh** (Political Science and Survey Methodology)

Frieder R. **Lang** (Psychology, DIW Research Professor)

Jörg-Peter **Schräpler** (Survey Methodology, DIW Research Professor)

C. Katharina **Spieß** (Educational Science)

Martin **Spieß** (Survey Methodology, DIW Research Professor)

ISSN: 1864-6689 (online)

German Socio-Economic Panel Study (SOEP)
DIW Berlin
Mohrenstrasse 58
10117 Berlin, Germany

Contact: Uta Rahmann | soeppapers@diw.de

Capabilities and Choices: Do They Make Sen's for Understanding Objective and Subjective Well-Being? An Empirical Test of Sen's Capability Framework on German and British Panel data

© Ruud Muffels & Bruce Headey¹

Abstract

In Sen's Capability Approach (CA) well-being can be defined as the freedom of choice to achieve the things in life which one has reason to value most for his or her personal life. Capabilities are in Sen's vocabulary therefore the real freedoms people have or the opportunities available to them. In this paper we examine the impact of capabilities alongside choices on subjective and objective well-being. There is a lot of theoretical work on Sen's capability framework but still a lack of empirical research in measuring and testing his capability model especially in a dynamic perspective. The aim of the paper is to elaborate and test a 'stock-flow' model measuring capabilities and choices to explain longer-term changes in well-being using 25 years of German and 18 years of British data. Three measures of well-being are constructed: life satisfaction for subjective well-being (SWB) and relative income and employment security for objective well-being (OWB). We ran random and fixed effects GLS models. The findings strongly support Sen's capabilities framework and provide new evidence on the way capabilities and choices matter for well-being. Capabilities indicated by human capital, trust, altruism and risk taking, and family, work-leisure, lifestyle and social choices show to strongly affect the three well-being indicators but their effect sizes differ largely dependent on the type of indicator used.

Keywords: Subjective and objective well-being, happiness, work-leisure choices, income security, employment security, Sen's capability approach, German and British panel data, fixed effects GLS models

JEL-codes: D03, D31, D63, I32, J21, J24, J64

¹ The first author is professor of Socio-Economics at Tilburg University. The co-author is research professor at DIW, Berlin and former director of HILDA at Melbourne University. For further details contact ruud.j.muffels@uvt.nl

1. Introduction

There is a plethora of studies on the theoretical aspect of the capability approach (CA) of Sen, but contrasting little evidence and lack of research on the measurement of capabilities especially in a dynamic perspective. The need to address empirical research on the CA is however acknowledged (see e.g. Schokkaert, 2007; Stiglitz, Sen and Fitoussi, 2009). In this paper we test Sen's capability model by elaborating a 'stock-flow' or 'capability-choice' model to explain long-term changes in objective (OWB) and subjective well-being (SWB). The model is called a 'stock-flow' model while it purports to measure capabilities by people's stocks of psychological, social, economic and cultural capital and actual choices by the flows and events these choices generate. The choice to be active in sports or in volunteer work results in time spent to exercising and in volunteering whereas the choice to split leads to a dissolution event.

Three measures of well-being are constructed: life satisfaction for SWB and relative income and employment security for OWB. The test makes use of two of the richest panel data sets in terms of breadth and depth; the German panel for 1984-2008 (SOEP) with 25 years of data and the British one for 1991-2008 (BHPS) with 18 years of data, both containing extended information on important determinants of well-being such as personality traits, human, social and cultural capital, employment status, health, life values, time use, and work-leisure and life choices. The paper builds forth on earlier attempts to explain non-transient long-term changes in well-being (Headey and Wearing, 1992; Headey, Muffels and Wagner, 2010; Headey, Muffels & Wagner, 2011).

Outline

The paper is organized as follows. Section 2 discusses the so-called 'stock-flow' framework for studying well-being. Subsequently, in section three the empirical model derived from this framework is explained while in section 4 some evidence is presented on the applied well-being measures. Section 5 reports on the estimation results of the random and fixed panel regressions and in section 6 we end with conclusions and some discussion on how to progress in future research.

2. A stocks and flows approach to capabilities: theoretical framework and conceptual model

Well-being: objective or subjective

In much of Sen's work he views well-being as being primarily objective, whereas others, especially in the realm of psychology, adopt a subjective interpretation (Headey, 1993; Diener and Oishi, 2000, Kahneman, 2003, Van Praag and Ferrer-i-Carbonnell, 2004; Kahneman and Krueger, 2006; Clark et al., 2008a,b; Headey, 2008, Headey et al., 2008,). Sen was critical about stated or subjective measurement because disadvantaged people might report high levels of SWB partly due to ignorance or deficiencies in their knowledge of the range of choices that ought to be available to them (Headey, 2005, p. 22). Another argument is related to adaptation and anticipation effects: people in their subjective assessment of the quality of their lives adapt themselves rather quickly to a new situation (e.g. a rise in income or wealth) or even anticipate to future changes and adjust their judgment and behavior accordingly suggesting that though income or resources changes affect peoples' well-being or poverty status in the short run they do not in the longer run (Easterlin, 2001; Clark et al. 2008b, , Ball and Chernova, 2008). Arguments in favor of the subjective interpretation concerns the claims of especially psychologists that beliefs and motivations affect behavior but also of sociologists' that well-being is relative referring to the 'keeping up with the Joneses' argument; people tend to judge their own well-being relative to others by comparing their own situation with their peers' as in social comparison and relative deprivation theory (Festinger, 1954; Runciman, 1966). We contend that the joint use of objective and subjective well-being measures might render a better clue on how people cope with or respond to social and economic shocks and to financial and economic stress (cf. Oswald and Wu, 2010). The literature on the subject further shows that the concepts of well-being used in the various disciplines are rather different. Sociology is concerned with social deprivation and happiness, psychology with life satisfaction and mental health or stress and economics with income, wealth, objective health or subjective welfare. Common to all disciplines is however to make a clear distinction between objective and subjective definitions of well-being (Schokkaert, 2007).

Sen's notions of capabilities and functionings

According to Sen, well-being can be defined as the freedom of choice to achieve the things in life which one has reason to value most for his or her personal life. In Sen's vocabulary the freedoms are the capabilities to achieve particular functionings (the doings and beings) such

as finding a partner, getting a job or following education. Capabilities are in Sen's world the real freedom people have or the opportunities and choices available to them. Central is the notion of 'freedom of choice': people, in Sen's view, should have the opportunities to achieve the functionings they have reason to value most for their personal lives (Sen, 1983, 1993, 1999 a,b, 2004, 2005; Muffels et al., 2002; Alkire, 2007). Capabilities are in Sen's world distinct from Dworkin's concept of resources because resources are just instrumental to or the means to enhancing people's well-being whereas what matters more to people is the ability to achieve certain functions that contribute to their well-being. People make choices during their life contingent on their capabilities which in the end impact their well-being outcomes. Outcomes are shaped in the interaction between people's capabilities and actual choices and the societal and economic context imposing constraints on preferred choices. The wider context including public policy therefore affect peoples' 'opportunity sets' and define people's 'freedom of choice' and the contingencies they face. Sen's model implicitly has a behavioral component while it presumes that people strive for 'freedom' making them happier the more their efforts and choices allow them to do the things they value most. But the outcomes in terms of real freedom and happiness are affected by income or liquidity, employment and health constraints, holding people back on their preferred choices.

Direct empirical measures for peoples' capabilities viewed as the ability to achieve certain functionings are obviously very difficult to define. The approach in this paper is therefore to define indirect measures based on empirical data. The capability framework translates in our approach into a stock-flow model where stocks indicate capabilities and flows, arising from choices, the functionings or the doings and beings. The stocks and flows jointly determine well-being outcomes. Within the life satisfaction literature there is - to our knowledge - little to no empirical work done testing Sen's framework in this way. Previous studies viewed the role of life values (Headey, 2008) and events such as divorce and job loss (Headey and Wearing, 1989) or recurrent unemployment (Winkelmann & Winkelmann, 1995; Clark et al., 2008a). Others also looked into the role of particular choices, such as the choice of a partner or children (Diener et al., 1999; Powdthavee, 2007; Cuvén, Senik and Stichnoth, 2010). No study to our knowledge attempts to bring the different components of Sen's model together.

A stock-flow-outcome approach

The stocks are indicated by the amount of economic, social, cultural and psychological capital people possess embodying their capabilities:

- Economic capital pertaining to wealth, human capital endowments and skills (Becker, 1975)
- Social capital (Putnam, 2000, 2005) pertaining to the level of trust in other people and the social networks people are involved in, indicated by the frequency of contact with others and the support people get from others in their network (bonding social capital), but also the membership of organizations and associations or clubs such as trade unions, social and sport clubs (bridging social capital)
- Cultural capital pertaining to individual values and life goals, such as work, family and *social values* like helping others and volunteering, but also *life goals* such as forming a family, raising children or making a career and to *risk attitudes* such as risk taking or risk aversion (Dohmen et al., 2005)
- Psychological capital pertaining to people's personality traits, generally indicated by the so-called 'big five': extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience (e.g. Diener et al., 1999).

These forms of capital impact on peoples' life chances and opportunities although the returns in terms of happiness depend on their investments (efforts and choices) or their doings and beings. The beings are the consequences of people's efforts indicated by the level of education, consumption, work and leisure time or marital status. The doings are the efforts or choices themselves, indicated by people's care decisions, investments in volunteering or in the career through training, job search, exercising etc. Life events are the consequences of peoples' efforts and choices. They either result from voluntary choices or from involuntary choices due to constraints. People invest in looking for a partner or in work (efforts) and make decisions to marry or divorce, to change jobs, or to reduce working hours but confront constraints leading to involuntary choices such as dismissal, divorce, separation through death etc. The inclusion of events implies 'path-dependency' since the sort of events people experience over time and how long they lasts, tend to affect future well-being. The life satisfaction literature suggests that though most events only have temporary effects the adverse effect of particular events like the death of a child or recurrent unemployment on life satisfaction might persist rather long (cf. Clark et al., 2008a).

Stocks and flows

A stock like wealth and income drawn from wealth fits perfectly to this stock-flows-outcomes approach, but also human capital, health and social capital which are seemingly

more difficult to interpret in this way. The level of education people attain is a stock that renders people opportunities to find the job they like most. Further education and training can be viewed as an achievement or an investment in human capital, just like overtime work. Health can also be seen as a stock because it is to a considerable extent determined by people's genetic heritage, but it is also an achievement because a good or bad health is partly the outcome of or a return to an investment in a healthy or unhealthy life style irrespective of people's genetics. Exercising, sport activities and smoking and drinking act as investments respectively disinvestments in health and it improves in the end one's stock of health. Through the impact on health these behaviors also affect the value of someone's human capital and therewith impact on achievements and outcomes in the form of well-being.

Trust in other people is part of people's stock of social capital while it induces cooperation which might pay-off in terms of returns to effort and social support. The time invested in cooperating and collaborating with other people can be seen as an investment in trust. The frequency of social contacts and whether people get support from their friends or neighbors, another dimension of social capital, indicate the ability of people to maintain one's social network, even though it gives no clue about the quality of the relationships within the network. Risk attitudes, but also life values can be seen as a stock and being part of people's cultural capital just as religion or religious convictions are. There is ample evidence that life goals or values matter for explaining SWB (Headey, 2008). Risk attitudes in the form of risk seeking or risk averse behavior is an important economic component influencing people's achievements and outcomes. Investing in a new job or starting a business might be risky but pays-off in terms of an improved career. Life values or goals can be divided into economic (success in job, affording luxuries, owning a house etc.), family (importance of having children or a partner), and social goals (altruism, get support from neighbors, good relationships with friends)². According to Headey (2008) economic life goals represent zero sum and family and social life goals positive sum domains. In zero sum domains gains for one always imply losses for others whereas in positive sum domains, gains are either not at the costs of others or even improve those of others. We therefore might view the time spent in volunteer work and caring as an investment in the relevant component of cultural capital.

² The distinction between family, social and economic life goals is based on performed principal components analysis on the data (see section 3 on data and methodology).

Table 1. Sen's CA approach and the measurement of stocks, flows and events

Capabilities	Functionings	
Stocks (capital)	Flows-Investments (choices)	Flows-Events (choices-constraints)
<i>Human capital</i>		
Education level	Training, Following courses	Completing education, school drop out
Health status	Exercise, healthy life-style (smoking, drinking) Visit doctor	Accident, work disability, handicapped
Job quality, wage	Job search Working time, job preferences Wage expectations	Lay-off, dismissal, new job, poverty (In)voluntary job change, Job loss Start-up, stop business
<i>Social capital</i>		
Social relationships (bonding)	Social contacts, get support	Change of residence
Membership union etc. (bridging)	Time spent to memberships, union, clubs	Change of residence
Living in a sustainable consensual union	Caring time	Marriage, cohabitation Divorce, separation
Trust in other people	Time spent on community events, working together etc.	Revealed distrust Victim of crime
<i>Cultural capital</i>		
Willingness to take risks	Invest in new job/ self-employment	Change of job, business, career
Life goals/values	Volunteer work, social activities Forming a family, number of children	Social events, life events: child birth
Religion	Attending religious events	Personal events
<i>Psychological capital</i>		
The big five (openness, agreeableness, extroversion, emotional stability, conscientiousness)	Investment in one-self (self-development)	Personal events

Source: SOEP, 2001-2008, BHPS, 2001-2008

Events

Events are functionings affecting future outcomes. Divorce can be seen as an event following a decision to split with large consequences for people's well-being. But also marriage tends to have long-term consequences just like unemployment or stopping a business. There is ample evidence in the literature on the positive effects of marriage and the negative effects

of divorce and unemployment on SWB (e.g. Gangl, 2006; Headey, 2008, Clark et al., 2008a, Headey, Muffels and Wagner, 2010). The two panel surveys now permit to define a variety of events, like moving into poverty, job loss, early retirement, divorce, marriage etc.³.

The 'stock-flow' model

The 'stock-flow' model is presented in Figure 1. Well-being is the outcome of the interaction process between stocks of capital and the choices or flows. Stocks allow people to make particular choices and choices result in decay (disinvestments) or accrual of stocks (investments). Using panel data we can associate levels of and changes in stocks to particular choices or flows by viewing the sequence of stocks changes and flows/investments over time. However, some reverse causation between the capabilities or stocks and the flows or choices people make might exist. People might adapt and change for example their life goals in the next period when the desired choice cannot be realized due to constraints.

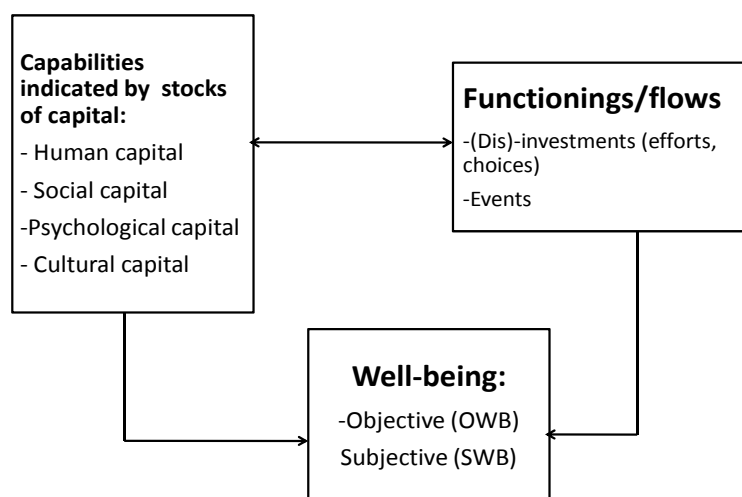


Figure 1. A 'Stock-Flow' model of Well-Being based on Sen's Capability Approach

³ In the German panel study we were able to derive events from the annual and monthly calendar information on labour market status. The German panel contains a calendar in which information is asked about the socio-economic status of the respondent for each of the 12 months preceding the interview date. Also the British panel contains monthly information on people's activities. The calendar information permits to assessing changes over people's work history and life course. Most of the events are however derived from the annual information at the time of the interview.

The empirical model

From a behavioral point of view it is assumed that people make choices which they value most for their subjective and objective well-being. People invest in a career for example because it provides economic and social resources they need to satisfy particular needs which they value important for their well-being. The outcome though in terms of OWB and SWB is affected by events resulting from voluntary as well as involuntary choices imposed by the context and acting as constraints. Though objective well-being might be perceived as instrumental to achieving a satisfactory level of subjective well-being it might also be that particular correlates with SWB (such as personality traits) have low correlations with OWB and vice versa, that particular correlates with OWB (such as human capital endowments) have low correlations with SWB. This questions also the relationship between SWB and OWB. Though this relationship is interesting for further scrutiny it is not the main purpose of this paper which is to view the distinct impact of capabilities and choices on various measures of well-being used in the literature. From the evidence to be presented later in section 4, we show that the concepts of OWB and SWB are clearly associated but that the correlations are all below 0.35 indicating that they pertain to different concepts.

Country and welfare regime

We use evidence for the two countries to test Sen's approach, but to be able to interpret the occurring differences we make use of the Varieties of Capitalism (VOC) literature (Hall and Soskice, 2001). The two countries seem to represent two different types of market economies: a strongly coordinated (Germany) and a weakly coordinated, more or less liberal type (United Kingdom). The question addressed is to what extent Sen's CA model is able to explain well-being in these two countries representing two different market economies and two different 'policy regimes'. The distinction is relevant for Sen's framework because people's 'capabilities' are to a large extent influenced by the level of their human capital endowments obtained through education, learning on the job and training. The coordinated type is now typified by a so-called 'specific skills' regime and the weakly coordinated one by a 'general skills' regime (see also Estéves-Abe et al., 2001). We therefore suspect that because of the insider-outsider issue a 'specific skills' regime due to the non-transferability of these skills to other employers meet particularly problems to ensuring employment security for in particular the low-skilled whereas a 'general skills' regime due to market forces might encounter problems to ensure low-skilled workers income security or income stability over the career. The British education system is suspected to have 'meritocratic' features because of which the low educated might have ample chances to make a career

and move upwards on the career ladder attaining higher wage levels than the low educated in Germany who have much worse chances to escape low level jobs or making a career.

3. Data and methodology

3.1 Data

We used the German and the British panel covering respectively 25 (1984-2008) and 18 years (1991-2008) of data.⁴ We included all persons of 16 to 65 years. All incomes were deflated by the consumer price index. The data were weighted with the product of the cross-sectional weights and the staying factors (the probability to stay in the panel across two consecutive waves). We created a person-year file while including information from the monthly calendars for the entire period.

The information on risk attitudes and life values were collected in only four years (SOEP) of the German panel. The UK data do not contain information on risk attitudes and in only three waves information was asked about social values, the last time in 2008. Though values might change over time they turn out to be rather stable across the three and four years of observation in the British and German panel. We therefore imputed the values for the missing years in between by taking the average of the values between two years if available for that particular person. We also used the information on time use which was available for many years in the German and some years in the British panel. Even though time use information reflect preferences as well as behavior and therefore tend to change more over time than just values, for avoiding losing too many observations we imputed the values for the missing years by calculating the average of the values for the two non-missing years which are closest to the missing year.

3.2. Three measures for objective and subjective well-being

In this paper we use objective and subjective measures of well-being indicated by three yardsticks: income and employment security and life satisfaction:

- Income security is defined as escaping relative low income statuses. We calculated the ratio of equivalent household income in proportion to the 60% income poverty threshold as used by the OECD and Eurostat. The income measure is a rather well-known continuous measure of 'relative income' very similar to Sen's well-know

⁴ For more information about both panel studies see Frick et al., 2007.

‘income inequality’ or ‘income deprivation’ measure though his inequality measure was defined as a weighted gap between income and the income threshold (weighted with the level of inequality among the poor) instead of the ratio . The income information in both panels refers to the last year’s income period but in Germany this is the last calendar year whereas for the UK it is the current year running from the last interview in the period October-December last year to the same interview period this year. For Germany we therefore assigned the $t+1$ income to the current year whereas for Britain we used the information as it is given for the current year.

- Employment security is defined as the number of weeks people were full-time or part-time employed in the current year. Since the information in both panels is asked for the preceding year we assigned the values of the next year to the current year. People might however choose for part-time employment because they cannot find a full-time job. But when people prefer to work part-time and they are able to realize their preferences they should be considered as being employment-secure. For that reason we correct for whether the part-time or full-time work corresponds to people’s working time preferences or not. We correct for the voluntary nature of a low attachment to the labor market by deriving a variable indicating whether people want a job or prefer not to work. Unemployed and inactive people in the British as well as the German panel were asked whether they actively search for a job or not and whether they are available for work and can start in due course. In the second step we used this information to define a job or hours match variable indicating whether the actual working hours match peoples working time preferences or not. In the latter case they are overworked (work more hours than they want) or underworked (work less hours). Unemployed and inactive people are assumed to be underworked if they actively look for a job, otherwise they are classified as having their preferences met.
- Life satisfaction is measured in the usual way on a scale of 0 to 10 as in Germany or 1 to 7 as in the UK, 0 indicating the lowest level and 10 or 7 the highest. The life satisfaction question is asked every single year in the German panel but only as of 1996 in the British panel and missing for 2001, so for 11 years only. We transformed the British scale into a 0 to 10 scale. According to set-point theory (Diener, 1984; Headey, 1993; Headey, Muffels and Wagner, 2010) people’s life satisfaction score remains rather stable over time because each individual tend to stay on his or her own track, dependent in particular on a person’s score on the ‘big five’ social-

psychological traits. Shocks associated with health impairments or life events (such as unemployment, marriage/divorce) may cause people to depart from their long-term path but only temporarily; people tend to recover rather quickly to return to their quasi permanent baseline track.

3.3. The empirical model

We employed random and fixed effects panel regression models to allow correcting for unobserved heterogeneity or individual effects. This is important because capabilities are latent or unobserved factors which are likely to be associated with the observed measures for capabilities that we included in our models such as education level and participation in training. Even though we were able to incorporate many capability and functionings indicators we cannot rule out the possibility that we only partly capture the unobserved heterogeneity related to factors as ability, motivation and effort. The fixed effects (FE) models correct for this provided that these unobserved factors are assumed to be time constant. The FE models show the impact of time varying covariates such as choices and events on changes in well-being. The random effects (RE) models inform us about the impact of time constant but important factors such as gender, education level and being an immigrant etcetera on measures of SWB and OWB which are removed in the fixed-effects models. More importantly, the random effects models show the relative size of the effects of personality traits (measured only once) compared to those of stocks, choices and events. For these reasons we estimated random and fixed effects panel regression models separately for the three measures of subjective well-being (SWB), income security (YS) and employment security (ES):

$$SWB_{it} = \alpha_0 + \beta X_{it} + \delta_1 Traits + \delta_2 Stocks + \delta_3 Choices + \delta_4 Events + \mu_i + \gamma_t + \varepsilon_{it} \quad (1)$$

$$YS_{it} = \alpha_0 + \beta X_{it} + \delta_1 Traits + \delta_2 Stocks + \delta_3 Choices + \delta_4 Events + \mu_i + \mu_i + \gamma_t + \varepsilon_{it} \quad (2)$$

$$ES_{it} = \alpha_0 + \beta X_{it} + \delta_1 Traits + \delta_2 Stocks + \delta_3 Choices + \delta_4 Events + \mu_i + \mu_i + \gamma_t + \varepsilon_{it} \quad (3)$$

where income security (YS_{it}) is the ratio of equivalent income of each individual at time t to the level of the poverty line in the country for year t as defined by the 60% of the median household income threshold and applied by the European Commission (Y_{it}^{eq} / pl_t). Employment security is defined as the number of weeks employed in the current year and

life satisfaction or subjective well-being (SWB) as the score on the life satisfaction scale in the current year ranging from 0 to 10. The X_{it} 's represent a set of control variables either time invariant like sex, living in East Germany and 'born in a foreign country' or time varying, like age, age squared, education level, number of children, life course stage and whether people are seeking work or not. The traits, stocks and events variables are also included either as time invariant variables, like personal traits or risk attitudes (part of stocks), or as time varying such as functionings and events. The γ_t represents a time-specific effect that is assumed to correct for business cycle influences indicated by the yearly changing unemployment rate for each of the periods (1980s, 1990s or 2000s). The u_i represent the unobserved heterogeneity or individual effects and the disturbance is given by ε_{it} . The SWB scale is ordinal and ranges from 0 to 10⁵. However, a cardinal treatment of it renders more or less the same results (Diener et al., 1999, Clark et al., 2008a). The advantage of treating the life-satisfaction scale in a linear manner is that we can correct for unobserved individual effects estimating GLS random and fixed effects models.

Variables

The most important variables are of course the variables indicating the capabilities, choices and events. Table 2 shows the definition of the included variables in the model. We, firstly, added some obvious controls knowing to be important correlates of well-being such as gender, age, age squared and immigrant status. For Germany we added a variable indicating whether they are living in former East-Germany since well-being levels are known to be lower in the former East. We added as control also a life-course oriented household type variable indicating the marital status and life-stages of people (single, single parent family with young children, couple with young children, empty nest etc.). For the variables of interest, firstly, the capabilities we included variables measuring genetic or psychological capital, human capital and social and cultural capital. Genetic capital is measured through the 'Big Five' personality traits. Human capital is measured through education level and training of which the first is however measured very differently in the two countries. For Germany as well as Britain we used the international education level classification called ISCED to distinguish between three levels of education (high, intermediate and low. Social

⁵ Because SWB is basically an ordinal scale some researchers used ordered probit or ordered logit for estimation. However, since the scale ranges from 0 to 7 in Britain and 0 to 10 in Germany (and hence contains 7 to 11 mass points), the linearity assumption as implied by treating it as a cardinal scale is not seriously violated. A test using Kernel density estimates and kernel density plots on the data confirms this.

capital is measured through the frequency of contacts with friends and relatives, the support they get from others in their social network and through the level of 'trust in other people'. The amount of cultural capital is measured by the so-called life goals or life values dealing in Germany with the importance of certain aspects in life such as altruism, success in job, what people can afford, being happy with the partner, having children, friends, travel and social or political activities and owning a house. The life goals list in the British panel largely pertains to the same items such as the importance of partner and children, of friends, owning a house, having success in work and good health. We employed for both countries a principal components factor analysis on these life goals and the results (not given here) show that there remain basically three main factors in Germany and two factors in Britain which we called the economic (in Germany success in job and to afford things, and in Britain: success in job, to afford things and living an independent life), family (importance of partner and children) and social life goals (in Germany and in Britain importance of friends). Because of the low loadings in Germany of 'owning a house' and 'travel' and 'participation in social and political activities' we removed these items. We did not weigh the factors with the factor loadings but just took the aggregated scores on the variables belonging to the two dimensions. Eventually we included a number of events as listed in Table 1. For Germany and Britain we constructed a limited set of events based on the monthly and/or annual information in the panel with a view to employment and marital status. These events are getting divorced, getting married or cohabiting, early retirement, start or stop one's own business and involuntary job change due to dismissal, lay-off or business close downs. The constructed well-being indicators for income (IS) and employment security (ES) and subjective well-being (SWB) refer to the current year whereas the events refer to the change from the last calendar or last financial year to the current year.

Table 2: List of variables used in the empirical model

Variable	Germany	Britain
Controls		
Age and age squared	Based on year and month of birth	Based on year of birth
Household type (life course stages)	Couple youngest child <5 years; couple youngest child between 6 and 15, single with children, single parent, youngest child <5, single parent, youngest child between 6 and 16, other type	Similar
Number of children	In-living child between 0 and 16 years of age	Similar
Number of other employed in the household	All other members in the household with self-reported employment status.	Similar
East-Germany and Immigrant	Living in East-Germany; Not born in Germany	No region indicator used; Not born in Britain
Interaction unemployment rate and period correcting for the business cycle	Overall annual unemployment rate is derived from the Eurostat database. Period is split into the 1980s, the 1990s and the 2000s	Similar to Germany though period split in two (1990s and 2000s)
Stocks		
Health limitations	People reporting being handicapped or not and their degree of disability. If more than 50% people are considered disabled for work	Health problems limit amount and type of work
Human capital	Education level using ISCED codes and recoded into low, intermediate and high.	Similar ISCED classification used.
Social capital	<i>Bonding</i> : Frequency of contacts relatives/friends, Trust other people (4 categories from totally agree to totally disagree) <i>Bridging</i> : Membership trade union/association, clubs	Frequency contacts friends Trust based on question whether people can be trusted, that runs from 1 'most people can be trusted' to 3 'depends'.
Cultural capital	Religion: Catholic, Protestant, Other Christian, Other religion, No denomination Life goals: importance of being able to afford something, altruism, success in job, family, friends, partner, owned house Willingness to take risks (11 points scale)	Similar Life goals: importance of family, friends, success in work, health, house, travel. No information on willingness to take risks
Functionings/Events		
Career choices through investing in training, apprenticeship	Training participation for the employed and unemployed separately and apprenticeship	Participation in general and specific training and apprenticeship for the employed, and in government training for the unemployed/inactive
Work-leisure choices indicated by job match for unemployed and employed separately	Difference between preferred and actual total working hours in all jobs smaller or equal to 3 hours. More than 3 hours difference indicates being overworked or underworked. Unemployed and inactive people are considered underworked when they actively search for a job.	Asked to people whether they want to work more or fewer hours or that they want to continue with the same number of hours. Unemployed and inactive people are considered underworked when they actively look for a job.
Lifestyle choices through investment in healthy lifestyle (time use)	Healthy life: active sports, exercising,	Similar
Social choices through investment in social networks (time use)	Time spent with friends, attending community and social events, volunteer work. <i>Time weekdays on</i> : housework, shopping, work, visiting friends	Frequency of attending social and community events; frequency of volunteer work and of spending time with relatives/friends
Cultural choices through investment in culture	Time spent on cultural events Visiting church or religious events	Similar
Events such as divorce/separation, marriage/cohabitation, early retirement, involuntary job change	Constructed from the monthly calendar and from annual information at t-1 and at interview date	Constructed from monthly information on activities and from annual information at t-1 and t

Source: SOEP, 2001-2008, BHPS, 2001-2008

4. First evidence on the three well-being measures

In Table 3 some evidence is presented on the levels of our three well-being measures: subjective well-being (SWB), income security (YS) and employment security (ES) by employment status for the years 1999-2008 in Germany and Britain.

Table 3: Well-being according to three well-being measures by employment status and gender, SOEP 1999-2008; BHPS 1999-2008

Employment status	Germany			Britain		
<i>Males</i>	SWB	YS	ES	SWB	YS	ES
Employed	7.1	2.1	49.4	7.0	2.6	49.9
Self-employed	7.0	3.0	50.3	7.1	2.4	50.9
Unemployed	5.5	1.2	7.9	6.1	1.4	14.8
Inactive	6.9	1.7	2.9	6.6	1.7	8.1
Total men	7.0	2.0	39.3	6.9	2.4	41.0
<i>Females</i>						
Employed	7.1	2.2	47.3	7.0	2.5	49.1
Self-employed	7.2	2.8	46.9	7.0	2.6	49.9
Unemployed	5.9	1.3	3.7	6.0	1.6	17.4
Inactive	7.1	1.7	2.2	6.8	1.6	7.7
Total women	7.0	2.0	29.9	6.9	2.2	34.4

Note: LS=life satisfaction (0-10); YS=income security (income-to-needs ratio); ES=Employment security (number of weeks employed in the current year)

Source: SOEP, 2001-2008, BHPS, 2001-2008

Not surprisingly, the unemployed together with the inactive people show the lowest levels of well-being according to all measures in both countries. The unemployed though perform much better in the UK than in Germany according to all well-being measures whereas the self-employed in Germany show higher levels of well-being than their counterparts in Britain. In particular the average employment security level indicated by the number of weeks the unemployed still work over the entire year in this ten year period is much better in Britain than in Germany reflecting probably the more efficiently operating labor market in Britain. Whereas women have higher levels of subjective well-being in Germany the reverse is true in Britain. On the other hand female income and employment security levels are higher in Britain than in Germany. The evidence therefore shows that the three concepts are rather different. Further evidence on their relationship is shown in Table 4 below however indicates that SWB and OWB measures are clearly associated but that the correlations are all below 0.35, suggesting that the three concepts indeed are substantially different.

Table 4: Correlations between subjective and objective well-being measures

	Britain 1996-2008 (BHPS)	Germany 1984-2008 (SOEP)
SWB with YS	0.10	0.17
SWB with ES	0.11	0.10
YS with ES	0.31	0.25

Note: SWB=Subjective well-being; YS = Income security; ES=Employment Security

Source: SOEP, 2001-2008, BHPS, 2001-2008

When estimating a fixed-effects panel regression model on SWB (see also section 5) with the standard controls (such as age, marital status, number of kids, gender, immigrant status and unemployment rate) and with the OWB measures of income and employment security as covariates, the effects of OWB on SWB turn out to be significant but rather moderate (0.11 for income security and 0.03 for employment security in Germany and 0.02 and 0.03 respectively in Britain).

5. Results on the model estimations

In the next step several GLS panel regression models are estimated to test the empirical ‘stock-flow’ model. The results show the separate contribution of capabilities, choices and events on the three measures of objective and subjective well-being. We estimated five separate models on each of the three well-being indicators. These are the following:

- Model I. The *baseline model* with the usual controls (age, age squared, sex, household type, number of children, region (West and East German region only), being an immigrant and unemployment rate.
- Model II. The *traits model* with the controls and the five personality traits variables included
- Model III. The *stocks model* with the controls and the stocks but without the personality traits.
- Model IV. The *traits-stocks model* with the controls, the *stocks* and the *traits* included
- Model V. The *stocks-flows model* with the controls, traits, stocks, choices and events.

For each of the three well-being indicators five random effects models are estimated to examine the added value of traits, stocks, choices and events for explaining well-being. The results show the effect sizes of the various measures of capabilities, choices and events and

their additional explanatory power for subjective and objective well-being. Table 5 reports on the fit indices (R-squares) for the five random effects models. Random instead of fixed effects models were estimated since we had information on personality traits in the German and British panel for one year only. In the fixed-effects model time-constant traits variables drop out. Set-point theorists argue that subjective well-being is relatively stable over time because of the stability of personality traits not changing much after childhood. There is one exception though known from the literature associated with the death of a child which event however is relatively rare. For that reason we assumed the traits to be time-constant and imputed them for the missing years.

Table 5. Contribution of traits, stocks, choices and events to explaining well-being according to five random effects GLS models in Germany and Britain (R-squares)

	Germany 1984-2008					Britain 1991-2008¹⁾				
	(SOEP)					(BHPS)				
	M I	M II	M III	M IV	M V	M I	M II	M III	M IV	M V
	BL	TR	ST	TR+ST	ST-FL	BL	TR	ST	TR+ST	ST-FL
Life satisfaction (SWB)	0.045	0.098	0.117	0.148	0.193	0.034	0.119	0.107	0.171	0.195
Income security	0.116	0.128	0.172	0.176	0.228	0.212	0.223	0.290	0.291	0.330
Employment security	0.268	0.280	0.330	0.334	0.546	0.177	0.183	0.279	0.280	0.445

Notes: ¹⁾ Life satisfaction is asked from 1996 only in the BHPS. MI-MV=model I to model V; BL=Baseline; TR=Traits; ST=Stocks; FL=Flows (choices plus events)

Source: SOEP, 1984-2008; BHPS, 1991-2008

The stocks, measuring capabilities, seem particularly important for explaining income and employment security. Adding the stocks variables to the models with only controls (model III) raises the explanatory power indicated by the R-square strongly in both countries (in Britain from 21% and 18% for respectively the income and employment security model to 29% and 28%). The traits seem particularly important for explaining life satisfaction or SWB in both countries (the R-square raises from 4.5% to 10% in Germany) but exert hardly any additional effect on explaining income and employment security. Comparing models II, III and IV on SWB shows that the joint impact of stocks and traits is larger than the impact of each separately, though without being additive. Favorable traits seem to reinforce people's capabilities and jointly determine more than each separately changes in subjective well-

being. The effects of choices and events are particularly strong in the employment security model in both countries and to a lesser extent also in the income security model. As will be shown later, in particular work-leisure choices exert a strong impact on changes in income and employment security over time. On the other hand social choices turn out to be more important for SWB than for OWB whereas the effect of the work-leisure choice is smaller in the SWB models especially in Britain, though the impact is still substantial.

Fixed effects (FE) models

Since we are also interested in the effects sizes of the various capabilities and choices separately for the three well-being measures we estimated in the second stage fixed effects models in particular the extended Model V, the model with stocks, choices and events. We employed the Hausman model selection test, showing indeed that the fixed effects model should be preferred over the random effects in both countries for all three well-being measures. The FE specification is the preferred one because the individual unobserved effects are likely to be associated with especially our capability measures. The results are given in Table 5 (Germany) and 6 (Britain) in Annex 1.

Below we discuss shortly the outcomes showing to what extent capabilities and choices can explain long-term changes in objective and subjective well-being.

5.1 Results from the random and fixed effects models in Germany and Britain (estimation results are given in Annex 1)

The baseline model with only controls

We briefly review the results of the baseline model for the well-being measures since the results confirm the evidence in the literature. The relationship of SWB with age is U-shaped, first decreasing up to 45 years in Germany and 41 in Britain and then increasing. But for income and employment security the relationship is exactly the opposite, inversely U-shaped, first for income security increasing up to 50 years in Germany and 42 years in Britain and for employment security up to 39 years in both countries and then decreasing. It shows that subjective and objective well-being measures are indeed different concepts which need to be studied separately.

Children tend to increase life satisfaction in Germany but to reduce it in Britain which is remarkable. On the other hand, children seem to reduce people's income security and especially employment security in both countries compared to people without children.

This is known in demographic research known as the 'life cycle squeeze' associated with the retreat of the female partner from the labour market after childbirth resulting in a decline of income (see e.g. Kalmijn and Alessie, 2008), the so-called 'child valley' in life cycle income. Nevertheless, couples with very young children are happier than couples without children but only in Germany; in Britain they are seemingly less happy. Worst off though are single parent households with young children viewing their levels of subjective and objective well-being in both countries. This confirms the 'income squeeze' thesis since these households suffer most from a reduced household income due to a combination of labour market withdrawal and the income consequences of divorce while facing increasing costs of children. The 'child valley' effect seems therefore more important for these single parent families. The more household members work the happier people are in Germany but not in Britain. The latter finding might be associated with 'time squeeze' effects because of the reduced time left for fulfilling caring duties and household chores. The more workers there are in the household the better though the level of income and employment security in both countries. East-Germans and immigrants share a lower level of subjective well-being and have a worse record in maintaining income and employment security. The British immigrants fare apparently better with a view to their subjective well-being than their German counterparts. The unemployment evidence confirms the adverse impact of unemployment experience known from the literature on subjective and objective well-being in Germany as well as in Britain.

The fixed effects results are very similar to the random effects results except for the unemployment rate that becomes insignificant in the FE model. That effect seems to be taken over by the effect of the number of workers in the household which effects is stronger in the FE model.

Traits

The purpose of the analyses is to show the effects of capabilities after netting out the effects of personality traits. The evidence on traits, as being part of the set of capabilities, confirms the adverse effects of emotional instability or neuroticism on life satisfaction in both countries. All the other personality traits except openness show a positive effect on subjective well-being in both countries. Less well-known are the significant effects of these traits on income and employment security. Especially the sign and the size of the negative effects of neuroticism and of openness and agreeableness on employment security in Germany are remarkable. In Germany but also in Britain we find a negative effect of agreeableness on income and employment security. Conscientious people seem more

satisfied with life though they are less income secure and more employment secure in Germany. In Britain they are both, more income and employment secure.

Stocks or capabilities

The more human, social and cultural capital endowments people have the more satisfied they are with life and the better they appear capable of maintaining one's income and employment security in both countries. A high education level warrants a job and therefore pays off in terms of feeling happier. Remarkably though, the effect of education level on SWB is negative in Britain according to the random effects model possibly reflecting the meritocratic nature of the British system. In particular the adverse effect of health limitations and disability shows up very strongly in all models in both countries.

Interestingly, we find significant effects of the 'willingness to take risks' variable in Germany showing that economic risk seeking behavior seems to reward in terms of life satisfaction and staying income and employment secure at least in the random effects models. In the fixed effects models the impact on income and employment security turns insignificant and even negative. This is likely to be due to the few measurements we had and the lack of variation associated with that. Another interesting finding deals with the positive impact of social capital (trust, memberships). It is shown that '*trust in other people*' exerts a particularly strong positive effect on subjective well/being in Germany as well as in Britain. The positive effect of trust on income and employment security in both countries disappears in the fixed effect model. This might again be due to the few measurement time-points and lack of variation over time. The impact of social capital on income and employment security is especially in Britain also reflected in the strong positive effect of membership of a trade union or association. Both results render firm support to the social capital thesis put forward by Putnam and others (Putnam et al., 2005).

Religion exerts a small effect on income and employment security but a stronger effect on life satisfaction in both countries. In Britain, Protestants and Other Christians are slightly happier compared to Catholics, whereas in Germany people with no denomination or another religion are less happy. Social and family life goals make people feel happier in Germany and in Britain but not necessarily more income and employment secure. The positive effects on SWB are rather strong in both countries (see also Headey, Muffels and Wagner, 2011). On the other hand, the more important social goals are, the less employment secure people tend to be, both in Germany and Britain. The explanation might be that the time invested in family and social networks make people happier but reduces the time available for working. That family and social goals do not harm people's income

security - in Germany family goals even have a positive effect on income security - might be related to the positive impact of social capital on the job match and the career counterbalancing the negative time spending effect. The SWB literature suggests that persistent rather than transient commitments to material goals matter more for life satisfaction (see Headey, 2008; Headey et al., 2010). The random effects models show no effect of material goals on SWB in Britain and in Germany. In an earlier paper on Germany we found support for the findings in the literature that persistent commitment to material life goals not only matter more to happiness than short-term commitments but also that they exert a negative effect on SWB too. The negative effect is confirmed in another paper on the German, British and Australian panel data (Headey, Muffels and Wagner, 2011). The explanation might be that striving for material success may make people happier in the short-term but harms people social relationships in the longer-term while it reduces the time spent with friends and relatives.

Functionings: Choices

Choices can be seen as investments or disinvestment in stocks. Working overtime might be considered a choice for investing in the career. That turns out to be rewarding while it indeed improves people's income and employment security in Germany and Britain. It has no effect on people's life satisfaction in Britain and only a small positive effect on their SWB in Germany which is slightly surprising. The effects of being overworked or underworked while at work on subjective well-being are much stronger though in both countries suggesting that it is not the number of hours that matters but to what extent people's working hours fit or match their working time preferences. In another paper (Muffels and Kemperman, 2011) focusing on German women of 20 to 55 years we find strong support for the impact of the hours match on subjective well-being. Employed people working less than they wish (underworked) pay a price in terms of income security in both countries but their employment security is even improved compared to working and non-working people for which the working hours match their preferences. On the other hand overworked people (working more than they wish) are less happy but more income and employment secure. The negative effects of being over or underworked on SWB are rather strong. They are even stronger for the unemployed and inactive people, which is not surprising with a view to the stronger mismatch between their preferences and actual involvement in work.

For training we found rather strong and positive effects on well-being in Britain but puzzling negative effects on all well-being measures in Germany. The reason might be that it resembles the adverse well-being outcomes for the unemployed or inactive people who

participate strongly in (vocational) training in Germany. For the same reason we also found negative effects for apprenticeship jobs in Germany. The explanation might also be found in the different professional education system and the earlier discussed difference between a 'general skills' regime such as in Britain and a 'specific skills' regime such as in Germany. In Germany potential workers are educated and trained in the highly stratified vocational (apprenticeship) education system for a particular job in a particular profession with specific skills prior to entering the labour market. Formal training on the job can therefore be limited to compensate for lack of skills obtained before. In Britain the educational system is much less stratified with respect to vocational education and it provides much larger shares of (lower educated) workers with general skills who require training on the job to fulfill a specific job (see also Korpi et al., 2003). Training tends to act as a sorting mechanism to select workers into the better jobs and careers. These results on training require further scrutiny with a different research design since for examining the effects of training we need to compare a matched group of workers with and without training in their subsequent careers, but that goes beyond the purpose of this paper. That people though with job related training tend to have better income and employment opportunities in Britain suggest that training matters to people's careers.

The investment in a healthy lifestyle seem to pay-off since people active in sports or exercising are happier and more income secure in both countries. They are also more employment secure in Germany but not in Britain. Earlier we reported already on the effect of religion on subjective well-being as part of the capabilities; the results on attending religious events show positive effects on life satisfaction but not on income or employment security.

The investments in social capital not always pay off while it seems to be related to the amount of time people invest. Time spent to volunteer work has a negative effect on income and employment security in Britain but a positive effect in Germany. There seems to be a trade-off between the time invested in volunteering leaving less time to spend in formal work (Britain) and the positive impact of the building up of social capital through volunteering on the career (Germany). The time spent to visit relatives and friends during weekdays also harms income security as well as life satisfaction though visiting relatives and friends occasionally (social networking) improves the employment security.

Events

Events exert a rather strong impact on all three WB measures in both countries though the effects are rather dissimilar. Unexpectedly, we find that the birth of a first child raises

people's life satisfaction in Britain and Germany but also their income and employment security at least in Britain. In Germany the birth of the first child lowers people's income and employment security. We already referred earlier to the 'life cycle squeeze' thesis for an explanation. It might be that fathers in Britain after childbirth tend to invest more in work to compensate the income loss of their partner and aimed at raising the household income to cover the additional costs of children (Fouarge et al., 2010). The effect of second and following childbirths on employment security is negative in Britain. Divorce harms people's life satisfaction in both countries but remarkably not people's income and employment security, at least in Britain. The transition into early retirement harms all three forms of well-being in Germany, but only the employment security and not people's life satisfaction or income security in Britain. Rather strong adverse effects on income and employment security but also on life satisfaction are observed for unemployment experiences in the past in Germany and Britain. Stopping one's business has especially a negative impact on life satisfaction in Germany but exerts no strong effects on subjective or objective well-being in Britain. These results confirm the existence of strong 'scarring' effects of unemployment on well-being and suggest that people seem to recoup with great difficulty from unemployment experiences in the past (see Clark et al., 2008a, Muffels, 2008).

6. Conclusions and discussion

The empirical findings render strong support for the capabilities and functionings approach of Sen. The results are generally very plausible and confirm the findings of earlier research. The outcomes show the added value of Sen's capability approach for explaining objective and subjective well-being and their evolution over time. The aim of the paper was to examine the added-value of Sen's capability approach for explaining well-being. Therefore we did not look into the relationships between the various well-being measures which is however an interesting issue for future research.

The stocks indicating Sen's capabilities seem particularly important for explaining income security and employment security in both countries whereas the personality traits exert the largest impact on SWB and only a small effect on income and employment security in both countries. Choices and events exert a large impact in all three models both in Britain and Germany whereby choices in particular affect SWB and events in particular income and employment security. All models perform rather satisfactory with a view to the explained variance, including the fixed effects models. The reason might be that the long-running

German panel but also the shorter British panel allow the researcher to include a rather rich set of covariates in the models which are required to test Sen's capability model.

Overall, the results appear fairly robust in the models and we consider it reassuring that the fixed effects models reveal no different picture from the random effects models except for a very few variables indicating that correcting for the correlation between the unobserved individual effects and the observables does not do much harm to the parameter estimates of the models suggesting that most of the variance is captured with the observables in the models.

The results further show that the effects of most variables are very similar across the two countries except for some. Germany has a better record in maintaining income security and Britain a better record in maintaining employment security especially for females. Whether that should be attributed to the different 'skill' regime in the two countries remains to be seen. But we do find evidence in our models that the human capital variables such as education level and training efforts behave very differently across the two regimes. We argued that the dissimilar outcomes seem to mirror the differences between a 'general skills' regime as Britain is and a 'specific skills' regime as Germany is. Since the evidence is not conclusive yet, there is reason for further scrutiny into the issue.

Rather strong positive effects were observed of social capital variables like trust and social networks (bonding) and memberships (bridging) on income and employment security though not on SWB, but also of cultural capital factors like the willingness to take risks and social and economic life values such as altruism and success in a job. Strong positive effects are observed for risk taking behaviour on income and employment security in Germany but negative effects on life satisfaction. Social values raise people's life satisfaction in both countries. The results therefore convincingly show that along with human capital and economic values social capital and social values do significantly contribute to explaining changes in well-being confirming earlier findings (Headey, Muffels and Wagner, 2011).

These results hold a plea for more interdisciplinary research since a single discipline appears unable to fully explain long-term changes in well-being. In this paper the aim was to use of a broad set of measures derived from the rich theoretical literature on well-being in the various disciplines to test whether the capability approach of Sen translated into an empirical 'stocks-flows' model of well-being has added value. We showed that Sen's approach makes sense to arrive at a better understanding of long-term changes in objective and subjective well-being. The capability approach adds to our knowledge about what raises people's long-term well-being with a view to income and employment security and how satisfied people are with their lives.

Annex 1. Estimation results

Table 6: GLS random (RE) and fixed effects (FE) models on subjective well-being (SWB), income security (YS) and employment security (ES), Germany, 1984-2008, population 16-64 years

	SWB-RE	SWB-FE	YS-RE	YS-FE	ES-RE	ES-FE
<i>Controls</i>						
Age	-0.037***	-0.028***	0.054***	0.057***	3.244***	3.152***
Age squared /100	0.042***	0.016***	-0.054***	-0.057***	-4.153***	-3.992***
<i>Household Type</i>						
Couple, child 0-5	0.050**	0.044*	-0.199***	-0.195***	-5.298***	-5.511***
Couple, child 6-15	0	0	-0.117***	-0.109***	-0.640**	-1.010***
Single, no child	-0.220***	-0.163***	-0.108***	-0.047**	-0.08	-0.05
Single parent, child 0-5	-0.380***	-0.285***	-0.304***	-0.248***	-5.599***	-4.520***
Single parent, child 6-15	-0.356***	-0.272***	-0.275***	-0.220***	1.974***	2.117***
Other	-0.060***	-0.064***	-0.028**	-0.013	-0.945***	-1.094***
Number of children 0-15	0.023**	0.021*	-0.134***	-0.136***	-2.303***	-2.148***
Female (ref. male)	0.103***	.	0.041***	.	-6.654***	.
Number of other employed	0.035***	0.031***	0.036***	0.026***	-0.202**	-0.263**
East	-0.514***	.	-0.503***	.	-1.421***	.
Foreign	-0.033	.	-0.301***	.	0.145	.
Unempl Rate *Period	-0.014***	-0.009***	-0.005***	-0.006***	0.030***	-0.02
<i>Traits</i>						
Neuroticism	-0.217***	.	-0.059***	.	-0.544***	.
Extroversion	0.040***	.	-0.003	.	0.151	.
Openness	0.034***	.	0.067***	.	-0.363***	.
Agreeableness	0.053***	.	-0.059***	.	-0.364***	.
Conscientiousness	0.068***	.	-0.032***	.	1.266***	.
<i>Stocks</i>						
<i>Highest completed education(Ref. low education)</i>						
High education)	0.099***	0.042	0.268***	0.051*	3.858***	3.373***
Intermediate education	0.001	-0.033	-0.042***	-0.096***	1.018***	0.393
<i>Health</i>						
Work disability	-0.245***	-0.159***	-0.087***	-0.063***	-6.995***	-6.030***
Handicapped	-0.321***	-0.243***	-0.049***	-0.034**	-4.430***	-4.498***
<i>Social-cultural capital</i>						
Social Network	0.094***	0.073***	-0.029***	-0.032***	-0.687***	-0.569***
Member Trade Union	-0.029	-0.029	-0.013	0.019	2.887***	2.193***
Trust	0.274***	0.108***	0.067***	-0.006	0.505***	-0.236
Risktaking	0.022***	0.027***	0.013***	0.001	0.078**	-0.111*
<i>Religion (Ref.: Catholic)</i>						
Protestant	-0.017	-0.069	-0.02	-0.023	-0.221	0.339
Other Christian	-0.125**	-0.063	0.005	0.120**	0.76	1.397
Other religion	-0.242***	0.042	-0.118***	0.097*	-2.147***	1.118
No denomination	-0.075***	-0.065	0.045**	0.072**	0.243	1.213**
<i>Life goals</i>						
Social Goals	0.084***	0.068**	0.011	-0.029	-1.057***	-1.338***
Family goals	0.140***	0.130***	0.030***	0.046***	-0.174	-0.097
Material/success goals	0.01	0.055**	0.068***	0.044***	4.584***	4.542***
Overtime in work	0.005***	0.006***	0.005***	0.004***	0.325***	0.306***
<i>Functionings</i>						
<i>Job (hours) match (Ref. match)</i>						
Underworked employed	-0.215***	-0.181***	-0.035***	-0.035***	5.622***	4.884***
Overworked employed	-0.060***	-0.047***	0.090***	0.077***	6.507***	5.578***
Underworked unemployed	-0.775***	-0.713***	-0.176***	-0.160***	-18.966***	-18.251***
Underworked inactive	-0.427***	-0.387***	-0.113***	-0.100***	-14.533***	-12.894***
<i>Training (Ref. No training)</i>						
Training when inactive	-0.044*	-0.056*	-0.141***	-0.200***	-21.686***	-20.204***
Training on the job	0.001	-0.018	-0.117***	-0.136***	0.23	0.358
Apprentice	-0.048*	-0.027	-0.143***	-0.164***	-20.593***	-19.527***

(Table 6 continued)

	SWB-RE	SWB-FE	YS-RE	YS-FE	ES-RE	ES-FE
Time spent to exercise/sports	0.046***	0.035***	0.029***	0.010***	0.400***	0.282***
Time spent to volunteer work	-0.008	-0.005	0.002	-0.004	0.453***	0.392***
Attend social events	0.175***	0.152***	0.059***	0.029***	0.581***	0.473**
Attend religious events	0.052***	0.019*	-0.005	-0.005	-0.043	-0.122
<i>Events</i>						
Involuntary job change	-0.022	0.004	-0.050***	-0.040***	2.073***	2.128***
Start own business	-0.03	-0.034	0.050*	0.014	0.784*	0.910*
Stop own business	-0.164***	-0.160***	-0.038	-0.071**	0.64	0.347
First childbirth	0.206***	0.210***	-0.116***	-0.119***	-4.597***	-4.420***
Birth second, third child	0.138	0.153	-0.035	-0.028	-0.316	-0.19
Divorced or separated	-0.350***	-0.349***	0.008	-0.006	-0.980***	-1.142***
Marriage/ cohabitation	0.226***	0.253***	0.115***	0.135***	0.948***	0.923***
Early retirement event	-0.066*	-0.070**	-0.109***	-0.112***	-16.308***	-16.823***
Unemployment event in past	-0.043***	0.007	-0.076***	-0.065***	-1.378***	-1.207***
Constant	5.522***	6.229***	0.828***	0.794***	-26.855***	-28.387***
Rsquared	0.188	0.104	0.224	0.125	0.546	0.511
N	163550	163550	151588	151588	136824	136824
SigmaU	0.938	1.226	0.841	1.026	10.331	13.541
SigmaE	1.237	1.237	0.615	0.615	11.496	11.496
Rho	0.365	0.495	0.652	0.736	0.447	0.581

* p<0.10, ** p<0.05, ***, p<0.01***

Table 7: GLS random (RE) and fixed effects (FE) models on subjective well-being (SWB), income security (YS) and employment security (ES), Great-Britain 1991/6-2008, population 16-64 years

	SWB-RE	SWB-FE	YS-RE	YS-FE	ES-RE	ES-FE
<i>Controls</i>						
Age	-0.066***	-0.047***	0.095***	0.097***	2.713***	2.855***
Age squared /100	0.082***	0.055***	-0.113***	-0.117***	-3.450***	-3.547***
<i>Household Type</i>						
Couple, yng child 0-5	-0.013	-0.041	-0.598***	-0.626***	-2.247***	-2.987***
Couple, yng child 6-15	-0.064**	-0.073**	-0.512***	-0.509***	0.081	-0.352
Single, no ch	-0.347***	-0.229***	-0.267***	-0.261***	-1.023***	-0.514
Single parent, yng ch 0-5	-0.503***	-0.357***	-0.687***	-0.673***	-5.352***	-5.138***
Single parent, yng ch 6-15	-0.405***	-0.239***	-0.740***	-0.693***	-0.794	-0.649
Other	-0.136***	-0.104**	-0.348***	-0.338***	-2.571***	-1.969***
N of kids 0-15	-0.016	0.019	-0.366***	-0.355***	-1.573***	-1.439***
Gender (1=Female)	0.094***	.	-0.024	.	-4.477***	.
Number of other employed in HH	-0.022**	-0.027**	0.163***	0.158***	1.122***	0.756***
Not born in Britain	-0.181	0.255	-0.123	-0.032	-5.657	-2.763
Unemployment rate*Period	-0.023***	-0.019***	-0.006**	-0.002	0.157***	0.070*
<i>Traits</i>						
Neuroticism	-0.340***	.	-0.036***	.	-0.639***	.
Extroverticism	0.092***	.	0.004	.	0.223**	.
Openness	-0.047***	.	0.043***	.	-0.059	.
Agreeableness	0.106***	.	-0.091***	.	-0.515***	.
Conscientiousness	0.153***	.	0.020**	.	1.074***	.
<i>Stocks</i>						
<i>Highest completed education(Ref.: Low education)</i>						
High education (iscd)	-0.069*	0.215*	0.639***	0.158***	5.743***	4.338***
Intermediate education (iscd)	-0.076**	0.254**	0.198***	-0.095*	3.426***	-0.46
Health limitations for work	-0.622***	-0.445***	-0.129***	-0.073***	-5.699***	-3.452***
Member Trade Union	0.004	0.004	0.108***	0.102***	4.507***	4.235***
Trust	0.134***	0.095***	0.051***	0.012	0.178	0.068
<i>Religion (Ref.: Catholic)</i>						
Protestant	0.108***	0.062	0.033	-0.025	0.723**	-0.556
Other Christian	0.106**	0.086	-0.013	-0.081	0.356	-0.588
Other religion	-0.011	0.108	0.008	-0.015	-0.9	-1.085
No denomination	0.073**	0.069	0.039	-0.008	1.180***	0
Social contacts	0.101***	0.087***	-0.026***	-0.003	-0.554***	-0.503***
Material/success goals	0.014	0.013	0.004	0.005	1.628***	1.505***
Social Goals	0.117***	0.114***	-0.007	0.006	-0.122	-0.365**
<i>Functionings – Choices</i>						
Overtime	0	0.001	0.014***	0.012***	0.208***	0.190***
<i>Job (hours) match (Ref. fit)</i>						
Underworked employed	-0.148***	-0.097***	-0.078***	-0.058***	4.560***	4.101***
Overworked employed	-0.159***	-0.141***	0.178***	0.158***	4.949***	4.225***
Underworked unemployed	-0.466***	-0.431***	-0.077**	-0.069*	-6.101***	-6.505***
Underworked inactive	-0.284***	-0.200***	-0.120***	-0.106***	-17.762***	-16.312***
<i>Type of training (Ref. No training)</i>						
Government training	-0.059	-0.099	0.021	0.044	-5.832***	-5.646***
Apprenticeship	0.280**	0.251	0.1	0.218**	10.061***	10.151***
Training on the job	0.037***	0.040***	0.082***	0.063***	3.663***	3.232***
Training when inactive	0.003	0.012	-0.047*	-0.050**	-4.694***	-4.035***
<i>Time use</i>						
Time spent to exercise/sports	0.066***	0.046***	0.012***	0.002	-0.104*	-0.205***
Time spent to volunteer work	0.008	0.011	-0.035***	-0.035***	-0.767***	-0.681***
Attend social events	0.205***	0.177***	0.145***	0.074***	1.724***	0.900***
Attend religious events	0.055***	0.026**	0.005	-0.004	-0.043	-0.032

(Table 7 continued)

<i>Events</i>	SWB-RE	SWB-FE	YS-RE	YS-FE	ES-RE	ES-FE
Start own business	0.068	0.080*	-0.054	-0.059*	0.254	-0.011
Stop own business	-0.057	-0.046	-0.056*	-0.059*	0.321	-0.224
First childbirth	0.242***	0.250***	0.097***	0.099***	2.092***	2.227***
Birth second, third child	0.064*	0.056	0.038***	0.029**	-0.581**	-0.572**
Divorced or separated	-0.467***	-0.479***	0.071**	0.072**	1.027***	0.650*
Marriage/Cohabitation	0.192***	0.243***	-0.107***	-0.092***	0.508*	0.575**
Involuntary job change	-0.027	-0.009	-0.041*	-0.032	2.298***	1.920***
Early retirement event	0.176***	0.174***	-0.006	-0.009	-3.072***	-2.475***
Unemployment events in past	-0.215***	-0.190***	-0.096***	-0.056*	-7.821***	-6.280***
Constant	5.321***	5.566***	0.381***	0.477***	-22.132***	-21.871***
Rsquared	0.195	0.112	0.329	0.283	0.445	0.394
N	93648	93648	111464	111464	110794	110794
SigmaU	1.199	1.512	0.86	1.037	10.609	14.452
SigmaE	1.37	1.37	0.89	0.89	11.805	11.805
Rho	0.434	0.549	0.483	0.576	0.447	0.6

* p<0.10, ** p<0.05, ***, p<0.01***

References

- Alkire, S. (2007). Choosing Dimensions: the Capability Approach and Multidimensional Poverty. In J. Silber (ed.), *The Many Dimensions of Poverty*. New York: Palgrave Macmillan.
- Ball, R. and K. Chernova (2008). Absolute Income, Relative Income, and Happiness. *Social Indicators Research*, vol. 88, 497-529.
- Becker, G. (1975). *Human Capital: A Theoretical and Empirical Analysis, with special Reference to Education*. New York, National Bureau of Economic Research.
- Clark, A. , Frijters, P. and Shields, M. (2008a). Relative Income, Happiness and Utility: An Explanation for the Easterlin Paradox and Other Puzzles", *Journal of Economic Literature*, Vol.46, no.1, pp.95-144.
- Clark, A. E., E. Diener, Georgellis, Y. and R. E. Lucas (2008b), Lags and Leads in Life Satisfaction: A Test of the Baseline Hypothesis, *Economic Journal*, 118: 222-243.
- Cuven, C., C. Senik & H. Stichnoth (2010), You can't be happier than your wife, Happiness Gaps and Divorce, ISSN 1864-6689, SOEP Papers, No. 261, DIW Berlin.
- Diener, E. (1984), Subjective Well-Being, *Psychological Bulletin*, 95:542-575
- Diener, E., Suh, E.M., Lucas, R.E. & Smith, H.L. (1999), Subjective well-being: three decades of progress, *Psychological Bulletin*, 125, 276-302.
- Diener, E. and S. Oishi (2000). Money and Happiness: Income and Subjective Well-Being Across Nations. In: Ed Diener and Eunkook M. Suh (eds). *Culture and Subjective Well-Being*. Cambridge, MA: MIT Press: 185-218.
- Dohmen, T., A. Falk, D. Huffman, U. Sunde, J. Schupp, and G.G. Wagner (2005) Individual Risk Attitudes: New Evidence from a Large, Representative, Experimentally-Validated Survey, Institute for the Study of Labor (IZA), RePEc/Discussionpaper/dp1730.
- Easterlin, R. A. (2001). "Income and Happiness: Towards A Unified Theory." *The Economic Journal* 111(July): 465-484.
- Estéves-Abe, M., Iversen, T. and Soskice, D. (2001). Social Protection and the Formation of Skills: A Reinterpretation of the Welfare State, in Hall, P. and Soskice, D. (ed.), *The Institutional Foundations of Comparative Advantage*, New York: Oxford University Press, pp. 145-83.
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7(2) 117-140.
- Fouarge, D., A. Manzonni, R. Muffels and R. Luijkx (2009), Childbirth and cohort effects on mother's labour supply: A comparative study using life-history data for Germany, the Netherlands and Great-Britain, *Work, Employment and Society*, forthcoming, p. 1-29.
- Frick, J.R., S.P. Jenkins, D.R. Lillard, O. Lipps, and M. Wooden. 2007. The Cross-National Equivalent File (CNEF) and its Member Country Household Panel Studies. *Schmollers Jahrbuch* 127, no. 4, 627-654.
- Gangl, M. (2006). Scar Effects of Unemployment: An Assessment of Institutional Complementarities. *American Sociological Review* 71(December): 986-1013.
- Hall, P. and Soskice, D. (eds.) (2001), *Varieties of capitalism: the institutional foundations of comparative advantage*, Oxford: Oxford University Press.
- Headey, B. and A. J. Wearing (1992). *Understanding Happiness*. Melbourne, Longman Cheshire.

- Headey, B. (1993). An Economic Model of Subjective Well-Being: Integrating Economic and Psychological Theories. *Social Indicators Research*, 28(1): 97-116.
- Headey, B. (2008), 'Life goals matter to happiness: A revision of set-point theory', *Social Indicators Research*, 86(2), 213-31.
- Headey, B., Muffels, R. & Wooden, M. (2008), 'Money does not buy happiness: Or does it? A reassessment based on the combined effects of wealth, income and consumption', *Social Indicators Research*, 87(1), 65-82.
- Headey, B.W., Muffels, R.J.A. and Wagner, G.G. (2010) Long-running German panel survey shows that personal and economic choices, not just genes, matter for happiness, *Proceedings of the National Academy of Sciences*, 107.42, 17922-17926 (Oct. 19).
- Headey, B.W., Muffels, R.J.A. and Wagner, G.G. (2011) Choices which change life satisfaction: similar results for Australia, Britain and Germany, *Social Indicators Research* (forthcoming).
- Kalmijn, M. & R. Alessie (2008), Life course changes in income. An exploration of age and stage effects in a 15-year panel in the Netherlands, NETSPAR, Panel Paper 10, pp. 75.
- Kahneman, D. (2003), A psychological perspective on economics. *American Economic Review*, 93(2): 162-168.
- Kahneman, D. and A. B. Krueger (2006), Developments in the measurement of subjective well-being. *Journal of Economic Perspectives*, 20(1): 3-24.
- Korpi, Tomas, Paul de Graaf, John Hendrickx and Richard Layte (2003), Vocational Training and Career Employment Precariousness in Great Britain, the Netherlands and Sweden, *Acta Sociologica*, Vol. 46, No. 1 (Mar., 2003), pp. 17-30).
- Muffels, R. & P. Tsakoglou & David G. Mayes (2002), *Social Exclusion in European Welfare States*, Edward Elgar, Series on Globalization and Welfare, Cheltenham, pp. 366.
- Muffels, R. (2008), *Flexibility and Employment Security in Europe. Labour Markets in Transition*, Edward Elgar: Cheltenham, pp. 407.
- Muffels R. and B. Kemperman (2011), Does a Better Job Match Makes Women Happier? Work Orientations, Work-Care Choices and Subjective Well-Being in Germany, ISSN 1864-6689, SOEP Papers, No. 361, DIW Berlin, pp. 32.
- Nussbaum, M. C. (1997) Capabilities and Human Rights *Fordham Law Review*. 66: 273-300.
- Oswald, Andrew J. & Stephen Wu (2010), Objective Confirmation of Subjective Measures of Human Well-Being. Evidence from the U.S.A., *Science*, 327, no. 5965, pp. 576-579
- Powdthavee, N. (2007), Putting a Price Tag on Friends, Relatives and Neighbours: Using Surveys of Life Satisfaction to Value Social Relationships, *Journal of Socio-Economics*, 37(4), 1459-1480.
- Praag, B.M.S. Van & Ferrer-i-Carbonell, A. (2004), *Happiness Quantified: A Satisfaction Calculus Approach*, Oxford University Press, Oxford.
- Putnam, R.D. (2000) *Bowling Alone: The Collapse and Revival of American Community*. New York, Simon & Schuster.
- Putnam, R.D., R. Leonard and R.Y. Nanetti (2005). *Making Democracy Work*, Princeton University Press, Princeton.
- Runciman, W.G.. 1966. *Relative deprivation and social justice*, Routledge and Kegan Paul, London.
- Schokkaert, E. (2007). The capabilities approach, *CES Discussions Paper Series (DPS)* 07.34

- Sen (1983). Poor, Relatively Speaking, *Oxford Economic Papers*, 35:153-169
- Sen, A. K. (1993) "Capability and Well-Being". In M. Nussbaum and A. K. Sen (eds.), *The Quality of Life*. Oxford: OUP.
- Sen, A. (1999a), *Development as Freedom*, New York: Alfred A. Knopf.
- Sen, A. (1999b), *Commodities and Capabilities*, Oxford: Oxford University Press.
- Sen, A. K. (2004a) "Capabilities, Lists and Public Reason: Continuing the Conversation", *Feminist Economics* 10 (3): 77-80.
- Sen, A. K. (2005). Human Rights and Capabilities, *Journal of Human Development*, 6 (2): 151-66.
- Stiglitz, J. , Sen, A. & Fitoussi, J.-P. (2009). Report by the Commission on the Measurement of Economic Performance and Social Progress, European Union, Brussels.
- Townsend, Peter (1985). A Sociological Approach to the Measurement of Poverty: A Rejoinder to Prof. Amartya Sen, *Oxford Economic Papers*, 37:659-668
- Winkelmann, L. and Winkelmann, R. (1995) Happiness and unemployment: a panel data analysis for Germany, *Konjunkturpolitik*, 41, 283-307.