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Special Issue Article

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The economic research potentials of the German Socio-Economic Panel study

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Abstract: We provide a concise introduction to a household-panel data infrastructure that provides the international research community with longitudinal data of private households in Germany since 1984: the German Socio-Economic Panel (SOEP). We demonstrate the comparative strength of the SOEP data in answering economically-relevant questions by highlighting its diverse and impactful applications throughout the field.

Keywords: panel data, Socio-Economic Panel, inequality, policy evaluations, wellbeing, health, education, demographic economics, labor economics, wages, mobility, migration, behavioral economics, experiments

JEL Classification: C2, C3, C5, C8, D04, D1, D3, D6, D7, D9, I00, J1, J2, J3, J6

1 Introduction

Established in 1984 and located at the German Institute for Economic Research (DIW Berlin), the German Socio-Economic Panel (SOEP) provides the international research community with longitudinal data of private households in Germany. In 2019, about 30,000 persons across nearly 15,000 households partici-

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pated in the SOEP survey.¹ They provide information on a broad spectrum of “objective” variables (verifiable by a third party), such as income, age, gender, education, and employment status, as well as “subjective” variables, like satisfaction with life and the Big Five Personality Traits. This information can be studied along not just individuals’ and households’ life courses but also across generations.

In his econometrics textbook, Baltagi (2013) lists benefits arising from the use of panel data compared to cross-sectional data in empirical applications. (A) They allow one to control for individual heterogeneity. (B) They are more informative because they provide more variability and less collinearity among variables, more degrees of freedom and more efficiency. (C) They allow for better description of the dynamics of adjustment (after a shock). (D) They enable one to better identify and measure effects of all kinds of events – from governmental interventions, over natural disasters to health shocks. (E) They allow for the construction and testing of dynamic behavioral models. In this light, it is not surprising that researchers from various disciplines like economics and sociology, political sciences and psychology, demography and gerontology, transportation, architecture and city planning; nutrition and dietetics as well as genetics and neuroscience make use of SOEP data. Researchers use SOEP to study long-term societal changes; relationships between early life events and later life outcomes; interdependencies between the individual and the household; inter-generational mobility and transmission; effects of policy reforms; speed of convergence between East and West Germany or other societal groups; determinants of wealth and human capital accumulation, fertility, labor supply; among many more.

As of the end of 2019, SOEP has more than 9,000 users in more than 50 countries worldwide. The number of SOEP-based publications totals between 300 and 400 annually, with about 30 percent appearing in (S)SCI journals. SOEP-data are also used for various internationally recognized studies (e. g., OECD 2008, 2011 and 2015, IMF, 2019) as well as government reports in Germany. Examples include the German Federal Government’s reports on Poverty and Wealth (Federal Ministry of Labour and Social Affairs, 2017) and on Wellbeing in Germany (German Federal Government, 2017) as well as annual reports by the German Council of Economic Experts.

¹ The panel is rooted in the multidisciplinary Collaborative Research Center Sfb3, “Microanalytic Foundations of Social Policy” at the Universities of Frankfurt am Main and Mannheim and funded by the German Research Foundation (DFG) from 1983 to 2002. Since 2003, SOEP is part of Germany’s research infrastructure under the umbrella of the Leibniz Association (WGL) and funded by the Federal Ministry of Education and Research (BMBF) and state governments (see Goebel et al., 2019).

Panel survey data are facing increasing competition from administrative panel data. This is especially true in economics. Administrative data are impressive, with large numbers of observations, and, arguably, have higher validity. However, like survey data, administrative data have downsides. First, administrative micro data are not as easily accessible to researchers as survey data because of legal concerns. Second, administrative data are, often by design, restrictive in its coverage of the population. Third, information is restricted to the administrative purpose for which the data are collected. This certainly applies to Germany. For example, data on employment biographies from the Institute for Employment Research (IAB) provide very detailed information about individual earnings and employment careers, but lack information on working hours, household composition, household income, wealth, leisure activities, or peoples' expectations and aspirations. Further, there is the issue of constructing the correct unit of observation for the analysis as economic households and administratively relevant units can diverge. For example, the income tax panel provides information at the level of tax units that are not necessarily equivalent with household units.

At the same time, panel surveys have advanced in several respects. First, many of the available datasets, including SOEP, have grown over time – both in terms of sample size and covered topics. Second, national panel surveys are in the process of being consolidated and harmonized in large cross-country datasets like the Cross National Equivalent File (CNEF).² Third, panel surveys are adopting new techniques to oversample certain sub-population that are of high relevance for economic research. For example, the SOEP top-shareholder sample (SOEP-P, see Schröder et al., 2019) uses data from company registers to oversample the population of wealthy shareholders. Fourth, survey-methodological advancements have substantially contributed to improving data quality. Fifth, an increasing number of initiatives seek to link register and survey data, thus combining their respective strengths.

It is not the aim of the present article to give a full-fledged overview of SOEP. This is found in Goebel et al. (2019). Rather the article provides economists with an overview of potential fruitful applications of SOEP as well as guidance on how to access and use the data. Further, the article provides an overview of the specific strengths of the SOEP for empirical research in economics and of initiatives seeking to enlarge SOEP's research potentials including:

1. *Core and rotating modules.* SOEP includes a core set of yearly-surveyed variables. This core set is complemented with several rotating modules – usually

2 For detailed information about CNEF, see <https://cnef.ehe.osu.edu/>

- asked every few years. Topics in the rotating modules include time use, energy consumption, household wealth portfolios, and expectations about the future. Together with the core variables, variables from the rotating modules provide new opportunities for substantive and innovative research projects.
2. *Comprehensive tracking.* SOEP follows up with and interviews people who are currently living in a household unit as well as those moving in and out of a unit. Thus, SOEP covers all persons who (even temporarily) lived in SOEP households. This allows investigations of intra- and inter-generational household dynamics (like births and deaths, marriages, and divorces) and their determinants – both at the household and individual level.
 3. *Sample enlargements.* The composition of the German population changes over time and sometimes suddenly. To cope with such changes, SOEP regularly includes enlargement samples. Examples include German reunification in 1990 and the influx of refugees in 2015. Further, certain sub-populations receive increasing attention over time. Examples include families with many children and wealthy households. The sample enlargements allow systematic analyses of large societal changes and meaningful analyses for several small-*N* subpopulations that would result in insufficiently small sample sizes in conventional general-purpose panels.
 4. *Linkage of SOEP with external datasets.* To combine the comparative strengths of existing micro-data infrastructures in Germany, SOEP data are, and will be, linked with other datasets. One example is the 1-to-1 record linkage of SOEP with administrative micro data from the IAB and the German statutory pension insurance (DRV Bund). Another example is a linkage of SOEP with regional indicators like information on the living environments, environmental pollution around the dwelling, and local unemployment rates.
 5. *SOEP Innovation Sample (SOEP-IS).* SOEP-IS is a data laboratory, inviting researchers worldwide to submit proposals for new survey modules (Richter and Schupp, 2015). Accordingly, SOEP-IS accommodates new survey modules of the following types: items for pre-testing before implementation in SOEP, specific items in terms of contents as well as (complex) experiments, association tests, and procedures (e. g. Day Reconstruction Method, DRM). Hence, SOEP-IS is also an interesting tool to test and implement – based on a large-*N* sample – new questions, vignette designs, informational treatment designs, and incentivized experiments.
 6. *SOEP in international panel-data infrastructures.* National panel surveys are consolidated and harmonized in large cross-country datasets. Examples in-

clude the Luxembourg Income Study (LIS³), the Luxembourg Wealth Study (LWS⁴), and the Cross-National Equivalence File (CNEF). These integrated international datasets allow implementations of various comparative research designs for more and more countries around the globe. Furthermore, SOEP's so-called EU-SILC clone (Bartels et al., 2019) provides SOEP data following the variable definitions of the EU-SILC database.⁵

Section 2 provides a short description of the basic features of the SOEP – starting from the basic sampling strategy to the structure of the released data. Section 3 outlines the potentials of SOEP in economic research, thereby focusing on under-explored or novel features of the data infrastructure. Section 4 is about data access and user support. Section 5 concludes.

2 Basic features of SOEP

Sampling, weighting, and field work

The SOEP relies on random draws from base populations. Usually, the base population are all households residing in Germany (except for households living in institutions). The SOEP sample is representative of all the characteristics that have been included in the drawing and of which the margins are adjusted. For characteristics considered in the weighting in the corresponding categories, it is assumed that the random nature of the drawing also means that the sample is representative. This is only the case with bivariate distributions if they accounted for in either the drawing, weighting or margin adjustment. Small numbers of observations do not mean that the sample is not representative of one characteristic, but that the sample is not effective resulting in large confidence bands. Actually, this is why certain subsamples, like the recent migrant samples, are not random draws from the entire base population but from subpopulations: The oversampling secures more statistical power. Siegers et al. (2020) provide a detailed SOEP documentation of sampling, representativeness, weighting, and statistical power. Hainbach et al. (2019) show how auxiliary data can improve the precision of SOEP-based estimates when sample sizes for certain subpopulations are small.

³ See <https://www.lisdatacenter.org/our-data/lis-database/> for details.

⁴ See <https://www.lisdatacenter.org/our-data/lws-database/> for details.

⁵ See [https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:EU_statistics_on_income_and_living_conditions_\(EU-SILC\)](https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:EU_statistics_on_income_and_living_conditions_(EU-SILC)) for details.

SOEP's *refreshment samples* ensure the representativeness and a reasonable sample size in the presence of panel attrition. Such refreshments were integrated in 1998 Sample E, 2000 Sample F, 2006 Sample H, 2011 Sample J, 2012 Sample K, 2017 Sample N, and 2018 O Sample. Additional boost samples focus on high-income households in 2002 (Sample G), families with newborn and young children in 2010 (Sample L1), low income / large families / single parents in 2010/11 (Samples L2 and L3), top-shareholder in 2019 (Sample P, to better capture the top-tail of the income and wealth distribution, see Schröder et al., 2019), lesbian, gay or bisexual persons also in 2019 (Sample Q).

SOEP's *enlargement samples* help maintain the cross-sectional representativeness in the presence of population influx to the underlying target population (see Table A1 in Goebel et al. (2019) for an overview). One example is the East German sample. The vast majority of the first wave of interviews in East Germany were conducted in June 1990, hence just before the monetary, economic and social unification between West and East Germany. The remaining four percent of the interviews took place in May and July 1990. Another example is the migrant ("M") samples.

Random sampling with known selection probabilities (probabilistic sampling) allows for the construction of design weights, cross-sectional weights, and the integration of new subsamples into a single sampling frame (Rendtel, 1995, Schonlau et al., 2013). Longitudinal weights at the household and individual level correct for non-response probabilities between consecutive waves.

Field work for SOEP is undertaken by Kantar Public. Predominantly, interviews are conducted face-to-face with an interviewer. Since 1998, answers are usually recorded in computer-assisted personal interviews (CAPI), a mode that eases error-free data transfer into an electronic format. Tracking rules help to follow households longitudinally: If members of an originally sampled household leave the household, for instance, either because of a divorce or children forming their own household, both the original as well as the split-off household are interviewed, thus remaining part of SOEP and the integrated weighting scheme (Kroh et al., 2008).

Core topics and topical modules

SOEP's core topics are household demography and population, education and qualification, occupation and employment, earnings and work hours, other sources of income, housing and rent, physical and mental health, as well as subjective indicators on perceptions, expectations, and attitudes. Annual questions on migration and integration, with extended information for all non-German

subsamples, are also incorporated. SOEP also entails variables that link the participating households with information from the actual fieldwork, meaning that data users can measure, for example, interviewer and sampling mode effects. Since 2000, a youth questionnaire for household members turning 17 covers topics like the situation at home, relationship to parents and friends, as well as job aspirations. Since 2001, SOEP contains psychological and health questions as well as age-specific questionnaires. In 2013, a specific questionnaire for pre-teens (11 to 12 years old) and in 2016 for teens (13 to 14 years) were introduced, respectively.

The data are collected on the *household* and *individual* levels, a feature that expands the research potential compared to a single-level approach. As an example, SOEP surveys both individual and household wealth and incomes, thus facilitating research on within-household bargaining power and inequalities, the modelling of labor market choices, and policy evaluations. The surveyed information usually covers the current situation (e. g., family composition or satisfaction with life). In some contexts, it includes the past (e. g., job changes and employment biographies, retrospective questions on youth, childhood, and early childhood) and the future (e. g., expected life satisfaction in 5 years, and chance of re-employment). These data enable the modelling of household and individual life courses.

The core questions – asked every year – are complemented by topical modules as well as perennial rotating modules on topics such as wealth, neighborhood, family, and networks (see Table 1; questionnaires are also available online via the website of the SOEP Research Data Center⁶).

Types of datasets

SOEP is released in datasets of the following types:

1. Files providing the originally surveyed data for each year.
2. Files providing the originally surveyed data in long format, i. e. including intertemporal-consistently harmonized variables from 1984 to present to ease data usage.
3. Files about the development of the sample, for example whether persons or households were interviewed in a given year or the inverse staying probability to correct the cross-sectional weighting variable.
4. Files providing respondents' biographies prior to their first survey year.
5. Files providing additionally generated intertemporal-consistently coded variables.

⁶ See <http://www.diw.de/soep-questionnaires>

Table 1: SOEP's topical modules.

Year of wave	Wave letter	Topic
1986	3 C	Residential environment and neighborhood
1987	4 D	Social security; transition to retirement
1988	5 E	Household finances; Wealth and assets
1989	6 F	Further occupational training courses
1990	7 G	Time use; Labor market and subjective indicators; Life goals
1991	8 H	Family and social networks
1992	9 I	Social security (2nd measurement); Life goals (2nd)
1993	10 J	Further occupational training courses (2nd); Transportation and energy use
1994	11 K	Residential environment and neighborhood (2nd); Expectations for the future; Locus of control; Wellbeing aspects
1995	12 L	Time use (2nd); Locus of control (2nd); Life goals (3rd)
1996	13 M	Family and social networks (2nd); Locus of control (3rd)
1997	14 N	Social security (3rd)
1998	15 O	Transportation and energy use (2nd); Time use (3rd)
1999	16 P	Residential environment and neighborhood (3rd); Expectations for the future (2nd); Locus of control (4th); Wellbeing aspects (2nd)
2000	17 Q	Further occupational training courses (3rd); Course of life satisfaction
2001	18 R	Family and social networks (3rd); Working conditions
2002	19 S	Wealth and assets (2nd); Social security (4th); Health
2003	20 T	Transportation and energy use (3rd); Trust; Time use (4th)
2004	21 U	Residential environment and neighborhood (4th); Further occupational training courses (4th); Risk aversion in different domains; Health (2nd); Life goals (4th)
2005	22 V	Expectations for the future (3rd); Locus of control (5th); Big Five; Reciprocity
2006	23 W	Family and social networks (4th); Working conditions (2nd); Health (3rd); Grip strength
2007	24 X	Wealth and assets (3rd); Social security (5th)
2008	25 Y	Further occupational training courses (5th); Health (4th); Trust (2nd); Time use (5th); Life goals (5th); Grip strength (2nd)
2009	26 Z	Residential environment and neighborhood (5th); Risk aversion in different domains (2nd); Big Five (2nd); Expectations for the future (4th); Globalization and trans-nationalization; Diseases
2010	27 BA	Consumption and saving; Reciprocity (2nd); Locus of control (6th); Health (5th); Grip strength (3rd)
2011	28 BB	Family and social networks (5th); Working conditions (3rd); Diseases (2nd)
2012	29 BC	Wealth and assets (4th); Social security (6th); Health (6th); Life goals (6th); Grip strength (4th)
2013	30 BD	Big Five (3rd); Trust (3rd); Loneliness; Diseases (3rd); Time use (6th); Course of life satisfaction (2nd)
2014	31 BE	Health (7th); Risk aversion in different domains (3rd); Expectations for the future (5th); Globalization and trans-nationalization (2nd); Residential environment and neighborhood (6th); German election; Grip strength (5th)

Table 1: (continued)

Year of wave	Wave letter	Topic
2015	32 BF	Minimum wage; Reciprocity (3rd); Locus of control (7th) Transportation and energy use (3rd); Diseases (4th)
2016	33 BG	Minimum wage (2nd); Family and social networks (6th); Life goals (7th); Working conditions (4th); Activities and attitudes toward migration issues; Health (8th); Grip strength (6th)
2017	34 BH	Minimum wage (3rd); Wealth and assets (5th); Social security (7th); Big Five (4th); Loneliness (2nd); Diseases (5th)
2018	35 BI	Minimum wage (4th); German election (2nd); Trust (4th); Health (9th); Activities and attitudes toward migration issues (2nd); Narcissism; Grip strength (7th)
2019	36 BJ	Wealth and assets (6th); Globalization and trans-nationalization (3rd); Big Five (5th); Expectations for the future (6th); Characteristics of Discrimination; Residential environment and neighborhood (7th); Diseases (6th); Time use (7th)
2020	37 BK	Reciprocity (4th); Locus of control (8th) Transportation and energy use (4th); Health (10th); Activities and attitudes toward migration issues (3rd); digitalization

Note. Update of Table A3 from Goebel et al. (2019).

Data quality

Data quality and consistency are crucial for scientific data infrastructures. Beyond the usual test routines to check data plausibility and consistency that take place after data collection, institutional safeguards to ensure data quality include: (a) close interaction with the field institute and interviewer workshops, (b) implementation of monitoring mechanisms to verify the correct work of the interviewers, (c) hosting a website to inform (potential) respondents about the study and publications related to “their” data, (d) generation and integration of the surveyed data in a panel structure including the provision of user-friendly variables, (e) provision of “data from scientists (not public authorities) for scientists”,⁷ (f) provision of a unique persistent identifier (the so-called Digital Object Identifier, DOI) for each new SOEP release to secure replicability of data and results, and (g) regular external validations of the data with external data sources.

⁷ Beyond the data privacy act, no other legal restrictions limit data access for scientific purposes. All data are accessible to external researchers as early as possible and all users have the possibility to compare the original raw data from the field with the generated data from the SOEP group. Indeed, all researchers can generate their own version of generated variables, even if a research stay at DIW Berlin is necessary.

3 SOEP's research potentials in economics

3.1 Quasi-experimental designs

SOEP's panel structure allows economists to make the field their laboratory and evaluate "shocks" such as policy interventions, disease-outbreaks, disasters, etc. Standard methods frequently used include differences-in-differences and regression discontinuity designs. Using observational data, such field evaluations mimic experimental designs (in the lab) that randomly assign subjects to either treatment or control groups to study causal relationships.⁸ Previous SOEP-based applications include evaluations of family policies (e. g. Kottwitz et al., 2016), and labor market interventions (e. g. Caliendo et al., 2019), among others. Research explores the causal effects of early-life events on outcomes later in life. For example, Fitzenberger et al. (2013) estimate the effect of fertility on labor supply, Schmitz (2011) the effect of involuntary unemployment on health, Siedler (2011) the effect of parental unemployment on political party affinity, and Dohmen et al. (2012) the transmission of risk and trust attitudes across generations.

The next two subsections describe two exemplary SOEP modules designed for quasi-experimental examinations: One module provides data to evaluate the German minimum wage reform, another the implications of digitalization.

3.1.1 The minimum wage and the digitalization module

The minimum wage module

Quasi-experimental assessments of the German minimum wage reform require panel information about monthly earnings, wages, working hours, and eligibility status, etc. Prior to the reform, the SOEP had designed the so-called SOEP minimum wage module to enable a comprehensive assessment of the reform by complementing its basic set of labor market variables with additional information. More specifically, in addition to standard SOEP labor market information about monthly earnings, working hours, employment status, etc., the minimum wage module gathers information about workload, work breaks, innovations at the workplace, tariff coverage, illicit work, and retrospective information on anticipatory adjustments before the actual introduction of the minimum wage.

⁸ Many lab experiments rely on small and selective samples, raising the issue of external validity. The SOEP Innovation Sample (SOEP-IS, see Richter and Schupp, 2015), established in 2012, provides researchers the possibility to integrate their experimental designs into SOEP's large-scale panel context. Previous SOEP-IS applications are reviewed in a later section.

With the possibility of linkage to other data sources, like regional wage levels,⁹ SOEP provides a database for a comprehensive assessment of the effects of the reform. For example, Caliendo et al. (2017) explore the distributional effects of the reform, Caliendo et al. (2018) the employment effects, and Burauel et al. (2020) the changes in the distribution of working hours. Fedorets et al. (2018) explore the effects of the minimum wage on reservation wages, Güral and Ayaita (2018) on subjective wellbeing, while Koenig et al. (2019) explore the effects on fair wage perceptions and the link to effort provision.

Digitalization module

Digitalization is characterized by a strong connection of the physical and virtual worlds. It provides new opportunities for flexible workplace and time arrangements, creates new job types like platform work, but also changes social life in various domains. Starting in 2020, the SOEP includes a module on digitalization covering four domains: (a) work with artificial intelligence, (b) platform work, (c) digitalized workplace, and (d) subjective attitudes and fears toward digitalization. For example, the module gathers information on job tasks that involve pattern-recognition, involvement into business transactions via internet platforms, as well as a series of measures on job tasks and workplace equipment that show the digital exposure of a workplace. The items are adaptable to a wide range of occupations and new technologies.

In the short run, the module will provide data to study differential exposure to digitalization in society and its interconnectedness with economic outcomes at the individual and household level. Over time, the module will also provide a database for assessing the speed of digital transformation, its implications for structural changes in the labor market, and economic inequalities.

3.2 SOEP's experimental laboratory: SOEP-IS

The SOEP Innovation Sample (Richter and Schupp, 2015) is SOEP's data laboratory. Each year, interested researchers from around the world can propose new

⁹ Existing administrative data from the Research Institute of the Federal Employment Agency only provide categorical information on working hours and, hence, do not allow researchers to compute hourly wages without further applied assumptions. Assumptions are required about the distribution of working hours in a certain category of working hours (e. g., full time or part time) or the covariance with certain characteristics of employees or firms etc. Furthermore, the administrative data provide very little background information on relevant outcome variables, such as disposable household income, occupation status of the partner, effort provision, fairness perceptions, etc.

items and survey modules to SOEP Survey Management. The deadline is November 30. The submissions undergo a standardized refereeing process. Positively evaluated items and modules are included in SOEP's Innovation Sample.

In addition to a basic set of variables analogous to the SOEP-core, SOEP-IS accommodates new survey modules of the following types: items for pre-testing before implementation in SOEP, specific items in terms of contents, as well as (complex) experiments, association tests, and procedures. With the exception of possible incentive payments to the subjects, experiments are implemented free of costs for successful applicants. Successful applicants benefit from an embargo period of 12 months before data are released and made accessible to the entire SOEP user community as part of the regular data provisions. This makes SOEP-IS an interesting tool for economists seeking to test and implement new questions, vignette designs, informational treatment designs, or incentivized experiments.

The SOEP-IS modules page¹⁰ provides an overview of all previous modules. Modules that should be of particular interest to economists include:

Risk allocation

The module, implemented in 2016, deals with within-household risk allocation. In about 500 households, the partnered household members persons are interviewed. The collected data allow an assessment of the degree to which people are averse to risk, shy away from responsibility, and how these findings vary with socio-demographic controls (see Engel et al., 2018).

Stock market participation

The module, implemented in 2012, is concerned with the determinants of stock market participation and the (perceived) risks people expose themselves to with their investments. At the module's heart is an elicitation and an experimental manipulation of respondents' beliefs about returns on the German stock market (see Breunig et al., 2019).

Financial investment

The module, implemented in 2014, asks respondents about asset holdings, investment goals, risk preferences, and expectations about returns on the German stock market index DAX. Further, the module contains an incentivized experiment

¹⁰ See <http://www.diw.de/soep-is-mod>

in the form of a stylized investment task: Respondents invested a hypothetical amount in either (i) an asset whose return is risky – determined by the DAX – or (ii) a riskless German government bond (see Breunig et al., 2019).

Present bias

The module, implemented in 2006 in SOEP-core, is designed to investigate the extent to which a survey measure of present bias predicts present-biased choice behavior in incentive-compatible experiments and real-world outcomes. Surprisingly, the survey measure tends to be a stronger predictor of real-life outcomes than the experimentally elicited measure of present bias (see Pinger, 2017).

Attitudes to income redistribution

The module of Fong, 2014 and 2019, provides a pair of measures of beliefs about the causes of low and high income that are shown to be important determinants of preferences for redistribution. In particular, the module infers opinions on the following types of statements: (a) “Taxes on those with high incomes in Germany should be increased.”, (b) “Financial help to those with low incomes in Germany should be increased.”

Job preferences and job offer acceptance

While SOEP’s general questionnaire provides information on employment, earnings, wages, etc., the 2013 module of Auspurg and Hinz collects information on job preferences, reservation wages, conditions of labor market participation, and the willingness to move jobs using a factorial-survey design. The data enable evaluations of the impact of gender, household structure, working conditions, and work-family policies on inequalities in labor market participation and the drivers of work-family conflicts.

Justice sensitivity

The module, implemented in 2011, 2014 and 2017, includes justice sensitivity short scales of the following type: (a) “It makes me angry when others are undeservingly better off than me.” (b) “I get upset when some-one is undeservingly worse off than others.” The collected data allow assessing the extent to which individuals differ in how readily they perceive situations to be unjust and how strongly they react to subjective injustice—cognitively, emotionally, and behaviorally (Baumert et al., 2014). Justice sensitivity may matter, for example, how people assess the fairness of tax-transfer or pay schemes.

Self-evaluation and overconfidence

The overconfidence module, implemented in 2014, gathers data about (a) the pervasiveness of overconfidence in the population and how it varies across different life domains, (b) the dynamics of overconfident beliefs over time, and (c) the behavioral implications of overconfidence. Forming accurate judgements over one's relative ability is important to make appropriate decisions to, e. g., apply for a job or promotion.

2D4D ratio and its implication for social preferences and risk taking

The module, implemented in 2019, collects data on the 2D4D-ratio, i. e. the ratio of the length of the second to the fourth digit on one's hand, a physiological marker of prenatal testosterone exposure. This digit-ratio is linked with behavioral differences in risk taking, reaction to monetary incentives, and social preferences. The module allows for investigating these links on a large scale with a large number of subjects, thus allowing replications of previous small-scale experimental studies. Additionally, the data can be used to describe, for example, associations to socio-economic and health outcomes (Fossen et al., 2019).

3.3 Economic modeling of lifecycles and microsimulation

Deaton (2015) emphasizes three steps for understanding welfare-enhancing policies: First, differences in resources across individuals should be measured throughout the life course. Second, to better assess socio-economic outcomes, economic measures of wellbeing should be linked to measures of wellbeing from sociology, demography, and psychology. Third, data observations should be reconciled with lifecycle models to investigate the causal mechanisms behind socio-economic outcomes.

In lifecycle models in the tradition of Modigliani and Brumberg (1954), each decision depends on what individuals expect to happen in the future. Thus, lifecycle models explicitly address a crucial latent variable in economic analyses: expectations. Because lifecycle models take expectations into account, they are able to identify the mechanisms that explain how incidents and decisions affect outcomes in different life phases. For example, they allow the identification of the role of educational, family, labor market, and health policies on economic welfare and the transmission of inequality over the life course.

SOEP collects data about expectations (see Section 3.7) as well as a comprehensive set of variables on family formation, labor supply, wealth accumulation, time use, wellbeing, etc. Information on a respondent's life course is not limited

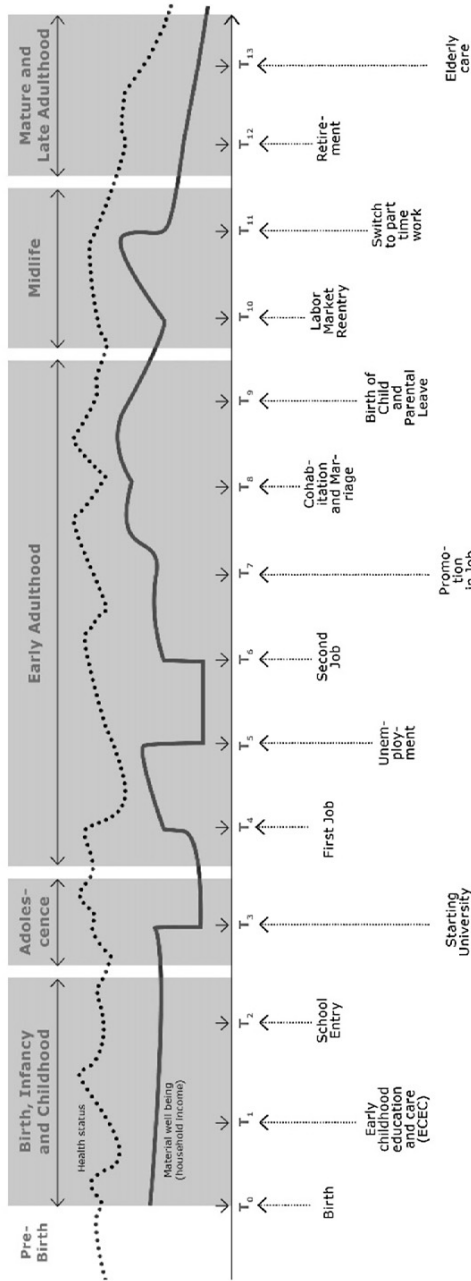


Figure 1: A stylized female life course of health and well-being.

to the period starting from her first participation in the survey. Rather, respondents provide retrospective information about their lives before becoming part of the panel. Furthermore, parents provide information about their children during childhood and adult respondents about their parents. Taken together, this detailed level of information is most appropriate for estimating and calibrating lifecycle models.

In various applications, SOEP data form the basis for estimating and matching lifecycle models (Diener et al., 2006). For example, Haan and Wrohlich (2011) draw on SOEP data to estimate a lifecycle model that identifies the effect of financial incentives on employment and fertility by exploiting variation in the tax and transfer system with employment status and the number of children. As another example, Haan and Prowse (2014) use SOEP data to estimate a lifecycle model assessing how public pension systems can be made fiscally stable when the population is ageing. Kemptner (2019) estimates a structural lifecycle model that accounts for the impact of one's health status on employment risk, productivity, and longevity as well as the correlation between health risk and other lifecycle risks like productivity. Geyer and Korfhage (2015) develop a structural model that determines the impact of either in-kind or cash benefits on the labor supply of family carers. Goldstein et al. (2019) use SOEP and complementary data sources to compare the cost effectiveness of family policies, paying special attention to estimating how intended fertility (fertility before children are born) responds to these policies.

Another important application of SOEP data is in tax-calculation and microsimulation models. For such models, SOEP provides a broad set of key variables including all kinds of income sources, tax burdens, social transfers, and family composition. SOEP-based microsimulation models have been developed by scholars like Schwarze (1995), Kaltenborn (1998), Jacobebbinghaus and Steiner (2003), Steiner et al. (2012), and Loeffler et al. (2014). Applications include labor supply responses to changes in the tax and benefit system (Blömer et al., 2019), how unemployment responds to changes in social security (e.g. Franz et al., 2012), and households' responses to a switch from joint taxation of married couples to single taxation (Wrohlich and Steiner, 2008). Jessen et al. (2017) and Jessen et al. (2018b) both use the STSM microsimulation model of Steiner et al. (2012) to calculate tax payments and estimate labor supply reactions.

3.4 Inequalities and mobility

SOEP provides time-series information about individual and household economic wellbeing in terms of income, wealth, savings, and health. Since the start, SOEP

provides annual disposable household incomes according to the guidelines provided by the Canberra Group.¹¹ With individual-level information on real and financial wealth positions, SOEP is among the few data sources to study the within-household wealth accumulation processes and household portfolios. This information is complemented by monthly household savings. SOEP also provides information on the individual health status, both in physical and psychological terms.

3.4.1 Income

SOEP provides incomes at the individual and at the household level. Predominantly, the figures are reported in gross amounts, but for some income concepts this is complemented by net amounts. The reference period is either the previous month or previous year. To give an example, in 2018, SOEP collected almost 40 different individual-level and 15 household-level income components. All relevant monetary public transfers are surveyed (e. g., child benefit, unemployment benefit, and housing benefit) as well as one-time payments (Christmas or holiday bonuses, bonuses, or indemnity payments). In addition, 20 different pension types are surveyed, scholarship or grants, spousal support, alimony, or other types of private transfers received. This information constitutes the ingredients for deriving annual post-government income, the core concept for analyses of income inequality.

This detailed view into the structure of many income concepts at the individual and household levels allows for various applications. A breadth of research potentials exists in the cross-section: 1) Income composition by sources, e. g. what is the impact of capital income on the distribution of income; 2) Income distribution broken down by demographic and socio-economic characteristics like age, education, and migration background; 3) Comparisons of distributions of different income concepts, e. g. gross and disposable income to study the redistributive effects of taxes and transfers; and 4) Distributional comparisons by unit of analysis, for example poverty rates in single- vs two-parent families. Further potentials for research exist longitudinally: 1) Income dynamics and the stochastic components of income; 2) The distribution of long-term measures of income, like lifetime income or up-to-age-X income; and 3) Mobility in income over two or more generations.

¹¹ See https://www.unece.org/fileadmin/DAM/stats/groups/cgh/Canberra_Handbook_2011_WEB.pdf

A pioneering work employing SOEP for distributional analysis is Biewen (1999). It contains time trends of inequality, as measured by the Gini and the mean log deviation, computed for equivalent income from 1984 to 1996. Biewen (2000) is a follow-up study. Jessen (2019) performs a related exercise, combining distributional analysis with microsimulation of labor supply reactions to examine the determinants of the dynamics of income inequality. Several studies focus on income poverty. Jenkins and Schluter (2003) use SOEP data to contrast child-poverty rates in the UK and Germany. Clark et al. (2016) investigate life satisfaction during spells of poverty.

Several studies have a comparative focus – be it across nations or societal groups. For example, Beaudry and Green (2003) compare the employment and wage structures across Germany and the United States, while Ayala et al. (2020), Guillaud et al. (2020), and Chang et al. (2018) compare household income inequalities across OECD countries. Frijters et al. (2004) examine whether the increase in household income of East Germans after reunification contributed to their life satisfaction. Büchel and Frick (2004) compare the UK and Germany with regard to the position of immigrants in each country's income distribution. Olney (2015) investigates remittances of immigrants and income changes due to immigration.

Mobility estimates, both within a generation and intergenerational, are implemented by linking parents and children or by using parent information from the biography questionnaire. For example, Maasoumi and Trede (2001) employ generalized entropy measures to compare income mobility in Germany and the United States. Bratberg et al. (2017) contrast intergenerational income mobility across Germany, Sweden, Norway, and the United States.

3.4.2 Wealth and the very wealthy

SOEP is the premier provider of directly surveyed wealth data in Germany. Every five years since 2002, SOEP includes a detailed wealth questionnaire that surveys *individual* wealth in, as of 2017, 12 asset categories.¹² SOEP also provides information on intergenerational transfers, like inheritances and gifts, both at the individual and at the household levels. Item non-response is multiply imputed. A detailed roundup of all intergenerational transfers received is asked at the individual level irregularly, while condensed information about any incident in the respective previous year is asked since 2000.

¹² As Frémeaux and Leturcq (2020) demonstrate, intra-household inequality is a widespread phenomenon that can only be documented with individual wealth data.

Descriptive studies of the net wealth distribution, wealth concentration, and savings are frequent. One of the most well-known uses of the data is Fuchs-Schündeln (2008), who tests the lifecycle consumption model against the backdrop of the large shock of German reunification. However, applications vary widely: Bönke et al. (2020) and Bönke et al. (2019) use the marketable wealth data of SOEP, compute pension claims, and then study augmented wealth, which combines the two. Grabka et al. (2015) and Sierminska et al. (2010) leverage the individual-level wealth data of SOEP to examine intra-household wealth inequality as well as the gender wealth gap.

However, a short coming of all general population surveys, not just the SOEP, is the coverage of the very wealthy in a probabilistic sample that is supposed to be representative for the entire population. As Westermeier and Grabka (2015) document, large uncertainty about the true extent of wealth inequality persists because the coverage of the very wealthy is insufficient and even data-augmentation techniques, like the use of rich-lists, cannot remedy the issue. Since, as Zucman (2019) and De Nardi and Fella (2017) show, the shape and dynamics of the wealth distribution crucially depends on the upper tail of the wealth distribution, past SOEP waves cannot provide a complete account of wealth inequality and dynamics.

There is hope on the horizon. SOEP is addressing this problem by implementing a novel sampling strategy to draw from the population of the very wealthy. The sampling frame builds on the empirical regularity that the top wealth holders tend to hold much of their wealth in business equity, especially in Germany, where the German “Mittelstand” remains an important economic engine. SOEP is employing register data from German company registers to identify significant shareholders in highly valued companies, then collecting a sample from this population of close to 2,000 households. The full details on the sampling frame, its implementation, and the verification of the approach’s success are detailed in Schröder et al. (2019), which documents a pre-test. Both the pre-test and the collected sample of the very wealthy, called SOEP-P, are successful in reaching the very wealthy. For example, average net wealth in SOEP is €107,650 in 2017, while for SOEP-P it is €2,060,000. Further, the distribution of net wealth for SOEP-P statistically dominates that of SOEP at every point.

The successful sampling of the very wealthy in SOEP-P opens up a broad array of research questions for economics that can now be studied with the SOEP. First, it is now possible to give a reliable account of the cross-sectional wealth distribution in Germany. Modeling wealth inequality using a Pareto law is the standard approach in economics. A fundamental step toward understanding the wealth distribution in Germany is to test the actual wealth distribution against this common functional form. Second, even in the simplest models of lifecycle

consumption and savings, the wealthy differ from the poor. Attitudes toward risk, accumulation of assets, as well as the choices of consumption and leisure differ systematically with one's position in the wealth distribution. Researchers can now be confident in estimating models (see De Nardi and Fella, 2017) that are supposed to fit the cross-sectional wealth distribution and estimate these important behavioral parameters for Germany. Third, SOEP is unique in its collection of attitudes, beliefs, and expectations. A fundamental set of questions addresses the formation of attitudes, beliefs, and expectations as well as how the process of formation differs among the very wealthy compared to the rest of the population. SOEP also contains a variety of psychological markers, like the Big 5 personality traits and willingness to take risk that will prove instrumental in revealing the fundamental differences between the very wealthy and the rest of the population.

3.4.3 Health

SOEP collects a wide range of health-related variables including the current health status, height, weight, disability, doctor visits, hospital stays, diagnosed diseases, persons in need of care, and addictive behavior. Since 2002, the module SF-12, a widely used instrument for assessing self-reported health-related quality of life measure (HRQOL), is used to gather information about mental and physical health. SOEP is also one of the very few population wide surveys collecting information on health insurance (either statutory or private) and supplementary insurance on a regularly basis. With the available information and in combination with other items, the data can be used, for example, to study insurance choices (Andersen et al., 2007), determinants of smoking (Everding and Marcus, 2020), the effects of health policies (Schreyögg and Grabka, 2010), or the effect of being overweight on earnings (Cawley et al., 2005).

3.5 Enlarging research possibilities through data linkage

There are various possibilities for users to augment SOEP data with complementary information. For example, SOEP provides the occupational classification of all employees following the International Standard Classification of Occupations (ISCO). The ISCO code allows for linking SOEP data with further information on job-specific tasks. As another example, the day of the respondents' interview can be used to link media information or any other time varying information. Goebel et al. (2015), for example, make use of the day of the interview to study the impact of the Fukushima disaster on environmental concerns, wellbeing, risk aversion,

and political preferences in Germany, Switzerland, and the UK. The Covid-19 pandemic has led to a redesign of the questionnaire centered around the disease and its impact on individuals' lives starting with the data release of 2020.

3.5.1 Linkage with regional and geocoded information

SOEP offers diverse possibilities for spatial analyses.¹³ The information about the region of residence enables linkages with spatial indicators at various levels like federal states, planning regions, counties, municipalities, and postal codes. For example, Becker and Woessmann (2009) use county-level data from late 19th-century Prussia to test whether Protestant economies prospered because instruction in reading the Bible generated the human capital crucial to economic prosperity.

Information on the federal state is contained in the standard data set. The use of county codes (around 400 regions in Germany) are possible via remote execution. For the use of small-scale geographical data, a research stay at the SOEP Research Data Center in Berlin is mandatory.

Since 2000, exact geo-location is available within a specialized secured setting at the SOEP Research Data Center (Goebel and Pauer, 2014). This offers new possibilities to combine SOEP data with “Big Data” (internet of things, mobile devices, readers, wireless sensor networks, etc.). A prominent example is Falck et al. (2014), who utilize the availability of fixed-line broadband infrastructure for high-speed Internet for each individual household given by the exact address to study the effect of information disseminated by the Internet on voting behavior.

3.5.2 Record linkage with (administrative) micro data

Many researchers argue that administrative panel data have advantages over panel surveys due to the larger numbers of observations, smaller measurement errors, and very detailed information on certain topics. By contrast, survey data entail a much broader variable spectrum and – at least for Germany – valuable household background information. Thus, combining both data sources yields both data quality improvements and vastly furthers the number of questions the data can answer. Record linkage enhances the SOEP in various ways, with additional biographical sketches, special interest variables like employer infor-

¹³ See <http://www.diw.de/soep-regionaldata>

mation of pension prospects, and finer grids containing e. g. monthly or daily information. Due to this enormous potential, there are several projects linking SOEP data to administrative or external data sources. This diversity ensures that a wide range of very specialized questions can be addressed with the SOEP.

The first linkage project is the Linked Employer–Employee Study (SOEP-LEE, see Weinhardt et al., 2017). Conducted in 2012/13, SOEP-LEE asks employees in the SOEP to provide employer and company location information. Subsequently, about 1,700 employers were surveyed, providing rich information on work context and working conditions. This permits researchers to investigate the impact of structures and processes within a firm on social inequalities and the individual development over the life course. SOEP-LEE is available at the SOEP Research Data Center as well as at the University of Bielefeld and the University of Konstanz, the home of two remote access guest stations.

The second record-linkage project, IEB-SOEP, adds labor market related biographical register information to the SOEP migration samples M1/M2 (Brücker et al., 2014). This information stems from the Integrated Employment Biographies (IEB) of the Institute for Employment Research (IAB). IEB data entails the possibility to draw on long biographical sketches while having access to rich employer and establishment related information, such as establishment size or industry type at the same time. Thus, economists frequently utilize IEB data, especially for research on inequality (e. g. Dustmann et al., 2009, Card et al., 2013) or labor markets (e. g. Goldschmidt and Schmieder, 2017). Our sample of migrants in IEB-SOEP offers a unique opportunity to analyze e. g., the labor market integration process of migrants in Germany. The IAB-SOEP Migration Samples started in 2013 with about 2,700 migrant households, with an additional sample incorporated in 2016. To assess the possible effects on response rates and other phenomena in later survey waves, only part of the respondents took part in the record linkage procedure. Moreover, the year in which respondents are asked for their consent to the record linkage was randomly assigned (Eisnecker and Kroh, 2017). These data are accessible in the Research Data Center of the IAB via a guest research stay.

The third project, SOEP-RV, links SOEP data to that of German pension insurance. Starting in 2021, two datasets are linkable to consenting SOEP individuals, data from the Rentenbestand (RTBN) and the Versicherungskontenstichprobe (VSKT). The VSKT provides long-term social security biographies with monthly information on earnings, employment status, pension prospects, etc. Like the IEB data, the VSKT is frequently used in economics research, e. g., on long-term inequality like lifetime earnings (Bönke et al., 2015) or on old-age research (e. g. Lüthen, 2016, Geyer and Welteke, 2019). Although RTBN data, which includes information on current pensioners, e. g. pension amount or pension type, is less frequently used in research on a stand-alone basis, it provides useful extensive in-

formation when combined with other data sources (e. g. Haan et al., 2019). When combined, these datasets provide ample new research avenues regarding questions addressing e. g. long-term household inequality, retirement transitions and other old age related questions, life-courses research, as well as the impacts of social policies in the short and long run. The SOEP-RV consent rate for the interviews in 2019 is between 55 and 60 %. We expect that, from 2021, interested researchers can obtain the pension data from the Research Data Center of German Pension Insurance (FDZ-RV) and link it to the SOEP via an identifying variable. Research can be conducted at the researchers' home institution.

The fourth ongoing project, SOEP-IAB, will link the SOEP data again to IEB data from the IAB. In contrast to the second linkage project (IEB-SOEP, see above), the consent question is not limited to migration subsamples but extends to all SOEP-samples (except for the subsample of top-shareholders). This will allow us to address questions on e. g. long-term labor market developments for households or questions regarding employers and their characteristics.

3.5.3 Analyzing SOEP jointly with panel data around the world

SOEP data form the German part of comparative international data infrastructures. One key infrastructure is the Cross National Equivalence File (CNEF), located at Ohio State University, which provides harmonized cross-national variables for household panel surveys from Australia, Canada, Germany, Great Britain, Russia, South Korea, Switzerland and the United States. SOEP also contributes to the Cross-National Data Center in Luxembourg. The Center acquires cross-sectional household micro data on income, wealth, employment, and demographics from many high- and middle-income countries. After harmonization, these data are made publicly available in two databases: the Luxembourg Income Study Database (LIS) and the Luxembourg Wealth Study Database (LWS). Today, LIS provides data for 36 countries and LWS for 15 countries.

In sum, the CNEF and LIS/LWS frameworks enable researchers to conduct cross-national comparative research without requiring the substantial individual, harmonization efforts that would be required if the original national datasets were used.

3.6 Migration

In 2016, 9.2 million foreigners were registered in Germany, accounting for about 11 percent of the German population (German Federal Statistical Office, 2016). This

Table 2: Overview SOEP migration samples.

Sample	Year added	Target population	Sampling strategy	Initial response rate, initial N
B	1984	Guest workers from Italy, Greece, Spain, Turkey, and Yugoslavia	Multistage stratified sampling procedure using the registers of foreigners in each county	68.1 %, N = 4807
D	1994	Immigrants, who arrived after 1984, focus on ethnic Germans	Representative surveys of the German population in 1992 and 1994	76.8 %, N = 1624
M1	2013	Immigrants, who arrived in Germany between 1995 and 2013, second generation immigrants	Multistage stratified sampling based on the Integrated Employment Biographies (IEB)	31.7 %, N = 7445
M2	2015	Immigrants, who arrived between 2009 and 2015		28.8 %, N = 2638
M3	2016	Refugees, who arrived between 2013 and 2016	Multistage stratified sampling based on the German Central Register of Foreigners	48,7 %, N = 9965
M4	2016	Refugees, who arrived between 2013 and 2016, focus on refugee families		
M5	2017	Refugees who arrived between 2013 and 2016		54.7 %, N = 1519

Source: Kroh et al. (2018) and Jacobsen et al. (2019).

is the result of a long history of immigration, which started after World War II with the so-called guest worker programs in the 1960s. Seven SOEP migration samples represent specific immigrant populations in Germany, such that SOEP captures all major immigration waves to Germany (see Table 2): the guest workers, ethnic Germans, first- and second-generation immigrants in the period from 1995 to 2015, and the recent inflow of refugees following the destabilization of the Middle East and North Africa (MENA) region.

Respondents from the migrant samples receive the same individual- and household-level questions as any regular SOEP respondent. Additionally, migrants in the M-samples receive supplementary survey modules, covering the periods before migration, during migration, and after immigration into Germany. These modules allow users to analyze the migration motive, pre-migration employment, language proficiency levels, the route to Germany, legal status, and German language skills after arrival in Germany; these all may be both relevant covariates or potential outcome variables. It is also possible to link SOEP respondents to the Integrated Employment Biographies (cf. Section 3.5.2).

With all survey waves since 1984 including foreign-born respondents in Germany, the SOEP offers unique potentials for economists to study issues from social and labor market integration, the economic implications of heterogeneities in country-dependent norms and social roles, as well as the effectiveness of migration policies – both in descriptive and causal ways. For instance, previous research investigates immigrant-native wage gaps (Aldashev et al., 2012, Basilio et al., 2017), immigrants' savings behavior (Bauer and Sinning, 2011), and the influence of macroeconomic conditions in home countries on immigrants' wellbeing (Akay et al., 2017). Considering that migration often is a family decision, research also analyzes the labor market activity of immigrant families (Basilio et al., 2009) and the consequences of tied migration (Krieger, 2019). Other studies perform cross-country comparisons (Adsera and Chiswick, 2007, Brücker et al., 2014), use a quasi-experimental design to analyze the effects of xenophobic attacks on immigrants' subjective wellbeing and health satisfaction (Deole, 2019, Steinhardt, 2018), study the determinants of speaking fluency and wages of immigrants (Dustmann and Van Soest, 2001), and asylum seekers' self-selection with respect to pre-migration education (Guichard, 2020).

3.7 Perceptions, expectations, and attitudes

SOEP offers avenues for research into various domains of perceptions, expectations, and attitudes (see Table 3). These include self-assessments of satisfaction in various life domains, personality traits and attitudes, including locus of control and the Big Five, as well as risk attitudes (for an overview see Richter et al., 2017). In most economic models, these variables are unobserved and residual variation in observed outcomes is rationalized by appealing to unobserved heterogeneity in the above domains. SOEP offers a way forward by providing explicit measurements of these latent factors.

Satisfaction and wellbeing

Besides measuring material wellbeing via objective measures like income or wealth, subjective measures like satisfaction with life are gaining increasing attention in descriptions of inequality and social welfare (Stiglitz et al., 2009). SOEP collects items on satisfaction in various life domains (life, health, household income, dwelling, free time, job, household, childcare availability, personal income, family life, sleep) and the perceived course of life satisfaction over the past years. Studies use the satisfaction items to examine, for example, the in-

Table 3: Variables with information about perceptions, expectations, and attitudes.

Topic	Variables	Waves
Satisfaction and Wellbeing	Satisfaction in various domains	1984 ongoing
	Graphical course of life satisfaction over the last 10 years	2013
Personality	Big 5: 5 personality domains (openness, conscientiousness, extraversion, agreeableness, neuroticism) consist of 15 to 16 items (see Richter et al., 2017)	2005, every 4 years
Risk attitudes	Risk aversion	2004 ongoing
Expectations	Satisfaction with life in 5 years	1990–2004, 2008, 2009, 2011–2013, 2018
	Satisfaction with life in 1 year	1984–1987, 2008, 2013
	Graphical course of the expected life satisfaction in the over 5 years	2013
	Attitudes toward future	2005, 2009, 2014
	Future in general	1999
	Confident in future	1994
	Development in different domains (income, health, job advancement, family make-up, cost of living, local environment, political activity)	1994
	Gainfully employed, future	1984 ongoing
	Likelihood of career changes within the next 2 years (new job, lose job, promotion, self-employed, working in different field, give up job, demotion, retire, change to full- or part-time, qualification, wage increases)	1985, 1987, 1989, 1990–1994, 1996, 1998, 1999, 2001, 2003, 2005, 2007, 2009, 2013, 2015, 2018
	Reservation wage	1987–1989, 1992–1994, 1996–2018
	Expectation deterioration work	2006, 2011, 2012, 2016
	Change of the number of employees in respondent field	1991, 1992, 1994, 1996, 1999, 2009
	Expected future household net income	1994
	Inheritance of gift in the future	2001
	Amount of future inheritance of gift	2001
Fairness	Unfair income	2005, 2007, 2009, 2011, 2013, 2015, 2017, 2018
	Manager/unskilled worker: income unfair	2005

fluence of the income of a reference group on satisfaction with life (Ferrer-i-Carbonell, 2005, Goerke and Pannenberg, 2015), poverty and life satisfaction (Clark et al., 2016, Welsch and Biermann, 2019), as well as income, working hours, and happiness (Pouwels et al., 2008). Ferrer-i-Carbonell and Van Praag

(2003) develop a method to decompose income satisfaction inequality. Knabe et al. (2010) examine the subjective wellbeing of the unemployed in conjunction with time-use, while Hetschko et al. (2014) focus on the subjective wellbeing of the unemployed in conjunction with retirement decisions. Schröder and Yitzhaki (2017) revisit the evidence for a cardinal treatment of ordinal measures of wellbeing.

Personality traits

Different kinds of personality characteristics may influence decisions, behavior, and development. For example, the Big Five Personality Traits correlate with self-employment entry (Caliendo et al., 2014), locus of control with job search behavior (Caliendo et al., 2015), as well as personality traits with returns on the labor market and job loss (Heineck and Anger, 2010, Anger et al., 2017).

Risk attitudes

Risk preference, often given by the Arrow-Pratt measure of relative risk aversion, is a deep parameter in many economic models. As researchers have long suspected that heterogeneity in risk attitudes goes beyond the simple form that the Arrow-Pratt measure implies, they have subsequently examined the relationship between risk attitudes and diverse outcomes. For instance, researchers study individual risk attitudes (Dohmen et al., 2011), the relationship of migration and risk attitudes (Jaeger et al., 2010), and the connection between performance pay, risk attitudes, and job satisfaction (Cornelissen et al., 2011b). Other papers explore the relationship between risk attitudes and portfolio decisions (Barasinska et al., 2012).

Expectations

Respondents report their expected satisfaction with life in one year, five years, or the expected course of life satisfaction within the next five years (depicted graphically in the questionnaire). Furthermore, several questions identify if the thoughts about the future in general, or in specific domains (e. g. health, income, local environment), are more optimistic or pessimistic. Including these thoughts or expectations about the future may increase the explanatory power of (e. g. wellbeing) models. For instance, Piper (2019) examines the correlation of evaluations of the future on life satisfaction today.

Furthermore, there are variables regarding expectations of future employment, future situation at work, and future pay. Individuals also report their

reservation wage, the expectation of career changes within the next two years (e.g. new job, lose job, promotion, self-employed, working in different field, give up job, demotion, retire, change to full- or part-time, qualification, wage increases), deterioration of the working conditions, or general development of the change in the number of employees in the respondents' occupational area. These items on subjective expectations may influence individuals' behavior, for instance, in job search. Drahs et al. (2018) use the question on reservation wages to identify the influence on job search. Rainer and Siedler (2008) examine the impact of the expectation of a future pay rise on preferences for redistribution. Kattenbach et al. (2011) compare the career expectations of regular white-collar workers and managers. Knabe and Rätzler (2010) investigate whether expectations about future job market status influence life satisfaction. Fedorets et al. (2018) examine the impact of the minimum wage reform on the reservation wage.

Concerning the future financial situation, indicators on the expected future household net income or the expectation of an inheritance or a gift (including the expected amount) in the future may influence households' consumption and saving decisions. Von Werder (2018) studies how an expected inheritance influences individual behavior.

Fairness

Perceptions of what is fair or unfair income is elicited every second year since 2005. Employed respondents answer whether they think that their 1) gross and 2) net income is fair and what would be a fair income to receive for their current job. This question is based on the work by Jasso (1978) in sociology and Akerlof and Yellen (1990) in economics. SOEP-based fairness studies in economics focus on the perceived fair income and gender differences (Pfeifer and Stephan, 2019), wellbeing and quits (d'Ambrosio et al., 2018), satisfaction with democracy (Pfeifer and Schneck, 2017), and the determinants of fair income (Pfeifer, 2014). Koenig et al. (2019) study the impact of the introduction of the German minimum wage in 2015 on fair wages.

Other authors use the difference between the fair gross and fair net income as a proxy of what respondents are willing to contribute to the public redistribution system and construct fair tax schedules (Jessen et al., 2018a, Metzger, 2018).

In 2005, SOEP asked their respondents how fair they perceived the income and the tax rate of managers and unskilled workers to be (Liebig and Schupp, 2005). These data are used in studies by Cornelissen et al. (2011a) as well as Pfeifer and Schneck (2017).

4 Data access and user support

SOEP data are available free of charge to universities and research institutes for research and teaching purposes around the world as scientific use file with anonymized microdata. Interested users must sign a user contract¹⁴ and, after approval, then the data can be downloaded from the website via a secure data transfer system. More sensitive regional data can be accessed either by remote execution or during a guest-stay at the Research Data Center SOEP. All forms and conditions are available online at the website of the RDC SOEP.¹⁵

SOEP offers different forms of user support:

1. SOEP email hotline – soepmail@diw.de – with fast services related to user-contracts, data distribution, as well as support for general and specialized questions on data structure and data analysis.
2. [Paneldata.org](http://paneldata.org)¹⁶ is the documentation system for SOEP. It provides basic information on each variable. Item-correspondence tables indicate changes in variable names and/or value labels across time. A script-generator produces syntax files for standard software programs to combine and generate datasets.
3. [SOEPcompanion](http://soepcompanion.org)¹⁷ is an online handbook designed to help new (and old) users to get quickly started with SOEP by introducing the survey, its structure, and research potential. The [SOEPcompanion](http://soepcompanion.org) also provides information on the topics, survey design, the various subsamples, a precise explanation of the data structure, and specific instructions on working with the various SOEP data products.
4. [SOEP-in-Residence](http://soep-in-residence.org)¹⁸ provides SOEP users the opportunity for research stays at SOEP at DIW Berlin to discuss data matters and research projects with the SOEP team. Since 2017, European researchers can apply for visitation grants via the EU's InGRID-2 project.¹⁹
5. [SOEPcampus](http://soepcampus.org)²⁰ is a modular training program that familiarizes SOEP users with the data. Campus events take place at the SOEP offices in Berlin, at German universities, or as pre-conference workshops (in cooperation with other household-panels).

14 See <http://www.diw.de/soep-contractmanagement>

15 See https://www.diw.de/en/diw_02.c.222829.en/access_and_ordering.html

16 See <https://paneldata.org/>

17 See <http://companion.soep.de/>

18 See http://www.diw.de/en/sixcms/detail.php?id=diw_01.c.98086.en

19 See <http://www.inclusivegrowth.eu/visiting-grants>

20 See <http://www.diw.de/soepcampus>

5 Concluding remarks

SOEP sets national and international standards in the conception, design, implementation, user-friendly preparation, and distribution of household panel and related data. It strives to lead the field internationally in the quality, originality, significance, and rigor of its work. Together with its international counterparts, SOEP provides not just an indispensable empirical foundation to describe longitudinal phenomena and relationships, but also a better understanding of economic processes and behavior, thereby better informing policymakers.

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