

The Socio-Economic Panel Linked Employer-Employee Survey Version 2 (SOEP-LEE2): Overview and Results from the First Wave

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Abstract – The trend toward digitalization not only changes the organization of work in areas such as production, services and logistics, but also the work situation of employees. To study such changes, data is needed at both the individual and corporate levels. The SOEP-LEE2 project contributes to research through a linked employer-employee study in combination with an establishment and self-employed survey for Germany. The data infrastructure enables research into the organizational characteristics (such as ownership, turnover, employment structure), human resource management, changes in the organization of work and the consequences for the employees and their households. The data infrastructure relates this to different aspects of digitalization. In this article we describe the research project with the different surveys and present some results based on the first wave.

Keyword – *Linked Employer-Employee Data, Digitalization, COVID-19, SOEP, Human Resource Management*

NOMENCLATURE

| | |
|----------|---|
| COVID-19 | Coronavirus disease |
| FDZ | Research data center |
| IAB | Institute for Employment Research |
| INFAS | Institute for Applied Social Science GmbH |
| SOEP | Socio-Economic Panel |

I. INTRODUCTION

The sociological observation of changes in the organization of work, not only as a result of digitalization, requires data at various levels. The change has preconditions on the part of the individuals, e.g. with regard to education, career or life situation, and has consequences for these variables. Parallel to this, the company level, in particular the organization of work, but also personnel management and personnel development, must be considered. If one assumes that this change is incremental, continuous observation of the link between both levels—individuals and companies—is

required [1], [2]. Linked employer-employee data sets are regularly called for in the literature. However, this demand is not met, as the production of such data sets is not only costly, but ideally also requires linking with existing social science instruments and data sets.

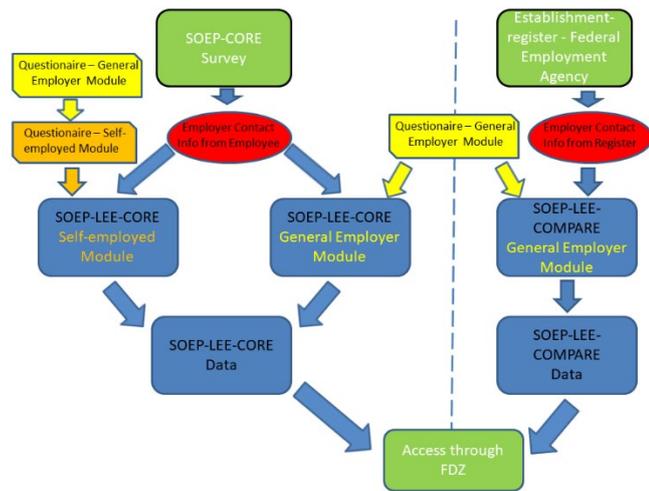
The SOEP-LEE2 project fills this gap. Based on a central data set for continuous observation at household and individual level in Germany, the project taps into additional data sources to supplement the description of the work situation of the employed surveyed in the Socio-Economic Panel (SOEP). The SOEP has been collecting data at the household and individual level annually for almost 40 years. Following on from a first attempt [3], the project serves to establish the survey of establishments of employed persons in the SOEP. Self-employed persons are asked separately about their company or—as solo self-employed persons—individual work situation. Finally, the project includes comparative surveys of establishments on the basis of the IAB establishment register in order to be able to assess methodological aspects of the employer-employee linked survey instrument, which is still little tested in Germany. Insofar as the data sets produced are made available to the secondary analyses, SOEP-LEE2 can be seen as a contribution to the establishing the national research data infrastructure. It therein builds on well-established data structures (SOEP) extending these into an employer-employee linked setting.

The following sections first outline the project structure and the various data collections over time (II). We then focus on the first wave of the linked employer-employee dataset (III) and its statistical description (IV). In the following section (V) we sketch the next steps of data analysis, processing and release for secondary analytical research and conclude with a summary (VI).

II. THE SOEP-LEE2 PROJECT

The SOEP-LEE2 project is an interdisciplinary research data infrastructure project that combined different existing and new surveys. The data infrastructure comprises three different surveys: 1. SOEP-LEE2-CORE, 2. SOEP-LEE2-COMPARE and 3. SOEP-LEE2-SELF-EMPLOYMENT. The SOEP-

LEE2-CORE survey is an employer-employee linked survey with an employee-first design. This means that employees are first interviewed in the SOEP survey about employer contact data and employers are subsequently surveyed. The survey data on the employees from SOEP is linked to survey data on their employer, which makes it possible to examine the work situation of employees in the SOEP in more detail. Because of the variable-rich data sets at the individual and organizational levels, a wide variety of research questions can be investigated. The SOEP-LEE2-CORE survey has two waves with the first wave being just completed in July 2022, while a second wave will arrive in 2024. In contrast, the SOEP-LEE2-COMPARE survey will be conducted annually from 2022 to 2024. This survey is a representative establishment survey based on the establishment register of the German Federal Employment Agency at IAB. The sample of the SOEP-LEE2-COMPARE is stratified by 5 strata of firm sizes, 8 strata of business sectors and 2 strata of geography. This survey allows for representative studies at the establishment level. Furthermore, the questionnaires of the SOEP-LEE2-CORE and the SOEP-LEE2-COMPARE survey are identical. The consequences of using an employer-first design in the SOEP-LEE2-CORE data in terms of for example nonresponse can accordingly be researched in detail. The SOEP-LEE2-SELF-EMPLOYMENT is an additional survey of the self-employed persons in the SOEP sample. For this survey, a special module for self-employed persons is created addressing issues for self-employed based on the establishment survey of the SOEP-LEES-CORE. This makes it possible to compare the situation for self-employed persons with the situation in other types of establishments. This survey arrives in 2022 and 2024.



FIGURES 1: CONCEPTUAL FRAMEWORK FOR THE SOEP-LEE2 DATA STRUCTURE.

The questionnaires of the first wave of SOEP-LEE2-CORE and SOEP-LEE2-COMPARE have the same topics. This includes questions about company characteristics, as well as questions about human resource management, wage and digitalization. A main focus is on the effects of COVID-19 and the reactions of the companies, especially on the implementation and development of remote work and digital solutions. The questionnaire has 64 questions. The survey is conducted by the external survey institute INFAS (Institute for Applied Social Science GmbH).

III. DESIGN AND PARTICIPATION RATES OF THE FIRST WAVE OF THE LINKED EMPLOYER-EMPLOYEE SURVEY (SOEP-LEE2-CORE)

At the time of writing, data collection for the first wave of the linked employer-employee (SOEP-LEE2-CORE) survey has completed, which allows us to give a brief overview of the survey design and the response rates. As described above, the design of the SOEP-LEE2-CORE survey relies on the employee-first method. This approach requires an ideally representative sample of employees who are willing to provide the name and further contact details of their employer. Here, we use the 2021 wave of the SOEP-Core survey (SOEP hereafter), which asks for employer contact information (see section III.A). In a next step, the contact information is used to reach and survey the employers (section III.B). Together, the two surveys constitute SOEP-LEE2-CORE.

A. Employee Survey (SOEP-Core 2021)

In SOEP-LEE2, the representative sample of employees consists of all employees of the 2021 wave of SOEP. The SOEP is a yearly panel survey that is representative for private households living in Germany. It is a suitable basis for the goals of the SOEP-LEE2 project for a set of different reasons. The SOEP survey collects individual information from each household member, providing a representative sample of individuals living in Germany. Second, the number of survey respondents is relatively large. Typically, a wave of the SOEP comprises around 30,000 individuals, although the number has somewhat diminished in 2021 [4]. The large size of the initial sample mitigates the effects of an inevitable reduction in the sample size along the sampling process of the employee-first method (see below). Lastly, due to a panel design and extensive questionnaires, the SOEP contains rich data relevant for the SOEP-LEE2 project, such as detailed records on income, education, and employment, measures of physical, and mental health, and information on the household context.

In the 2021 wave, employees in the SOEP were additionally surveyed for the name and address of their current employer. The question text specifically asked for contact information of a company's local branch or subsidiary to ensure that data on the immediate workplace environment could be collected in the subsequent employer survey. Moreover, the question was accompanied by a transparency statement informing respondents that the collected data would be used, first, to conduct a survey with employers, and second, to link public register employer data to the survey data.

Response rates to the questions on employer contact information are presented in TABLE I (preliminary data). Response was generally high. From a total of 8920 employees, 73.2 percent reported the name of their employer, with rates being similar for the different elements of an employer's address. First analysis of the response process shows that employees of large companies and employees working in the public sector are somewhat more likely to name their employer [5]. Overall however, the relatively high response rate suggests that (non-)response to the question on employer contact information probably produces relatively little selection bias in the sample.

TABLE I: RESPONSE RATES TO QUESTIONS ON EMPLOYER CONTACT INFORMATION IN SOEP-CORE 2021 (PRELIMINARY DATA).

| | <i>N</i> | <i>Percent</i> |
|---|----------|----------------|
| SOEP employees (w/o migrations samples M3-M8) | 8920 | 100 |
| Respondent provided: | | |
| - Name of employer | 6525 | 73.2 |
| - Municipality | 6518 | 73.1 |
| - Postal code | 6127 | 68.7 |
| - Street | 6164 | 69.1 |
| - House number | 5865 | 65.8 |
| - Name and complete address | 6093 | 63.4 |

B. Establishment Survey (SOEP-LEE2-CORE)

After completion the SOEP survey, data collection for the linked establishment survey began. Establishments were surveyed between November 2021 and June 2022, with the majority of interviews being conducted during the first quarter of 2022. Relative to the planned schedule, data collection for the establishment survey was delayed by about half a year due to a postponement of the 2021 wave of the SOEP survey in the course of the COVID-19 pandemic.

The survey institute offered different survey modes to accommodate the needs of the respondents, and aiming to achieve high response rates. While the first contact was established by telephone, respondents could choose to conduct the interview by telephone, web, or self-administered pen-and-paper questionnaires. Around half of the respondents in the first wave opted for a telephone interview, 45 percent for a web interview, and five percent chose self-administered pen-and-paper questionnaires.

The survey institute contacted a total of 5204 establishments, of which 990 (19 percent) agreed to participate in the interview. Of these, 732 establishments completed the interview, resulting in a response rate of 14 percent. The rate is lower than that of, for example, the establishment panel of the Institute for Employment Research (IAB), which in recent years has attained response rates of 32 to 35 percent in samples of newly-recruited German establishments. Different from the SOEP-LEE2 survey, the IAB establishment panel relies on face-to-face interviews and might be better known among firms due to its longer existence, which may explain some of the discrepancies in response rates [6].

IV. DESCRIPTIVE ESTABLISHMENT CHARACTERISTICS FROM THE FIRST SURVEY WAVE

The data collected from the first wave of the establishment survey allow us to characterize the participating establishments and to identify first relevant patterns in their responses. The description also provides a good overview of the four main topics covered by the survey: (1) General establishment characteristics and the workplace environment, (2) digitalization, (3) organization of work, personnel management and development, and (4) the COVID-19 pandemic.

A. General Establishment Characteristics and the Workplace Environment

To begin with, it is instructive to summarize some general characteristics of the participating establishments. Most of the 732 establishments that completed the interview are from the private sector (64.9 percent), while the other third is publicly owned. On average, the establishments have 667 employees, with a more detailed breakdown of establishment by size given in TABLE II. The majority of establishments in the sample employ between 10 and 49 persons or between 50 and 249 persons. Very few establishments have fewer than five employees, as very small establishments were excluded from the SOEP-LEE2-CORE survey for privacy concerns and based on a priori information on the establishment size.

TABLE II: CHARACTERISTICS OF THE SURVEYED ESTABLISHMENTS, UNWEIGHTED STATISTICS.

| <i>Characteristics</i> | <i>Percent</i> |
|--|----------------|
| Number of employees: | |
| - 0-4 | 1.85 |
| - 5-9 | 6.41 |
| - 10-49 | 31.3 |
| - 50-249 | 32.8 |
| - 250-499 | 11.0 |
| - More than 500 | 16.7 |
| Sector: | |
| - Private | 64.9 |
| - Public | 35.1 |
| Composition of workforce | |
| - Average percentage of female workforce | 54.5 |
| - Average percentage of foreign workforce | 8.2 |
| - Average percentage of workforce in occupations that do not require apprenticeship | 14.8 |
| - Average percentage of workforce in occupations that require apprenticeship or comparable professional experience | 56.2 |
| - Average percentage of workforce in occupations that require degree from university (of applied sciences) | 30.9 |

The data also contain information about the work environment, such as the composition of the workforce. Those aspects are not only interesting to analyze processes at the establishment level, but they also characterize the work environment individuals are exposed to. As such, we expect them to have an effect on individual career opportunities, job-related decision-making, and individual attitudes and beliefs. While the analysis of these effects is part of future research, we can present some aggregated statistics at the establishment level. On average, 54.5 percent of the workforce in surveyed establishments are female, and the average share of the workforce with foreign background is 8.2 percent. Moreover, the average workforce consists of 14.8 percent employees in occupations that do not require apprenticeship. On the other hand, the average share of the workforce in occupations that do require apprenticeship is 56.2 percent, and for those occupations that require a university degree it is 30.9 percent.

These numbers indicate that the establishments in the sample rely on a highly educated workforce.

B. Digitalization

Digitalization is one of the far-reaching processes that are expected to continuously transform the way companies operate and organize their workforce. As such, the topic assumes a prominent role in the SOEP-LEE2-CORE survey. For example, as a general indicator of digitalization, the survey asks for the usage of computers, laptops, and digital devices for task completion at work. On average, 69.1 percent of an establishment's employees use these devices, indicating that, digital devices are, maybe not surprisingly, a very common tool for task completion, even if a significant share of workers still do not apply them. Further questions on more specific types of technology highlight that over the last years the majority of establishments has intensified the usage of different digitalization technologies, emphasizing the ubiquity and relevance of digitalization at the workplace.

The effects and drivers of digitalization are one of the relevant research topics addressed in the SOEP-LEE2 project. First descriptive results from the first wave of the survey already show some important aspects to consider from the viewpoint of establishments. For example, 54.4 percent of the surveyed establishments agree with the statement that digital technologies led to an increased need for employee training and education. Similarly, 45.5 percent of the establishments state that the usage of digital technologies causes a strong dependency on external service providers, all of which suggests that digital technologies render the production process more complex and demanding. On the other hand, the results show that only a small share of establishments (15.1 percent) agrees with the statement that their employees tend to be critical of digitalization technologies. This suggests that employee attitudes are unlikely to be a barrier to expanding the use of digital technologies in the future.

C. Organization of Work, Personnel Management and Development

The (re-)organization of work, personnel management, and the educational development of the workforce are ways in which establishments potentially respond to digitalization and sociological changes. In the SOEP-LEE2-CORE survey, the corresponding questions first ask for current challenges in personnel management to identify areas where establishments see urgency to act. Descriptive results show that for a large majority of establishments (72.5 percent) it is a large or very large challenge to recruit the required number of qualified employees. Similarly, 46.8 percent see general personnel shortages as a problem. Moreover, 52.6 percent of the establishments are confronted with a heavy workload for the existing staff, which possibly reflects the unmet demand for workers. In contrast, somewhat less of a challenge are high salary costs (26.2 percent see it as a large or very large challenge), an ageing workforce (19.1 percent), a large need for training of the workforce (18.0 percent), and a high employee turnover rate (14.7 percent).

In light of these challenges, establishments may invest more into human capital, for example by increasing their efforts to recruit new employees or train the workforce. In the SOEP-LEE2-CORE survey, establishments are asked how they organize their human resource management and whether they use certain types of recruitment methods and employee

training. The questions distinguish between employee skill group to assess how human capital investments are allocated over the skill distribution. With respect to training, first results show that almost every establishment in the sample (96.6 percent) offers some form of employee training, including on-the-job training. However, the likelihood of such offers differs depending on the skill group. Workers in the lowest skill group, that is employees in occupations that do not require apprenticeship, are less likely to get the opportunity for training. Among those establishments that employ low-skilled workers, 81.9 percent offer training for this skill level of workers. This is less than the 93.6 and 95.1 percent of establishments that employ and offer training for the middle and upper skill groups. There are also differences in the type of training offered. For instance, establishments are less likely to offer courses or seminars to low-skilled workers (66.9 percent, conditional on offering training to this group), compared to middle-skilled (87.9 percent) or high-skilled workers (89.9 percent), suggesting that investments into human capital are somewhat more directed towards those workers with a skill advantage.

D. COVID-19 Pandemic

The COVID-19 pandemic is another of the four main topics of the first wave of the SOEP-LEE2 establishment survey. The survey focusses on the pandemic's impact on the size of the workforce, on hiring and layoffs, the number of working hours, and the usage of remote work. Establishments are asked to compare their pre-pandemic situation to that of the first half of 2021, when Germany was hit by the third wave of the pandemic and different lockdown measures were temporarily in place, including the closure and restriction of certain types of businesses, and the requirement to work remotely from home if possible [7].

The pandemic and its lockdown measures show in the data. With respect to the working hours, descriptive results suggest that establishments were relatively likely to reduce working hours in response to the COVID-19 pandemic. In total, 59.7 percent of the establishments took measures to cut down the number of hours worked. Establishments most commonly opted for a reduction of accumulated working time credits or an increase in debit hours in their employees' working time accounts (52.1 percent), followed by an introduction of short-time work (27.6 percent), and a mandated use of vacation days (24.2 percent).

Unlike working hours, most establishments did not adjust the size of their workforce. The data indicate that 58.7 percent of establishments in the sample employed the same number of persons as before the pandemic. And only 16.6 percent of the establishments report a decrease in the number of employees. Additional questions on whether establishments responded to the pandemic by adopting specific human resource policies confirm the overall impression. Most establishments (70.6 percent) did not implement any of the policies surveyed that aimed at a reduction of the workforce size. The most commonly adopted measures were to postpone a planned increase of the workforce (17.3 percent) and not filling vacancies (15.1 percent), suggesting that establishments made only moderate adjustments to the size of the workforce, and if so, by a hiring freeze.

A clear response to the pandemic is evident with respect to remote work. In mid-2021, 67.3 percent of the establishments

in the sample had part of their workforce working from home. In most of these establishments (92.0 percent), the share of employees working remotely increased during the COVID-19 pandemic, emphasizing the pandemic's large impact on the organization of work. In addition, the data show that the establishments grant their employees a certain flexibility as regards to when they work from home. In 69.6 percent of establishments where remote work is available, employees decide jointly with the employer on the times when they work remotely. In the remaining establishments, the decision is taken either mostly or exclusively by the employer (18.4 percent) or the employees (12.1 percent).

V. UPCOMING RESEARCH AGENDA

The central task is the preparation and provision of the data sets in the research infrastructure. This includes quality assurance [8] and in particular the analysis of the non-response in order to be able to assess possible biases. The design of the project comprising comparable questionnaires in particularly SOEP-LEE2-CORE and SOEP-LEE2-COMPARE offers unique opportunities along those lines. For these analyses the project also cooperates with the IAB Establishment Panel, which has access to supplementary data in context of the comparison sample. Beyond the research on survey methodology, the analyses focus on the development of a typology of human resource management and industrial relations. Analyses of the use and impact of digital technologies are also planned. This includes analyses of the spread of various forms of remote work [9]. Aspects of innovation management will also be addressed. Special focus is on questions of social security for the self-employed based on SOEP-LEE2- SELF-EMPLOYMENT.

VI. CONCLUSION

Social science research, as well as labor and social policy, calls for continuous monitoring of changes in working conditions and labor relations, both at the level of employees and at the level of employers. The SOEP-LEE2 project collects information on establishments and their economic situation, on organization and personnel policy, and on work conditions, based on the address data of the employers of the dependent employees surveyed annually in the SOEP. The focus is on transformation trends due to digitalization in general and the COVID-19 crisis in particular. Using the employee-first methodology, the data on dependent employees in the SOEP are thus enriched by an external data source. Furthermore, the project surveys the self-employed, whereby social security issues are also addressed. In order to be able to control for the methodological effects of the employee first approach, a comparative sample of establishments is surveyed on a representative basis.

The data sets will be processed in the project and made available to the research community via the FDZ. Beyond the project's special research issues, a wide range of research questions will be addressed, not least because of the linkage of data at the individual and company level. It is to be hoped that this contribution to the national data infrastructure will be widely received and will enrich social science research on working conditions and industrial relations in the long term.

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