Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

FAKULTÄT
FÜR WIRTSCHAFTS- UND
SOZIALWISSENSCHAFTEN

Overestimated Labor Force Potential in Germany
The Role of Flexible Working Time Models

Christina Heike Maaß

WiSo-HH Working Paper Series
Working Paper No. 84
November 2024

WiSo-HH Working Paper Series
Working Paper No. 84
November 2024

Overestimated Labor Force Potential in Germany
The Role of Flexible Working Time Models

Christina Heike Maaß, University of Hamburg

ISSN 2196-8128

Font used: „TheSans UHH“ / LucasFonts

Kontakt:
WiSo-Forschungslabor
Von-Melle-Park 5
20146 Hamburg
E-Mail: experiments@wiso.uni-hamburg.de
Web: http://www.wiso.uni-hamburg.de/forschung/forschungslabor/home/

Overestimated Labor Force Potential in Germany

The Role of Flexible Working Time Models

Maaß, Christina Heike
University of Hamburg, Hamburg, Germany
christina.maass@uni-hamburg.de

Abstract

With economists suggesting to increase labor market participation to counter demographic changes and skills shortages, contrary to the recently increased awareness of work-life balance, the question arises as to how much of the previously unexploited labor supply can actually be activated and pushed into full-time positions. In this paper, we empirically analyze the intentions of the underemployed and inactive individuals based on a sound theoretical analysis. By firstly exploring responses to the EU Labor Force Survey and the German microcensus, we find changes in labor supply behavior over time. The results are corroborated and extended by novel search data from Google Trends, which provide further details on the increasing preferences for fewer working hours and part-time work implicitly expressed via the search engine. We identify the overestimation of the labor force potential in Germany to be substantial and realistically assume a limited potential to activate the unexploited workforce.

1. Introduction

For a long time, an enormous hidden labor force potential was propagated in Germany, which was estimated to be around 4.4 million people in 2019 (FSO 2020a). With the beginning retirement of the high birth rates generation and the high demand for skilled workers, the labor force potential in Germany is expected to drop substantially in the next decades (see e.g. FSO 2020b and Hellwagner et al. 2023). Some economists thus propose to utilize the remaining potential (in particular women and older workers) more intensively, in form of longer working hours and higher participation rates. However, there are increasing incentives not to work like

high social benefits, the tax and social security law and retirement at 63 years as well as regulatory restrictions on taking up work (e.g. for asylum seekers). In addition, the proposal contrasts with recent developments associated with increased awareness of work-life balance and sufficient time to pursue own life goals, causing demands not only for work from home and purpose of work, but also for reduced working time in the direction of a 4-day working week with 32 hours. With constantly low unemployment rates, there is a change of classical labor market dynamics from a demand-oriented to a supply-oriented market implying a preferential negotiating position of job seekers. Thus, the question arises as to how much previously unexploited labor supply can actually be activated. The most straight-forward way to quantify this is by looking at the share of part-time workers (which could possibly work full-time) and unemployed workers (which could possibly be re-employed). However, these statistics do not demonstrate the full picture as the potential labor force is not directly observable and some unemployment remains hidden (Rengers and Fuchs 2022). This *hidden unemployment* can be defined as people without an occupation who are not actively searching for employment or are not promptly available but are potentially willing to work (Baum and Mitchell 2010). Although not registered as unemployed, this group constitutes additional potential for the labor market. The relevance of counting the non-employed in addition to the unemployed is known for a long time (see e.g. Green 1999). The topic became center of several studies investigating the dropping out of workers, in particular older, discouraged men, from the labor market (Beatty and Fothergill 2002; Beatty and Fothergill 2023; Clasen et al. 2006) as well as the reasons why non-employed people, in particular women, decide to not actively search for a job (Baum and Mitchell 2010; Malmberg-Heimonen and Julkunen 2002).

The issue of getting more people into employment is particularly relevant for a country like Germany, which is facing challenges such as shortage of skilled workers and the need to stabilize its pension and social systems in order to maintain its industrial base and prosperity. It is assumed that increasing the labor supply is rather easy, as the country disposes of a large potential of people who could be easily integrated into the labor market. However, the recent popularity of work-life balance suggests that individual preferences for work may have changed, making previous approximations imprecise. Due to the importance of the issue, rather than relying on possibly outdated assumptions concrete evidence is needed to determine how large the potential really is. Preference changes, however, start in the dark and are not directly observable in the

official data. This is, where this paper comes in. We look for evidence of changes in preferences for a flexible choice of weekly working time that affects individual labor supply behavior. This would indicate that previous estimates of the labor force potential in Germany are overly high. The question is studied empirically on the basis of a sound theoretical analysis. We present evidence for limited labor force potential by first analyzing publicly available data from the EU Labor Force Survey (EU-LFS) and data from the German microcensus. Particularly innovative is the confirmation and extension of the results with the traditional data through a novel analysis of labor market-related search volume data from Google Trends. We find strong arguments for an overestimation of the labor force potential in Germany that goes well beyond being marginal. Specifically, we find workers to increasingly supply labor in form of a backwards-bending labor supply curve, changes in the causes for remaining inactive, fewer hours worked per person, fewer underemployed individuals and higher demand for reducing working hours and part-time jobs. The paper contributes to the research on the true extent of the labor force potential. In addition, the paper contributes to the literature on uncovering hidden, not directly observable, phenomena.

2. Current estimation methods and why they could be overestimating nowadays

The labor force potential covers all persons who, in a favorable labor market situation with full employment, are willing, suitable and, according to their personal requirements like health and education, able to pursue a corresponding occupation. How those currently non-employed but potentially activatable individuals can be quantified in Germany is well summarized in Rengers and Fuchs (2022). The number of unemployed persons is counted in two ways, either as part of the microcensus by the Federal Statistical Office (FSO, Statistisches Bundesamt) or as number of registered unemployed by the Federal Employment Agency (Bundesagentur für Arbeit). The FSO considers individuals as unemployed if they do not work more than one hour a week as employed or self-employed. In addition, according to the criteria of the international labor organization, these persons need to have been actively looking for a job in the four weeks preceding the reference week and be able to take up any job offered within two weeks (Rengers and Fuchs 2022). While both measures do reflect what they are supposed to, they miss many unemployed persons. Who registers as unemployed at the job center depends on rules for eligibility of benefits

and on employment prospects. Due to the strict definition of unemployment, further measures of labor underutilization are necessary.

On the one hand, there are time-related unemployed (wishing to increase hours worked) and the hidden/potential labor force (the so-called “Stille Reserve”). For the former group, one needs to rely on survey data like the microcensus asking individuals whether they would like to work more hours and if yes how many in total. The latter group covers persons without employment who are in principle willing to work but who, for a variety of reasons, do not appear in official statistics in times of poor labor market situations. This group constitutes people actively searching for a job, but not able to start it within two weeks (category A) plus people not searching for a job for various reasons but generally willing to work and available for work (category B). Finally, there are other willing non-jobseekers (category C), which are not part of the official labor underutilization. There are two different approaches to measure this hidden labor force. The FSO directly estimates the potential labor force from the microcensus using a microeconomic perspective. The German Institute for Employment Research (IAB) estimates this group indirectly based on annual data on the participation rate from the microcensus in an econometric model using a macroeconomic perspective and by inserting labor market indicators at their expected full employment level (Rengers and Fuchs 2022).

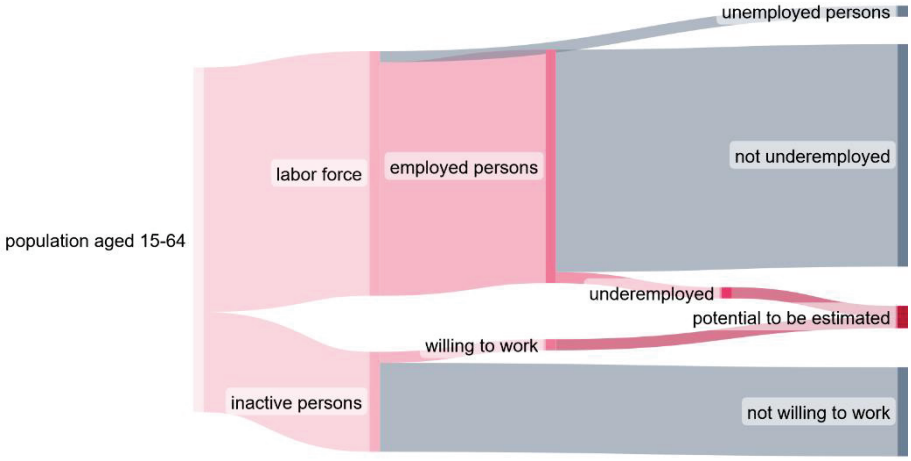
These methods are suitable for retrospective observations of stated preferences some years ago. However, the current rapid changes in labor supply, recently accelerated by the COVID-19 pandemic (Brinca et al. 2021), which could lead to a substantially lower labor force potential than previously assumed, require timely information. Novel data sources such as search volume from Google Trends enable up-to-date insights in near real time. Moreover, they capture implicit motives related to individual behavior and preferences, e.g. regarding the desired work-life balance and working hours, which may not be revealed by direct questioning in surveys. For this reason, we complement the survey data with further information from Google.

3. Data and method

In order to better understand the actual labor force potential force in Germany that could be activated in an ideal situation, we analyze underemployed persons, employed individuals who wish to increase the number of hours they work per week, and inactive persons outside the labor

force who are willing to work (see Figure 1). For the latter group, in this paper, we consider not only the potential labor force (hidden labor force categories A and B), which are usually the focus of labor force potential estimates, but also willing non-jobseekers (hidden labor force category C), which are of importance to get a complete picture. Both groups consist of approximately 2 million persons each. We exclude the unemployed from the analysis as we believe that they are rather easy to active as they are still on the labor market and are easily quantifiable, so that further analysis of this group appears secondary in our context. We also refrain from including inactive persons who are not willing to work, since they cannot be activated.

Figure 1: Labor force potential to be estimated in this paper



Note: Diagram created using SankeyMATIC modifying figure 1 in Rengers (2016).

We firstly review related literature on the topic. Secondly, we analyze standard (micro-)economic theory of labor supply. Regarding empirical data, we focus on the years 2009 to 2022. Hence, we consider a period without profound changes in basic social security after the implementation of unemployment benefit II ("Hartz IV") in 2005[1] and before the implementation of the new citizen´s benefit (Bürgergeld) in 2023. The introduction of the statutory minimum wage in 2015 appears to have had insignificant effects on employment rates, but possibly contributed to the trend of reducing contractually agreed working hours (Bruttel et al. 2019).

In the first place, we examine the EU-LFS and the German microcensus. The EU-LFS is a household survey conducted across the EU by the national statistical institutes since 1983. In Germany, it is

[1] Studies (see e.g. Hochmuth et al. 2021) show substantial changes to the labor market in the first quarters following the reform, which are predominantly levelling out over time, so that we expect the influence on results from 2009 and after to be negligible.

included in the microcensus survey. It contains quarterly information on labor market participation of individuals living in private households starting from the age of 15 and on individuals outside the labor force (Eurostat 2023d). Many statistics are freely available on Eurostat[2]. Since 1957, the German microcensus annually surveys 1 % of the German population in a rotating panel survey regarding their economic, social and living conditions as well as the labor market (RDC FSO 2023a). The data can be accessed for research purposes via Scientific Use Files. For the analysis in this paper, we focus on the years 2009, 2014 and 2019 (RDC FSO 2023b, 2023c, 2023d), which constitutes the latest available year comparable with previous waves. In the EU-LFS and the microcensus we consider only individuals aged 15 to 64 years and living in private households. Although overlapping, the use of both data sources allows us, on the one hand, to obtain more recent and more frequent aggregate information (EU-LFS) and, on the other hand, to analyze some years in more detail and disaggregated (microcensus).

We then go beyond traditional data and investigate labor market-related search volume from Google trends to gain further insights into changes in individual labor supply implicitly expressed. The data from Google Trends consists of relative search volumes of a supposedly representative sample during the considered period. The values range between 0 and 100, with a value of 0 indicating lowest search volume and a value of 100 indicating highest search volume during that period. Previous studies demonstrate high potential of Google Trends data to study issues related to the labor market, e.g. for predictions of the unemployment rate in Germany (Askitas and Zimmermann 2009) and the US (Xu et al. 2013) as well as of employment growth in the US (Borup and Schütte 2022). We complement the findings with further publicly available labor market statistics, e.g. from the IAB or the FSO.

After the presentation of descriptive statistics, the microcensus data is additionally evaluated using logistic regressions[3] for the dependent binary variables work desire, wishing to increase hours worked and wishing to decrease hours worked. As explanatory variables the socio-economic factors age, gender, marital status, level of education, income category, receipt of pension, other public payments or further income as well as income mainly from family members

[2] https://ec.europa.eu/eurostat/web/main/data/database?node_code=employ

[3] Logistic regressions for dependent binary variables were firstly promoted by the biometrician Joseph Berkson (Berkson 1944).

are used. We further include interaction terms between relevant variables and survey years to examine whether the size of a difference, e.g. between men and women or married and unmarried individuals, depends on the survey year. As it is not possible to obtain information on the presence of small children from the 2019 survey, we estimate the regressions without accounting for children. As a robustness check we repeat the estimations for 2009 and 2014 including a dummy for having a child younger than six years and find only minor changes for the remaining coefficients. As p-values are known to become very close to zero with larger sample sizes, we provide additional information on the size of the detected effects and confidence intervals, following the recommendations of Lin et al. (2013). With the presented methodology we strive to better capture the realistic labor force potential in Germany by understanding (hidden) preference changes over time that translate into a new way of labor supply.

4. Analysis of actual extent of labor force potential

4.1. Literature on labor supply behavior

Recent evidence from the COVID-19 pandemic confirms the need to focus on the supply side of labor as the negative supply shock was far more substantial than the demand shock (Brinca et al. 2021) and women reduced the amount of hours worked more than men (Alon et al. 2022). Current literature on labor supply behavior indicates wide-spread part-time work in Germany (Eurofound and Cedefop 2020) and further non-standard employment relations being on the rise (Kalleberg 2000; Katz and Krueger 2019). Employees are developing a new understanding of the 'standard' which is characterized, among others, by better work-life balance in form of flexible working time and reduced hours allowing to allocate more time to child and elderly care, house work or just leisure activities (Kalleberg 2000; Katz and Krueger 2019; Markert 2022; Windscheid-Profeta 2023). This is accompanied by a substantial willingness to pay for amenities like paid time off (Maestas et al. 2023) with ambiguous results for work schedule flexibility (Mas and Pallais 2017; Maestas et al. 2023).

Despite the recent reduction in overall working hours, current survey results – amongst others from the German Socioeconomic Panel (SOEP) – indicate that the majority of workers, especially full-time workers, increasingly wish to further reduce their weekly working time (BAuA 2022;

Blömer et al. 2021; Rengers et al. 2017)[4]. To meet workers´ demands, collective agreements increasingly offer the flexibility to choose between payment increases, reduced weekly working time and additional holidays, e.g. at the German railway company Deutsche Bahn or the German postal operator Deutsche Post (Schulten 2023). Subsequent press releases by the railway and transport union showed that the workers value the flexibility and in many cases decide for more leisure (EVG 2017, 2020). On the one hand, this pushes companies towards offering flexible work arrangements in order to attract (skilled) workers (Windscheid-Profeta 2023) and towards experiments analyzing the effects of shorter working weeks, e.g. in Iceland (Haraldsson and Kellam 2021) and in companies in Japan and New Zealand (Delaney 2018; Haar 2018; Microsoft 2019). On the other hand, while making work more attractive and possibly moving individuals out of non-employment, these arrangements are accompanied by reduced usage of the existing labor force and might thus increase skill shortage.

Another issue relates to the fact that, instead of registering as unemployed, individuals might move into other (more unconventional) forms of non-employment (Beatty et al. 2022; Beatty and Fothergill 2002). This impedes the capture of actual unemployment differences over time in official statistics and possibly distorts labor market perceptions and policies (Beatty et al. 2022; Beatty and Fothergill 2002). Persons with overly negative perceptions, however, are less optimistic regarding their employment prospects and wages (Cardoso et al. 2016). Since labor market perceptions are often rather imprecise (Cardoso et al. 2016; Kunovich 2012), job-search ambitions could be sparse despite favorable market conditions.

Since labor underutilization is associated with a loss of productive capacity in the labor market, a loss of national income, and issues related to social justice, poverty, and social exclusion (Mitchell and Muysken 2010; Baum and Mitchell 2010), governments take action. However, recent research on state measures to push individuals into the labor market delivers ambiguous results. Interventions to reduce the number of workers claiming incapacity benefits were found to be rather ineffective (Beatty and Fothergill 2023) or successful (Clasen et al. 2006). Better availability of child care to increase female labor market participation appears to be beneficial (Baum and Mitchell 2010; Boll and Lagemann 2019) or minor (Malmberg-Heimonen and Julkunen 2002). Yet,

[4] The results differ when analyzing the microcensus with only few workers with a discrepancy between actual and desired working time and of those the majority would like to work more (Rengers et al. 2017).

higher flexibility at work, ideally incorporated into a work culture approving deviations from full-time jobs, appears to be a relevant factor to encourage women to accept a job (Malmberg-Heimonen and Julkunen 2002; Baum and Mitchell 2010). Furthermore, the social identity of a worker affects his or her labor supply (Oh 2023) and women's participation increases when they have greater control over their earnings (Field et al. 2021). In order to reduce hidden unemployment, in addition to supply-side policies, programs to increase the demand for labor should be implemented, as well as measures aimed at reducing the number of people leaving the labor market (Beatty and Fothergill 2002; Beatty and Fothergill 2023; Baum and Mitchell 2010).

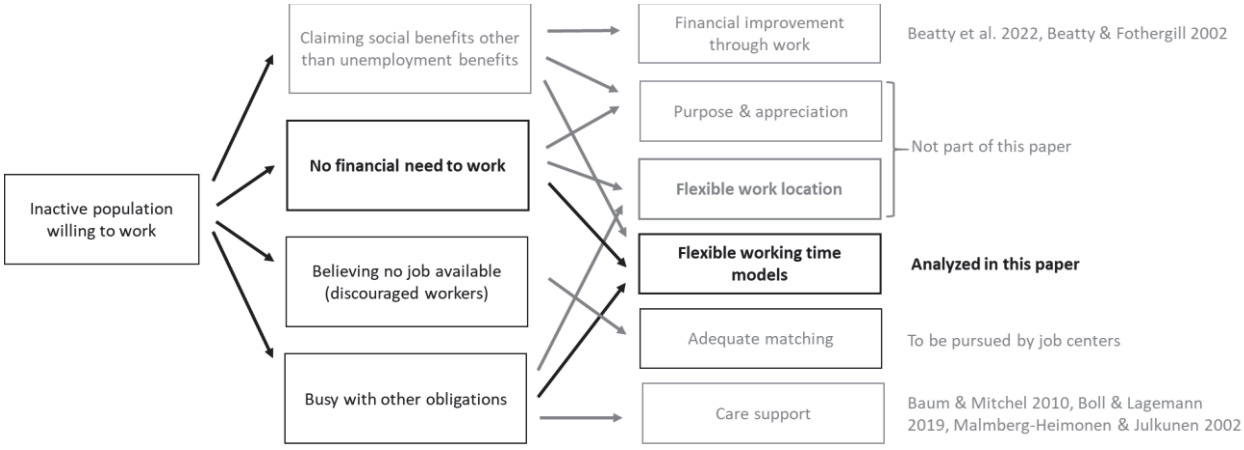
Evidence from an analysis of reactions by employed and unemployed individuals to hypothetical job offers as part of the Panel Study Labour Market and Social Security (PASS), shows that while unemployed are generally more willing to accept offered jobs, they are equally distracted by unfavorable job characteristics such as long working-hours (Abraham et al. 2013). Higher preferences in form of willingness to pay for flexibility and limited overtime work are confirmed in an analysis of a more recent PASS version (Papac 2023).

In addition to receiving income from regular employment or social benefits, individuals might decide to be active in the shadow economy as this might be financially preferable. Especially during an economic downturn with increases in the unemployment rate, (unemployed) people might substitute income losses by engaging in the shadow economy irrespective of the generosity of the unemployment benefits (Bajada and Schneider 2009). These individuals are also creating value, but they are tied up outside the regular economy, so that the additional potential they could provide is limited. In general, there might be less time available than assumed as large parts of the labor force are involved in obligations like child and elderly care, as coaches and trainers or as volunteers in charitable organizations.

Based on the preceding literature review, inactive individuals willing to work can roughly be divided into the categories *claiming social benefits other than unemployment benefits*, *no financial need to work*, *believing no job available (so-called discouraged workers)* and *busy with other obligations* (Figure 2). They can possibly be moved out of non-employment if they experience *financial improvement through work*, are seeing a *purpose & appreciation* in their work, are offered *flexible working time models* or *flexible work location*, are *matched adequately* with available jobs or obtain *care support*. A similar story can be told with respect to persons´

choice of the number of weekly working hours. The focus of this paper thereby lies on determining whether individual preferences for flexible working time have changed, meaning not only the free choice of how to arrange working time, but also of the number of hours worked. A change in preferences could thus indicate a change in the number of hours supplied to the labor market.

Figure 2: Factors influencing labor supply of inactive population



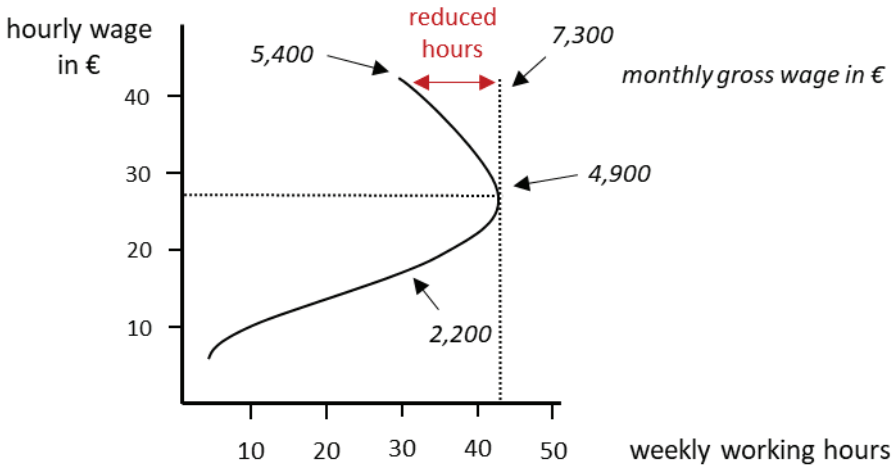
4.2. Theory of labor supply

This section argues for an overestimation of hidden unemployment based on standard (micro-) economic theory of labor supply as found in textbooks. Here we use the explanations from Katz and Rosen (1998) and Taylor and Weerapana (2012). The individual decision whether to work (extensive margin) and how much to work (intensive margin) depends on personal characteristics and preferences for work and leisure. The presence of money disposable without working oneself, e.g. assets, government support or family members´ income, as well as particular preferences for working conditions such as high preference for leisure, e.g. due to children, or for a highly matching job, e.g. regarding purpose or flexibility, might lead to the decision to remain rather (hidden) unemployed instead of searching for a job on the labor market and thus to refrain from supplying labor to the market (Taylor and Weerapana 2012; Katz and Rosen 1998).

Assuming most people have preferences for generating income from work, they decide how many hours to supply to the labor market depending on the market wage offered. From this point, an increase in the wage rate could induce individuals either to supply more labor, because leisure becomes less attractive (dominant substitution effect), or less labor, because with higher real income an individual can buy more goods and also more leisure (dominant income effect). The

baseline assumption is a dominant substitution effect and an upward-sloping supply curve, but there might also be individuals with a dominant income effect and thus a downward-sloping supply curve. Economics textbooks, however, indicate the possibility of changing preferences with changing wage levels, e.g. an individual may choose to increase its labor supply with increasing wages at lower wage levels but once a certain wage is reached, further wage increases may lead to reduced labor supply as the income effect starts to dominate the substitution effect. The labor supply curve would firstly be upward-sloping and then bend back (see Figure 3). The intuition behind that is that as soon as a certain living standard is reached the individual prefers more leisure over working more hours when the wage increases, a behavior that could especially be pursued by high earners (Taylor and Weerapana 2012; Katz and Rosen 1998). In this situation, the labor market is not stable and no equilibrium can be reached (Prasch 2000).

Figure 3: Labor supply



Note: Extension of labor supply curves by Katz and Rosen (1998).

For a more straightforward interpretation of the graph, it is helpful to add exemplary monthly gross wages[5] to the graph. Without paying too much attention to the exact values, it becomes clear that with strong preferences for work-life balance, individuals receiving a high hourly wage would, starting from a certain individual threshold, prefer to reduce the number of weekly hours supplied from the standard-full time work of approximately 40 hours. The exact shape of the labor supply curve, and thus the wage level at which the labor supply curve bends backwards is difficult to determine and expected to vary considerably with personal circumstances, such as family

[5] The monthly gross wage is calculated by multiplying the hourly wage with the weekly working hours and the approximate number of weeks worked per month (13/3 ≈ 4,33).

income, personal living standards, phase of one´s life, and fiscal policies. It is clear, however, that workers close to the subsistence level cannot afford to trade income for leisure, and thus only at high wages does the income effect dominate the substitution effect, since leisure is less appealing without the necessary financial resources (Prasch 2000).

This type of labor supply behavior is not new, but with current developments in the era of new work, people´s preferences move towards higher valuation of leisure. Workers prefer more time for non-work-related activities and increasingly demand a reduced number of working hours per week. This suggests more workers supply labor in form of a backward-bending supply curve. In addition, it can be expected, that the threshold from which on the curve bends back is lower (in real terms) than it was 20 years ago. Furthermore, it is nowadays becoming much easier and more socially acceptable to deviate from standard full-time work arrangements. When individuals can freely choose the quantity of hours supplied to the labor market, they are expected to supply labor only until a certain monthly or annual individual or family income is generated. Beyond this point, individuals prefer to pursue their own work-unrelated goals or to spend time with their families instead of striving for higher income. Additionally, with the cold progression and growing tax burden, the marginal utility of labor decreases and incentives to work fewer hours to increase the hourly wage after taxes are emerging. With strong preferences for reduced working time, an activation of the hidden labor force and supposedly unemployed workers could be extremely hard and thus lead to an overestimated potential labor force. These arguments are going to be elaborated empirically in section 4.3.

4.3. Empirical analysis

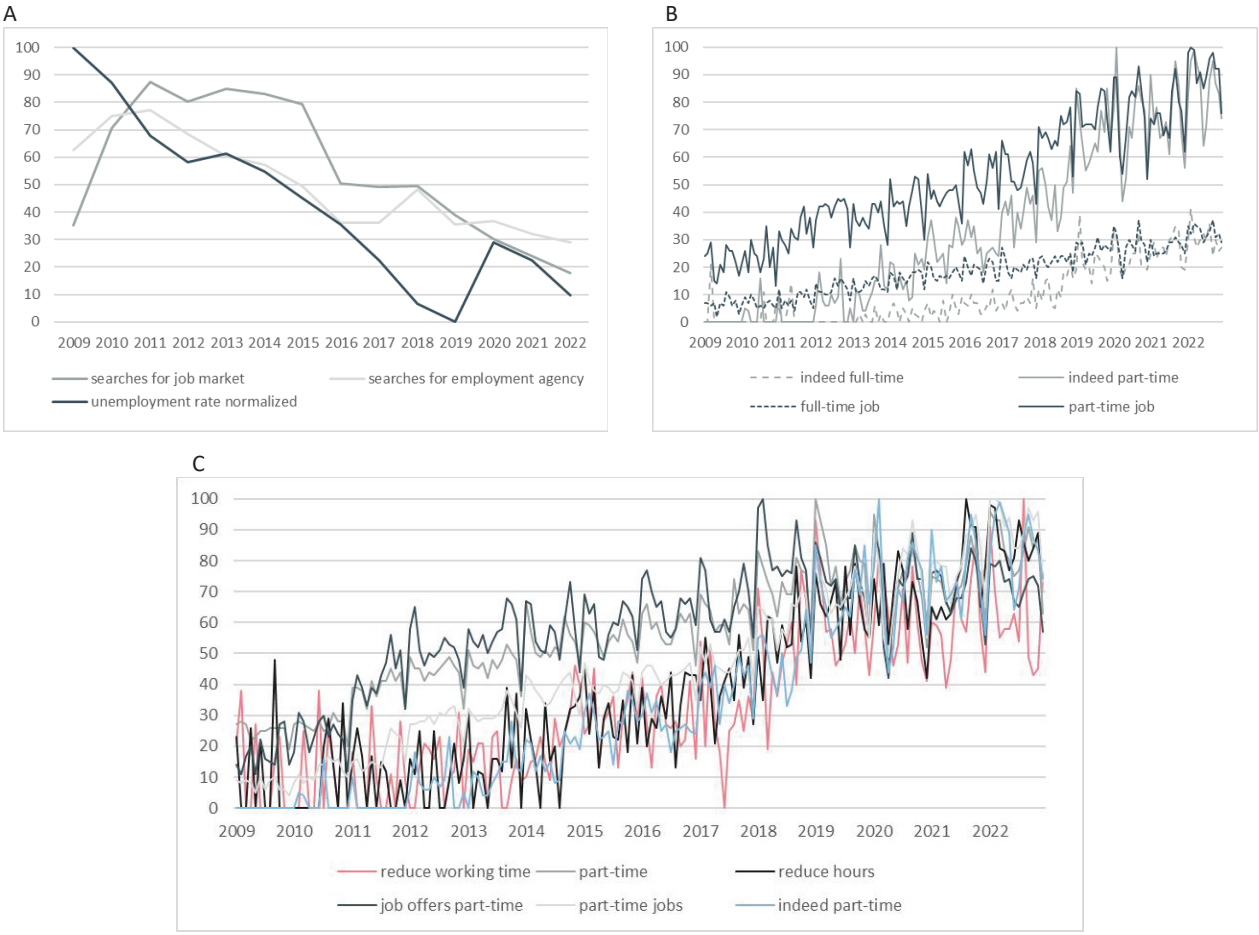
This section presents empirical arguments as to why a limited potential for an increasing labor supply should be assumed, as fewer people are willing to work more or leave inactivity. For an overestimation of the potential labor force, the following points should be observable in the data. With respect to people outside the labor force increasingly rejecting re-employment we would expect (1) higher non-employment rates and lower job search intensity and (2) changes in the reasons for non-employment and in the willingness to work. With respect to people inside the labor force abstaining from increasing their weekly working hours, we would expect (3) fewer underemployed individuals and (4) higher demand for reducing working hours and part-time jobs.

(1) Higher non-employment rates and lower job search intensity

Strong indicators for the willingness to work are the non-employment rate and the intensity to search for a new job. Non-employed individuals can only be detected through surveys since, without registering officially as unemployed, individuals are not captured in the official statistics. According to the EU-LFS, the inactive share of the total German population between 15 and 64 years decreased from around 24 % in 2009 to below 21 % in 2022. The drop was mainly driven by a reduction in female inactivity from almost 30 % to below 25 %; male inactivity fell by 1 percentage point to below 17 % (Eurostat 2023b). However, microcensus data reveal that inactive individuals are diminishingly searching for a job (RDC FSO 2023b, 2023c, 2023d).

Moreover, in Figure 4 panel A, we observe a reduced job search intensity on Google with decreasing search volume between 2009 and 2022 for the queries *employment agency* and *job market*. The former seems to be an early predictor of the unemployment rate as published by the Federal Employment Agency Germany (2023). Both time series are significantly correlated (about 83 % for the whole period), which reflects the strong link between unemployed individuals and the employment agency. The latter term is also correlated with the unemployment rate, but to a much lower extent (around 51 % for the full period), possibly reflecting the job search behavior of other groups such as the non-employed or the employed. After 2015, the search volume for job market decreases substantially more than the unemployment rate and it continues its downward trend after 2019 despite the increase in the unemployment rate, providing evidence of a decline in job search intensity independent of the evolution of the unemployment rate. Overall, the evidence for this hypothesis is mixed. Non-employment rates as well as job-search intensity appear to be declining.

Figure 4: Search volumes on Google for job-market related searches 2009-2022



Note: Own visualization based on data from Google Trends (trends.google.com) and Federal Employment Agency Germany (2023). Panel A and C represent plots of the respective search volumes over time. Moreover, panel A plots the unemployment rate normalized to values between 0 and 100 for the considered period. The graphs contain no information on the relative search intensity of the different search terms. Panel B represents the relative search intensities of indeed full-time vs. indeed part-time and full-time job vs. part-time jobs. Again, no information on relations between the two groups are observable.

(2) Changes in the reasons for non-employment and in the willingness to work

Regressing the work desire of currently inactive individuals on different socio-economic variables (Table 1) shows that the likelihood of a woman to desire work is 2 percentage points lower compared to men in 2009. The effect is slightly smaller (larger) in 2014 (2019) although the differences are not statistically significant. Being married is also negatively associated with work desire, however, the effect diminishes in the 2014 and 2019 waves. There are no significant changes over time in the effects of high personal income and receiving further income. Individuals receiving income from family members are increasingly less likely to desire a job. The significant interaction terms show that for some effects of the variables, the magnitudes depend on the year

of the survey, meaning that the behavior of individuals with certain characteristics changes over time.

According to the microcensus (RDC FSO 2023b, 2023c, 2023d), the number of individuals making a living mainly by income from parents, spouse or other family members diminished continuously between 2009 and 2019, both in absolute and in relative terms from 19 % to 15 %. However, among inactive individuals who are dependent on the income of family members, the share of persons indicating no general desire to work increased from below 89 % in 2009 to substantially above 90 % in 2019 confirming the regression results. While there are no indications of growing dependency, there do appear to be changes in the supply of labor of this group.

Table 1: Logistic regression results work desire 2009-2019 (excerpt)

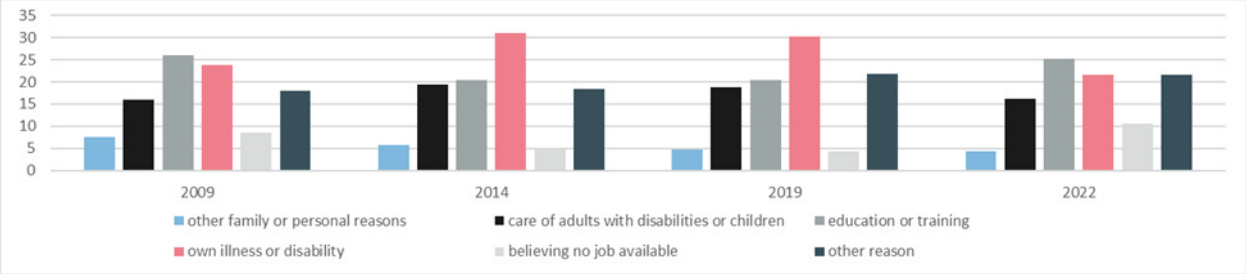
dependent variable	work desire		
variables / statistics	AME	SE	95 % CI
female	-0.0208***	0.0027	[-0.0261, -0.0155]
femaleX2014	0.0041	0.0038	[-0.0034, 0.0117]
femaleX2019	-0.0023	0.0038	[-0.0097, 0.0051]
married	-0.0343***	0.0028	[-0.0399, -0.0288]
marriedX2014	0.0118**	0.0037	[0.0045, 0.0191]
marriedX2019	0.0107**	0.0037	[0.0035, 0.018]
personal income high	-0.0644**	0.0205	[-0.1045, -0.0243]
personal income highX2014	0.0340	0.0263	[-0.0175, 0.0856]
personal income highX2019	-0.0078	0.0259	[-0.0585, 0.0428]
receiving further income	0.0025	0.0035	[-0.0042, 0.0093]
receiving further incomeX2014	-0.0070	0.0047	[-0.0163, 0.0022]
receiving further incomeX2019	-0.0029	0.0048	[-0.0123, 0.0065]
income mainly from parents, spouse etc.	-0.0378***	0.0030	[-0.0437, -0.0318]
income mainly from parents, spouse etc.X2014	-0.0161***	0.0036	[-0.0232, -0.0091]
income mainly from parents, spouse etc.X2019	-0.0229***	0.0036	[-0.0299, -0.0159]
year 2014	-0.0063	0.0035	[-0.0131, 0.0005]
year 2019	0.0011	0.0034	[-0.0056, 0.0078]
observations	201822		

Note: Full regression results in Table A 1 in appendix. Table presents marginal effects. AME: average marginal effect, SE: standard error, CI: confidence interval. * p<0.05, ** p<0.01, *** p<0.001. Reference category for personal income high (2,900 € until 18,000 € and more net income) is no personal income. The remaining variables are dummies. Results based on microcensus data (RDC FSO 2023b, 2023c, 2023d).

Looking at the reasons why inactive people wanting to work do not seek employment from the EU-LFS (see Figure 5), the composition is temporarily dominated by own illness or disability in 2014 and 2019. It becomes apparent that own health issues and care of others are losing importance, whereas believing no job is available and other reasons reach their highest temporal

shares in 2022. This could be an indication of a freer choice to remain inactive, because the right jobs with the desired flexibility are not available or for other reasons, possibly related to pursuing one´s own goals. When considering both genders separately (see Figure A 1 and Figure A 2 in appendix), we note substantially different compositions in the beginning but similar trends to those described above.

Figure 5: Reasons why inactive population aged 15-64 does not seek employment although wanting to work (in % of inactive population), 2009-2022



Note: Own visualization based on data from Eurostat (2023c). Due to some breaks in time series, the values are not exactly comparable. In 2022, family and personal reasons are queried separately. For sake of comparability, the answers to both questions are summarized in 2022.

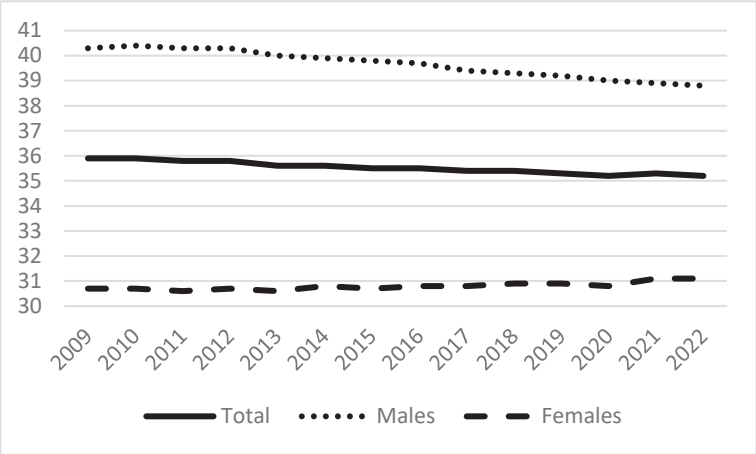
A detailed analysis of the shares of slightly different reasons from the microcensus (RDC FSO 2023b, 2023c, 2023d) in 2014 and 2019 compared to the share in 2009 (see Table A 2 in the appendix) shows a statistically significant increase in the share of persons with illness, accident or temporary disability and with permanent reduced capacity. This may point at individuals moving from unemployment into incapacity, a similar trend to that observed in Great Britain. In addition, there are major and statistically significant rises in the shares of persons citing *other reasons* as the main factor, confirming the visual results from the EU-LFS. In contrast, the share of respondents indicating retirement or lack of employment opportunity diminished substantially in 2019. Overall, we find evidence of changes in the reasons why inactive persons do not seek employment despite being willing to work.

(3) Fewer under-employed individuals

One indicator of the labor supply of employed workers is the overall number of hours worked per week (Figure 6). Total working time dropped from slightly below 36 hours in 2009 to slightly above 35 hours in 2022. The decline was mainly driven by reduced male working time from over 40 hours to below 39 hours, whereas female working time was rather constant at around 31 hours, with a slight upward trend since 2021. IAB results show that since 2009 the number of hours worked has been mainly reduced for full-time employees and increased for part-time employees

(IAB 2023). In addition, there has been an increase in days off and an overall reduction in overtime (IAB 2023).

Figure 6: Usual weekly hours of work in main job for all employed persons 15 to 64 years by gender, 2009 - 2022



Note: Own visualization based on data from Eurostat (2023a).

The substantial drop in the under-employment rate, the number of underutilized workers and their share of the total population between 2011 and 2019 (FSO 2020a) shows that these developments are in line with the preferences of the workforce. In addition, the number and share of individuals wishing to increase their weekly working hours diminished between 2009 and 2019 from around 27,000 (12 %) to 17,000 (7 %) as can be observed in Table 2 (RDC FSO 2023b, 2023c, 2023d). Google searches for *increase working time* or *increase hours* remain relatively constant over time with substantial variations (see Figure A 3 in the appendix).

Table 2: Active individuals wishing to change working hours

group / year	2009	2014	2019
wishing to work more (abs.)	27,402	21,251	17,084
(in %)	12.25	9.38	6.6
wishing to work less (abs.)	4,606	5,336	9,361
(in %)	2.06	2.36	3.62
difference (abs.)	22,796	15,915	7,723

Note: Own calculations based on (RDC FSO 2023b, 2023c, 2023d).

Examining changes in the effects of socio-economic variables on the willingness to work more hours (Table 3), shows a significant reduction over time with persons being 1.3 (2.3) percentage points less likely to desire an increase in working hours in 2014 (2019) compared to 2009. Furthermore, married individuals as well as those receiving income mainly from family members increasingly oppose an increase in working time. This contrasts with individuals receiving further income (apart from pensions and other public payments) which are diminishingly less likely to be

willing to work more hours. Significant appears the diminishing difference for most indicators (see Table A 4 in the appendix) compared to their reference group. For example, the gap between individuals with no completed education compared to individuals with some education narrowed, particularly for high school degree and professional training. The significantly positive effect for women and negative effect for individuals receiving other public payment vanished in 2019, suggesting that many women have arrived at their desired working hours and public payments do no longer discourage individuals to increase their hours. Overall, there is considerable evidence that individuals are becoming diminishingly underemployed. In addition, the reduced desire to work more is becoming less dependent on socio-economic factors over time.

Table 3: Logistic regression results work more 2009-2019 (excerpt)

dependent variable	work more		
variables / statistics	AME	SE	95 % CI
female	0.0043***	0.0008	[0.0027, 0.0059]
femaleX2014	0.0029*	0.0012	[0.0004, 0.0053]
femaleX2019	-0.0021	0.0013	[-0.0047, 0.0005]
married	-0.0078***	0.0008	[-0.0094, -0.0061]
marriedX2014	-0.0043***	0.0012	[-0.0067, -0.0019]
marriedX2019	-0.0112***	0.0013	[-0.0137, -0.0086]
personal income high	0.0351***	0.0028	[0.0296, 0.0406]
personal income highX2014	0.0012	0.0030	[-0.0046, 0.0071]
personal income highX2019	0.0034	0.0029	[-0.0022, 0.009]
receiving further income	-0.0087***	0.0014	[-0.0115, -0.006]
receiving further incomeX2014	0.0068**	0.0021	[0.0027, 0.0109]
receiving further incomeX2019	0.0179***	0.0022	[0.0136, 0.0222]
income mainly from parents, spouse etc.	-0.0161***	0.0014	[-0.0189, -0.0133]
income mainly from parents, spouse etc.X2014	-0.0048*	0.0021	[-0.009, -0.0007]
income mainly from parents, spouse etc.X2019	-0.0184***	0.0025	[-0.0233, -0.0135]
year 2014	-0.0133***	0.0011	[-0.0154, -0.0112]
year 2019	-0.0231***	0.0011	[-0.0253, -0.0209]
observations	958569		

Note: Full regression results in Table A 3 in appendix. Table presents marginal effects. AME: average marginal effect, SE: standard error, CI: confidence interval. * p<0.05, ** p<0.01, *** p<0.001. Reference category for personal income high (2,900 € until 18,000 € and more net income) is no personal income. The remaining variables are dummies. Results based on microcensus data (RDC FSO 2023b, 2023c, 2023d).

(4) Higher demand for reducing working hours and part-time jobs

The proportion of employees working part-time has risen steadily over the past decade (FSO 2023a; IAB 2023). Particularly remarkable is the increase in part-time work among men, with particularly strong growth since the turn of the century. The absolute number of men working

part-time has risen by 75 % since the year 2000 to almost 700,000 in 2022 (FSO 2023b), reaching a part-time rate for men of 12.7 % in 2022 (FSO 2023a). In a good labor market situation, as currently observable, men switching to part-time work is a strong indicator of a behavior change. In order to better grasp individual demand for reducing working hours and part-time jobs we analyze interest for the search terms *reduce working time*, *part-time*, *reduce hours*, *job offers part-time*, *part-time jobs* and *indeed part-time*[6] on Google from 2009 until 2022 and find strong increases over time (see Figure 4). When contrasting the search intensities for *indeed full-time* versus *indeed part-time* and *full-time job* versus *part-time job*, the increased interest in part-time work compared to full-time work becomes apparent (Figure 4 panel B). These are all indications for individual preferences for non-standard employment relations.

The regression of the willingness to work fewer hours on various socio-economic variables (Table 4) displays a significant and increasing magnitude in the probability of preferring fewer hours over time, especially in 2019. Women initially prefer to work less, but the interaction terms with 2014 and 2019 show that the size of the effect shrinks over time. Being married is only significantly, and then negatively, associated with preferring fewer hours in 2019. This indicates a general tendency towards preferences for reduced hours which is not exclusively related to certain socio-economic factors.

[6] The German search terms Arbeitszeit reduzieren, Teilzeit, Stunden reduzieren, Stellenangebote Teilzeit, Teilzeit Jobs, indeed Teilzeit were used. Indeed is one of the most popular job search engines in Germany.

Table 4: Logistic regression results work less 2009-2019 (excerpt)

dependent variable	work less		
variables / statistics	AME	SE	95 % CI
female	0.0077***	0.0006	[0.0065, 0.0089]
femaleX2014	-0.0019*	0.0008	[-0.0035, -0.0003]
femaleX2019	-0.0043***	0.0007	[-0.0058, -0.0029]
married	0.0004	0.0006	[-0.0008, 0.0016]
marriedX2014	-0.0014	0.0008	[-0.003, 0.0002]
marriedX2019	-0.0025***	0.0007	[-0.0039, -0.0011]
personal income high	0.0245***	0.0012	[0.0221, 0.0269]
personal income highX2014	0.0001	0.0010	[-0.0018, 0.002]
personal income highX2019	-0.0022*	0.0009	[-0.0039, -0.0004]
receiving further income	0.0093***	0.0008	[0.0078, 0.0108]
receiving further incomeX2014	-0.0007	0.0010	[-0.0028, 0.0013]
receiving further incomeX2019	-0.0027**	0.0010	[-0.0046, -0.0008]
income mainly from parents, spouse etc.	-0.0409***	0.0025	[-0.0458, -0.036]
income mainly from parents, spouse etc.X2014	-0.0018	0.0037	[-0.0091, 0.0056]
income mainly from parents, spouse etc.X2019	-0.0040	0.0036	[-0.0111, 0.003]
year 2014	0.0019*	0.0008	[0.0003, 0.0034]
year 2019	0.0113***	0.0007	[0.0099, 0.0128]
observations	958569		

Note: Full regression results in Table A 3 in appendix. Table presents marginal effects. AME: average marginal effect, SE: standard error, CI: confidence interval. * p<0.05, ** p<0.01, *** p<0.001. Reference category for personal income high (2,900 € until 18,000 € and more net income) is no personal income. The remaining variables are dummies. Results based on microcensus data (RDC FSO 2023b, 2023c, 2023d).

Overall, we find evidence for changes in the reasons for non-employment, in particular towards less specific reasons, fewer hours worked per person, fewer underemployed individuals and higher demand for reducing working hours and part-time jobs. Hypothesis (2), (3), and (4) can thus be confirmed. For hypothesis (1) the indications are ambiguous, with reduced non-employment rates and lower job search intensity. While there is no evidence of non-employed individuals to increasingly avoid re-employment, those in this group with limited incentives to work are diminishingly searching for a job. Among the employed, there is strong evidence of rising preferences for reduced working time across most socio-economic groups. Thus, the strongest reduction in potential is expected to result from the limited opportunities to extend the working hours of those in employment and to attract those not in employment to jobs with possibly long working hours.

5. Discussion

There are lots of job features that can attract individuals to work (more). They differ substantially depending on the reasons why people decide to abstain from the labor market or work reduced hours. For persons claiming social benefits other than unemployment benefits, financial improvement through work as well as enjoying work in form of purpose and appreciation might be the main drivers. In turn, for individuals busy with other obligations, e.g. care of children or family members, governmental care support as well as flexibility with respect to hours worked, work schedule and work location could increase labor market participation. These factors should be analyzed in more depth in further studies.

Turning to adequate measurement, not the mere number of employed workers should be the ultimate indicator, but labor productivity per hour should be taken into account. With modern technologies, it might not be imperative to push as many people into employment as possible but to use labor more efficiently. With respect to the reliability of data, increases in Google search volume are often suspected to be caused merely by increased queries over time. However, the comparison of different search terms indicates that barely all volumes increased over time and to a similar extent.

Finally, the topic of reducing the working time should not only be discussed from a business perspective, on how to attract workers to specific companies, but from an overall economic perspective, on how to utilize the available work force in the country in the best possible way.

6. Conclusions

In this paper, we explore hidden changes in labor supply behavior. Based on profound theoretical reasons for reduced labor supply, we analyze official statistics and survey results, as well as novel search volume data from Google Trends, which go beyond traditional data and provide insights into implicit motives. There is strong evidence of individual preferences for flexible working time models that allow employees to work less, and thus of limited possibilities to activate the unexploited labor potential. This includes an increasing supply of labor in the form of a backwards-bending supply curve, changing reasons for non-employment, fewer hours worked per person, fewer underemployed individuals, and higher demand for reduced working hours and part-time jobs. This paper shows that bringing more people into employment and, in particular, extending

hours worked of employed individuals may be more difficult than previously thought due to a profound change in individual labor supply. The labor force potential in Germany, thus, appears to be substantially overestimated. The exact quantification of the behavioral change and thus the reduction in the labor force potential remains speculative. However, based on the preceding analysis, which identifies especially the potential of the presumably underemployed to be highly limited, we expect that 40 % of the assumed labor force potential is actually not available to the labor market. Future research should examine whether similar developments can also be observed in other countries.

Acknowledgements

The author would like to thank Thomas Straubhaar and Ulrich Fritsche and his team as well as the participants of the Ph.D. Seminar in Empirical and Theoretical Economics at University of Hamburg (January 2024) for their valuable feedback. In addition, the author would like to thank Paul Griensteidl for his continued support.

Publication bibliography

Abraham, Martin; Auspurg, Katrin; Bähr, Sebastian; Frodermann, Corinna; Gundert, Stefanie; Hinz, Thomas (2013): Unemployment and willingness to accept job offers. Results of a factorial survey experiment (46). In *Journal for Labour Market Research* (4), pp. 283–305.

Alon, Titan; Coskun, Sena; Doepke, Matthias; Koll, David; Tertilt, Michèle (2022): From mancession to shecession. Women's employment in regular and pandemic recessions (36). In *NBER Macroeconomics Annual*, pp. 83–151.

Askitas, Nikolaos; Zimmermann, Klaus F. (2009): Google econometrics and unemployment forecasting (55). In *Applied Economics Quarterly* (2), pp. 107–120.

Bajada, Christopher; Schneider, Friedrich (2009): Unemployment and the shadow economy in the OECD (Vol. 60). In *Revue économique* (5), pp. 1033–1067.

Baum, Scott; Mitchell, William F. (2010): Labour underutilisation and gender. Unemployment versus hidden-unemployment (29). In *Population Research and Policy Review* (2), pp. 233–248.

Beatty, Christina; Fothergill, Stephen (2002): Hidden unemployment among men. A case study (36). In *Regional Studies* (8), pp. 811–823.

Beatty, Christina; Fothergill, Stephen; Gore, Tony; Leather, David (2022): The real level of unemployment 2022. The myth of full employment across Britain. Edited by Centre for Regional Economic and Social Research. Sheffield Hallam University.

Beatty, Christina; Fothergill, Steve (2023): The persistence of hidden unemployment among incapacity claimants in large parts of Britain (0). In *Local Economy: The Journal of the Local Economy Policy Unit* (0), pp. 1–19.

Berkson, Joseph (1944): Application of the logistic function to bio-assay: Taylor & Francis (39). In *Journal of the American Statistical Association*, 9/1/1944 (227), pp. 357–365.

Blömer, Maximilian; Garnitz, Johanna; Gärtner, Laura; Peichl, Andreas; Strandt, Helene (2021): Zwischen Wunsch und Wirklichkeit. Unter- und Überbeschäftigung auf dem deutschen Arbeitsmarkt. Edited by Bertelsmann Stiftung. Gütersloh. DOI: 10.11586/2021019.

Boll, Christina; Lagemann, Andreas (2019): Public childcare and maternal employment. New evidence for Germany (33). In *LABOUR* (2), pp. 212–239.

Borup, Daniel; Schütte, Erik C. (2022): In search of a job. Forecasting employment growth using Google Trends (40). In *Journal of Business & Economic Statistics* (1), pp. 186–200.

Brinca, Pedro; Duarte, Joao B.; Faria-E-Castro, Miguel (2021): Measuring labor supply and demand shocks during COVID-19 (139). In *European Economic Review*, 1-20.

Bruttel, Oliver; Baumann, Arne; Dütsch, Matthias (2019): Beschäftigungseffekte des gesetzlichen Mindestlohns. Prognosen und empirische Befunde (20). In *Perspektiven der Wirtschaftspolitik* (3), pp. 237–253.

Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (BAuA) (2022): Arbeitszeitreport Deutschland. Ergebnisse der BAuA-Arbeitszeitbefragung 2021. Dortmund. DOI:

10.21934/baua:bericht20221103. Available online at https://www.baua.de/DE/Angebote/Publikationen/Berichte/F2507.pdf?__blob=publicationFile&v=16.

Cardoso, Ana R.; Loviglio, Annalisa; Piemontese, Lavinia (2016): Misperceptions of unemployment and individual labor market outcomes: Springer (5). In *IZA Journal of Labor Policy*, 7/12/2016 (1), pp. 1–22.

Clasen, Jochen; Davidson, Jacqueline; Ganßmann, Heiner; Mauer, Andreas (2006): Non-employment and the welfare state. The United Kingdom and Germany compared (16). In *Journal of European Social Policy* (2), pp. 134–154.

Delaney, Helen (2018): Perpetual Guardian's 4-day workweek trial. Qualitative research analysis. University of Auckland Business School. 4 Day Week Global. Available online at https://www.4dayweek.com/research-perpetual-guardians-4day-workweek-trial-qualitative-research-analysis, checked on 8/31/2023.

Eisenbahn- und Verkehrsgewerkschaft (EVG) (2017): EVG-Wahlmodell ein Erfolg. 56% entscheiden sich für mehr Urlaub - 3.000 Neueinstellungen erforderlich. Available online at https://www.evg-online.org/meldungen/details/news/evg-wahlmodell-ein-erfolg-56-entscheiden-sich-fuer-mehr-urlaub-3000-neueinstellungen-erforderli/, checked on 11/8/2023.

Eisenbahn- und Verkehrsgewerkschaft (EVG) (2020): Wahlmodell DB AG. „Mehr Urlaub" bleibt der Renner. Available online at https://www.evg-online.org/meldungen/details/news/7924/, checked on 11/8/2023.

Eurofound and Cedefop (2020): European Company Survey 2019. Workplace practices unlocking employee potential. With assistance of Gijs van Houten, Giovanni Russo (European Company Survey 2019 series). Publications Office of the European Union. Luxembourg.

Eurostat (2023a): Average number of usual weekly hours of work in main job, by sex, age, professional status, full-time/part-time and economic activity (from 2008 onwards, NACE Rev. 2). Available online at https://ec.europa.eu/eurostat/databrowser/view/LFSA_EWHUN2__custom_8791425/default/table?lang=en, updated on 4/27/2023, checked on 12/1/2023.

Eurostat (2023b): Inactive population as a percentage of the total population, by sex and age (%). European Union (EU) (Labour Force Survey). Available online at https://ec.europa.eu/eurostat/databrowser/view/lfsa_ipga__custom_8408436/default/table?lang=en, updated on 4/27/2023, checked on 11/9/2023.

Eurostat (2023c): Inactive population not seeking employment by sex, age and main reason. European Union (EU) (Labour Force Survey). Available online at https://ec.europa.eu/eurostat/databrowser/view/lfsa_igar__custom_8379662/default/table?lang=en, updated on 9/14/2023.

Eurostat (2023d): Microdata. EU labour force survey. European Union (EU). Available online at https://ec.europa.eu/eurostat/web/microdata/european-union-labour-force-survey, checked on 12/1/2023.

Federal Employment Agency Germany (2023): Statistik der Bundesagentur für Arbeit. Arbeitslosigkeit im Zeitverlauf. Available online at https://statistik.arbeitsagentur.de/Statistikdaten/Detail/Aktuell/iiia4/alo-zeitreihe-dwo/alo-zeitreihe-dwo-b-0-xlsx.xlsx?__blob=publicationFile&v=1, checked on 1/22/2024.

Federal Statistical Office of Germany (FSO) (2020a): Erwerbsstatus von Personen im Alter von 15 bis 74 Jahren. Ungenutztes Arbeitskräftepotenzial. Available online at https://www.destatis.de/DE/Themen/Arbeit/Arbeitsmarkt/Erwerbstaetigkeit/Tabellen/ungenutztes-arbeitskraefte-potenzial_internet_insgesamt.html, updated on 10/14/2020, checked on 12/13/2023.

Federal Statistical Office of Germany (FSO) (2020b): Erwerbspersonenvorausberechnung 2020. Available online at https://www.destatis.de/DE/Themen/Arbeit/Arbeitsmarkt/Erwerbstaetigkeit/Erwerbspersonenvorausberechnung-2020.html.

Federal Statistical Office of Germany (FSO) (2023a): Erwerbstätigkeit. Available online at https://www.destatis.de/DE/Im-Fokus/Fachkraefte/Erwerbstaetigkeit/_inhalt.html.

Federal Statistical Office of Germany (FSO) (2023b): Kernerwerbstätige in unterschiedlichen Erwerbsformen. Atypische Beschäftigung. Available online at https://www.destatis.de/DE/Themen/Arbeit/Arbeitsmarkt/Erwerbstaetigkeit/Tabellen/atyp-kernerwerb-erwerbsform-zr.html, updated on 3/31/2023, checked on 11/9/2023.

Field, Erica; Pande, Rohini; Rigol, Natalia; Schaner, Simone; Moore, Charity T. (2021): On her own account. How strengthening women's financial control impacts labor supply and gender norms (111). In *The American Economic Review* (7), pp. 2342–2375.

Green, Anne E. (1999): Insights into unemployment and non-employment in Europe using alternative measures (33). In *Regional Studies* (5), pp. 453–464.

Haar, Jarrod (2018): Overview of the Perpetual Guardian 4-day (paid 5) work trial. Auckland University of Technology. Available online at https://news.aut.ac.nz/__data/assets/pdf_file/0019/188002/Final-Perpetual-Guardian-report_Professor-Jarrod-Haar_July-2018.pdf.

Haraldsson, Gudmundur D.; Kellam, Jack (2021): Going public. Iceland’s journey to a shorter working week. Edited by Autonomy, Association for Democracy and Sustainability (Alda).

Hellwagner, Timon; Söhnlein, Doris; Weber, Enzo (2023): Modeling migration dynamics in stochastic labor supply forecasting (IAB-Discussion Paper). Nürnberg. DOI: 10.48720/IAB.DP.2305.

Hochmuth, Brigitte; Kohlbrecher, Britta; Merkl, Christian; Gartner, Hermann (2021): Hartz IV and the decline of German unemployment. A macroeconomic evaluation (127). In *Journal of Economic Dynamics and Control*, p. 104114.

Institute for Employment Research (IAB) (2023): Durchschnittliche Arbeitszeit und ihre Komponenten in Deutschland. Available online at https://doku.iab.de/arbeitsmarktdaten/AZ_Komponenten.xlsx, checked on 11/8/2023.

Kalleberg, Arne L. (2000): Nonstandard employment relations. Part-time, temporary and contract work (26). In *Annual Review of Sociology* (1), pp. 341–365.

Katz, Lawrence F.; Krueger, Alan B. (2019): The rise and nature of alternative work arrangements in the United States, 1995–2015 (72). In *ILR Review* (2), pp. 382–416.

Katz, Michael L.; Rosen, Harvey S. (1998): Microeconomics. 3. ed., internat. ed. Boston, Mass.: Irwin (Irwin/McGraw-Hill advanced series in economics).

Kunovich, Robert M. (2012): Perceived unemployment (42). In *International Journal of Sociology* (4), pp. 100–123.

Lin, Mingfeng; Lucas, Henry C.; Shmueli, Galit (2013): Research commentary —Too big to fail. Large samples and the p-value problem (24). In *Information Systems Research* (4), pp. 906–917.

Maestas, Nicole; Mullen, Kathleen J.; Powell, David; Wachter, Till von; Wenger, Jeffrey B. (2023): The value of working conditions in the United States and implications for the structure of wages (113). In *The American Economic Review* (7), pp. 2007–2047.

Malmberg-Heimonen, Ira; Julkunen, Ilse (2002): Equal opportunities, true options or hidden unemployment? A comparative perspective on labour-market marginality (11). In *International Journal of Social Welfare* (2), pp. 120–131.

Markert, Cornelius (2022): Eine neue Normalarbeitszeit? Arbeitszeitverkürzung, Flexibilisierung und ein neues Verständnis der ‚Normalarbeit'. Edited by Country office NRW. Friedrich-Ebert-Stiftung. Available online at https://library.fes.de/pdf-files/bueros/nrw/18947.pdf.

Mas, Alexandre; Pallais, Amanda (2017): Valuing alternative work arrangements (107). In *The American Economic Review* (12), pp. 3722–3759.

Microsoft (2019): 「週勤 4 日 & 週休 3 日」を柱とする自社実践プロジェクト「ワークライフチョイス チャレンジ 2019 夏」の 効果測定結果を公開. Edited by Japan News Center. Available online at https://news.microsoft.com/ja-jp/2019/10/31/191031-published-the-results-of-measuring-the-effectiveness-of-our-work-life-choice-challenge-summer-2019/, checked on 8/31/2023.

Mitchell, William; Muysken, Joan (2010): Full employment abandoned. Shifting sands and policy failures (5). In *International Journal of Public Policy* (4), pp. 295–313.

Oh, Suanna (2023): Does identity affect labor supply? (113). In *The American Economic Review* (8), pp. 2055–2083.

Papac, Anthony J. (2023): Essays on job search and job choice (UCLA Electronic Theses and Dissertations). University of California Los Angeles (UCLA). Available online at https://escholarship.org/uc/item/6n24k675.

Prasch, Robert E. (2000): Reassessing the labor supply curve (34). In *Journal of Economic Issues* (3), pp. 679–692.

RDC of the Federal Statistical Office and Statistical Offices of the Federal States (RDC FSO) (2023a): Household. Microcensus. Available online at https://www.forschungsdatenzentrum.de/en/household/microcensus.

RDC of the Federal Statistical Office and Statistical Offices of the Federal States (RDC FSO) (2023b): Mikrozensus 2009. Scientific Use File (SUF). DOI: 10.21242/12211.2009.00.00.3.1.0.

RDC of the Federal Statistical Office and Statistical Offices of the Federal States (RDC FSO) (2023c): Mikrozensus 2014. Scientific Use File (SUF). DOI: 10.21242/12211.2014.00.00.3.1.0.

RDC of the Federal Statistical Office and Statistical Offices of the Federal States (RDC FSO) (2023d): Mikrozensus 2019. Scientific Use File (SUF). DOI: 10.21242/12211.2019.00.00.3.1.0.

Rengers, Martina (2016): Ungenutztes Arbeitskräftepotenzial in der Stillen Reserve. Ergebnisse für das Jahr 2015. In *Wirtschaft und Statistik (WISTA)* (6), pp. 30–51.

Rengers, Martina; Bringmann, Julia; Holst, Elke (2017): Arbeitszeiten und Arbeitszeitwünsche. Unterschiede zwischen Mikrozensus und SOEP. In *Wirtschaft und Statistik (WISTA)* (4), pp. 11–43.

Rengers, Martina; Fuchs, Johann (2022): Stille Reserve in Deutschland. Gemeinsamkeiten und Unterschiede zweier Konzepte (16). In *AStA Wirtschafts- und Sozialstatistisches Archiv*, pp. 189–230.

Schulten, Thorsten (2023): Tarifpolitischer Jahresbericht 2022. Edited by WSI Tarifarchiv (Berichte zur Tarifpolitik). Wirtschafts- und Sozialwissenschaftliches Institut (WSI). Available online at https://www.wsi.de/fpdf/HBS-008584/p_ta_jb_2022.pdf, checked on 11/8/2023.

Windscheid-Profeta, Eike (2023): Leben und Arbeiten in Flexibilität. Befunde und Konzepte für die Arbeitszeitgestaltung von morgen. Edited by Hans Böckler Stiftung (Forschungsförderung Report, 10). Available online at https://www.boeckler.de/fpdf/HBS-008694/p_fofoe_report_10_2023.pdf.

Xu, Wei; Li, Ziang; Cheng, Cheng; Zheng, Tingting (2013): Data mining for unemployment rate prediction using search engine query data (7). In *Service Oriented Computing and Applications* (1), pp. 33–42.

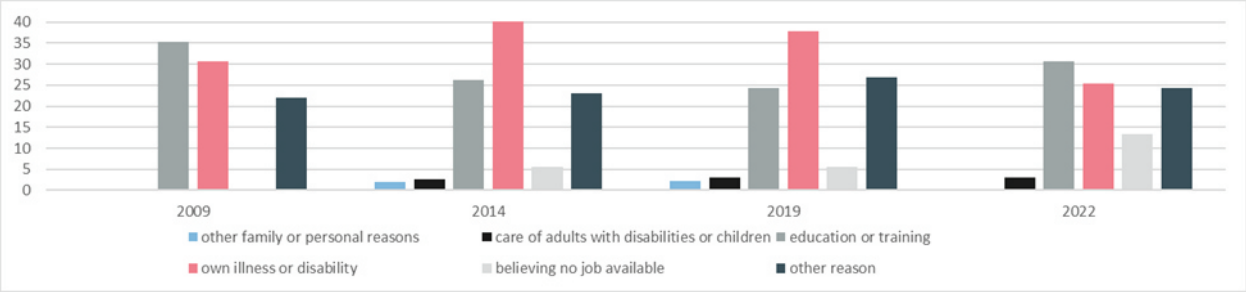
Appendix

Table A 1: Logistic regression results work desire 2009-2019 (all results)

dependent variable	work desire		
variables / statistics	AME	SE	95 % CI
age	0.0232***	0.0004	[0.0225, 0.0239]
age^2	-0.0003***	0.0000	[-0.0003, -0.0003]
female	-0.0208***	0.0027	[-0.0261, -0.0155]
femaleX2014	0.0041	0.0038	[-0.0034, 0.0117]
femaleX2019	-0.0023	0.0038	[-0.0097, 0.0051]
married	-0.0343***	0.0028	[-0.0399, -0.0288]
marriedX2014	0.0118**	0.0037	[0.0045, 0.0191]
marriedX2019	0.0107**	0.0037	[0.0035, 0.018]
finished school	0.0451***	0.0025	[0.0403, 0.05]
high school	-0.0393***	0.0022	[-0.0435, -0.035]
professional training	0.0152***	0.0018	[0.0116, 0.0188]
university degree	0.0383***	0.0030	[0.0325, 0.0441]
personal income low	0.0229***	0.0026	[0.0178, 0.0281]
personal income medium	-0.0158***	0.0045	[-0.0246, -0.007]
personal income high	-0.0644**	0.0205	[-0.1045, -0.0243]
personal income highX2014	0.0340	0.0263	[-0.0175, 0.0856]
personal income highX2019	-0.0078	0.0259	[-0.0585, 0.0428]
receiving pension	-0.1011***	0.0026	[-0.1062, -0.096]
receiving other public payment	0.0435***	0.0024	[0.0389, 0.0481]
receiving further income	0.0025	0.0035	[-0.0042, 0.0093]
receiving further incomeX2014	-0.0070	0.0047	[-0.0163, 0.0022]
receiving further incomeX2019	-0.0029	0.0048	[-0.0123, 0.0065]
income mainly from parents, spouse etc.	-0.0378***	0.0030	[-0.0437, -0.0318]
income mainly from parents, spouse etc.X2014	-0.0161***	0.0036	[-0.0232, -0.0091]
income mainly from parents, spouse etc.X2019	-0.0229***	0.0036	[-0.0299, -0.0159]
year 2014	-0.0063	0.0035	[-0.0131, 0.0005]
year 2019	0.0011	0.0034	[-0.0056, 0.0078]
observations	201822		

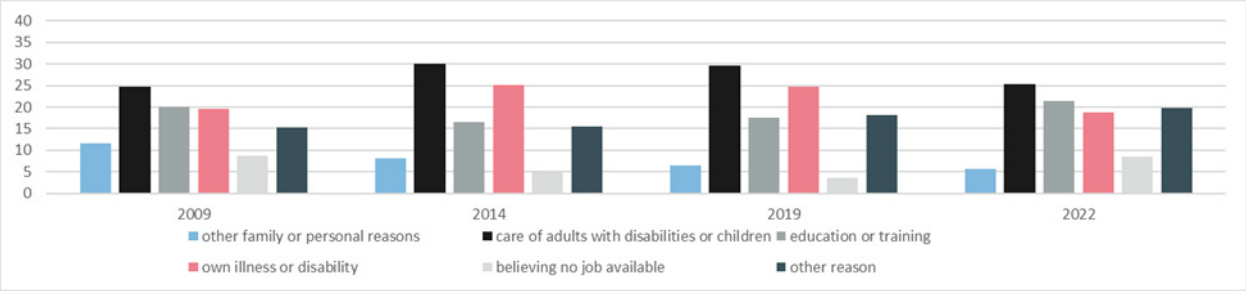
Note: Table presents marginal effects. AME: average marginal effect, SE: standard error, CI: confidence interval. * p<0.05, ** p<0.01, *** p<0.001. Reference category for education levels is not having finished school and for income categories no income. The remaining variables are dummies. Personal income low: below 1,500 €, medium: 1,500 € until below 2,900 € net income, high: 2,900 € until 18,000 € and more net income. Results based on microcensus data (RDC FSO 2023b, 2023c, 2023d).

Figure A 1: Reasons why inactive males aged 15-64 do not seek employment although wanting to work (in % of inactive population), 2009-2022



Note: Own visualization based on data from Eurostat (2023c). Due to some breaks in time series, the values are not exactly comparable. In 2022, family and personal reasons are queried separately. For sake of comparability, the answers to both questions are summarized in 2022.

Figure A 2: Reasons why inactive females aged 15-64 do not seek employment although wanting to work (in % of inactive population), 2009-2022



Note: Own visualization based on data from Eurostat (2023c). Due to some breaks in time series, the values are not exactly comparable. In 2022, family and personal reasons are queried separately. For sake of comparability, the answers to both questions are summarized in 2022.

Table A 2: Share of main reasons why inactive individuals are not searching for employment, 2009, 2014, 2019 (in %)

reason / year	2009	2014	2019
job search completed	0.76	0.8 (+ 5 %)	0.94 (+ 24 %)
reemployment expected	0.18	0.23 (+ 28 %)	0.18 (+ 0 %)
illness, accident or temporary disability	4.21	6.05 (+ 44 %)	6.99 (+ 66 %)
permanent reduced ability to work or disability	6.32	8.19 (+ 30 %)	8.62 (+ 36 %)
care of children or people in need of care / with disability	8.98	9.85 (+ 10 %)	10.3 (+ 15 %)
other personal or family reasons	7.48	5.28 (- 29 %)	4.29 (- 43 %)
school or vocational training	36.90	38.4 (+ 4 %)	38.12 (+ 3 %)
retirement	23.37	16.85 (- 28 %)	14.71 (- 37 %)
no employment opportunity	2.16	1.66 (- 23 %)	1.44 (- 33 %)
other reasons	9.65	12.68 (+ 31 %)	14.41 (+ 49 %)

Note: Values in parentheses indicate change in the share compared to 2009. Calculations based on (RDC FSO 2023b, 2023c, 2023d).

Table A 3: Logistic regression results work more 2009-2019 (all results)

dependent variable	work more		
variables / statistics	AME	SE	95 % CI
age	0.0107***	0.0002	[0.0104, 0.011]
age^2	-0.0001***	0.0000	[-0.0001, -0.0001]
female	0.0043***	0.0008	[0.0027, 0.0059]
femaleX2014	0.0029*	0.0012	[0.0004, 0.0053]
femaleX2019	-0.0021	0.0013	[-0.0047, 0.0005]
married	-0.0078***	0.0008	[-0.0094, -0.0061]
marriedX2014	-0.0043***	0.0012	[-0.0067, -0.0019]
marriedX2019	-0.0112***	0.0013	[-0.0137, -0.0086]
finished school	0.0137***	0.0015	[0.0107, 0.0167]
high school	-0.0087***	0.0008	[-0.0102, -0.0071]
professional training	0.0095***	0.0008	[0.008, 0.011]
university degree	0.0101***	0.0011	[0.008, 0.0122]
personal income low	0.1131***	0.0018	[0.1097, 0.1166]
personal income medium	0.0740***	0.0018	[0.0704, 0.0776]
personal income high	0.0351***	0.0028	[0.0296, 0.0406]
personal income highX2014	0.0012	0.0030	[-0.0046, 0.0071]
personal income highX2019	0.0034	0.0029	[-0.0022, 0.009]
receiving pension	-0.0759***	0.0017	[-0.0793, -0.0725]
receiving other public payment	0.0036***	0.0006	[0.0025, 0.0046]
receiving further income	-0.0087***	0.0014	[-0.0115, -0.006]
receiving further incomeX2014	0.0068**	0.0021	[0.0027, 0.0109]
receiving further incomeX2019	0.0179***	0.0022	[0.0136, 0.0222]
income mainly from parents, spouse etc.	-0.0161***	0.0014	[-0.0189, -0.0133]
income mainly from parents, spouse etc.X2014	-0.0048*	0.0021	[-0.009, -0.0007]
income mainly from parents, spouse etc.X2019	-0.0184***	0.0025	[-0.0233, -0.0135]
year 2014	-0.0133***	0.0011	[-0.0154, -0.0112]
year 2019	-0.0231***	0.0011	[-0.0253, -0.0209]
observations	958569		

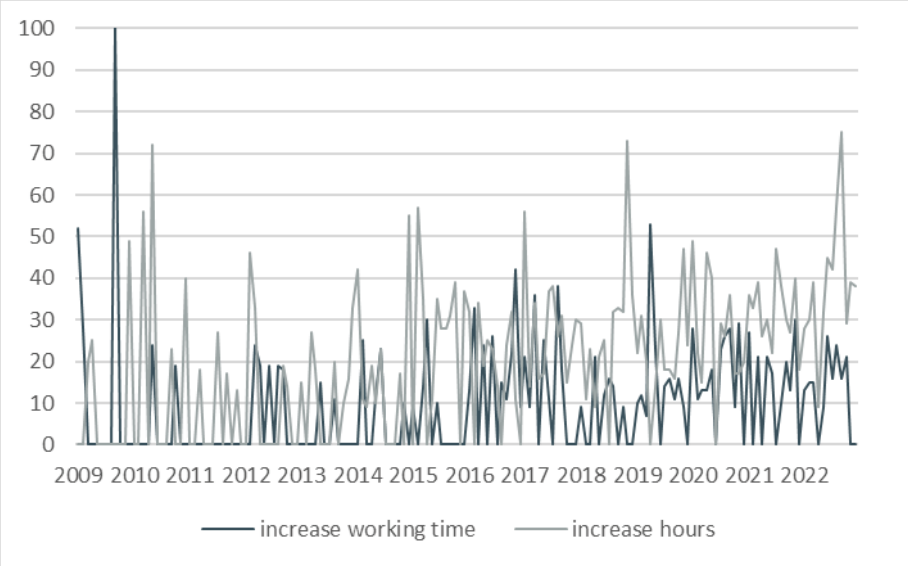
Note: Table presents marginal effects. AME: average marginal effect, SE: standard error, CI: confidence interval. * p<0.05, ** p<0.01, *** p<0.001. Reference category for education levels is not having finished school and for income categories no income. The remaining variables are dummies. Personal income low: below 1,500 €, medium: 1,500 € until below 2,900 € net income, high: 2,900 € until 18,000 € and more net income. Results based on microcensus data (RDC FSO 2023b, 2023c, 2023d).

Table A 4: Logistic regression results work more in 2009, 2014 and 2019 (no interactions)

sample	2009				2014				2019			
variables / statistics	AME	SE	p-value	95 % CI	AME	SE	p-value	95 % CI	AME	SE	p-value	95 % CI
age	0.0137***	0.0003	0.0000	[0.0131, 0.0143]	0.0108***	0.0003	0.0000	[0.0102, 0.0114]	0.0078***	0.0002	0.0000	[0.0073, 0.0083]
age^2	-0.0002***	0.0000	0.0000	[-0.0002, -0.0002]	-0.0001***	0.0000	0.0000	[-0.0001, -0.0001]	-0.0001***	0.0000	0.0000	[-0.0001, -0.0001]
female	0.0060***	0.0011	0.0000	[0.0039, 0.0081]	0.0067***	0.0010	0.0000	[0.0048, 0.0085]	0.0019*	0.0008	0.0160	[0.0004, 0.0035]
married	-0.0099***	0.0011	0.0000	[-0.0121, -0.0077]	-0.0131***	0.0010	0.0000	[-0.0151, -0.0112]	-0.0136***	0.0008	0.0000	[-0.0153, -0.012]
finished school	0.0158***	0.0030	0.0000	[0.01, 0.0216]	0.0145***	0.0028	0.0000	[0.0091, 0.0199]	0.0098***	0.0022	0.0000	[0.0055, 0.0141]
high school	-0.0134***	0.0016	0.0000	[-0.0165, -0.0103]	-0.0100***	0.0014	0.0000	[-0.0128, -0.0073]	-0.0037***	0.0011	0.0010	[-0.0058, -0.0016]
professional training	0.0148***	0.0015	0.0000	[0.0119, 0.0177]	0.0089***	0.0013	0.0000	[0.0062, 0.0115]	0.0047***	0.0011	0.0000	[0.0025, 0.0069]
university degree	0.0111***	0.0022	0.0000	[0.0068, 0.0154]	0.0122***	0.0019	0.0000	[0.0084, 0.0159]	0.0066***	0.0015	0.0000	[0.0037, 0.0096]
personal income low	0.1203***	0.0026	0.0000	[0.1151, 0.1254]	0.1423***	0.0042	0.0000	[0.1341, 0.1505]	0.1082***	0.0040	0.0000	[0.1004, 0.1161]
personal income medium	0.0734***	0.0028	0.0000	[0.0679, 0.0789]	0.1009***	0.0043	0.0000	[0.0926, 0.1092]	0.0792***	0.0040	0.0000	[0.0713, 0.0871]
personal income high	0.0271***	0.0038	0.0000	[0.0197, 0.0346]	0.0629***	0.0047	0.0000	[0.0537, 0.072]	0.0505***	0.0042	0.0000	[0.0422, 0.0588]
receiving pension	-0.0974***	0.0034	0.0000	[-0.1041, -0.0908]	-0.0755***	0.0029	0.0000	[-0.0813, -0.0698]	-0.0556***	0.0026	0.0000	[-0.0607, -0.0506]
receiving other public payment	0.0053***	0.0011	0.0000	[0.0033, 0.0074]	0.0043***	0.0010	0.0000	[0.0023, 0.0062]	0.0006	0.0008	0.4900	[-0.0011, 0.0022]
receiving further income	-0.0089***	0.0018	0.0000	[-0.0124, -0.0055]	-0.0028	0.0016	0.0800	[-0.006, 0.0003]	0.0058***	0.0013	0.0000	[0.0032, 0.0084]
income mainly from parents, spouse etc.	-0.0231***	0.0019	0.0000	[-0.0268, -0.0194]	-0.0172***	0.0018	0.0000	[-0.0207, -0.0137]	-0.0246***	0.0017	0.0000	[-0.028, -0.0212]
observations	314891				307149				336529			

Note: Table presents marginal effects. AME: average marginal effect, SE: standard error, CI: confidence interval. * p<0.05, ** p<0.01, *** p<0.001. Reference category for education levels is not having finished school and for income categories no income. The remaining variables are dummies. Personal income low: below 1,500 €, medium: 1,500 € until below 2,900 € net income, high: 2,900 € until 18,000 € and more net income. Results based on microcensus data (RDC FSO 2023b, 2023c, 2023d).

Figure A 3: Search volumes on Google for increasing work time 2009-2022



Note: Own visualization based on data from Google Trends (trends.google.com).

Table 5: Logistic regression results work less 2009 - 2019 (all results)

dependent variable	work less		
variables / statistics	AME	SE	95 % CI
age	0.0024***	0.0001	[0.0022, 0.0026]
age^2	-0.0000***	0.0000	[0, 0]
female	0.0077***	0.0006	[0.0065, 0.0089]
femaleX2014	-0.0019*	0.0008	[-0.0035, -0.0003]
femaleX2019	-0.0043***	0.0007	[-0.0058, -0.0029]
married	0.0004	0.0006	[-0.0008, 0.0016]
marriedX2014	-0.0014	0.0008	[-0.003, 0.0002]
marriedX2019	-0.0025***	0.0007	[-0.0039, -0.0011]
finished school	0.0110***	0.0018	[0.0075, 0.0145]
high school	0.0030***	0.0004	[0.0022, 0.0038]
professional training	0.0099***	0.0006	[0.0086, 0.0111]
university degree	0.0126***	0.0007	[0.0112, 0.014]
personal income low	-0.0024*	0.0010	[-0.0044, -0.0004]
personal income medium	0.0148***	0.0010	[0.0129, 0.0168]
personal income high	0.0245***	0.0012	[0.0221, 0.0269]
personal income highX2014	0.0001	0.0010	[-0.0018, 0.002]
personal income highX2019	-0.0022*	0.0009	[-0.0039, -0.0004]
receiving pension	-0.0258***	0.0011	[-0.028, -0.0235]
receiving other public payment	-0.0072***	0.0004	[-0.0079, -0.0065]
receiving further income	0.0093***	0.0008	[0.0078, 0.0108]
receiving further incomeX2014	-0.0007	0.0010	[-0.0028, 0.0013]
receiving further incomeX2019	-0.0027**	0.0010	[-0.0046, -0.0008]
income mainly from parents, spouse etc.	-0.0409***	0.0025	[-0.0458, -0.036]
income mainly from parents, spouse etc.X2014	-0.0018	0.0037	[-0.0091, 0.0056]
income mainly from parents, spouse etc.X2019	-0.0040	0.0036	[-0.0111, 0.003]
year 2014	0.0019*	0.0008	[0.0003, 0.0034]
year 2019	0.0113***	0.0007	[0.0099, 0.0128]
observations	958569		

Note: Table presents marginal effects. AME: average marginal effect, SE: standard error, CI: confidence interval. * p<0.05, ** p<0.01, *** p<0.001. Reference category for education levels is not having finished school and for income categories no income. The remaining variables are dummies. Personal income low: below 1,500 €, medium: 1,500 € until below 2,900 € net income, high: 2,900 € until 18,000 € and more net income. Results based on microcensus data (RDC FSO 2023b, 2023c, 2023d)