The effect of weekly working hours on life satisfaction

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Abstract

This paper exploits changes in the length of the full-time workweek in the German public sector to identify the effect of weekly working hours on self-reported life satisfaction. We find suggestive evidence of an inverted U-shaped effect of hours worked on life satisfaction, but the effect of the full-time workweek on actual hours worked for part-timers is too weak to consolidate this finding. For full-timers, we find that an additional hour of work decreases the life satisfaction of men significantly, while it leaves the life satisfaction of female full-timers unchanged.

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1. Introduction

In standard economic models of labour supply, work only generates disutility. Individuals are depicted as making a trade-off between enjoying leisure time and earning income in order to buy consumption goods. However, public discourse, conversations at the coffee machine, and introspection also suggest that work can be valued in itself. This idea has been incorporated in concepts as psychic income or job utility, which suggest that individuals derive utility from work on top of the income it generates. This can be because they enjoy the activity in itself, or because of valuable things associated with working, such as social contacts, day structure, feeling of purpose, etc.

One way to obtain empirical evidence about utility or disutility derived from work is to study the link between working time and the subjective well-being of individuals while controlling for income levels. The existing literature applying this method provides ambiguous evidence. While some studies find a negative relationship between working time and life satisfaction[1] (Pouwels et al., 2008), others find no significant link between working time and well-being (Booth and Van Ours, 2008), and yet others find suggestive evidence of an inverted U-shaped relationship between both variables (Knabe and Rätzel, 2010). The evidence available so far is mainly correlational. Observed changes in working hours are rarely exogenous to individual characteristics or choices, and in case these changes are exogenous, they are often due to circumstances (like economic shocks) which likely affect not only working time, but simultaneously impact income and happiness.

In this paper, we use a series of changes in the definition of the full-time workweek of employees in the public sector in Germany, which took place in different years, in different federal states and for different groups of employees, as a source of exogenous variation in working hours to identify the effect of weekly working hours on well-being. The changes in standard weekly working time, which had an impact on hours actually worked, were not initiated due to circumstances likely to affect individual happiness directly. Moreover, they were not associated with corresponding changes in income, which makes it possible to distinguish between the effect of working time and the effect of income on well-being. To the best of our knowledge, this paper is the first to identify a causal effect of weekly working time on life satisfaction.

We merge information on the length of the standard workweek in the public sector to data from the 1985-2009 waves of the German Socio-Economic Panel Study (SOEP). Our estimation results suggest an inverted U-shaped effect of hours on life satisfaction, but we are unable to fully check this finding due to the weak influence of the standard workweek on actual working time for part-timers. For full-timers, however, the effect of hours worked on life satisfaction is clearly negative. It is driven by male full-timers only, who lose about 0.2 points of life satisfaction by additional hour worked, while female full-timers do not seem to mind. This finding is also mainly driven by increases in the standard workweek. It appears that those do lead to more hours actually work, while decreasing the length of the standard workweek does not seem to affect the actual working time of individuals.

The paper is further structured as follows. In the next section, we first give a brief overview of the relevant literature. Section 3 describes the changes in standard weekly working time in the public sector in Germany and their use in our empirical strategy. Section 4 describes the data. In section 5,

[1] We use the terms well-being, happiness and life satisfaction interchangeably in this paper.

we present and discuss the results of our analyses. We conduct a number of robustness checks in section 6. Section 7 concludes.

2. Literature

An extensive body of literature studies the relationship between work and individual subjective well-being. The main focus of the majority of these articles has been on the relationship between unemployment and well-being (from Clark and Oswald, 1994 to Knabe et al., 2010). This literature provides evidence that the negative effect of unemployment on happiness cannot entirely be explained by the negative consequences of unemployment on income. This seems to support the idea that work can be a source of utility in itself. Epstein and Kimball (2014), for instance, develop a model of job utility to explain why working time has barely decreased across the last decades in industrialized countries in spite of increasing wealth. If the benefits one derives from work increase with working hours, even if at a decreasing rate, then these same hours could have a positive effect on life satisfaction, at least for relatively low hours. On the other hand, increasing effort costs could make the effect of working hours on life satisfaction turn negative above a given threshold.

One can object that several studies find, using the Day Reconstruction Method, that work is one of the activities least enjoyed by individuals. Knabe et al. (2010) find that the employed enjoy their weekdays less than the unemployed because of the negative affect they experience at work. This rather seems in line with the standard model of labour supply. Knabe et al. (2010) conclude that not fitting in the reference framework of employment causes the unemployed to be less satisfied with their lives, while duration neglects prevents them from translating the higher amount of leisure they enjoy into higher life satisfaction. This reasoning raises a number of questions as far as working time is concerned. First, is working one hour per week enough to meet the reference framework of employment and derive the corresponding benefits for life satisfaction? Second, if duration neglect is important, does that mean that a possible influence of working time on affect will not be translated into changes in life satisfaction? If both questions are answered with yes, working time will have no effect on life satisfaction after controlling for income. However, if working more than one hour per week is needed in order to generate a positive effect on a cognitive evaluation of one's own life, then weekly working hours can have a positive effect on life satisfaction, at least for low weekly working hours. And if duration is not entirely neglected, or if weekly working hours are related in a systematic way to the peak and end of experiences at work, then weekly working time can have an impact of life satisfaction via affect, probably a negative one. Finally, a possible positive effect via cognitive evaluation and a possible negative effect via affect can combine into a non-linear effect of hours on life satisfaction, positive for low number of hours and negative for longer hours. To find out which of these possibilities apply, empirical investigation is needed.

The first studies which examined the relationship between work at the intensive margin and well-being have focussed on job satisfaction rather than general happiness or life satisfaction (e.g. Clark, 1997, 1996; van Praag et al., 2003). A more recent body of literature examines the link between working hours and subjective well-being, while controlling for income. In general, the models estimated take the form:

$$LS = f(H, Y, X)$$

where *LS* is life satisfaction, *H* is the number of hours worked per week, *Y* is household income and *X* contains a number of individual and household characteristics. To allow for a potential non-linear effect of weekly hours on life satisfaction, different specifications can be used, for instance categorical dummies for different weekly working hours, or a combination of a linear and a quadratic term in hours.

Pouwels et al. (2008) were – to the best of our knowledge – the first to conduct such a study, and found that working hours are negatively related to happiness. This result is, however, based on the analysis of only one wave of SOEP data. Exploiting the panel dimension of the SOEP, Knabe and Rätzel (2010) re-examine these findings and find an inverted U-shaped relationship between weekly working time and happiness, but which is not statistically significant. Two further studies based on the SOEP come to the conclusion that the relationship between working time and well-being is inversely U-shaped (Muffels and Kempermann, 2011; Rätzel, 2009). Booth and Van Ours (2008) and Willson and Dickerson (2010), who use respectively the British Household Panel Survey and the European Community Household Panel to study the same question, do not find a significant link between working time and well-being either. Other studies find that long working hours are negatively related to well-being for women in Australia and in the Netherlands (Booth and Van Ours, 2012, 2009), and that working between 35 and 50 hours a week is associated with higher well-being for Australian men (Booth and Van Ours, 2009).

Interpretation of the results of abovementioned studies is not straightforward, as it is unclear whether they truly identify a causal effect of weekly working time on well-being. The relationship found could be driven by unobservable characteristics of individuals related to both working time and well-being. Results could reflect reverse causality as well, in case happier individuals tend to work longer hours. Most authors use panel data and introduce individual fixed-effects in their estimations, in order to correct for time-invariant unobserved individual heterogeneity. This eliminates one important potential source of bias in the estimated coefficient on working time, but not other potential problems, like reverse causality and time-varying unobserved heterogeneity.

Two recent papers examine the effect of an exogenous change in weekly working time on life satisfaction. Rudolf (2013) concludes that the reduction in weekly working time in Korea from 44 to 40 hours per week did not influence life satisfaction of the affected individuals. Hamermesh et al. (2014), using the same data but controlling for baseline life satisfaction, find a positive effect of the same reform. They also come to the same conclusion using other Korean data, and find that the reduction in weekly hours in Japan from 48 to 40 also increased life satisfaction of individuals. However, these papers study the effect on life satisfaction of a change in both weekly hours and earnings, since the changes in the fulltime workweek in Japan and Korea were implemented using a change in the threshold for receiving an overtime wage premium. As Hamermesh et al. (2014) point out, it is very interesting to find out whether regulation introducing a different hours-wage package can make individuals better off. But the focus of the present paper is a different one: we can identify the effect of weekly working time on life satisfaction on its own, because earnings of employees do not change along with their weekly working time in our case.

The change in the length of the standard workweek which we use here has been used before by Loog et al. (2012), who study its effect on preferences for labour supply, and by Loog (2013) who uses the exogenous variation to study interdependent preferences in labour supply.

3. Changes in standard weekly working time as a source of exogenous variation in working hours

The length of the standard workweek in the public sector has been subject to a number of changes in several German federal states at different points in time during the 1989-2009 period. These changes were of different magnitudes, depending on the federal state and on whether someone works as civil servant ('Beamte'), or as an employee in the public sector ('Angestellte'). Figure 1 provides an overview of the evolution of the standard workweek for civil servants and public sector employees in the different federal states. It reveals that there is a period of contraction of the standard workweek (1989-1992) followed by a period of extensions. Prior to 1992 all employees in the public service experienced a reduction in the standard working time from 40 to 38.5 hours. For civil servants in Schleswig-Holstein the reduction from 40 to 38.5 hours became effective in April 1990 and for those in Hesse in April 1991. For all remaining civil servants and all public sector employees the reductions became effective in a staggered fashion. In April 1989 the full-time workweek was shortened by one hour to 39 hours. Exactly one year later (April 1990) it was shortened by an additional half hour to a standard full-time workweek of 38.5 hours. From 1994 civil servants in all states experienced one or several prolongations of the standard workweek, resulting in a standard workweek of up to 42 hours per week in Hesse and Bavaria. Note that the extensions became effective staggered over time as well as across the country.[2]

We use standard weekly working time as an instrument for hours actually worked by individuals in our sample. Our estimations rely on the assumption that standard weekly hours affect individual life satisfaction only through the number of hours actually worked by individuals. This seems to be a reasonable assumption for a number of reasons.

First, standard weekly working time is not influenced by happiness. Obviously, the happiness of a given individual does not affect the standard weekly working time of his professional category in his federal state. Improvement of employees' well-being might have been one of the arguments in favour of decreases in standard weekly working time, but the changes in weekly working time were not implemented after an observed drop in well-being in the German public sector, neither were they targeted at unhappy individuals or groups.

Second, the changes in the length of the standard workweek were not associated to economic circumstances or shocks which could have directly affected individual happiness and would create a spurious link between these reforms and happiness. The increases in standard working time were introduced in order to reduce the costs of labour in the longer run. In addition, we include time fixed-effects in our analyses to control for any other events which might have occurred at the same time as the change in standard working time and could have affected happiness.

Third, we need to address the relationship between standard weekly working time and the characteristics of the treated groups. Obviously, individuals were not randomly allocated to federal states and to the status of public sector employee or civil servant. This means that the groups which received different treatments also differ slightly on observables. Table 7 in the Appendix presents descriptive statistics for civil servants and public sector employees. We see that both groups differ mainly in terms of gender composition, hours worked and education level. But the latter two

[2] This paragraph borrows heavily from Loog et al. (2012).

differences are actually mainly driven by the first one, and gender is controlled for in the estimations. Even if civil servants have a number of advantages compared to public sector employees, in terms of earnings and job security, they are typically found in the same organisations and professions as the public sector employees without civil servant status, and often do very similar tasks. The role played by unobservables is therefore likely to be very limited. Table 6 in the Appendix provides descriptives by federal states. It shows that they are fairly comparable.

4. Data

4.1 Estimation sample and descriptive statistics

We use data from the German Socio-Economic Panel Study for the years 1985 to 2009. We concentrate on individuals employed as civil servants or public sector employees, aged 18 to 49. We choose to focus on individuals with a positive weekly working time, unlike Booth and Van Ours (2012, 2009, 2008), because we want to find out about the effects of work at the intensive margin, and would like to avoid picking up any effect of being employed rather than unemployed. We exclude individuals aged 50 and older because they are eligible for specific working time arrangements. We also exclude individuals who hold a second job, since their total weekly working time is difficult to measure. We also drop those individuals who indicated that they are civil servants but do not work in the public sector (n=481). We are left with almost 18000 observations on almost 4000 individuals. Table 1 provides descriptive statistics of the main variables of interest in our estimation sample.

Table 1 – Descriptive statistics for the estimation sample

Variable	Obs	Mean	Std. Dev.	Min	Max
Life satisfaction	17889	7.42	1.55	0	10
Standard hours	17889	39.19	0.94	38.5	42
Hours actually worked	17889	37.61	10.95	0.4	80
Female	17889	0.54	0.50	0	1
Log net monthly household income	17889	7.88	0.48	5.37	10.92
Years of education	17649	13.30	2.84	7	18
Age	17889	36.72	7.88	18	49
Number of children in the household	17889	0.81	0.99	0	7
Lives with spouse	17889	0.72	0.45	0	1
Civil servant	17889	0.43	0.49	0	1
Moved from one Bundesland to another	17889	0.01	0.07	0	1

Life satisfaction is measured using the following question: “In conclusion, we would like to ask you about your satisfaction with your life in general. Please answer on a scale from 0 to 10, where 0 means completely dissatisfied and 10 means completely satisfied. How satisfied are you with your life, all things considered?”[3]. Individuals who refused to answer, or answered that they do not know

[3] In the German version of the questionnaire, the question was phrased as follows: *Zum Schluss möchten wir Sie noch nach Ihrer Zufriedenheit mit Ihrem Leben insgesamt fragen. Antworten Sie bitte wieder anhand der folgenden Skala, bei der "0" ganz und gar unzufrieden, "10" ganz und gar zufrieden bedeutet. Wie zufrieden sind Sie gegenwärtig, alles in allem, mit Ihrem Leben?*

were dropped. These were only 54 observations in our sample. Figure 2 presents a histogram of life satisfaction in the estimation sample. Actual weekly working time is measured by asking respondents: "And how many hours do you generally work, including any overtime?"[4]. In the SOEP data, answers above 80 hours are considered implausible and set to missing. Figure 3 in the Appendix presents a histogram of hours actually worked in the estimation sample. To measure household income, we use the answer by the head of household to the question about the net monthly household income, and replace it by the adjusted household income variable made available in the SOEP data when it is present. Before 2000, we cannot distinguish between individuals living in Saarland and Rhineland-Palatinate. We consider this problem negligible since the inhabitants of Saarland constitute only a small fraction of the sample (about 2 percent).

Information on the length of the standard workweek is merged to the SOEP data. State-specific information on the length of the workweek of public sector employees was received from Ver.di, the labour union in which public sector employees are organized. Information on the length of the standard workweek of civil servants was received from the Federal Ministry of the Interior.

4.2 Assignment to standard hours regime[5]

Assigning the correct standard workweek length to the right individuals is complicated by the fact that there can be differences in the standard workweek between people employed at federal government bodies, states and municipalities. We briefly highlight these differences for civil servants and public sector employees in turn.

For civil servants, there are differences in the standard workweek only between those employed at states and municipalities (*Landesbeamte* and *Kommunalbeamte*) on the one hand, and those employed at the federal level (*Bundesbeamte*) on the other hand. In fact, the timing of workweek reductions is identical for most civil servants, while the timing of the workweek extensions after 1994 is not. For example, civil servants employed at the federal level saw extensions in the standard workweek in 2004 and 2006, whereas civil servants employed at several states and municipalities saw such extensions in the pre-2004 period already (see Table 5).

Whereas civil servants employed at states and municipalities do not differ with respect to their standard workweek length, these differences can be present for public sector employees. Even though the timing of the 1989-reductions is identical for all public sector employees, there exist differences with respect to the extensions. Public sector employees employed by federal bodies experienced a half-an-hour extension in October 2005, whereas those employed by states experienced extensions over a year later (November 2006). Public sector employees employed by municipalities may have been subject to a higher level of standard hours (up to 40) from October 2005 onwards, depending on bargaining agreements.

Unfortunately, the SOEP data lack information that explicitly indicates whether a civil servant or public sector employee is employed at a federal body, a state or a municipality. As a result, we cannot unambiguously assign the relevant standard workweek to all individuals. Since the vast majority of civil servants is employed at states/municipalities (German Federal Statistical Office, 2011), we maintain the assumption that all civil servants are subject to the state-level standard-

[4] In the German version of the questionnaire, the question was phrased as follows: *Und wie viel beträgt im Durchschnitt Ihre tatsächliche Arbeitszeit pro Woche einschließlich eventueller Überstunden?*

[5] This section borrows heavily from Loog et al. (2012).

workweek regulations prevailing in the state they reside in. In fact, we maintain the same assumption for public sector employees. However, in case of the public sector employees, the ratio of municipal-to-state employed is about fifty-fifty (German Federal Statistical Office, 2011). Thus, assuming all employees are subject to the length of the standard workweek prevalent in a particular state would introduce considerable noise after 2005. Therefore, we set the variable measuring the length of the standard workweek to missing for those public sector employees interviewed in October 2005 and after.

4.1 Correlation between weekly working hours and life satisfaction

To get a first idea of how the relation between weekly hours worked and life satisfaction looks like in our data, we present the estimation results of a fixed-effects OLS regression in Table 2. In column 1, we estimate a model that is linear in hours worked. In column 2, we allow for a non-linear relationship between hours and well-being by including the square of actual hours. We cannot reject the latter specification. The number of hours worked appears to be positively related to life satisfaction up to about 37 hours a week, beyond which an additional hour of work is associated with lower life satisfaction.[6] [7]

[6] In this specification of the model we treat the dependent variable as if it were continuous. Estimating an ordered logit with fixed-effects following the "blow-up and cluster" method (Baetschmann et al., 2011) leads to qualitatively similar results (results available from the authors).

[7] We also tried including a measure of subjective health in the analyses. It was clearly positively and significantly related to life satisfaction. The inclusion of the health variable had little impact on the magnitude of the estimated coefficients for working time. However, since subjective health is only measured since 1992 in the SOEP, its inclusion led to a loss of observations, and consequently to a loss of statistical significance of the hours variables in the 2SLS estimations.

Table 2 – Relationship between hours actually worked and life satisfaction (OLS with fixed-effects[8])

	Life satisfaction	Life satisfaction
Hours actually worked per week	-0.0020	0.0149**
	(0.0018)	(0.0063)
Hours actually worked per week^2		-0.0002***
		(0.0001)
Log net monthly household income[9]	0.2624***	0.2591***
	(0.0519)	(0.0519)
Age	-0.0389	-0.0397
	(0.0257)	(0.0257)
Age^2[10]	-0.0001	-0.0001
	(0.0003)	(0.0003)
Number of children in household	0.0168	0.0221
	(0.0254)	(0.0255)
Person lives with spouse	0.0996*	0.0993*
	(0.0585)	(0.0585)
Constant	7.1233***	6.8938***
	(0.6696)	(0.6700)
Includes dummies for: year, month, Bundesland, status as civil servant vs. public sector employee, moves from one Bundesland to another	Yes	Yes
R^2	0.03	0.03
N	17,889	17,889
Individuals	3,931	3,931

Robust standard errors in parentheses.

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

[8] The Hausman test rejects a random-effects model at the 10-percent level (p=0.08).

[9] Including income linearly slightly reduces R^2, while other coefficients remain unchanged. The same is true if we divide household income by the number of individuals present in the household. The latter changes do, however, have an impact on the coefficients of the children and spouse variables.

[10] We probably do not find the usual U-shaped relationship between age and life satisfaction because the age range we observe here is too narrow. When age is taken up linearly in the model, its coefficient is negative and significant. The coefficients on the hours variables are not affected.

5. Estimation results

In the previous subsection we presented correlational evidence of an inverted U-shape in the effect of working hours on subjective well-being. However, OLS estimates are likely affected by endogeneity problems. Therefore, we now turn to a source of exogenous variation in working time: the changes in the definition of the standard full-time weekly working time.

5.1 Estimations for the whole sample

We first examine the effect of the standard weekly working time on life satisfaction, i.e. the reduced form equation in our model. The estimation results of a fixed-effects OLS regression are presented in Table 3.

Table 3 - Effect of standard workweek on life satisfaction (OLS with fixed-effects)

	Life satisfaction	Life satisfaction
Standard workweek (hs)	-0.0424**	-0.0251
	(0.0196)	(0.0277)
Log net monthly household income	0.2514***	0.2605***
	(0.0519)	(0.0516)
Age	-0.0289	-0.0374
	(0.0253)	(0.0258)
Age^2	-0.0002	-0.0002
	(0.0003)	(0.0003)
Number of children in household	0.0207	0.0214
	(0.0252)	(0.0251)
Person lives with spouse	0.1047*	0.1019*
	(0.0586)	(0.0584)
Constant	8.3331***	8.0260***
	(1.0294)	(1.2516)
Includes dummies for: year, month, Bundesland, status as civil servant vs. public sector employee, moves from one Bundesland to another	No	Yes
R^2	0.02	0.03
N	17,889	17,889
Individuals	3,931	3,931

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

The results in column 1 indicate that an increase in the standard workweek by one hour is associated with a reduction in subjective well-being of 0.04 points on the ten-point scale. This corresponds to a reduction in subjective well-being by 2.6 percent of a standard deviation. That is, even though the effect is statistically significant, the economic impact seems small. After adding controls for year, month, federal state, status as civil servant vs. public sector employee, and geographical mobility (moving between federal states) in column 2, the coefficient of the standard workweek almost halves and loses statistical significance.

The correlational evidence presented above suggests that a change in standard weekly working time affects different individuals, with different weekly working hours, in a different way. This could be an explanation for the lack of significance of standard weekly working time in the estimated model.

We now examine the effect of actual weekly working hours on life satisfaction. To improve on the evidence obtained so far, we use standard working time as an instrument for hours actually worked by individuals. The estimation results of the corresponding 2SLS model are presented in Table 4[11].

The estimation results of the first stage are presented in the first column. The standard workweek has a strong and statistically significant effect on the number of hours actually worked by individuals, implying that individuals partly adjust their working hours following a change in the standard workweek. One additional hour for the standard workweek corresponds to slightly more than half an hour additional hours worked in the week. The effect cannot be one since the change takes effect only proportionally for part-timers. In general, about half of our sample has a reported contractual working time that is equal to the standard fulltime workweek. Only 10 percent report a contractual working time higher than that, and the rest have a contract for less than full-time. Further, 43 percent of our sample indicate that they work exactly the number of hours specified in their contract. The rest indicated that they work more. Only a very small group said they work less than specified on their contract. It is likely that individuals who work more than they have to according to their contract do not increase their actual working time in exact proportion of a change in the definition of the full-time workweek. The F-statistics at the bottom of the table indicate that standard working time is strong enough an instrument for the actual number of hours worked.

The second column presents the estimation results of a model in which hours actually worked are included linearly and instrumented using standard hours. The estimated coefficient on working hours is negative, but rather small, and statistically insignificant. This insignificant coefficient was to be expected since the effect of standard weekly working time in the reduced form was not significant either.

In the third column, we estimate a model including a quadratic term in hours worked. In this specification, the instruments used are standard hours and the square of the fitted values for hours obtained from the first-stage regression (see Wooldridge, 2002, p. 237). The coefficient on the quadratic hours term is marginally statistically insignificant (p-value = 0.11). The coefficients indicate a positive effect of hours worked on life satisfaction up to 27 hours, while an increase in hours above this threshold leads to a decrease in life satisfaction, all other things equal. However, since the coefficients estimated by 2SLS are not estimated very precisely, it is impossible to tell whether instrumenting for working time leads to a statistically significant improvement compared with OLS estimation.

The evidence from the two-stage least squares estimation suggests that the effect of weekly working time on life satisfaction is not linear, but positive up to a given threshold, after which the effect turns negative. If this is so, it is not surprising that we found no strong effect of changes in standard weekly working time on life satisfaction in the reduced form regression, since such changes are likely to affect individuals in a different way depending on their working time at the start of the observation

[11] We use the Stata command xtivreg2 (Schaffer, 2010).

period. This suggests that it would be interesting to examine in how far the effect of weekly working time is heterogeneous across individuals and situations. We turn to this in the next sub-section.

Table 4 - Effect of hours actually worked on life satisfaction (2SLS with fixed-effects)

	Hours actually worked per week (first-stage)	Life satisfaction (2SLS)	Life satisfaction (2SLS)
Standard workweek (hs)	0.5544***		
	(0.1649)		
Hours actually worked per week		-0.0453	0.1136*
		(0.0433)	(0.0604)
Hours actually worked per week^2			-0.0021
			(0.0013)
Log net monthly household income	1.8045***	0.3422***	0.2889***
	(0.3764)	(0.0935)	(0.0682)
Age	-0.6276***	-0.1119	-0.0752
	(0.1805)	(0.0944)	(0.0935)
Age^2	0.0069***	0.0002	0.0002
	(0.0024)	(0.0004)	(0.0004)
Number of children in household	-2.2267***	-0.0795	-0.0044
	(0.2211)	(0.0981)	(0.0561)
Person lives with spouse	-1.2981***	0.0432	0.0580
	(0.3622)	(0.0754)	(0.0693)
Constant	13.7401		
	(8.6247)		
Includes dummies for: year, month, Bundesland, status as civil servant vs. public sector employee, moves from one Bundesland to another	Yes	Yes	Yes
Kleibergen-Paap F-statistic		20.495	9.019
P-value Hausman test		0.3086	0.3858
R^2	0.07		
N	17,889	17,889	17,889
Individuals	3,981	3,981	3,981

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

5.2 Full-timers vs. part-timers

Our main estimation results suggest that weekly working hours have a positive influence on life satisfaction for those who work few hours and a negative influence for those who work many weekly hours. To further check this result, we estimate the model for part-timers and full-timers separately. We expect to find a positive effect of hours worked in the first subsample, and a negative effect in the second one. The estimation results for the reduced form, first stage and 2SLS are presented in Table 8, in panel A for the full-timers and panel B for the part-timers. The limit between part-time and full-time is set at 33 hours worked per week here, but the results are robust to variation in the limit.

Looking at the estimation results for the first stage, we see that the standard workweek clearly affects the working time of the full-timers, but lets the hours of part-timers practically unchanged. This means that our instrument is only strong enough for full-timers. Therefore, our finding of a hill-shaped relationship between hours worked and life satisfaction cannot be confirmed here, and it remains suggestive.

The effect of hours worked on life satisfaction of full-timers is negative, statistically significant, and corresponds to 0.1 point decrease on the life satisfaction scale per additional hour worked, which is not negligible. The effect size for the part-timers seems even bigger, but this is mainly driven by the fact that the first stage is smaller for this group, while the effect of standard hours in the reduced form is very similar for both groups (although it is much less precisely estimated for part-timers).

5.3 Male vs. female

Because it is well-known in the literature that the determinants of life satisfaction are different for men and for women, we also estimate the models presented above for men and for women separately. The estimation results are presented in Table 9. When looking at the reduced form and first stage for those two groups, it becomes clear that males' life satisfaction is more strongly influenced by standard hours than is females', while females' working time is more strongly affected by standard hours than is males'. The result is an estimated effect of hours worked on life satisfaction that is negative and rather strong for men, but absent for women.

Since men work clearly more than women in the sample (see the histograms of hours worked by gender, Figure 4 in the Appendix), it is worth checking whether this difference remains if we compare only full-time working men and women. In unreported estimations, we find that the first stage is very similar for male and female full-timers: one additional standard hour leads to roughly 0.45 additional hours worked. However, the effect of standard hours in the reduced form is negative and non-trivial for men (-0.08), while it is virtually inexistent for women. In the end, one additional hour worked decreases the life satisfaction of a male full-timer by almost 0.2 points, while it does not affect a female full-timer.

The difference found here between men and women is not due to the fact that the majority of women are not civil servants. If we look at female full-time civil servants only (results not reported here), the first stage is even stronger and there is still no effect of standard hours on life satisfaction in the reduced form.

5.4 Increase vs. decrease in working time

We now turn to the question whether the effect of weekly hours worked on life satisfaction is symmetric, i.e. whether it is the same regardless of whether working time increases or decreases. The estimation results are presented in Table 10 in the Appendix. The effect size in the reduced form seems to be similar for both periods, but the first stage is different. It is virtually absent in the case of a decrease in standard hours. Apparently, shortening the official duration of the full-time workweek does not influence the actual number of hours worked by employees. On the contrary, extending the duration of the full-time workweek seems to have at least some effect on the number of hours actually worked. The result is that in the IV estimations, hours worked have a clear negative effect on life satisfaction when standard hours are increased, but the effect is very difficult to pin down when standard hours are decreased.

In unreported estimations, we find that this pattern is even clearer if we look at full-timers only. Their actual weekly working time is not affected by a decrease in standard hours, while it goes up by 0.42 hours when the fulltime workweek increases by one hour. A decrease in standard hours leaves the life satisfaction of full-timers unaffected, while an increase in the fulltime workweek by one hour leads to a decrease by almost 0.1 point in their life satisfaction. In the context of an increase in standard weekly working time, we find that one additional hour worked reduces the life satisfaction of a full-timer by 0.22 points.

6. Robustness checks

In this section, we present a number of robustness checks on our estimation results, in particular to address potential objections to the exclusion restrictions presented in section 3.

6.1 Unobserved heterogeneity

A first potential concern with our main results is the role played by unobserved heterogeneity. As mentioned above, public sector employees and civil servants are not perfectly similar groups. To get a clearer picture of the differences between public sector employees and civil servants, and of how these could influence our main estimates, we also estimate the model separately for these two groups. The estimation results are presented in Table 11 in the Appendix.

The effect of standard hours in the reduced form equation is clearly negative for civil servants. For public sector employees, the effect size seems bigger, but it is estimated quite imprecisely. The effect of standard hours in the first stage is very difficult to pin down for public sector employees. This might be due to the fact that they were only subject to decreases, and not increases in working time. For civil servants, the first stage seems to be positive, even if the effect size is not very big and the coefficients is statistically not very significant. This results is an estimated effect of hours worked on life satisfaction which is negative and big for civil servants, and cannot be pinned down for public sector employees. For both groups, we also find suggestive evidence of an inverted U-shaped relationship between hours worked and life satisfaction, but it is very imprecisely estimated in the case of public sector employees. In the end, it seems like the civil servants are the group which is mainly driving our main estimation results.

6.2 Job insecurity

In some professions (e.g. teachers, policemen), a change in the definition of the fulltime workweek may have consequences for the number of employees that are needed. In particular, increasing weekly working time might lead to dismissals. This could cause an indirect effect on happiness of the policy change examined here. To check for this possibility, we use a question in the SOEP which asks respondent to indicate whether they think that the number of employees in their organisation will increase, decrease or stay the same during the coming 12 months[12]. Unfortunately, the question was only asked in 1991, 1994, 1996, 1999 and 2009, so that the sample size available for analysis is greatly reduced.

The correlation between own standard hours and the employment prospects estimated by an individual is indeed found to be negative and significant, but its magnitude is small (-0.05). Regressing subjective employment prospects on own standard hours and a set of year and federal state dummies in an OLS fixed-effects model yields a small and insignificant coefficient on standard hours (see Table 12). We also examine whether the increase in weekly working time of civil servants influences the employment prospects as estimated by public sector employees. The latter group is the one that runs a larger risk of losing their jobs in case of dismissals. Here again, we find no significant relationship (results available from the authors).

These results are reassuring: if there is any relationship between changes in the length of the standard workweek and employment expectations of workers in the public sector, it is weak and therefore unlikely to affect life satisfaction and disturb our main results.

6.3 Working time of the potential reference group

There is a possibility that individuals' behaviour and life satisfaction is influenced not only by their own standard weekly working time, but also by the standard workweek of the other group employed in the public sector (i.e. civil servants for public sector employees and vice versa), if it is a relevant reference group. Loog (2013) presents suggestive evidence that increases in the average working hours of civil servants influence the reported desired weekly hours of the public sector employees in the same federal state. A change in the working time of such a reference group may also directly affects an individual's life satisfaction, due to social comparisons. Both mechanisms are most likely to work between civil servants and public sector employees within a federal state.

To check for this possibility, we estimate a model in which we include the standard weekly working time of the potential reference group as a control variable. Sample size is reduced in this case because we are limited to the period before 2005, i.e. to the period for which we can attribute values for standard weekly working time to both civil servants and public sector employees (see section 4.2). Estimation results are presented in Table 13.

Interestingly, the length of the standard workweek of the potential reference group is significantly related to life satisfaction, and in a negative way. Interacting standard weekly working time of the peer group with a dummy for the period after 1993, in which only increases in weekly working time took place, and only for civil servants, shows that the effect is exclusively driven by that period (results available from the authors). It seems like public sector employees dislike civil servants having

[12] The original wording of the question is: "Und welche Entwicklungen erwarten Sie für diesen Betrieb: Wird sich die Zahl der Beschäftigten in den nächsten 12 Monaten erhöhen, verringern oder gleich bleiben?"

to work more. It could be related to negative employment consequences for the public sector employees, but we have shown above that public sector employees do not seem to make the link between their peers' working time and their employment prospects. Other potential explanations for the negative coefficient on peer working time could be the loss of shared leisure time or a loss of status if long working hours are a provider of status. The idea that the new working hours of civil servants could constitute a new norm to conform to is consistent with the evidence presented by Loog (2013) that public sector employees tend to change their desired working time along with the standard working time of civil servants.

In any case, and most importantly, our estimation results do not change much when controlling for the standard weekly working time of the potential reference group. Table 13 shows that the coefficient on standard hours in the reduced becomes slightly more negative, the first stage becomes a bit stronger, and as a result the coefficient on hours worked when instrumented do not change much. This indicates that the influence of the standard weekly working time of the reference group on life satisfaction does not disturb our results.

6.4 Other potential confounders

Finally, the changes in the definition of the full-time workweek may have an influence on other variables than hours actually worked, which may in turn affect life satisfaction.

The first potential confounder is constraints in working time. Loog et al. (2012) find evidence that standard hours influence desired hours of individuals. Standard hours may influence constraints experienced by individuals on their working time. We do find some evidence that a longer full-time workweek slightly decreases the probability to be unemployed and increases the probability to be overemployed, but those effects are very small. When desired hours are taken up as an additional control in the model, the coefficients remain very similar. (Results available from the authors.)

Second, the changes in the definition of the fulltime workweek were not associated with a corresponding change in earnings. This means that the changes could influence life satisfaction because individuals are affected by the corresponding change in their actual hourly wage. However, including an individual's hourly wage as an additional control in the model does not change the results, and the hourly wage itself is not significantly related to life satisfaction (results available from the authors). Additionally, we study the link between standard hours and satisfaction with personal income (observed from 2005 to 2009). The length of the standard workweek does not seem to affect satisfaction with personal income. Including this variable as a control in our model reduces the sample to the last years of our observation period. The estimation results for this reduced sample do not depend on whether we include satisfaction with personal income as a control or not. Finally, we check whether the change in standard hours influenced individual's satisfaction with their work. The length of the standard workweek seems, if anything, to be positively associated with work satisfaction, but the effect is very small. Including satisfaction with work as an additional control in our model does not change the results.

6.5 Self-selection into hours regimes

Finally, we want to address the possibility for individuals to self-select into different treatments, i.e. to choose a federal state or their status as civil servants or public sector employees in order to obtain the standard weekly working time which they prefer. In particular, it is possible for a civil servant to

leave the public sector because he expects an increase in weekly working time, or because he is dissatisfied with an increase in standard working time he experiences.

To check for these possibilities, we estimate two logit models to examine the determinants of the probability of having left the status of civil servant in the next period. Estimation results are presented in Table 14. The first model (column 1) examines the relationship between the standard workweek of civil servants in *t* and their status in *t+1*, i.e. the reaction of civil servants to an increase in hours. The second model (column 2) estimates the correlation between standard workweek and status as a civil servant measured both in period *t+1*, i.e. it examines whether individuals behave so as to avoid an increase in weekly working time. The estimation results suggest that, if anything, the duration of the standard workweek is rather negatively related to individuals leaving the civil servant status. This is evidence against the possibility that civil servants select out of the sector as a reaction to increases in standard working time.

We also estimated the models presented in Table 2 and Table 4 while excluding those individuals who either moved from one federal state to the other, or had experienced both the civil servant and the public sector employee status during the observation period. The results obtained (available from the authors) were very similar to the original ones, suggesting that our findings are not driven by individuals who move across treatment categories. We interpret this as evidence that our results are not disturbed by self-selection into treatment.

7. Conclusions

In this paper, we have estimated the effect of weekly working time on life satisfaction, using changes in the length of the standard workweek in the public sector across years and across federal states in Germany as a source of exogenous variation in working time, and therefore as an instrument for actual hours worked per week.

We first find suggestive evidence that the effect of weekly working time on life satisfaction is not linear, but positive at low level of hours and turning negative at higher levels. However, this evidence cannot be further confirmed, since the effect of the standard workweek on hours worked by part-timers is too weak to enable us to draw conclusions about the effect of hours worked on life satisfaction for this group. We find, however, clear evidence that one additional hour of work has a clear negative effect on life satisfaction for individuals who work full-time already. Interestingly, this finding is driven by men only, while women who work full-time do not seem to mind an increase in their hours, although their actual hours worked are influence by the standard workweek in exactly the same way as men's.

The negative effect of hours on life satisfaction for full-time working men suggests that for this group, the additional costs associated with an additional hour of work outweigh the benefits they derive from it. Alternatively, this additional hour does not improve their cognitive evaluation of their life, while its plausibly negative effect on affect still finds its way into their life satisfaction. For women, however, either costs and benefits of an additional hour are roughly equal, or the additional hour does not influence life satisfaction and its potential negative effect on affect is not translated into life satisfaction.

It is worth noting that the effect of hours worked on life satisfaction are identified mainly thanks to the period of increase in the standard workweek. A decrease in the standard workweek appears to

have no repercussions on actual hours worked, while an increase in standard hours does lead to more hours actually worked.

For future research, it would be interesting to find other exogenous sources of variation in weekly working time, which apply to a different or bigger part of the population. This would also hopefully make it possible to gather more evidence for or against an inverted U-shaped effect of hours on life satisfaction, and possibly also how it differs for different sub-populations.

References

Booth, A.L., Van Ours, J.C., 2008. Job satisfaction and family happiness: the part-time work puzzle. Econ. J. 118, F77–F99.

Booth, A.L., Van Ours, J.C., 2009. Hours of Work and Gender Identity: Does Part-time Work Make the Family Happier? Economica 76, 176–196.

Booth, A.L., Van Ours, J.C., 2012. Part-time jobs: what women want? J. Popul. Econ. 26, 263–283.

Clark, A.E., 1996. Job Satisfaction in Britain. Br. J. Ind. Relations 34, 189–217.

Clark, A.E., 1997. Job satisfaction and gender : Why are women so happy at work ? Labour Econ. 4, 341–372.

Clark, A.E., Oswald, A.J., 1994. Unhappiness and Unemployment. Econ. J. 104, 648–659.

Epstein, B., Kimball, M., 2014. The decline of drudgery and the paradox of hard work. FRB Int. Financ. Discuss. … 1106.

Hamermesh, D.S., Kawaguchi, D., Lee, J., 2014. Well-Being after an Hours Reduction Does Labor Legislation Benefit Workers ? IZA DP 8077.

Holly, S., Mohnen, A., 2012. Impact of working hours on work–life balance. SOEPpapers 465.

Killingsworth, M., 1983. Labour Supply. Cambridge University Press.

Knabe, A., Rätzel, S., 2010. Income, happiness, and the disutility of labour. Econ. Lett. 107, 77–79.

Knabe, A., Rätzel, S., Schöb, R., Weimann, J., 2010. Dissatisfied with Life but Having a Good Day: Time-use and Well-being of the Unemployed. Econ. J. 120, 867–889.

Loog, B., 2013. Interdependent preferences in labor supply.

Loog, B., Dohmen, T., Vendrik, M., 2012. The impact of changes in the standard workweek on preferences for labor supply.

Muffels, R., Kempermann, B., 2011. Does a Better Job Match Make Women Happier? Work Orientations, Work-Care Choices and Subjective Well-Being in Germany. SOEPpapers 361.

Pouwels, B., Siegers, J., Vlasblom, J.D., 2008. Income, working hours, and happiness. Econ. Lett. 99, 72–74.

Rätzel, S., 2009. Revisiting the neoclassical theory of labour supply – Disutility of labour, working hours, and happiness. FEMM Work. Pap. 5.

Rudolf, R., 2013. Work Shorter, Be Happier? Longitudinal Evidence from the Korean Five-Day Working Policy. J. Happiness Stud. 1–25.

Schaffer, M.E., 2010. xtivreg2: Stata module to perform extended IV/2SLS, GMM and AC/HAC, LIML and k-class regression for panel data models.

Van Praag, B.M.., Frijters, P., Ferrer-i-Carbonell, a, 2003. The anatomy of subjective well-being. J. Econ. Behav. Organ. 51, 29–49.

Willson, J., Dickerson, A., 2010. Part time employment and happiness: a cross-country analysis. Sheff. Econ. Res. Pap. Ser. 21.

Wooldridge, J.M., 2002. Econometric Analysis of Cross Section and Panel Data. MIT Press.

Appendix

Figure 1 – Length of the standard workweek for civil servants and public sector employees in West-German federal states

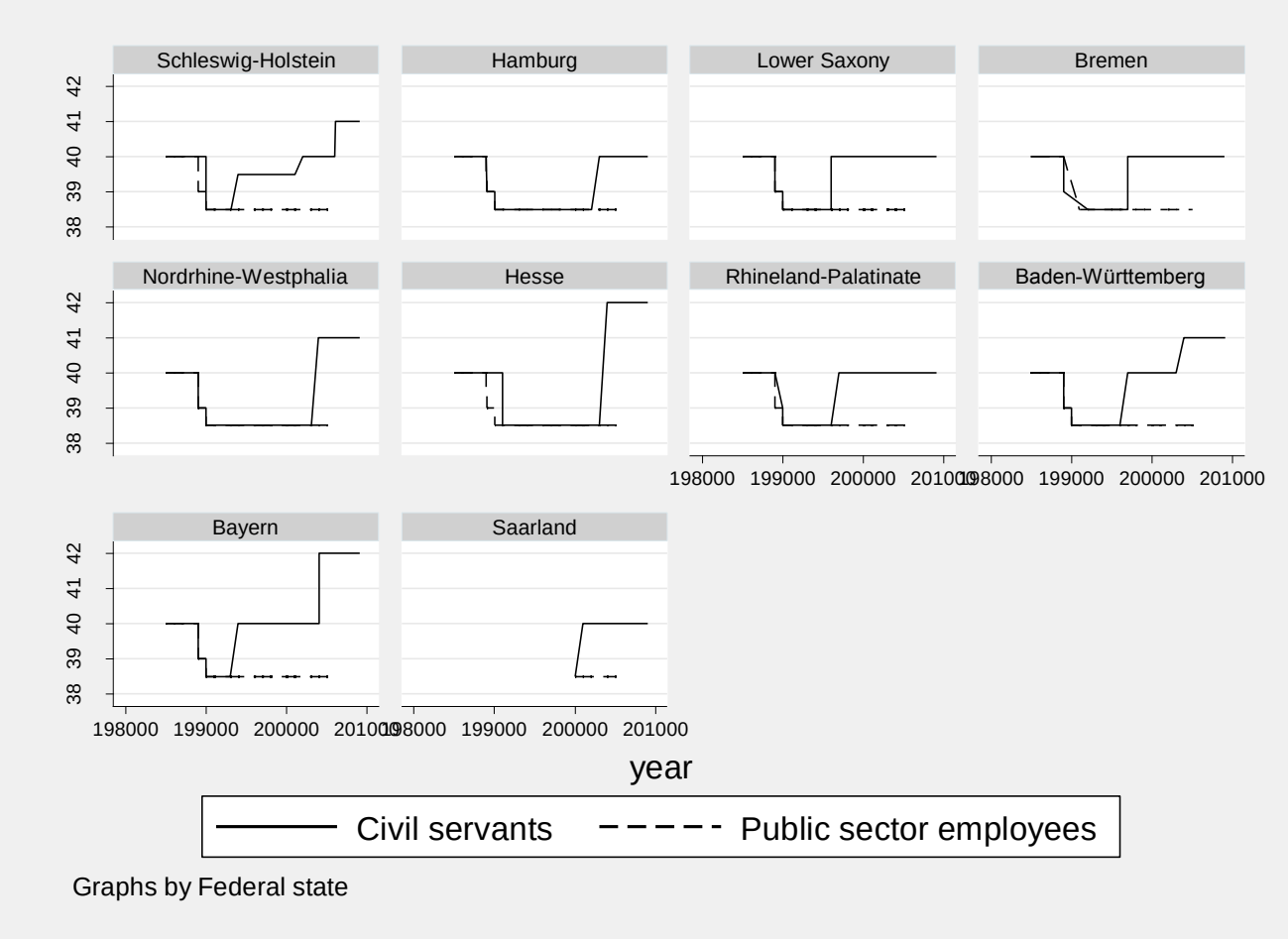

Figure 2 – Histogram of life satisfaction in the estimation sample

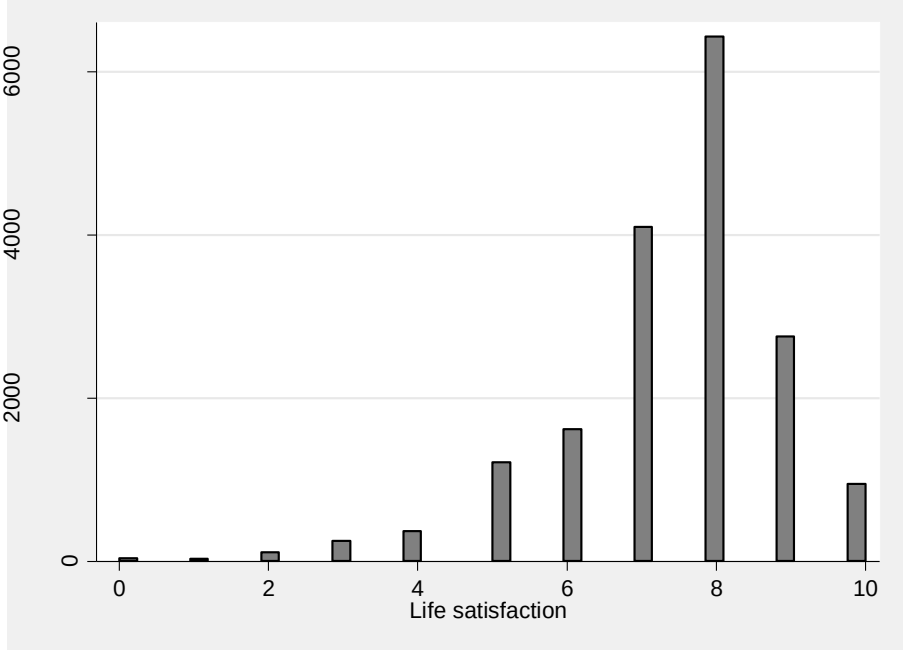

Figure 3 – Histogram of hours actually worked per week in the estimation sample

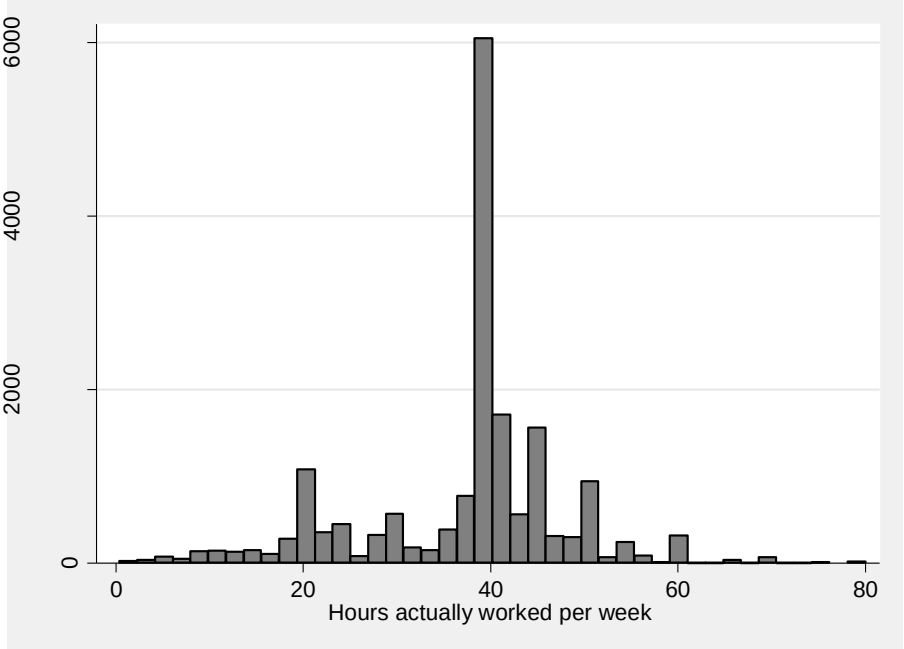

Figure 4 – Histogram of hours actually worked per week by gender

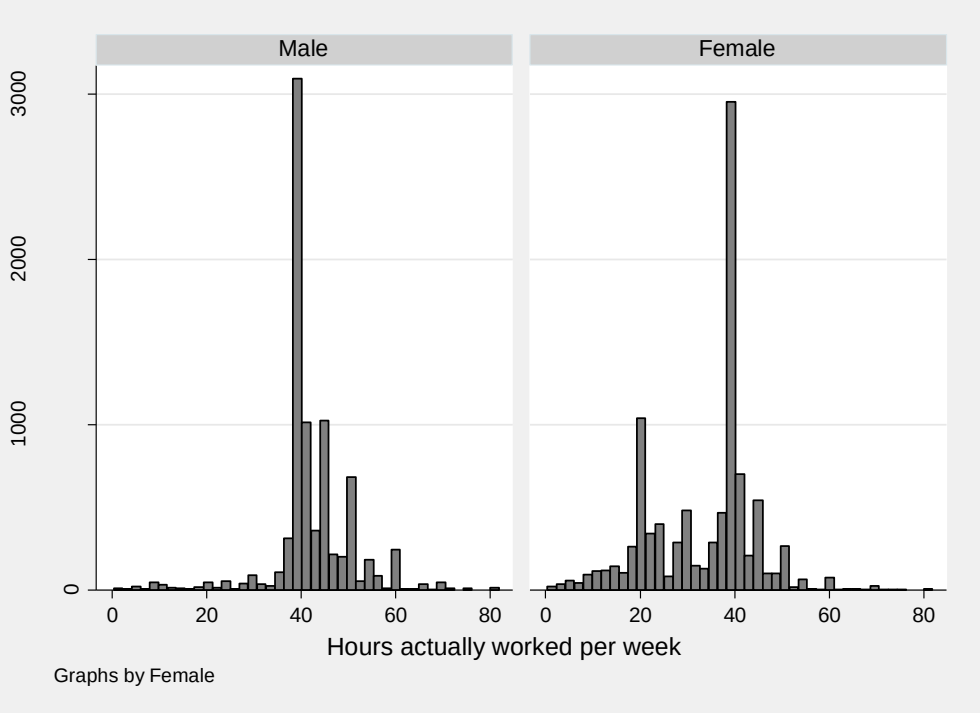

Figure 5 – Histogram of hours actually worked by employment status in the public sector

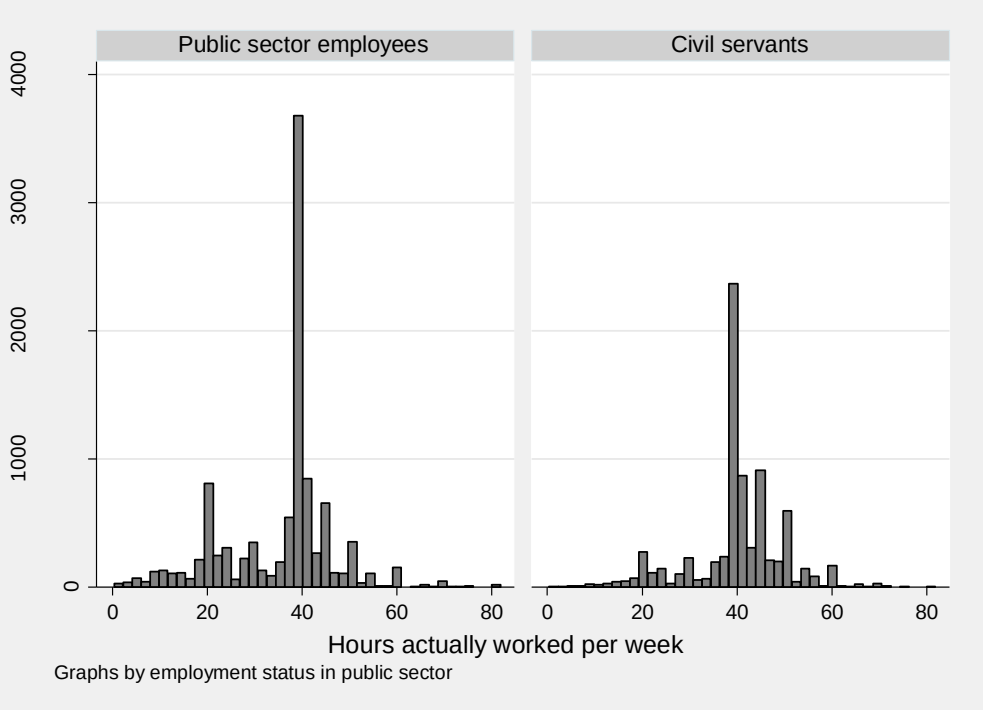

Table 5 – Length of the standard workweek

	85-'88	'89	'90	'91	'92-'93	'94	'95	'96	'97	'98-'00	'01	'02	'03	'04	'05	'06-'09
							Civil servants									
Baden-Württemberg	40	39	38.5	38.5	38.5	38.5	38.5	40[10]	40	40	40	40	41[9]	41	41	41
Bavaria	40	39	38.5	38.5	38.5	40[1]	40	40	40	40	40	40	40	42[9]	42	42
Bremen	40	39	38.5	38.5	38.5	38.5	38.5	38.5	40[4]	40	40	40	40	40	40	40
Hamburg	40	39	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	40[8]	40	40	40	40
Hesse	40	40	40	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	42[1]	42	42
Lower-Saxony	40	39	38.5	38.5	38.5	38.5	38.5	40[4]	40	40	40	40	40	40	40	40
Nordrhine-Westphalia	40	39	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	41[1]	41	41
Rhineland-Palatinate	40	39	38.5	38.5	38.5	38.5	38.5	38.5	40[1]	40	40	40	40	40	40	40
Saarland	40	39	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	40[1]	40	40	40	40	40
Schleswig-Holstein	40	40	38.5	38.5	38.5	39.5[1]	39.5	39.5	39.5	39.5	39.5	40[1]	40	40	40	41[8]
							Public sector employees									
Baden-Württemberg	40	39	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	39.5[11]
Bavaria	40	39	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	40.1[11]
Bremen	40	39	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	39.2[11]
Hamburg	40	39	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	39[11]
Hesse	40	39	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5
Lower-Saxony	40	39	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	39.8[11]
Nordrhine-Westphalia	40	39	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	39.84[11]
Rhineland-Palatinate	40	39	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	39[11]
Saarland	40	39	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	39.5[11]
Schleswig-Holstein	40	39	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.7[11]

Note: The table reflects the length of the standard workweek of civil servants (Beamte) and public sector employees (Angestellte) employed by states. The reductions - all changes in the years 1989-1991 - became effective on April first of the respective year. All changes after 1991 - the extensions - became effective on the first day of the month. The superscripts indicate the month the extensions became effective. For public sector employees employed by municipalities holds that - depending on collective agreements - the possibility exists to extend the workweek to a maximum of 40 hours from 2006 onwards. *Sources: Federal Ministry of the Interior for information on civil servants; Ver.di for information on public sector employees. The documents used to construct this table are available from the authors upon request.*

Table 6 – Descriptive statistics for the German federal states

	Schleswig-Holstein	Hamburg	Lower Saxony	Bremen	Nordrhine-Westphalia	Hesse	Rhineland-Palatinate	Baden-Württemberg	Bavaria	Saarland	Total
Life satisfaction	7.77	7.40	7.37	7.74	7.45	7.30	7.45	7.40	7.40	7.37	7.42
Standard hours	39.31	39.06	39.15	39.38	39.04	39.20	39.09	39.26	39.45	39.09	39.19
Hours actually worked	36.73	36.73	38.38	40.02	37.50	38.10	37.17	37.26	37.56	38.51	37.61
Female	0.47	0.67	0.49	0.51	0.55	0.53	0.60	0.56	0.54	0.59	0.54
Log net monthly household income	7.87	7.81	7.85	7.91	7.88	7.90	7.89	7.89	7.87	8.06	7.88
Years of education	12.94	13.78	13.24	14.41	13.70	13.37	12.68	13.13	12.93	13.44	13.30
Age	38.15	37.62	36.00	37.21	37.02	36.82	36.87	36.78	36.08	38.30	36.72
Number of children in the household	0.95	0.67	0.70	0.50	0.83	0.78	0.79	0.87	0.82	0.66	0.81
Lives with spouse	0.78	0.69	0.73	0.71	0.73	0.73	0.74	0.70	0.71	0.82	0.72
N	744	309	2,266	156	5,582	1,708	1,110	2,442	3,409	163	17,889

Table 7 – Descriptive statistics for public sector employees and civil servants

	Public sector employees	Civil servants	Total
Life satisfaction	7.36	7.51	7.42
Standard hours	38.75	39.79	39.19
Hours actually worked	35.62	40.28	37.61
Female	0.69	0.35	0.54
Log net monthly household income	7.80	7.98	7.88
Years of education	12.70	14.10	13.30
Age	36.01	37.68	36.72
Number of children in the household	0.75	0.89	0.81
Lives with spouse	0.69	0.76	0.72
N	10,243	7,646	17,889

Table 8 - Estimation results for full-timers and part-timers

	Life satisfaction (RF)	Hours actually worked per week (FS)	Life satisfaction (2SLS)
(A) Full-timers			
Standard workweek (hs)	-0.0493	0.4379***	
	(0.0312)	(0.1121)	
Hours actually worked per week			-0.1125*
			(0.0637)
R^2	0.02	0.03	
N	13,686	13,686	13,686
Individuals	3,194	3,194	3,194
(B) Part-timers			
Standard workweek (hs)	-0.0485	0.1330	
	(0.0644)	(0.2788)	
Hours actually worked per week			-0.3649
			(0.7837)
R^2	0.05	0.09	
N	4,203	4,203	4,203
Individuals	1,409	1,409	1,409

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Includes controls for: log net monthly income, age, age squared, number of children in the household, partner in the household, year, month, Bundesland, status as civil servant vs. public sector employee, moves from one Bundesland to another.

Table 9 – Estimation results for men and women

	Life satisfaction (RF)	Hours actually worked per week (FS)	Life satisfaction (2SLS)	Life satisfaction (2SLS)
(A) Men				
Hours actually worked per week			-0.2102	-0.0223
			(0.1300)	(0.1240)
Hours actually worked per week^2				-0.0019
				(0.0015)
Standard workweek (hs)	-0.0664*	0.3158*		
	(0.0373)	(0.1824)		
R^2	0.04	0.03		
N	8,178	8,178	8,178	8,178
Individuals	1,658	1,658	1,658	1,658
(B) Women				
Hours actually worked per week			0.0187	-0.0010
			(0.0585)	(0.0463)
Hours actually worked per week^2				0.0003
				(0.0013)
Standard workweek (hs)	0.0120	0.6420**		
	(0.0408)	(0.2790)		
R2	0.03	0.18	0.02	0.02
N	9,711	9,711	9,711	9,711
Individuals	2,273	2,273	2,273	2,273

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Includes controls for: log net monthly income, age, age squared, number of children in the household, partner in the household, year, month, Bundesland, status as civil servant vs. public sector employee, moves from one Bundesland to another.

Table 10 - Estimation results for the period of increase and the period of decrease in standard weekly working time

	Life satisfaction (RF)	Hours actually worked per week (FS)	Life satisfaction (2SLS)
(A) Decrease in standard hours (until 1993)			
Standard workweek (hs)	-0.0528	0.1329	
	(0.0999)	(0.5026)	
Hours actually worked per week			-0.3970
			(1.6319)
R^2	0.02	0.04	-4.22
N	5,716	5,716	5,716
Individuals	1,475	1,475	1,475
(B) Increase in standard hours (after 1993)			
Standard workweek (hs)	-0.0630**	0.3404*	
	(0.0296)	(0.1809)	
Hours actually worked per week			-0.1850*
			(0.1035)
R2	0.03	0.06	-0.94
N	12,173	12,173	12,173
Individuals	3,139	3,139	3,139

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Includes controls for: log net monthly income, age, age squared, number of children in the household, partner in the household, year, month, Bundesland, status as civil servant vs. public sector employee, moves from one Bundesland to another.

Table 11 - Estimation results for Civil servants and Public sector employees

	Life satisfaction (OLS)	Hours actually worked per week (OLS)	Life satisfaction (2SLS)	Life satisfaction (2SLS)
(A) Civil servants				
Standard workweek (hs)	-0.0883***	0.2955		
	(0.0339)	(0.1930)		
Hours actually worked per week			-0.2988*	0.2593
			(0.1742)	(0.1746)
Hours actually worked per week^2				-0.0068*
				(0.0041)
R^2	0.03	0.05		
N	7,646	7,646	7,646	7,646
Individuals	1,437	1,437	1,437	1,437
(B) Public sector employees				
Standard workweek (hs)	-0.2173	-0.1865		
	(0.1697)	(0.8344)		
Hours actually worked per week			1.1648	0.6372
			(5.3485)	(1.2771)
Hours actually worked per week^2				-0.0155
				(0.0329)
R^2	0.03	0.09		
N	10,243	10,243	10,243	10,243
Individuals	2,692	2,692	2,692	2,692

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Includes controls for: log net monthly income, age, age squared, number of children in the household, partner in the household, year, month, Bundesland, status as civil servant vs. public sector employee, moves from one Bundesland to another.

Table 12 – Determinants of employment prospects in the organisation in the coming 12 months as evaluated by respondents, OLS with individual fixed-effects.

	Employment prospects
Standard workweek (hs)	0.0653
	(0.0464)
year==1991	0.3964***
	(0.1395)
year==1994	0.0657
	(0.1342)
year==1996	0.0443
	(0.1325)
year==1999	0.0714
	(0.1265)
Schleswig-Holstein	-0.0340
	(0.3765)
Niedersachsen	-0.8088
	(0.5146)
Nordrhein-Westfalen	-0.8293
	(0.5883)
Hessen	-0.6011
	(0.6005)
Rheinland-Pfalz and Saarland	-1.4290**
	(0.6302)
Baden-Wuerttemberg	-1.3506*
	(0.6989)
Bayern	-0.5308
	(0.5946)
Civil servant	0.0786
	(0.1312)
Constant	-2.0985
	(1.9517)
R^2	0.09
N	2,542
Individuals	1,440

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Table 13 – Estimation results when controlling for the standard weekly working time of the potential reference group (2SLS with individual fixed-effects)

	Life satisfaction (RF)	Hours actually worked per week (FS)	Life satisfaction (2SLS)	Life satisfaction (2SLS)
Standard workweek (hs)	-0.0384	0.6921***		
	(0.0311)	(0.1639)		
Hours actually worked per week			-0.0554	0.1459**
			(0.0404)	(0.0670)
Hours actually worked per week^2				-0.0028*
				(0.0015)
Standard workweek of peers	-0.0568**	-0.1354	-0.0643**	-0.0679**
	(0.0244)	(0.1583)	(0.0257)	(0.0273)
R^2	0.03	0.06	-0.06	-0.13
N	16,501	16,501	16,501	16,501
Individuals	3,758	3,758	3,758	3,758

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Includes controls for: log net monthly income, age, age squared, number of children in the household, partner in the household, year, month, Bundesland, status as civil servant vs. public sector employee, moves from one Bundesland to another.

Table 14 – Determinants of the probability of leaving the civil servant status (logit model with individual fixed-effects)

	Left civil servant status in t+1	Left civil servant status in t+1
Standard workweek civil servants in t	-0.1402**	
	(0.0671)	
Standard workweek civil servants in t+1		-0.0507
		(0.0664)
Log net monthly household income	-0.0978	-0.0199
	(0.2072)	(0.2149)
Age	0.1725	0.1776
	(0.1099)	(0.1114)
Age^2	-0.0001	-0.0002
	(0.0015)	(0.0015)
Number of children in household	-0.5613***	-0.5955***
	(0.1076)	(0.1091)
Person lives with spouse	-0.2056	-0.1075
	(0.2135)	(0.2171)
N	3,348	3,238
Individuals	534	513

* $p<0.1$; ** $p<0.05$; *** $p<0.01$