

## SOEPpapers

on Multidisciplinary Panel Data Research

# Flexible Work Time in Germany: Do Workers Like It and How Have Employers Exploited It Over the Cycle?

Jennifer Hunt

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## Abstract

After describing qualitatively the increasingly flexible organization of work hours in Germany, I turn to the German Socio-Economic Panel to quantify practices and trends, and assess their effects on workers and employers. Measuring flexibility as the extent to which overtime is compensated with time off, and hence receives no overtime premium, I show that hourly-paid workers have undergone a regime shift towards more flexibility since 1984, while salaried workers have maintained an already high level of flexibility. I find weak evidence that flexibility causes workers to be slightly less satisfied with their work and more satisfied with their leisure. Over the boom and bust cycle of 2004–2009, I find that for hourly-paid workers in manufacturing, paid and unpaid overtime hours were equally cyclical, but that the cycle for unpaid overtime led the cycle for paid overtime. The results suggest that while the new practices do free employers to make more cyclical adjustments in hours, they have not eliminated the need for adjustments in paid overtime. I identify as constraints ceilings on cumulated overtime hours to be compensated with time off and the window within which the compensation in time off must occur.

A large share of salaried and hourly-paid German workers have hours that vary from day to day or week to week. While the use of paid overtime has always permitted this to some degree, the novelty of current practices is that much of the variation in hours occurs in the absence of any overtime payments. These flexible working time practices are heterogeneous. Some have been credited with improving working conditions for workers, by giving them control over their schedule, while others have been credited with improving firm efficiency, by giving employers more power to change workers' schedules. The modest fall in employment in the deep recession of 2008–2009 has been attributed by some to the smoothing of employment fluctuations induced by the latter practices. In this paper, by describing work time practices and exploiting data from the German Socio-Economic Panel, I show how working time flexibility has progressed over time, and investigate who controls workers' hours and whether workers like flexibility. I then characterize how employers exploited flexibility over the 2005–2009 boom and bust, and identify the limits of flexibility in smoothing employment over this cycle.

Measuring flexibility as the extent to which overtime is compensated with time off, and hence receives no overtime premium, I show that hourly-paid workers have undergone a regime shift towards more flexibility since 1984, while salaried workers have maintained an already high level of flexibility. I find weak evidence that flexibility causes workers to be slightly less satisfied with their work and more satisfied with their leisure. Over the boom and bust cycle of 2004–2009, I find that for hourly-paid workers in manufacturing, paid and unpaid overtime hours were equally cyclical, but that the cycle for unpaid overtime led the cycle for paid overtime. The results suggest that while the new practices do free employers to make more cyclical adjustments in hours, they have not eliminated the need for adjustments in paid overtime. I identify as constraints ceilings on cumulated overtime hours to be compensated with time off and the window within which the compensation in time off must occur.

# 1 Description of Institutions

## 1.1 Flexibility for whom and by whom?

Two different considerations could make flexibility of work schedules desirable: worker convenience or employer efficiency. Workers may want flexibility to respond to unexpected events at home, such as child illness, or may simply want to be able to take short periods of leisure at relatively short notice. Alternatively, some may want to work an unchanging work schedule, but one that differs from the standard one. Workers who like the standard work schedule may want others to work different schedules, so as to alleviate commuting congestion. Some workers may want to rearrange their work hours over a longer time horizon, and work longer hours in some stages of their life so as to be able to take a sabbatical or retire early.

At the same time, employers would like the flexibility to align production and product demand. For many products, demand is seasonal or subject to industry or economy-wide business cycles. Employers wish to be able to deploy their workforce flexibly over the season or cycle, particularly in the manufacturing and hospitality sectors. Construction firms have their own flexibility needs in view of both seasonal and unpredictable weather-related shocks to productivity. Furthermore, employers would like the flexibility to accommodate customer preferences for opening hours. Customer demand may fluctuate over the course of a day, and is often high outside normal work hours and for longer than the length of a normal work day. Flexibility in work schedules helps firms respond to these customer preferences, a consideration most salient in services.

The focus of this paper is privately contracted solutions to these flexibility needs. These privately contracted solutions take as given certain government interventions in flexibility, however. Most notably, the German government subsidizes reductions in hours per worker in both seasonal and (more commonly) business-cycle downturns through the short-time work program (*Saison-Kurzarbeit*). Until 2007, separate subsidies were available to construction firms subject to weather shocks (*Schlechtwettergeld*). Subsidies of varying magnitudes for early retirement have existed since the 1970s, while a current

program, soon to expire, subsidizes a gradual reduction of hours as retirement approaches (*Altersteilzeit*). Conversely, the government provides certain impediments to flexibility, through constraints on shop opening hours<sup>1</sup> and on working time.<sup>2</sup> A 2001 law permits full-time workers to move to part-time status on request.<sup>3</sup> On the other hand, unlike in the United States, the government has never imposed an overtime premium, which is instead negotiated between labor unions and employer associations at the industry level.

## 1.2 Evolution of working time flexibility

The purpose of the earliest forms of flexibility was worker convenience. Since the 1960s, many office workers have been able to benefit from flexitime (*Gleitzeit*).<sup>4</sup> In its most basic form, the flexitime framework specifies core hours during which all workers must be present, but otherwise permits workers to choose their start, end and lunch times within certain limits, upon agreement with their supervisor. In the basic form, the chosen daily hours are then unchanging from day to day. Over time, flexitime has become more flexible. Workers can work more than standard hours and take the cumulated hours as days off, and may be able to choose their schedule independent of their supervisor. Core hours may be applied to a group responsible for providing a certain level of service, rather than to an individual. Surveys by the Institut zur Erforschung sozialer Chancen (ISO), later continued by the Sozialforschungsstelle Dortmund (sfs), found that by 1989 and 1993, two thirds of workers with flexitime enjoyed flexibility beyond the basic variant (Gross 2010).

Flexibility for the purpose of enhancing employer efficiency first came about in the context of the 1980s union drive for a shorter standard work week for full-time workers. This drive was spearheaded by the powerful metal-workers union, IG Metall, and included the demand that shorter hours not cause any reduction in monthly pay. The campaign was successful: standard hours fell, causing actual hours to fall almost one for one, and

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<sup>1</sup> *Gesetz über den Ladenschluss* BGBl. 1 S.2407, 2434.

<sup>2</sup> *Arbeitszeitgesetz* BGBl. 1 S.1170, 1171, also BGBl 1 S. 1939.

<sup>3</sup> *Gesetz über Teilzeitarbeit und befristete Arbeitsverträge* BGBl. 1 S.1966 and BGBl. 1 S.2854.

<sup>4</sup> The main sources for this section are: Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (2008), Gross and Schwarz (2007), Institut der deutschen Wirtschaft (2002), and Klein-Schneider (1999).

monthly wages were unchanged (Hunt 1999). The first reductions below 40 weekly hours were agreed in 1984, and the reductions culminated in a 35-hour week for some workers in 1995. However, to gain all this, unions were forced to concede changes in working time practices.

The successful employer aim was labor contracts permitting establishments to reduce the cost of adjusting hours, by reducing the marginal cost of an extra hour per worker. Previously, with the 40 hour week, any daily hours beyond 8 were paid at the overtime rate, whose premium was typically 25%, sometimes rising with the number of overtime hours. A common new arrangement allows the employer to avoid making overtime payments as long as hours measured over a certain window (*Ausgleichszeitraum*) average to standard hours. In other words, if workers exceed standard hours in any part of the window, they are compensated with an equal amount of time off in another part of the window, rather than with money. Only if average hours at the end of the window are too high are overtime payments made (at the overtime rate). New arrangements often include other features, such as limits on daily and weekly overtime, and limits on the number of overtime (or undertime) hours that can be cumulated during the window. I shall refer to these practices as yearly working time (*Jahresarbeitszeit*), although the relevant time frame varies from three months to more than a year.

Most commonly, industry-level contracts between labor unions and employer associations establish general guidelines and permit, but do not impose, the introduction of these practices (Gross 2010). The decision as to whether to introduce them, and the details of how, are made at the establishment level. The negotiations are between management and the works council, if there is one, or between workers and management directly if not, as is common in small establishments. Accordingly, it is not possible to measure how widespread various practices are by examining the relatively few union contracts, but is instead necessary to conduct surveys of workers or establishments.

The ISO/sfs establishment survey of 2005 found that frameworks varied substantially across establishments.<sup>5</sup> Half included all the elements mentioned above, while in some

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<sup>5</sup> Gross and Schwarz (2007).



small establishments there were no formal rules at all. Some establishments had no window, but relied on ceilings and floors on cumulated overtime and undertime hours to keep work hours in balance. 73% of establishments had a window, while 72% had a ceiling on cumulated hours. The survey also found that what rules there were were often “broken”: for example, ceilings on cumulated hours were often exceeded. This would not be a violation of employer obligations if the hours in excess of the overtime premium were paid at the overtime rate (as they were being worked). But the surveys found that these excess hours were often not compensated within the window, but carried over to the next window, or indeed neither compensated nor carried over to the next window. Even carrying hours over to the next window may not be a violation, however, despite calling into question the notion of a window, as some contracts (such as in the construction industry) explicitly provide for carrying over hours into the next window, if the worker agrees (Bispinck 2005). Some union contracts provide for an overtime premium in the time off compensation (Bispinck 2005); the ISO/sfs survey does not provide information on what share of workers is affected.

Although the reduction in working time ended in 1995, yearly working time has continued to spread (Seifert 2005). Furthermore, as rules governing flexitime have evolved, flexitime has come to resemble yearly working time. Why has the spread continued now unions are not receiving lower working time in return? The quid pro quo evoked in the contracts is employment stability or growth in return for yearly working time – sometimes there is an explicit no-layoff agreement. In the high unemployment 1980s, unions expected (or claimed to expect) to be receiving employment growth through work sharing in addition to increased leisure and hourly wages, so on the face of it, particularly given stagnating wages since 2001, developments reflect weakened union and worker power.<sup>6</sup> A different, or additional, possibility is that workers and unions have come to value yearly working time per se, which would be likely if they have gained increased control over hours and if yearly working time is family friendly as sometimes claimed.

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<sup>6</sup>See Burda and Hunt (2011) for speculation on the reasons for weakened worker power and for wage data.

### 1.3 Who benefits from yearly working time?

In the general enthusiasm for flexible working time, the tension between flexibility that benefits employers and flexibility that benefits workers and families is sometimes overlooked (Munz 2006). Who benefits from yearly working time depends on who controls the work schedule. Yearly working time was conceived as being controlled by the employer. The reduced marginal cost of an extra hour per worker benefits employers who labor demand fluctuates. It causes a substitution from workers to hours per worker, substitution from capital to labor, and a positive scale effect. The net effect is that demand for labor (hours) increases, but the change in demand for workers is ambiguous, although demand will be more constant across business cycles as more adjustment takes place through hours per worker. How unions view this depends on how they trade off average employment against job stability and total hours. When coupled with the undesirable fluctuations in hours that workers do not control, the system may appear worse than the traditional one.

In practice, some employers may share control of hours with workers, in order to make workers happier and hence more productive or willing to work at a lower wage. A compromise that arises is that employers determine when peak hours must be worked, but workers have some control over when the compensating time off is taken. The degree to which control is shared varies across industries, types of worker and establishments.<sup>7</sup>

### 1.4 Lifetime working time

A more recent type of flexible working time appears to be principally for worker convenience rather than employer efficiency. An increasing number of union contracts allow for overtime hours to be saved up over many years, then used as a sabbatical, or for early retirement. A survey by the Wirtschafts- und Sozialwissenschaftliche Institut (WSI) in 2010 found that 2% of establishments had such an arrangement – though as these were disproportionately large establishments, the share of workers would be higher (Riedmann

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<sup>7</sup> Seifert (2005) and anecdotal evidence.

et al. 2011). This practice is sometimes described as appealing to employers who are looking for a replacement for the expiring government subsidy to gradual retirement. This presupposes that employers pay older workers more than their marginal product, or that they mistakenly think they do.

## 1.5 Working time accounts

Thus far I have described flexible working time without mentioning a term often closely associated with it: working time accounts (*Arbeitszeitkonten*). Working time accounts are a method of administering any of the flexible systems described thus far.<sup>8</sup> Overtime hours are added to the balance in the account, while undertime hours are subtracted; the balance may be positive or negative, and is measured in units of hours. Larger establishments are more likely to have such a formal accounting system, while smaller establishments are more likely to administer their flexibility on an ad hoc basis. The accounts used to manage lifetime working time are referred to as long-term accounts (*Langzeitkonten*; sometimes this term is used for any account linked to a practices with a horizon of more than one year). Rarely, long-term accounts are measured in money rather than time. Sometimes a single account is used to administer several hours-related issues: overtime or undertime worked at the employer's behest, overtime or undertime chosen by the worker, and vacation time. When ordinary and long-term accounts are separate, hours may under some conditions be transferred from the shorter term to the long-term account.

A 2007 Federal Labor Court ruling (Bundesarbeitsgericht 2007) meant that laid-off workers usually have to have their account balance drawn to zero through time off rather than paid off. If a worker quits, accounts may be settled in terms of money or time. If a firm goes bankrupt, workers often lose any positive balance: the 2004/5 WSI survey found that only 15% of establishments had ensured balances connected with windows of a year or less (Schietinger 2005). Insurance is up to the establishment, and can take var-

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<sup>8</sup> Seifert (2005).

ious forms, including contracting with an insurance company and investing the monetary equivalent under conditions protecting it from potential non-worker creditors. Laws have been passed to protect workers with long windows and high balances, most recently the “Flexi II Gesetz”, applying only to accounts set up for the convenience of workers and not employers (Riedmann et al. 2011). The law requires insurance, and permits workers changing firms to carrying over the balance to another firm, or to have the monetary equivalent paid into the pension fund, rather than having the balance disbursed in money or time.

## 1.6 Other types of flexibility

Some union contracts permit other types of flexibility, such as having hours average to standard hours across workers, rather than time, or allowing a certain fraction of workers to work longer than standard hours on a long-term basis, with all hours paid at the standard hourly wage (Bispinck 2005). A quite different type of flexibility involves working time corridors (*Arbeitszeitkorridore*) in opening clauses (*Öffnungsklauseln*): these permit firms undergoing hardship to lower hours below the standard hours and reduce pay proportionately. Perhaps because short-time work permitted larger hours reductions (and is subsidized), these clauses appear to have been little used in the 2008–2009 recession (Bogedan et al. 2009). In the rest of the paper, I will concentrate on working time flexibility involving compensating overtime with time off.

## 2 Data, Measures of Flexibility and Sample

For my empirical analysis, I use the 95% version of the German Socio-Economic Panel (SOEP), from 1984 (the initial year) to 2009. A great advantage of the SOEP data is that it has since inception posed a question on method of overtime compensation, permitting the tracing of long-term trends: “If you work overtime hours, are they as a rule compensated with time off, pay or not at all?”, in response to which respondents may check “time off”, “pay”, “both”, “uncompensated” or “not applicable, do not work

overtime”.<sup>9</sup>

Compensation with both time and money (which I shall refer to as hybrid overtime) arises when a worker whose basic overtime compensation is time off receives monetary compensation when his or her hours average more than standard hours by the end of the window, or when he or she works more than the maximum weekly overtime hours that may be compensated with time off. I shall therefore use as my principal measure of flexibility the prevalence of overtime compensated in whole or in part by time off. Except in the most recent years, I cannot measure directly whether the use of time off is for the benefit of workers or to enhance employer efficiency. I therefore get at this indirectly by examining whether workers like having overtime compensated with time off, and how cyclically employers use such overtime. I do not consider uncompensated overtime to be flexible, mainly because no policy prescription would recommend increasing it.

I complement this measure with an explicit question as to whether overtime workers have a working time account, present in the survey since 2002. As noted, this will not capture all workers with yearly working time. The specific question is “Can these overtime hours flow into a so-called working time account, that you can equalize within a year or more with time off?”<sup>11</sup> In addition, in odd years since 2003, all workers are asked which of the following best applies to their work: fixed beginning and end of daily work time; sometimes varying daily work hours determined by firm; choose own working time, no formal working time rules; flexitime and working time account and a certain control over daily work time within this framework.<sup>12</sup> This question gives some idea of how flexible hours are and who is controlling variable hours, though the use of “flexitime” (*Gleitzeit*),

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<sup>9</sup> “Wenn Sie Überstunden leisten, werden die in der Regel abgefeiert oder bezahlt oder gar nicht abgegolten? Abgefeiert; teils-teils; bezahlt; gar nicht abgegolten; trifft nicht zu, leiste keine Überstunden.”

<sup>10</sup> In 1997, the question as to whether the respondent works overtime was made an explicit filter question (still with no defined window of time), which led to a drop in the share of people giving an overtime compensation method (see Appendix Figure), but no apparent break in the shares of types of overtime compensation.

<sup>11</sup> “Können diese Überstunden auch in ein sogenanntes Arbeitszeitkonto fließen, das Sie innerhalb eines Jahres oder länger mit Freizeit ausgleichen können?”

<sup>12</sup> “Fester Beginn und festes Ende der täglichen Arbeitszeit; Von Betrieb festgelegte, teilweise wechselnde Arbeitszeiten pro Tag; Keine formelle Arbeitszeitregelung, lege Arbeitszeit selbst fest; Gleitzeit mit Arbeitszeitkonto und einer gewissen Selbstbestimmung über die tägliche Arbeitszeit in diesem Rahmen”.

which usually applies to salaried workers, may deter hourly-paid workers with working time accounts from choosing the last option.

The SOEP has one major drawback for the purposes of this study. There is no way of reporting undertime, a key component of flexible work time.

To keep the amount of information manageable, I restrict my analysis to full-time workers living in the west, using the worker's own designation of full-time status. To avoid special circumstances related to apprenticeship and early retirement, I drop apprentices and restrict the analysis to workers aged 20–54. I drop the self-employed, and those who declined to report standard (agreed) work hours on the grounds that they had no fixed working time (*keine festgelegte Arbeitszeit*).<sup>13</sup> I drop workers with missing values of the variables used in the analysis (including net wages), which means dropping subsample I for which experience is missing. Because certain questions I use were not asked in certain years, I do not use the identical sample in all analysis as I do not restrict myself to years in which all questions were asked. However, for each year, the sample is the same in all analysis.

### 3 Empirical analysis of SOEP data

#### 3.1 Who controls variable hours?

Column 1 of Table 1 shows that 45% of workers in the sample have fixed daily hours, 19% have varying hours over which they have no control, 9% have varying hours under their control, and 27% share control with their employer through a working time account. There is no particular trend in the distribution over the years available (odd years from 2003–2009), so I do not break down the shares by year.

In columns 2–5 I split the workers into manufacturing (including construction) and

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<sup>13</sup> Readers may fear that by dropping those with no fixed working time, I am dropping those whose hours are so flexible they do not realize they have regulated working time. Three quarters of those dropped only for this reason did not answer the question on control over working time. Almost all did answer the question on mode of overtime payment: they were much less likely than sample members to work overtime, much more likely to work uncompensated overtime, and much less likely to report time off or hybrid overtime. This evidence is consistent with the majority genuinely having no standard hours.

services (including the public sector), and into hourly-paid workers (*Arbeiter*) and salaried workers (*Angestellte* and *Beamten*), discarding agricultural workers. This reveals a large difference between hourly-paid workers on the one hand, who have relatively fixed daily hours (68% in manufacturing and 60% in services) and little control over their hours when they do vary, and salaried workers on the other hand, few of whom have fixed hours (26% in manufacturing and 36% in services), and the vast majority of whom have at least shared control over their hours if they vary. This suggests that working time accounts have very different implications for the two groups of workers, though as mentioned, the use of the term “Gleitzeit” may have deterred some hourly-paid workers from choosing the shared control option.

The options divide neatly into neither mutually exclusive categories of control, nor mutually exclusive categories of flexibility. In particular, fixed daily hours could reflect either employer or worker control and either rigidity or flexibility. Workers may work fixed daily hours of their own choosing, and in some industries with standard work hours of less than 40, workers work 8-hour shifts every day, then take the cumulated overtime as days off. Nevertheless, it is useful to cross-tabulate this variable with the flexibility measure based on methods of overtime compensation.

Table 2 shows that, unsurprisingly, workers who do not work overtime have the most fixed hours (column 1). What is somewhat surprising is that the share is so low at 68%, as it is not clear how hours could vary without triggering overtime. By contrast, workers who work overtime and are typically compensated with time off only (column 2) are unlikely to have fixed hours (37% do), and are very likely to share control (39%). The picture for workers receiving both money and time for their overtime (hybrid) is similar (column 3), while workers who work uncompensated overtime (column 5) have the least fixed hours (33%) by far the largest share with sole control of their hours (34%). Workers working paid-only overtime (column 4) appear to have fixed hours and little control over their varying hours; yet one would expect them to have some control over the decision to work overtime or not.

Table 3 provides a cross-tabulation with whether a worker holds a working time ac-

count. Column 1 is the same as in Table 2, since the question about accounts is asked only of those who work overtime. A comparison of columns 2 and 3 shows the puzzling result that workers with a working time account are as likely to have fixed hours as workers without an account. The two groups differ on the other dimensions, however: 39% of account holders share control and only 5% control hours completely, while for workers without an account, 23% control their own hours, compared to the 12% who share control through an account (a share unsurprisingly small, since a contradiction is involved).

### 3.2 Trends in working time flexibility

Having provided some description of the control and flexibility of hours in the 2000s, I now focus on the evolution of flexibility over time.<sup>14</sup> To provide the context, I plot work hours in Figure 1. The bottom line shows the two and a half hour decline in standard weekly hours from 1984 to 1995, and the subsequent slower rise. Workers' average actual hours, the top line, show an increase since 1995, but the fall from 1984–1995 is lower than found in employer-based data. This SOEP variable is thought to overstate actual hours, as is indicated by the much lower values obtained by adding standard hours and overtime last month divided by 4.33 (middle line), though this measure itself overestimates work time, as it ignores undertime. The second measure shows the expected large fall in actual hours in the early period.

In Figure 2, I summarize overtime hours last month (based on different questions from those about the form of compensation for overtime). Overtime hours per month are trending upwards (left axis), driven by a large increase in the share of workers reporting overtime last month, rising from 45% in 1984 to 65% at the peak in 2007 (right axis).<sup>15</sup> Overtime hours per overtime worker show no trend (top line). Recessions are shaded in the figure, but I postpone discussion of cyclical matters to later in the paper.

Having established the extent of overtime, in Figure 3 panel A I show how it is shared

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<sup>14</sup> Zapf (2012) provides a comparison of trends across data sets.

<sup>15</sup> One might expect this to occur if hours are increasingly fluctuating around standard hours, but the explanation does not appear to be this simple. Reductions in standard work time could cause a shift to overtime, though Hunt (1999) found little evidence for it.



across workers according to how it is compensated. The share of overtime workers compensated with pay only plummets from 40% in 1984 to 10% in 2009, with the steepest fall in the 1990s. 30% of overtime workers were already compensated with time off only in 1984, so such flexibility is not new, but the share rose to a peak of 50% by 2005. There was also a large increase in the share compensated with both time off and pay (hybrid), from 10% to over 25% of workers. After following a U-shaped path, uncompensated overtime is now more common than paid overtime.

Panel A is the right way to approach flexibility if we are interested in worker welfare. If we are interested in the degree to which flexibility enables employer efficiency, we should examine the shares of overtime hours, not workers, which are flexible. Accordingly, in panel B, I present shares of compensation methods weighted by overtime hours last month.<sup>16</sup> This paints rather a different picture. Because workers compensated with time off only work little overtime, the share accruing to time off only overtime in 1984 (20%) is much lower than in panel A and rises more slowly, to a peak of slightly over 30%. At the same time, uncompensated overtime assumes a much more important role than in panel A, and follows a similar trajectory to time off.<sup>17</sup> The share of overtime hours compensated with both pay and time (hybrid) rises through 1995, as in panel A, then falls, rather than levelling off as in panel A.

Panel B raises the question of whether flexibility has in fact risen at all since 1999. The sum of the shares of overtime hours associated with time off only and with hybrid overtime has oscillated around 56% since that year. It is possible that for hybrid overtime workers, the share of hours compensated with time off has grown, and since overtime is itself rising, flexibility could be said to be rising. It is also possible that the nature of the flexibility is shifting towards the type enhancing employer efficiency.

In both panels of Figure 3, I have also plotted the share of workers (panel A) or overtime hours (panel B) with working time accounts. The share is rising in both panels,

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<sup>16</sup> Note that some people who responded that they (generally) work overtime, and hence gave a compensation method, did not report any overtime hours last month.

<sup>17</sup> See Anger (2006) on the rise of uncompensated overtime.

from about 45% to 55%. The compensation method and working time account variables give a consistent picture: 88% of overtime workers receiving time off only have accounts, as do 79% of overtime workers receiving both pay and time off, compared to only 27% of overtime workers receiving pay only, and 8% of workers doing uncompensated overtime (these numbers are not tabulated). The rising share of working time accounts suggests rising flexibility, but may instead reflect better administration of existing flexibility. Indeed, the share of overtime workers compensated with time off only who have an overtime account rises from 83% to 92% between 2002 and 2009, and there is a similar rise for hybrid overtime workers.

Figure 4 plots the window length associated with the working time accounts: about 40% of workers with accounts have windows of more than a year (panel A), and this share is similar in panel B where shares are weighted by overtime last month. Panel B indicates a shift in recent years from windows of less than a year to windows of exactly a year. These lengths seem possibly longer than those found by the 2005 WSI survey, which found an average length of 42 weeks (Gross 2010), but it is impossible to know without more detailed information from the WSI survey.

Before examining trends separately for hourly-paid versus salaried workers in manufacturing compared to services, I show in Figure 5 what share of overtime hours various groups are responsible for. Salaried workers in services account for fully 44% of all overtime hours in the previous month, with hourly-paid and salaried workers in manufacturing accounting for 23% each. Hourly-paid workers in services represent only 8.5% of overtime hours, while the omitted agricultural workers represent less than 1%. Thus, if we are interested in worker welfare, salaried workers in services will be of particular interest. On the other hand, for an analysis of fluctuations over the business cycle, hourly-paid manufacturing workers will be of most interest.

There are sharp contrasts in flexibility trends among the four main groups of workers, as Figure 6 demonstrates. The share of overtime workers with flexible hours has increased greatly for hourly-paid workers in manufacturing (panel A), while at the other extreme, there is little change in the already high levels of flexibility salaried workers

in services experienced in 1984 (panel D). Hourly-paid workers in services and salaried workers in manufacturing have intermediate rises in flexibility, but are more similar to salaried workers in services.

For overtime workers who are hourly-paid in manufacturing (panel A), the share being paid only has declined from 80% to a mere 20%, replaced by workers receiving time off only, or both pay and time off (hybrid), each of which has increased its share from about 10% to over 30%. Uncompensated overtime is uncommon. Between 2002 and 2009, the share with working time accounts rises from about 40% to 50%. Overtime workers who are salaried in services (panel D), have had a 50% share with time off only ever since 1984, while the next most common type of overtime is uncompensated, at a constant more than 20%. The share with working time accounts has been steady at 40% in 2002–2009.

The pattern described in Figure 6 is altered significantly when the types of overtime compensation are weighted by overtime hours last month, as in Figure 7. Now a large increase in flexibility is also apparent for overtime workers who are hourly-paid in services. On the other hand, the share compensated with time off only falls considerably compared to Figure 6 for all four groups, and for salaried workers, uncompensated overtime emerges as the most common compensation form, as well as the one increasing (since the early 1990s) at the expense of paid only and hybrid overtime.

Figure 7 permits the question of whether flexibility has increased since 1999, posed in connection with Figure 3, to be revisited. Flexibility (overtime compensated with time off in whole or part) is clearly rising for hourly-paid workers in manufacturing, while it is steady for salaried workers in services. It is steady for hourly-paid workers in services, where the main action is that paid only overtime is being replaced with uncompensated overtime. However, flexibility is falling for salaried workers in manufacturing, where it is being replaced by uncompensated overtime. These patterns do not take into account the fact that overtime itself is rising, however (for all four groups, as we shall see below).

In summary, there is a big decline in paid-only overtime for hourly-paid workers: in manufacturing it is being replaced by time off or hybrid overtime, while in services after initially being replaced with time off or hybrid overtime, it is now being replaced

by uncompensated overtime. Salaried workers have long had time-off overtime, and the main trend since 1984 has been the rise of uncompensated overtime. Since 1999, only hourly-paid overtime workers in manufacturing have clearly had a rise in flexibility.

### **3.3 Do workers like flexibility?**

I now turn to whether workers like flexibility, as measured by overtime compensated by time off (or hybrid compensation), before investigating in the next section how employers have used flexibility. Table 2 showed that workers whose overtime is compensated with time off appear to have more control over their schedule than those whose overtime is paid, though those working uncompensated time off have most control. This is true for all four worker groups (not shown). This suggests that the main trend, from paid overtime to time off, will have increased workers' satisfaction with their job and leisure (conditional on earnings; any effect of flexibility on the wage is left for future research).

Respondents' satisfaction with work, leisure and life (and other things) are measured directly in the SOEP on a 0–10 scale; most responses lie between 5 and 10. Figure 8 shows that satisfaction with work and life have a downward trend (for the usual sample of workers), and that satisfaction with leisure is curiously decreasing in early years as workers were getting more of it, then fluctuating.

The variation I use to identify the effect of flexibility on satisfaction is within-employer variation for the individual. Cross-section or even within-worker variation is subject to the endogeneity of the worker choosing the job with the type of overtime compensation they prefer. Within-employer variation should capture the introduction at the establishment level of a flexibility regime for reasons exogenous to the individual. This identification is not perfect, because within a given industry (which I will control for), and hence union contract, establishments choose endogeneously to adopt flexibility, and the choice will be influenced by average worker characteristics.

For the three types of satisfaction  $S$ , I estimate

$$S_{ijt} = \beta_0 + \beta_1 Time_{ijt} + \beta_2 Hybrid_{ijt} + \beta_3 Uncompensated_{ijt} + \beta_4 None_{ijt} + \beta_5 X_{it} + \delta_{ij} + \gamma_t + \epsilon_{ijt}, \quad (1)$$

where  $i$  indexes workers,  $j$  employers and  $t$  time, and  $\delta_{ij}$  are worker–employer fixed effects (which I abbreviate as job fixed effects). The omitted overtime compensation type is paid only, and *Time* represents time off only, *Hybrid* both time off and pay, *Uncompensated* uncompensated overtime, and *None* no overtime.  $X$  includes human capital and demographic information, including industry, whose means are presented in the Appendix Table 1. I estimate the equation linearly, so as to be able to identify within–employer variation. Hence,  $\beta_1$  and  $\beta_2$  are identified from the establishment’s changeover from paid–only overtime to flexible overtime (or more rarely, from a worker’s changing job within the establishment). On the other hand,  $\beta_3$  and  $\beta_4$  are not well identified, since workers presumably have some choice over whether to do overtime or not in a given job, and whether to do uncompensated overtime versus other types, and are more likely to do so if they are satisfied with their job and dissatisfied with their leisure.

I first present the results for work satisfaction, in Table 4. Columns 1–3 present the cross–section results. Here workers’ ranking of the overtime possibilities is no overtime as most preferred, followed by the omitted paid only, then time off only and hybrid overtime (equally preferred), with uncompensated overtime least preferred. The estimated dislike of uncompensated overtime is somewhat of a surprise, given that Table 2 suggested workers have a lot of control over it, and given that endogeneity should bias the coefficient upwards. Controlling for standard and actual hours (column 2) changes the coefficients little, while controlling for the net hourly wage (column 3) makes uncompensated overtime even less desirable. When worker (column 4) or job (column 5) fixed effects are added, the point estimates are reduced to half or less of their cross–section values, rendering them statistically insignificant except at the 10% level in column 5. The exception is the coefficient on uncompensated overtime: workers’ dislike for this is unchanged by the addition of fixed effects.

As hourly-paid workers are more affected by their establishment's switching from paid to time off overtime than are salaried workers, and the introduction is more plausibly exogenous, I present the job fixed effects results for hourly-paid workers only in column 6. The only difference is that hourly-paid workers dislike uncompensated overtime more than workers generally. I have also estimated the regressions separately for men and women, without finding important differences, and interacted the overtime regime covariates with the child variables in the gender-specific regressions, finding statistically insignificant coefficients (results not reported).

The magnitude of even the cross-section coefficients is rather small compared to the standard deviation of work satisfaction (2.0), although none of the unreported coefficients is much larger: observed variables seem to affect work satisfaction little, and the R-squared is low. The finding of small and insignificant coefficients is consistent with Hanglberger (2010), who uses worker fixed effects using the 2005 and 2007 waves of the SOEP. Nor do I find different results when I use holding a working time account (for 2002–2009) as the measure of flexibility (these results are unreported). At the bottom of the table, I provide information for readers who prefer to compare time off with no overtime, rather than with the omitted paid overtime.

Table 5 shows that workers' rankings of overtime regimes in connection with leisure satisfaction are (column 1): no overtime, followed by time off only overtime, the omitted paid-only overtime, and hybrid overtime, with uncompensated overtime again being the least preferred regime. Column 2 shows that half of the reason for the high ranking of no overtime and time off only overtime is that they are associated with lower hours worked, and only half is (potentially) related to their flexibility. Controlling for the net hourly wage in column 3 changes little, but once again the addition of fixed effects (columns 4 and 5) moves the point estimates towards zero. The only coefficient that remains statistically significant in column 5 is the coefficient indicating that no overtime is preferred to the omitted unpaid overtime. When the sample is restricted to hourly-paid workers (column 6), the results remain similar, though the positive coefficient on time off rises and becomes significant at the 10% level: weak evidence that flexibility is preferred

to traditional paid overtime. As in Table 5, the magnitudes of the coefficients are small compared to the standard deviation of the dependent variable (2.2), and again effects are not found to differ by gender or by the presence of children (these results are not reported).

The results for life satisfaction, in Table 6, do not show a very different pattern. In the cross-section (columns 1–3), workers prefer no overtime most, then the omitted paid only, then (based on the point estimate only) time-off overtime, then equally uncompensated and hybrid overtime. When fixed effects are added (columns 4–6), the coefficients move towards zero, leaving statistically significant only a dislike of uncompensated overtime, and a preference for no overtime, always compared to the omitted paid-only overtime. Again I find no important differences by gender or presence of children (these results are unreported).

In summary, I have been unable to robustly rank workers' preferences over flexible forms of overtime versus paid-only overtime, though there is weak evidence that paid overtime is preferred to flexible forms for work, and the reverse for leisure. For leisure and life, no overtime is workers' first choice, and for work and life, uncompensated overtime is the last choice. There is no evidence that flexibility is family friendly. I can rule out differences in satisfaction caused by overtime regime that are substantial compared to trends in satisfaction.

### **3.4 How do employers exploit time off over the business cycle?**

A number of analysts have attributed the labor market miracle in 2008–2009 to increased use of yearly working time (working time accounts are often used as a synonym for this).<sup>18</sup> Certainly yearly working time would be expected to smooth employment over the cycle, but it may be more realistic to expect yearly working time to prevent employment fluctuations over industry or firm-specific cycles, rather than an economy-wide business cycle as

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<sup>18</sup> Herzog–Stein and Zapf (2012), Klös and Schäfer (2010), Möller (2010), Sachverständigenrat (2010), Schneider and Graef (2010). Many also saw short-time work as partly responsible for the unusual recession, despite its having existed since 1924.

large as that of 2005–2009. Burda and Hunt (2011) contend that hours per worker were no more flexible than in previous recessions, because hours reductions through yearly working time crowded out the use of government–subsidized short–time work. Figures 3B and 7 showed, furthermore, that much of the increase in use of time off had already occurred by the time of the previous recession in 2001–2005, a recession in which employment nevertheless dropped greatly. Burda and Hunt (2011) provide evidence instead that firms were unusually pessimistic in the 2005–2008 boom, hiring less than expected given output growth, which meant that when the recession came there was less need to lay off than in earlier recessions.<sup>19</sup>

It is difficult to use the SOEP data to test the role of yearly working time in keeping employment high in the recession, particularly in the absence of information on undertime and short–time work. Nevertheless, the SOEP data may be used to gain a fuller picture of how overtime and yearly working time were deployed over the 2004–2009 cycle. Rather than use the responses to the question on the type of overtime compensation, with its vague timing, I use information on overtime in the previous month, and particularly the information available since 2001 splitting overtime hours into paid and unpaid. The disadvantage is that unpaid hours cannot be separated into time off versus uncompensated, but where necessary, the graphs above on overtime regime can be used to add information. I investigate whether overtime adjustment is on the intensive or extensive margin, whether paid or unpaid overtime is more cyclical, whether paid or unpaid overtime is adjusted first, and which constraints arise in the use of unpaid overtime.

In the cyclical context, manufacturing is of more interest than services, since the export–led boom and the subsequent recession occurred in manufacturing, as value–added statistics indicate. Burda and Hunt (2011) show that the 2008–2009 labor market miracle – the virtual absence of the expected decline in employment – was a manufacturing one.<sup>20</sup>

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<sup>19</sup> Burda and Hunt (2011) also allow for other contributing factors, such as wage moderation and labor market reforms (Boysen–Hogrefe and Groll 2010, Gartner and Klinger 2010).

<sup>20</sup> In employer–based data, analysis is complicated by the fact that temporary agency workers (*Zeitarbeit*) are classified in other business services. Temporary workers responding to the SOEP question on industry, however, seem to have reported the industry of the establishment in which they are actually working, since they only very slightly disproportionately report working in other business services.



I also examine services likely to be cyclical: services without education, health and the public sector.

It is useful to know that most SOEP interviews are conducted between January and April of each year. GDP peaked in Q1 2008, and fell to a trough in Q1 2009, which means the data coincide well with the turning points.

### 3.4.1 Cyclicity of paid and unpaid overtime

Figure 9 depicts overtime hours per worker for the four worker groups, with recessions shaded to help the observation of cyclicity. Panel A shows that, as expected, overtime hours are very procyclical for hourly-paid workers in manufacturing over the 1984–2009. A Oaxaca decomposition of overtime hours in the steep rise from 2004–2007 reveals that 73% of the rise is due to the extensive margin (share of workers with any overtime) compared to 27% for the intensive margin (overtime workers per overtime hour). The same analysis of sharp drop in overtime from 2008–2009 shows a similar breakdown: 71% for the extensive margin versus 29% for the intensive margin. These margins will be examined separately below.

Panel A also shows that paid and unpaid hours are approximately equal for these workers, and both are procyclical from 2004–2009 (though probably due to their upward trend, unpaid hours increased in the slump from 2001–2005). The cycle for unpaid hours leads the cycle for paid hours by a year, however, a point to which I shall return. Since uncompensated overtime is unusual for this group, unpaid overtime can generally be equated with time off overtime. However, Figure 7A shows that uncompensated overtime contributed to the 2005–2006 increase in unpaid overtime.

For salaried workers (panels B and D of Figure 9), overtime hours are less cyclical, and since most overtime hours are unpaid, the cycle is driven by unpaid hours. Paid hours are acyclical except for a rise in paid overtime from 2007–2008 in manufacturing. For the smallest of the groups, hourly-paid workers in services, overtime was very procyclical in the 2000s, after having been less so in earlier periods. Paid and unpaid overtime hours are approximately equal, and though in this case paid overtime seems to lead unpaid

overtime, the series are too noisy to be certain.

I next examine the extensive and intensive margins of overtime separately. In Figure 10, I plot for the four groups of workers the shares of workers in the four possible categories: no overtime last month, reporting paid overtime hours only, unpaid overtime hours only, or both types of overtime hours (hybrid). Panel A shows that for hourly-paid workers in manufacturing, the share of workers with no overtime is countercyclical over the whole period, and that the shares with the three types of overtime are all procyclical, though only weakly so in the case of workers with hybrid overtime, whose share is very small. More workers have unpaid-only overtime than have paid-only overtime, and as was the case for total overtime hours, the cycle for unpaid overtime leads the cycle for paid overtime.

There is less procyclicality for the other groups of workers. The pattern for salaried manufacturing workers (panel C) is qualitatively similar to that in panel A. For salaried workers in cyclical services, the cyclical shifts are mainly between no overtime and unpaid overtime (panel D), while for hourly workers in cyclical services (panel B), overtime is not obviously cyclical.

In Figure 11, I plot the intensive margins – overtime hours per overtime workers, paid overtime hours per paid overtime worker, and similarly for unpaid hours – where sample size permits. For hourly-paid workers in manufacturing (panel A), overall overtime is procyclical, due to procyclicality in unpaid overtime hours. A comparison with Figures 7 and 8 suggests that some of the 2005–2006 rise in unpaid overtime in this panel may be due to uncompensated overtime, rather than to the usual time-off overtime. Paid overtime hours are not cyclical.

The intensive margin is also very procyclical for hourly-paid workers in cyclical services (panel B), though the sample size does not permit examination of paid and unpaid hours separately. The considerable cyclicity of overtime hours for the salaried in manufacturing (panel C) is driven by unpaid hours, as is the lower level of cyclicity for salaried workers in cyclical services (panel D).

For the remainder of the analysis, I will focus on the hourly-paid workers in manu-

facturing, the more cyclical group of workers in the sector where the boom and bust were concentrated. Thus far I have demonstrated that their very procyclical overtime hours are driven by the extensive margin, that paid and unpaid overtime hours are equal in magnitude and both procyclical, and that the unpaid cycle leads the paid cycle. The unpaid cyclical stems from cyclical in both time off and uncompensated overtime. Similarly, at the extensive margin, both paid only and unpaid-only overtime are procyclical, and the unpaid cycle leads the paid cycle. There is little cyclical in the share of workers with hybrid overtime. At the intensive margin, unpaid hours are cyclical while paid hours are not.

The low share of workers with both paid and unpaid hours in a given month, compared to the much higher share in an unspecified longer period (Figure 6), indicates that workers must typically receive both only as part of a settlement at the end of a window. If workers exceeded the weekly limits on overtime that can be compensated with time off, they would receive both time off and pay on a monthly basis. The weekly limits are either binding, or employers do not seek flexibility along this dimension. Employers would hire more workers in the former case than the latter case.

That employers first use unpaid overtime as the recovery begins suggests that, as expected, employers prefer to use overtime compensated with time off to the more expensive paid overtime. The transition from unpaid to paid overtime as the boom progresses suggests they cannot get all the way through the boom without recourse to paid overtime. Given this, it is somewhat puzzling that WSI surveys found that among establishments reporting having been affected, most still had positive balances in their workers' working time accounts as late as Q3 2009 (Zapf and Brehmer 2010). Using two of these surveys as a panel, Zapf and Herzog-Stein (2011) report that 22% of establishments in the panel were drawing down working time accounts in Q3 2008, Q3 2009 and Q1 2010.

I turn now to identifying the constraints preventing employers from relying exclusively on time-off overtime. If the window is too short for employers to keep workers doing overtime as long as employers would like, and it is necessary to switch them to undertime to even out hours over the window, we would see an increase in transitions from unpaid-only

overtime work to no overtime as the boom progressed. Conversely, if the constraint is that workers accumulate overtime hours up to the maximum that can be compensated with time off, employers would switch them to paid-only overtime. As the boom progressed, eventually these paid workers would be switched to undertime to even out hours over the window. I can use the longitudinal dimension of the SOEP data to distinguish the two constraints.

### 3.4.2 Constraints on the use of yearly working time

In order to distinguish whether employers turn to paid overtime because windows for time off are too short or because they reach the ceiling on cumulated overtime for time off, I use transition matrices for each pair of years from 2004 (when overtime begins rising at the end of the previous slump) for the states of Figure 10: no overtime, unpaid only, paid only or both paid and unpaid (hybrid). I present information from these transition matrices in two different ways, to make the numbers digestible.

First, I graph the exit probabilities from the different states. As overtime's extensive margin is so important, I begin with the probabilities of exiting the state of no overtime, in Figure 12 panel A. As the boom gets under way, the probability of remaining without overtime falls, before rising in the 2008–2009 recession. In the first part of the boom, when overtime is rising rapidly (2006–2007, see Figure 9), workers enter paid-only overtime and hybrid overtime, while in the second part of the boom, when overtime is maintained at a high level (2007–2008), they enter unpaid-only overtime (which Figure 7 suggests may be uncompensated overtime rather than time off). Increases in time-off overtime do not appear to be generated by moving workers from no overtime. Exits to unpaid-only and paid-only overtime then fall as total overtime dives in the recession.

In panel B, I plot the exit rates from unpaid-only overtime. In the first half of the boom (2006–2007), exits to no overtime fall in favor of paid-only overtime, as would be predicted if employers were constrained by the ceiling on maximum overtime hours, but not the window length. The probability of staying in unpaid-only overtime does not change. In the second half of the boom (2007–2008), in addition to a fall in the probability

of remaining in unpaid-only overtime, there is a rise in the probability of exiting to no overtime and fall in the probability of exiting to paid-only overtime, as would be predicted if employers were forced to switch their yearly working time workers to undertime as the end of the window approached. Panel C provides further support by showing that in the second half of the boom, the transition probability for paid-only to no overtime rises.

A second way of presenting the transition matrices is to compute the share of each matrix cell in all the transitions in the matrix, then to difference matrices adjacent in time. The resulting matrices have cells that sum to zero, showing how the composition of transition activity has changed compared to the previous pair of years. I present these cells in Table 7, with all entries for a matrix written in one row, and one row per matrix. (The cells involving transitions to and from hybrid overtime, which with one exception are all tiny, are reported in the Appendix Table).

In row 1, the economy is emerging from the previous slump, total overtime is stable, and the row shows that the main change in transition activity is an extension of unpaid-only overtime spells: the 3.5 in the U-U column means that 3.5 percentage points more of 2005–2006 transitions were from unpaid-only to unpaid-only compared to 2004–2005.

In row 2, the boom is in its first phase, overtime is rising rapidly, and the row shows that the main changes are a large fall in those remaining without overtime (-5.2), a further extension of workers with unpaid-only overtime (4.2), and an increase in transitions from unpaid-only to paid-only overtime (3.0). When combined with the increase in flows from paid to no overtime in the second half of the boom (row 3; 2.3), this indicates employers are reaching the cumulative overtime ceiling for yearly working time workers.

Row 3 represents the second phase of the boom when overtime is maintained at a high level. There is a continued fall in those remaining without overtime (-7.3), but unpaid-only (time off) overtime begins to be dismantled: the probability of staying in unpaid-only overtime falls (-4.2) and there is an equal increase in the transitions from unpaid-only to no overtime (4.1). This is support for window length being a binding constraint. In row 4, the recession, all changes are in the direction of reducing overtime.

It appears, therefore, that ceilings on cumulated overtime hours were a binding con-

straint in the first half of the boom, and the window length was a binding constraint in the second half of the boom. But the pattern suggests that these constraints were binding separately on different establishments, not sequentially on the same establishments (else the binding window constraint would be seen as transitions from paid-only to no overtime, not from unpaid to no overtime). One possibility is that firms or industries recovering later from the previous slump may have had shorter windows and/or no ceiling on cumulated hours. A less likely explanation is that workers on different types of contracts are deployed at different times in the same establishment.

Do these results imply that the efficiency of the economy would be enhanced if ceilings on cumulated overtime compensatable with time off were lifted, and windows lengthened? The possible problems with this include greater worker exposure to firm insolvency, more complications associated with worker turnover, and the binding of federal restrictions on working time.

## 4 Conclusions

About half of German hourly-paid and salaried workers have varying daily hours, and about half of these share control over hours with their employer through a working time account. Of the remaining workers, a minority control their own hours, while the rest have hours controlled by their employer. Compared to salaried workers, hourly-paid workers have much less variable hours and much less control over hours that do vary.

Measured as the degree to which overtime is compensated with time off rather than pay, working time flexibility has grown rapidly for hourly-paid workers since 1984. It is much less clear that there is a corresponding increase in flexibility for salaried workers, who have long had flexible hours. This is particularly true if flexibility is measured as a share of overtime hours rather than overtime workers, and since 1999. Since 1999, the main change for salaried workers is a shift to uncompensated overtime.

Flexibility does not appear to be a salient determinant of workers' satisfaction with work, leisure or life, though other observables also have only small effects compared to the

standard deviation of satisfaction. There is weak evidence that flexibility causes workers to be less satisfied with their work and more satisfied with their leisure. There is also no evidence that flexibility is family friendly.

Employers clearly take advantage of flexibility to accommodate the business cycle, preferring to use the flexible overtime hours, compensated later with time off, in preference to paid overtime hours which command a pay premium. However, the need to compensate the workers with time off within a given window and ceilings on the number of flexible overtime hours that can be cumulated within a window mean employers had to transition to paid overtime before the 2005–2008 boom was over.

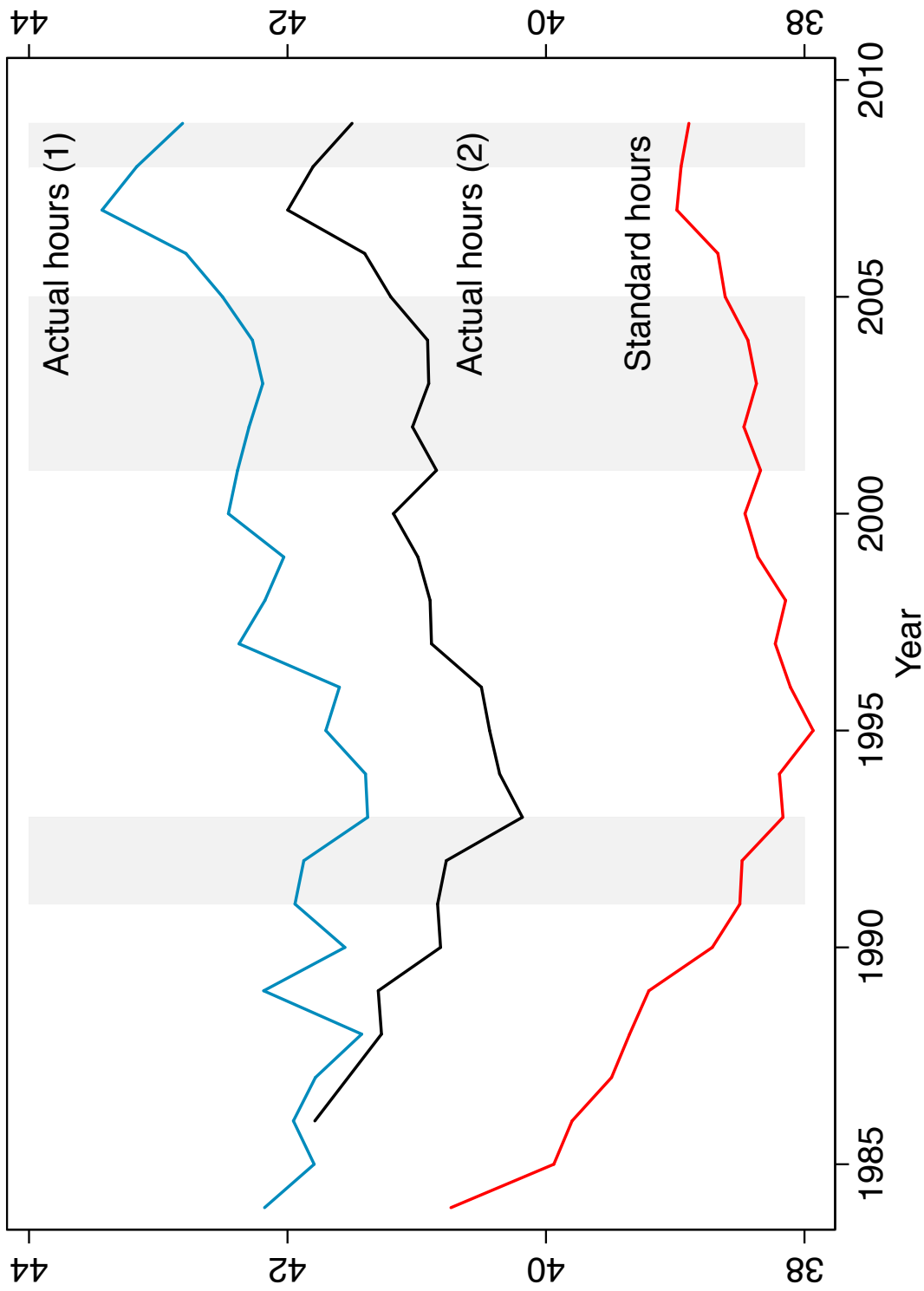
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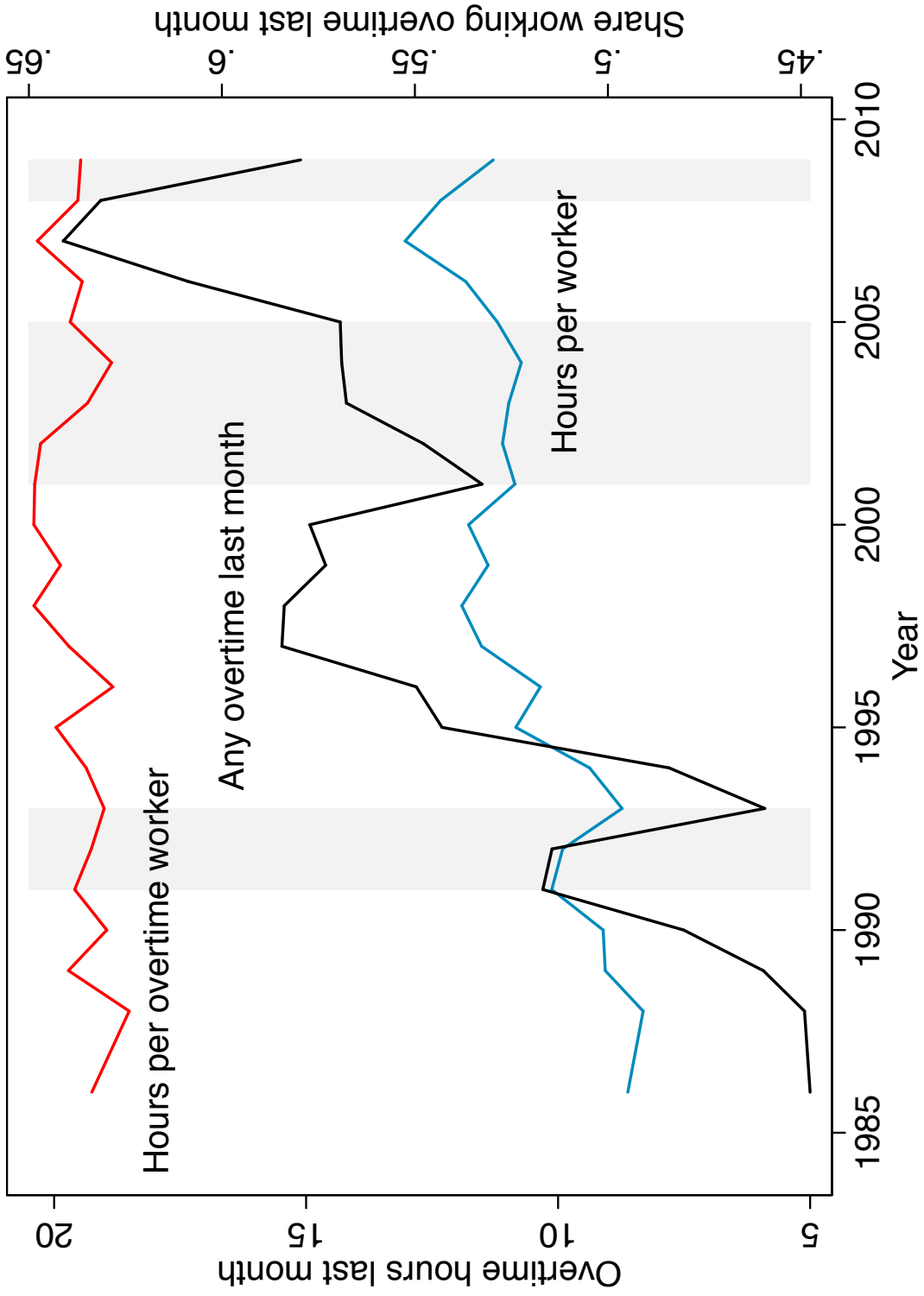
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Figure 1: Standard and actual hours



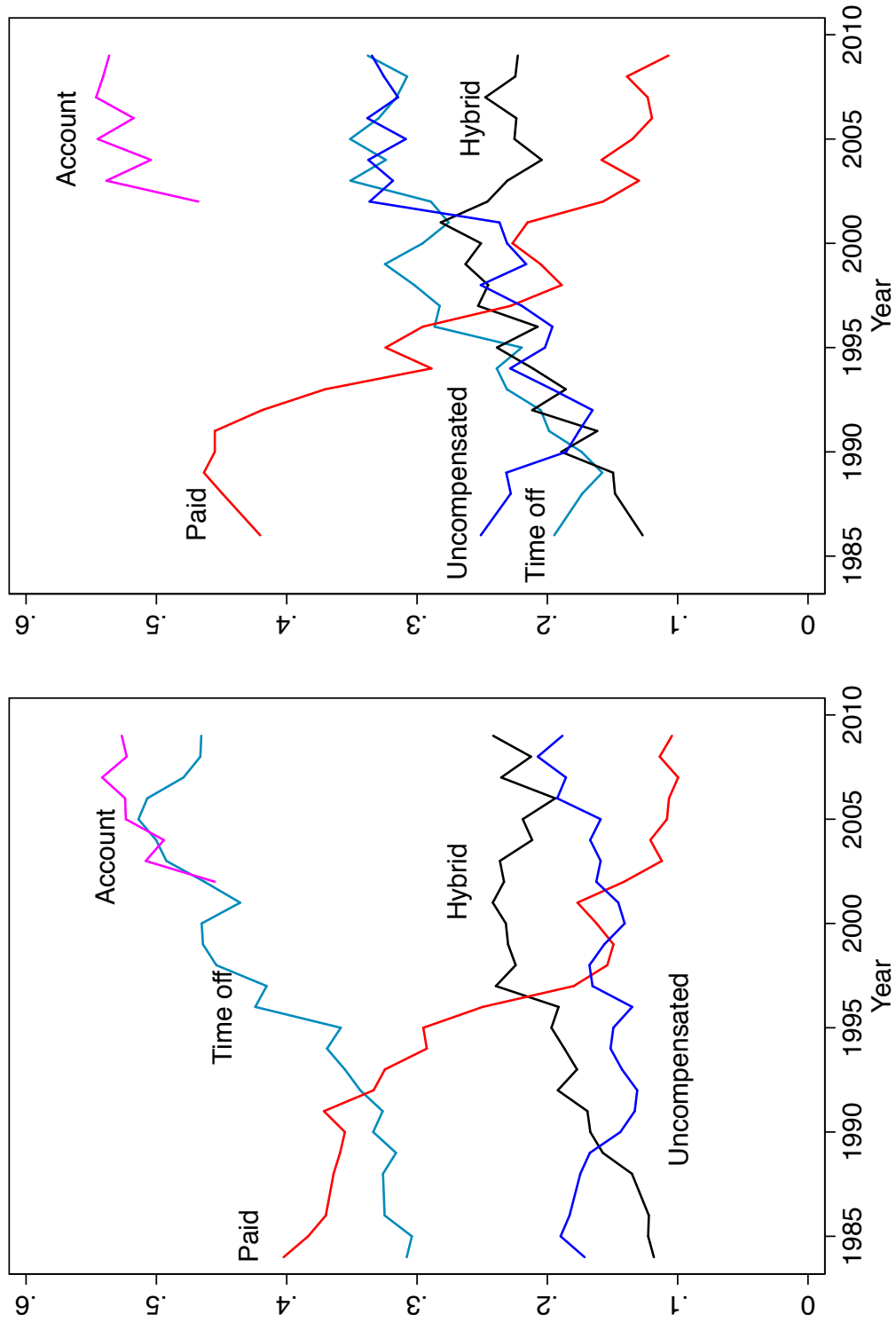
Note: Full-time workers age 20–54, living in west. Actual hours (1) are directly reported by respondents as their average actual weekly hours (except in 1984, when respondents reported their weekly hours last month). Actual hours (2) is computed as standard hours plus overtime last month divided by 4.33. Recessions are shaded.

Figure 2: Overtime hours last month and share of workers with overtime last month



Note: Full-time workers age 20-54, living in west. Recessions are shaded.

Figure 3: Shares of overtime with different types of compensation

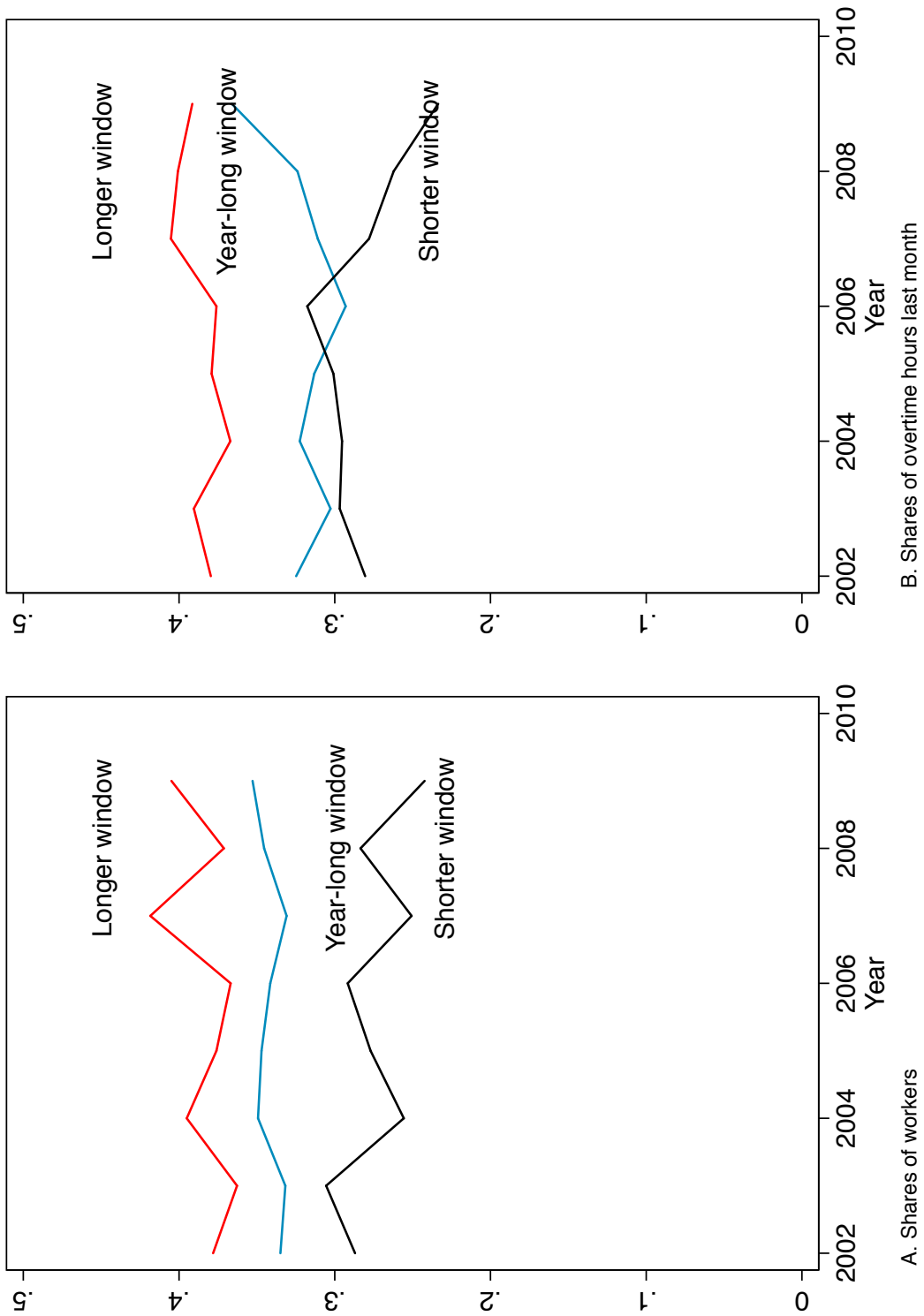


A. Shares of workers

B. Shares of overtime hours last month

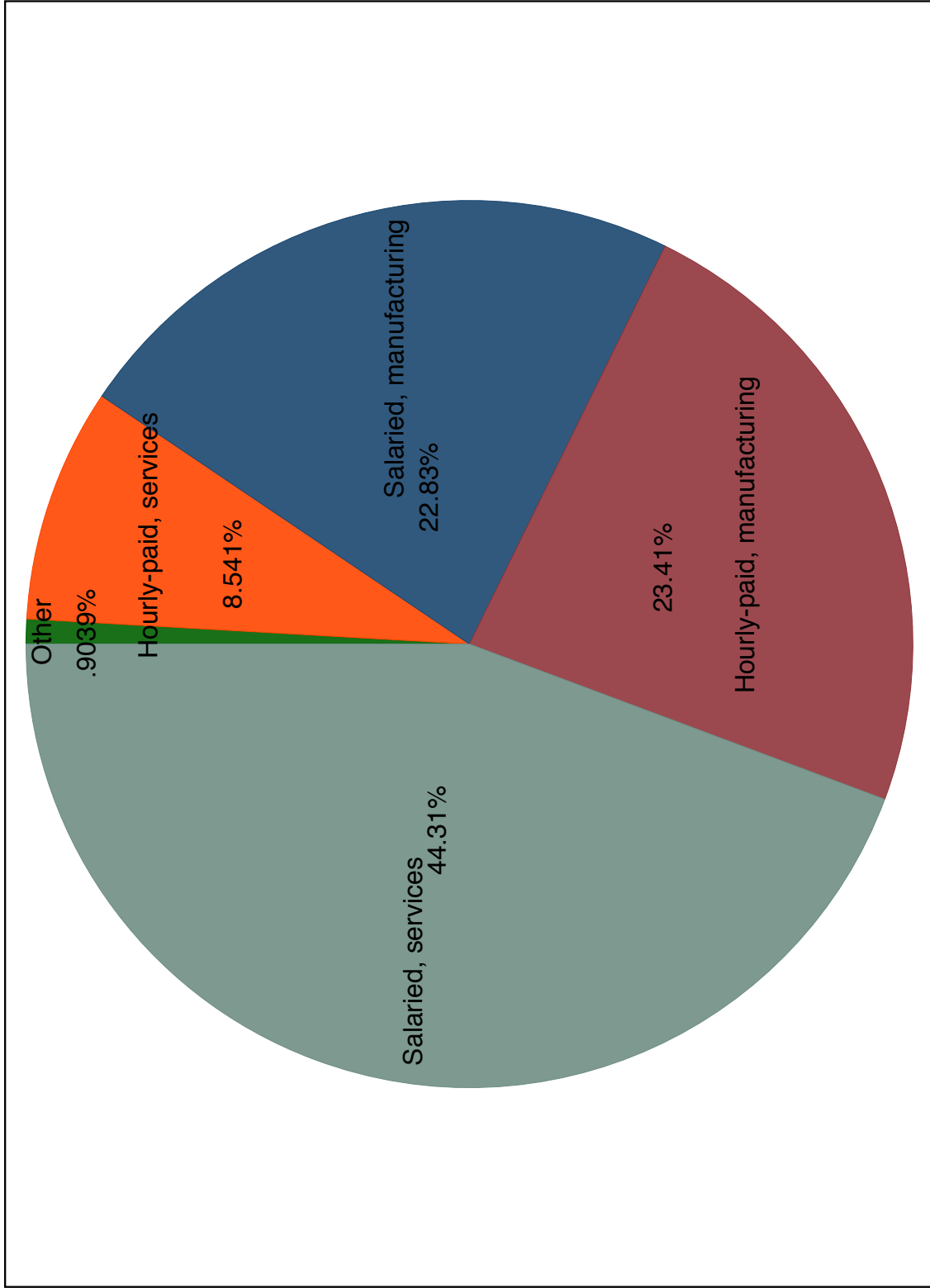
Note: Full-time workers age 20–54, living in west, who work overtime. Paid (only), time-off (only), hybrid (both time-off and paid), and uncompensated shares sum to one. Account is the share of overtime last month accruing to workers with working time accounts.

Figure 4: Shares of working time accounts with different window lengths



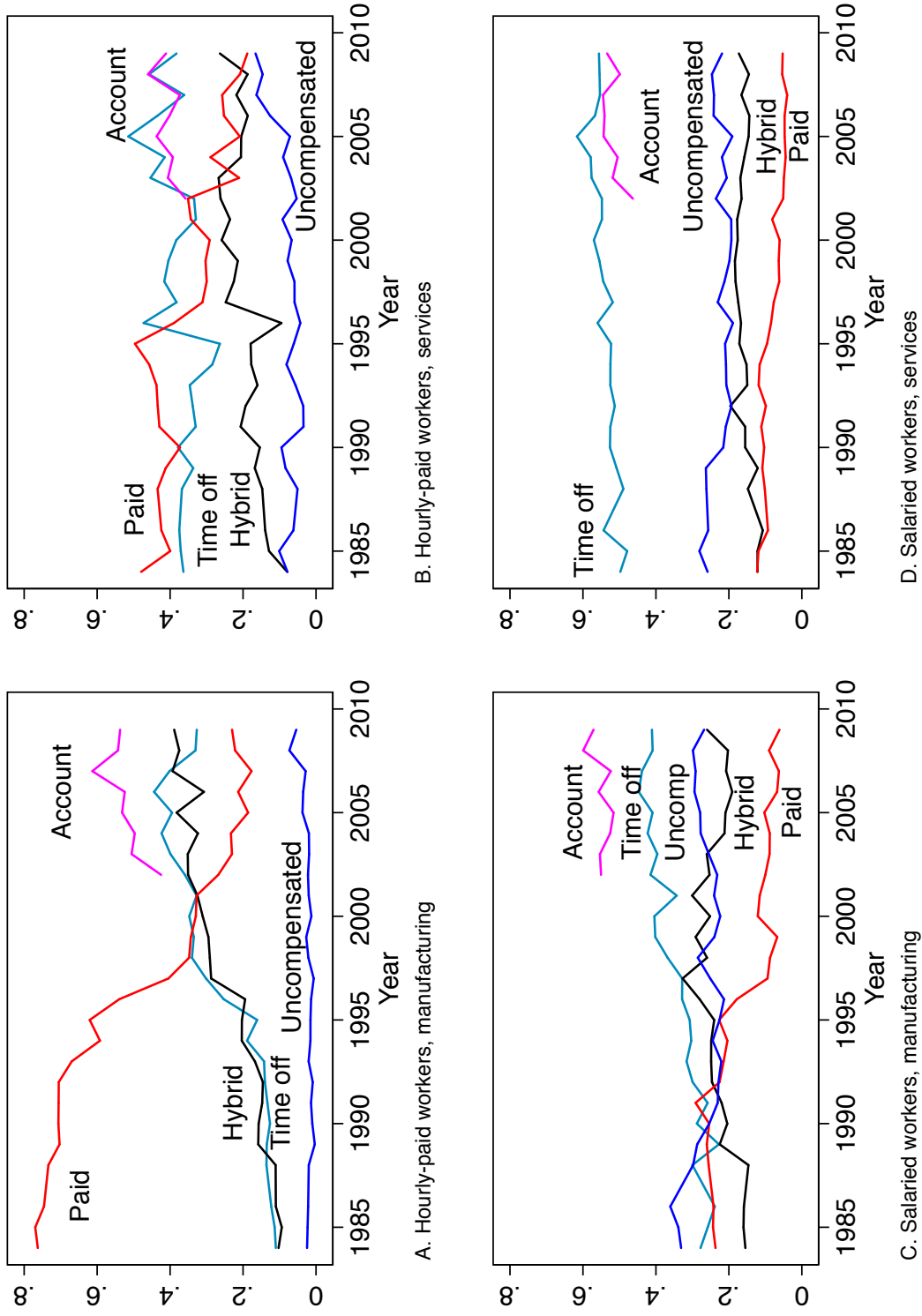
Note: Full-time workers age 20–54, living in west, who have a working time account. Shares sum to one. The window is the period of time within which actual hours must average to standard hours.

Figure 5: Division of overtime hours last month by type of worker and sector, 1984–2009 (except 1987)



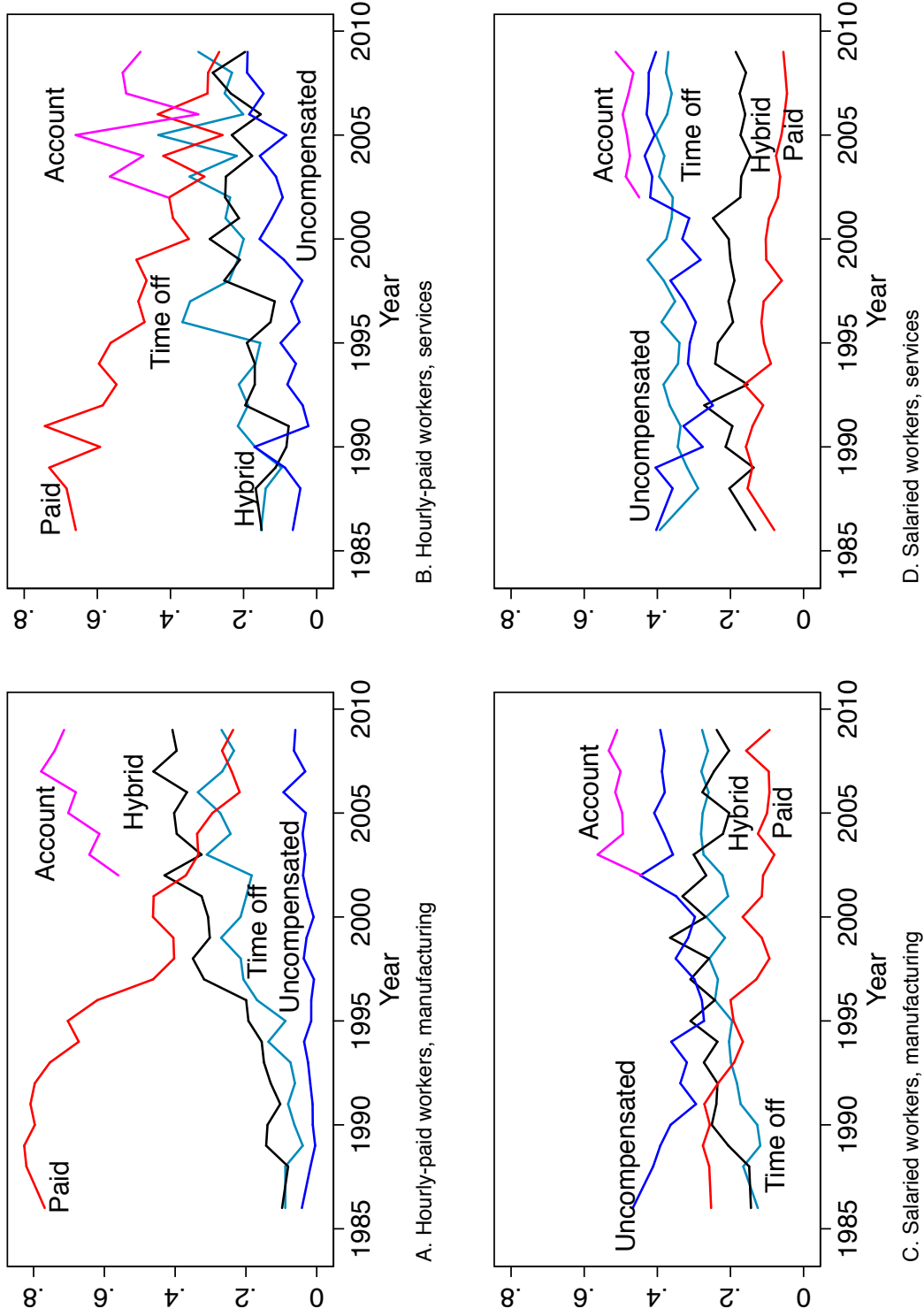
Note: Full-time workers age 20–54, living in west, who worked overtime last month. Hourly-paid means Arbeiter, salaried means Angestellte and Beamten. Manufacturing includes construction; services include the public sector.

Figure 6: Types of compensation for overtime workers, by worker type and sector: shares of overtime workers



Note: Full-time workers age 20–54, living in west, in manufacturing (including construction) or services (including the public sector) and who work overtime. Hourly-paid means Arbeiter, salaried means Angestellte and Beamten. Paid (only), time-off (only), hybrid (both time-off and paid), and uncompensated shares sum to one. Account is the share of overtime last month accruing to workers with working time accounts.

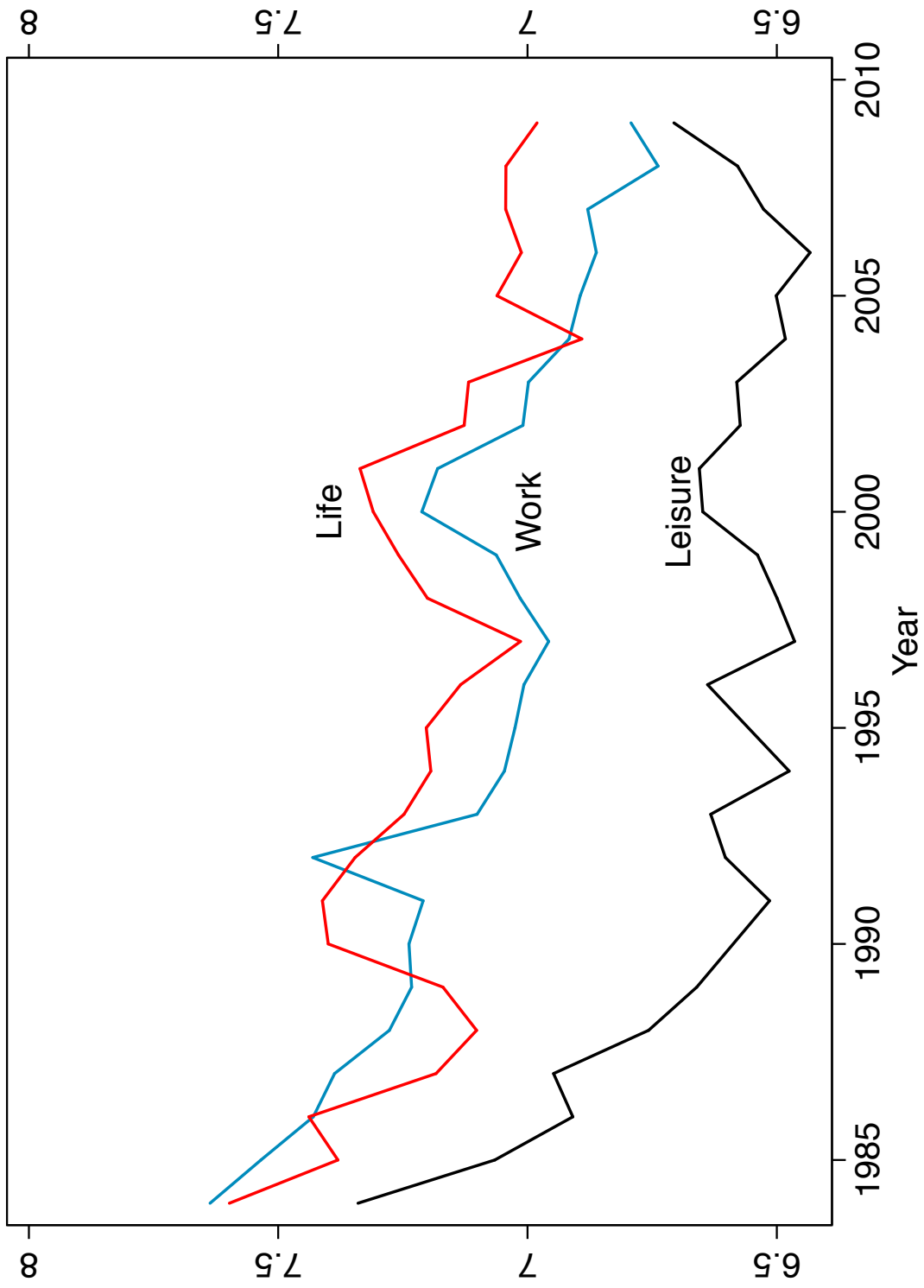
Figure 7: Types of compensation for overtime workers, by worker type and sector: shares of overtime hours last month



Note: Full-time workers age 20-54, living in west, in manufacturing (including construction) or services (including the public sector), and who work overtime. Hourly-paid means Arbeiter, salaried means Angestellte and Beamten. Paid (only), time-off (only), hybrid (both time-off and paid), and uncompensated shares sum to one. Account is the share of overtime last month accruing to workers with working time accounts.

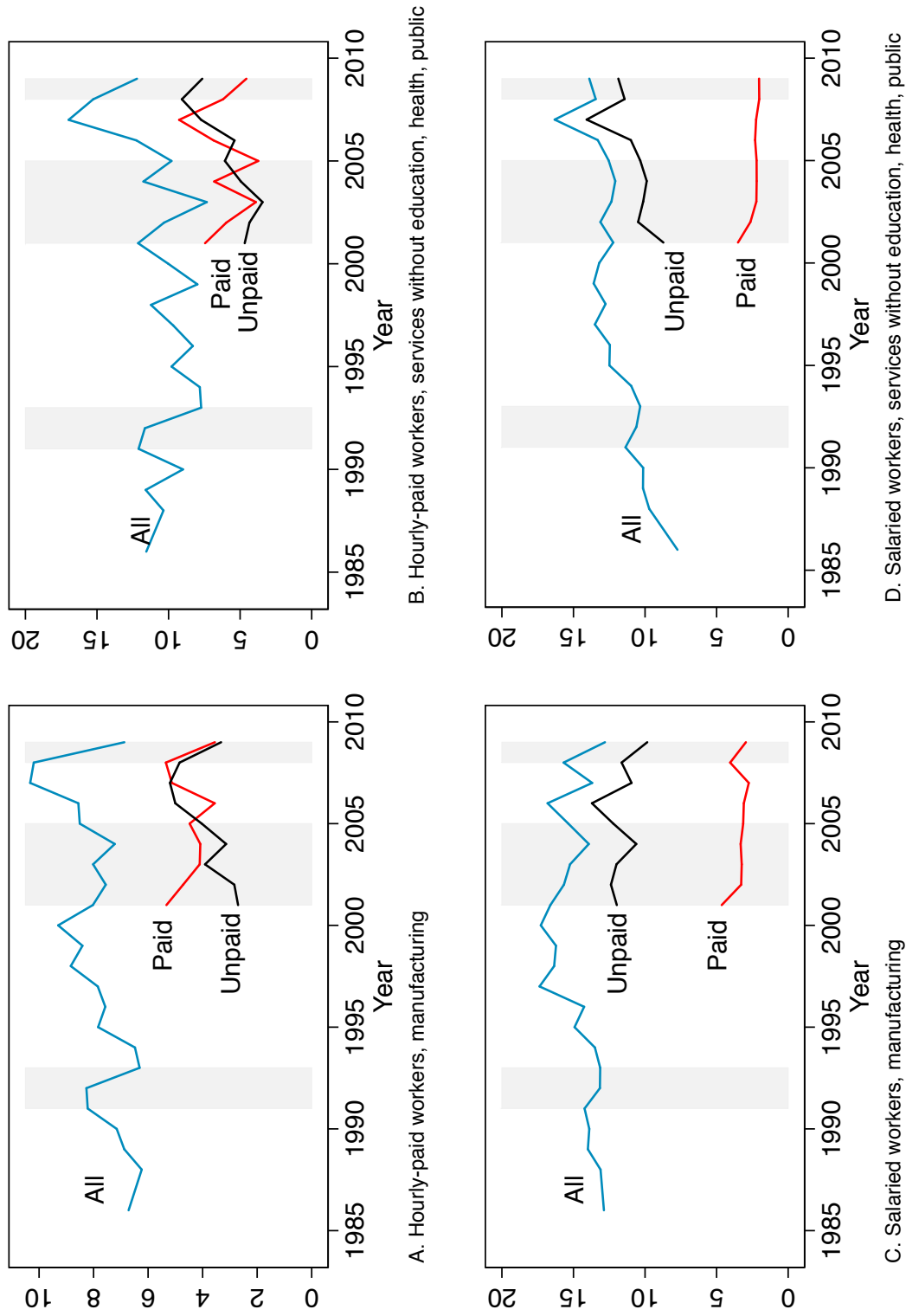


Figure 8: Satisfaction with work, leisure and life



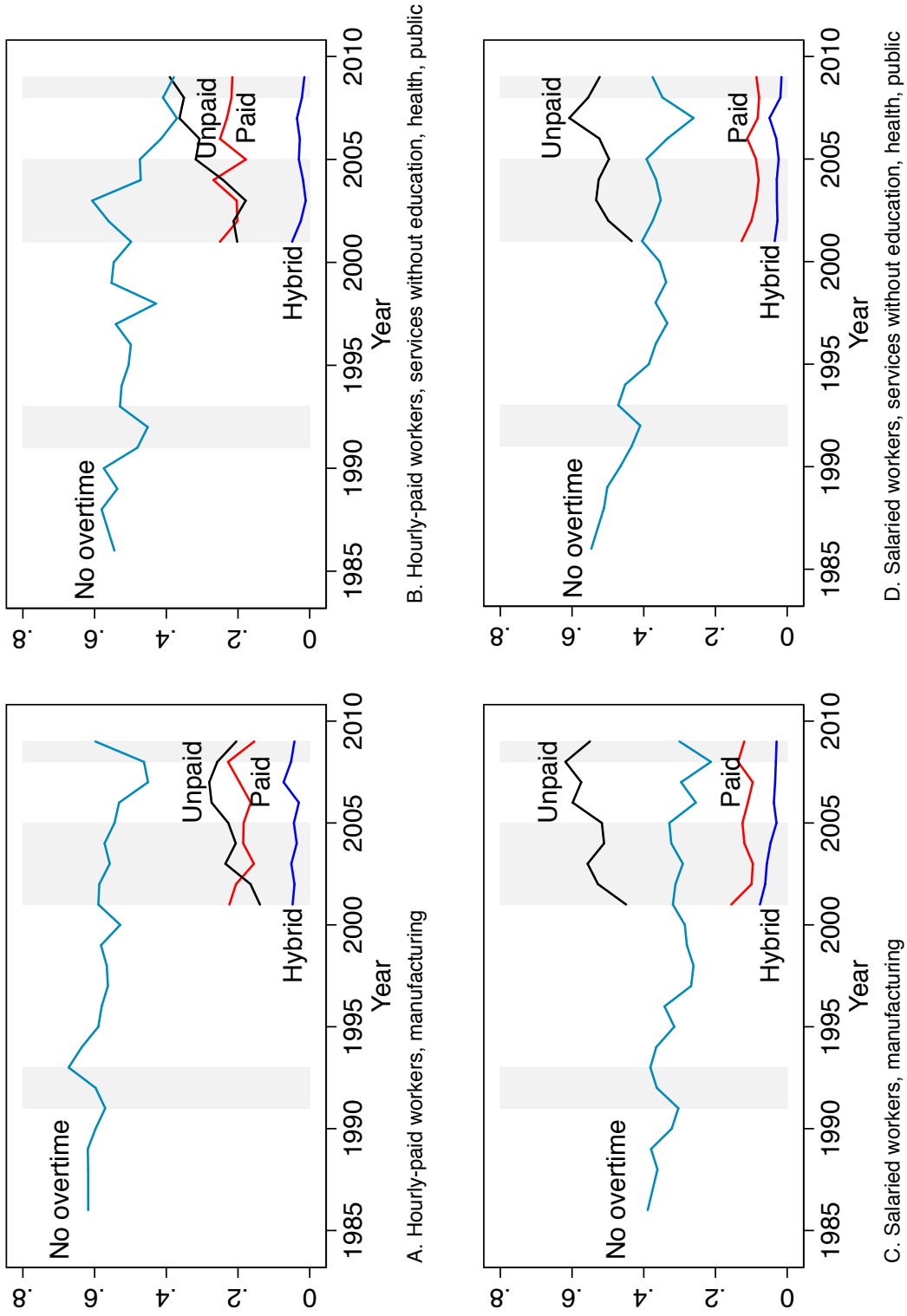
Note: Full-time workers age 20-54, living in west. Satisfaction is measured on a scale of 1-10.

Figure 9: Overtime hours last month per worker by whether paid



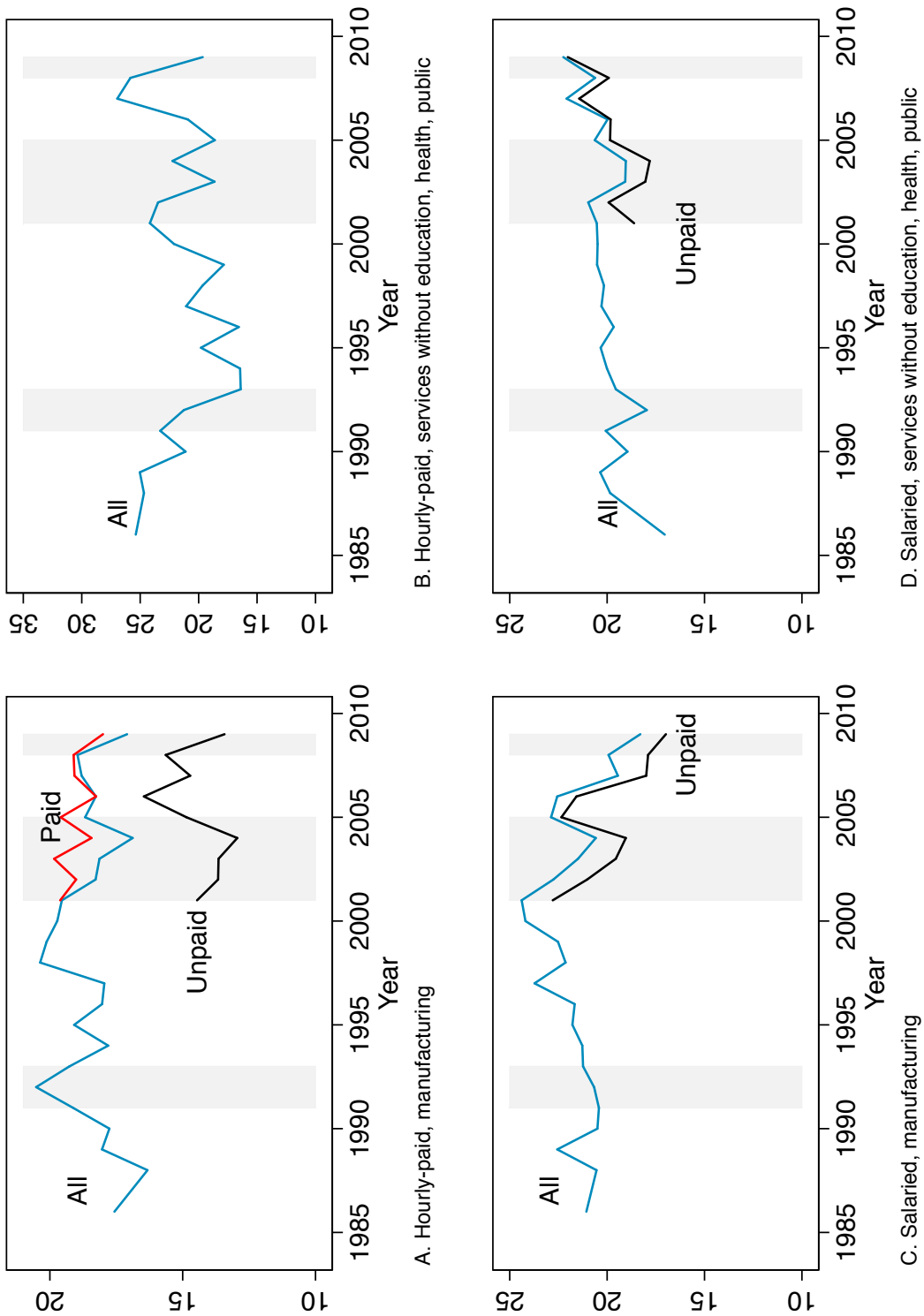
Note: Full-time workers age 20–54, living in west, in manufacturing (including construction) or services (excluding education, health and the public sector). Hourly-paid means Arbeiter, salaried means Angestellte and Beamtent. Recessions are shaded.

Figure 10: Shares of workers with paid and unpaid overtime last month



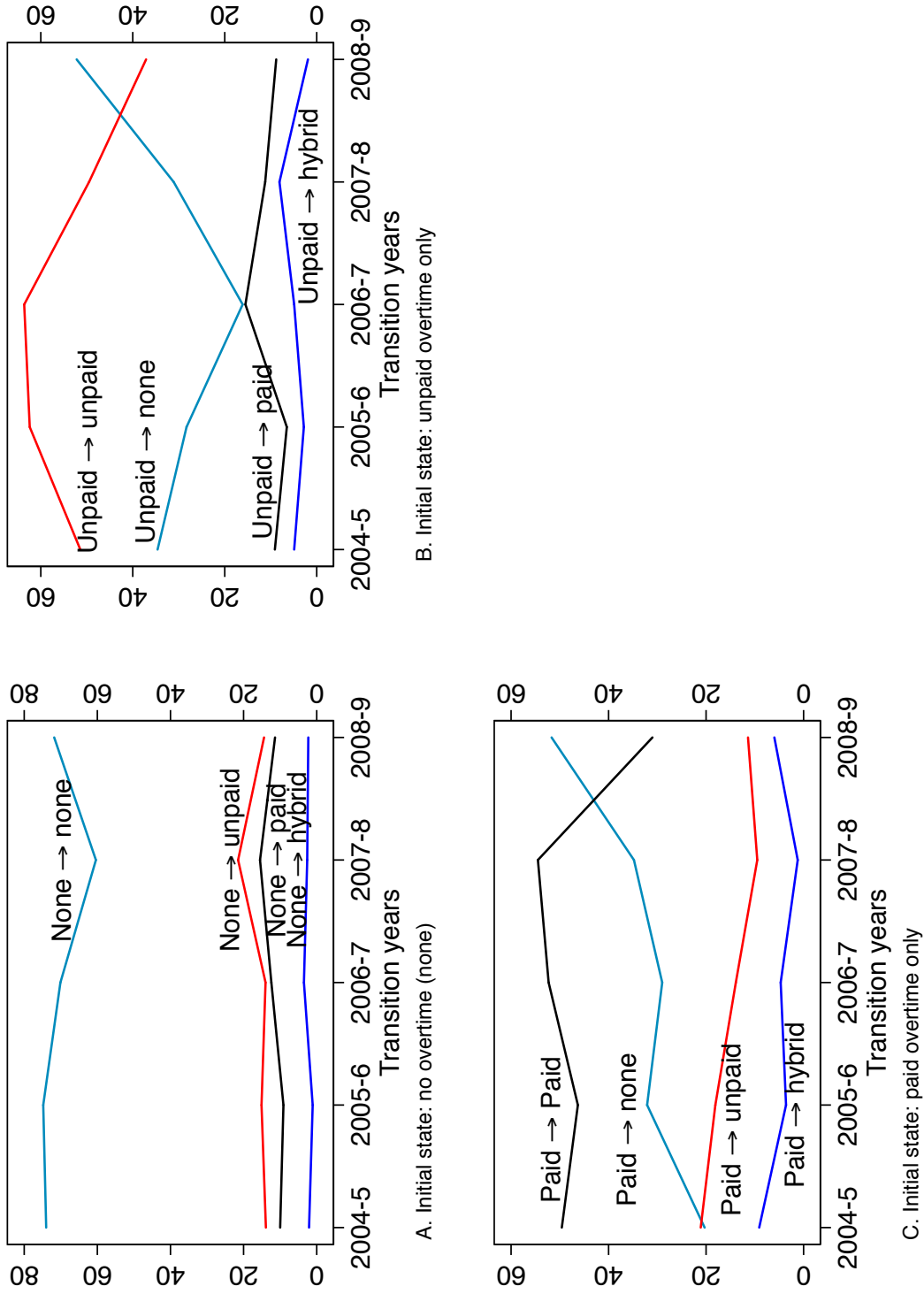
Note: Full-time workers age 20–54, living in west, in manufacturing (including construction) or services (excluding education, health and the public sector). Hourly-paid means Arbeiter, salaried means Angestellte and Beamten. Paid (only), unpaid (only), hybrid (both time-off and paid) and no overtime sum to one. Recessions are shaded.

Figure 11: Overtime hours last month per overtime worker by whether paid



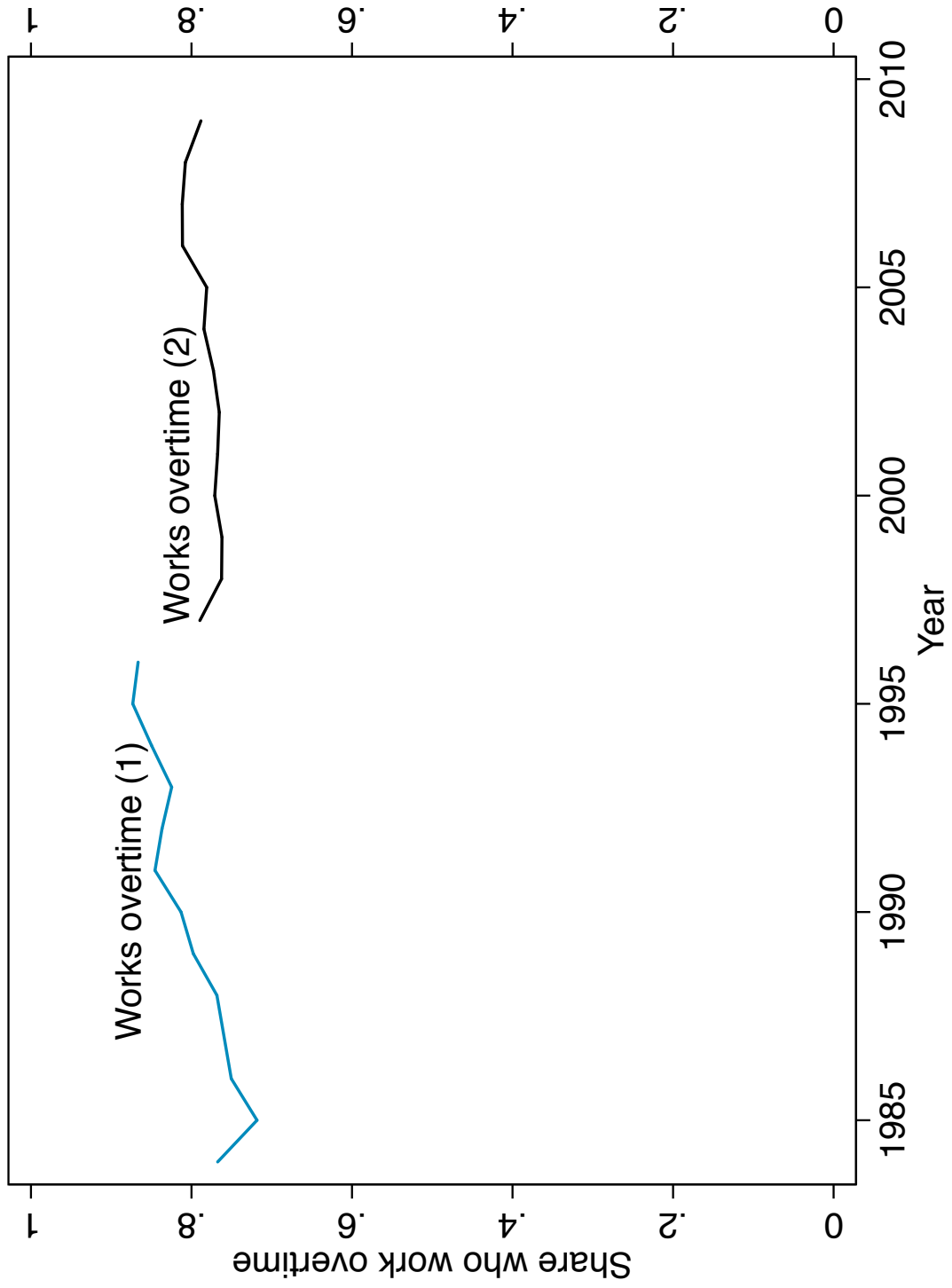
Note: Full-time workers age 20–54, living in west, in manufacturing (including construction) or services (excluding education, health and the public sector) and who worked overtime (“All”), paid overtime (“Paid”) or unpaid overtime (“Unpaid”). Hourly-paid means Arbeiter, salaried means Angestellte and Beamten. Recessions are shaded.

Figure 12: Year-to-year exit probabilities from different overtime states, hourly-paid manufacturing workers



Note: Full-time, hourly-paid workers age 20-54 in manufacturing (including construction), living in west, in sample for both years across which transition is measured. In top left panel, initially working no overtime, in top right panel, initially working unpaid-only overtime, in bottom panel, initially working paid-only overtime.. Probabilities for each year sum to 100. Hourly-paid means Arbeiter.

Appendix Figure: Share of workers who work overtime



Note: Full-time workers age 20-54, living in west. The way the question was asked was changed in 1997. The question is vague about the time frame both before and after 1997, but it is clearly longer than a month. Those who do work overtime respond to the question of how it was compensated.

Table 1: Daily working time flexibility by sector and type of worker, odd years 2003-2009

	All	Hourly-paid workers		Salaried workers	
	(1)	Manufacturing (2)	Services (3)	Manufacturing (4)	Services (5)
Fixed hours	45.2	67.7	60.1	26.3	35.8
Varying hours controlled by firm	18.6	18.4	30.0	7.5	19.6
Worker controls hours	9.4	2.6	3.7	15.8	12.2
Shared control using working time account	26.8	11.3	6.1	50.4	32.3
	100.0	100.0	100.0	100.0	100.0
Observations	12,864	3015	1167	2312	6214

Note: Full-time workers age 20-54 living in west. The categories the respondent chooses between are more exactly: “Fixed beginning and end of daily work time”; “Sometimes varying daily work hours determined by establishment”; “Choose own working time, no formal working time rules”; “Flexitime with working time account and a certain control over daily work time within this framework”. Manufacturing includes construction; services include the public sector. Shares are weighted using sample weights.

Table 2: Comparison of two measures of flexibility, odd years 2003-2009

	Doesn't work overtime (1)	Works overtime and overtime compensation is:			
		Time off only (2)	Both time and pay (3)	Paid only (4)	Uncompensated (5)
Fixed hours	68.2	37.1	41.2	53.0	33.0
Varying hours controlled by firm	14.9	18.2	20.1	28.2	17.7
Worker controls hours	3.0	5.4	8.1	7.3	33.6
Shared control using working time account	14.0	39.3	30.6	11.4	15.8
	100.0	100.0	100.0	100.0	100.0
Observations	2745	4860	2271	1030	1958

Note: Full-time workers age 20-54 living in west. The categories the respondent chooses between are more exactly: "Fixed beginning and end of daily work time"; "Sometimes varying daily work hours determined by establishment"; "Choose own working time, no formal working time rules"; "Flexitime with working time account and a certain control over daily work time within this framework". Shares are weighted using sample weights.



Table 3: Daily working time flexibility and working time accounts, 2003-2009

	Doesn't work overtime (1)	Works overtime; has working time account?	
		No (2)	Yes (3)
Fixed hours	68.2	40.9	38.1
Varying hours controlled by firm	14.9	23.4	17.7
Worker controls hours	3.0	23.4	5.0
Shared control using working time account	14.0	12.3	39.2
	100.0	100.0	100.0
Observations	2745	3480	6639

Note: Full-time workers age 20-54 living in west, odd years only. The categories the respondent chooses between are more exactly: “Fixed beginning and end of daily work time”; “Sometimes varying daily work hours determined by establishment”; “Choose own working time, no formal working time rules”; “Flexitime with working time account and a certain control over daily work time within this framework”. The working time account question is “Can these overtime hours also flow into a so-called working time account, that must be equalized within a year or more with time off?” Shares are weighted using sample weights.

Table 4: Flexibility and satisfaction with work 1984-2009 (except 1987)

	OLS		Worker FE		Job fixed effects	
	(1)	(2)	(3)	(4)	(5)	(6)
			All workers			Hourly-paid
OT compensated with						
Time off	-0.121*** (0.034)	-0.131*** (0.034)	-0.095*** (0.034)	-0.033 (0.028)	-0.049* (0.029)	-0.032 (0.041)
Time off and pay	-0.130*** (0.034)	-0.131*** (0.034)	-0.129*** (0.034)	-0.065 (0.028)	-0.050* (0.028)	-0.024 (0.039)
No compensation	-0.214*** (0.044)	-0.198*** (0.044)	-0.231*** (0.044)	-0.261*** (0.039)	-0.200*** (0.039)	-0.352*** (0.111)
Does not work OT	0.081*** (0.033)	0.059* (0.033)	0.120*** (0.033)	-0.003 (0.028)	-0.010 (0.029)	0.001 (0.037)
Standard, actual hours	--	Yes	Yes	Yes	Yes	Yes
Log net hourly wage	--	--	Yes	Yes	Yes	Yes
Time off – no OT	-0.202*** (0.030)	-0.190*** (0.031)	-0.215*** (0.031)	-0.031 (0.025)	-0.040 (0.025)	-0.033 (0.039)
R <sup>2</sup>	0.02	0.02	0.03	0.03	0.04	0.04
Observations	76,813	76,813	76,813	76,813	76,813	33,762

Note: The dependent variable ranges from 0-10, but 90.5% of responses are between 5 and 10. All specifications without fixed effects include gender, married spouse present, any child in household, number of children in household, interactions of child variables with gender, year of education, years of full time experience, years of part-time experience, years of unemployment, firm tenure, foreign born, hourly-paid status, 22 industry dummies, SOEP sample dummies, year dummies. Some of these variables are not identified when fixed effects are added. Standard errors clustered by person.

Table 5: Flexibility and satisfaction with leisure 1984-2009 (except 1987, 1990, 1995)

	OLS		All workers	Worker	Job fixed effects	
	(1)	(2)		FE	(5)	Hourly-paid
	(1)	(2)	(3)	(4)	(5)	(6)
OT compensated with						
Time off	0.194*** (0.039)	0.082** (0.038)	0.063 (0.038)	0.059* (0.031)	0.047 (0.033)	0.078* (0.048)
Time off and pay	-0.080** (0.040)	-0.090** (0.039)	-0.091** (0.039)	-0.040 (0.030)	-0.036 (0.033)	-0.015 (0.046)
No compensation	-0.388*** (0.052)	-0.226*** (0.050)	-0.209*** (0.050)	-0.076* (0.042)	-0.033 (0.045)	0.020 (0.139)
Does not work OT	0.419*** (0.037)	0.181*** (0.037)	0.149*** (0.037)	0.122*** (0.031)	0.110*** (0.033)	0.123*** (0.042)
Standard, actual hours	--	Yes	Yes	Yes	Yes	Yes
Log net hourly wage	--	--	Yes	Yes	Yes	Yes
Time off – no OT	-0.225*** (0.033)	-0.099*** (0.034)	-0.085** (0.034)	-0.062** (0.027)	-0.062** (0.028)	-0.046 (0.045)
R <sup>2</sup>	0.05	0.07	0.07	0.03	0.03	0.02
Observations	71,054	71,054	71,054	71,054	71,054	30,800

Note: The dependent variable ranges from 0-10, but 83.5% of responses are between 5 and 10. All specifications without fixed effects include gender, married spouse present, any child in household, number of children in household, interactions of child variables with gender, year of education, years of full time experience, years of part-time experience, years of unemployment, firm tenure, foreign born, hourly-paid status, 22 industry dummies, SOEP sample dummies, year dummies. Some of these variables are not identified when fixed effects are added. Standard errors clustered by person.

Table 6: Flexibility and satisfaction with life 1984-2009 except 1987

	OLS		Worker FE	Job fixed effects		
	All workers				Hourly- paid	
	(1)	(2)	(3)	(4)	(5)	(6)
OT compensated with						
Time off	-0.043 (0.028)	-0.058** (0.028)	-0.038 (0.028)	-0.026 (0.022)	-0.027 (0.023)	-0.017 (0.033)
Time off and pay	-0.089*** (0.029)	-0.090*** (0.029)	-0.089*** (0.028)	-0.041* (0.022)	-0.035 (0.023)	-0.028 (0.032)
No compensation	-0.083** (0.037)	-0.061* (0.036)	-0.079** (0.036)	-0.081*** (0.029)	-0.074** (0.031)	-0.197** (0.085)
Does not work OT	0.131*** (0.028)	0.097*** (0.028)	0.131*** (0.028)	0.063 (0.023)	0.052** (0.024)	0.066** (0.031)
Standard, actual hours	--	Yes	Yes	Yes	Yes	Yes
Log net hourly wage	--	--	Yes	Yes	Yes	Yes
Time off – no OT	-0.174*** (0.026)	-0.155*** (0.026)	-0.169*** (0.026)	-0.089*** (0.019)	-0.079*** (0.020)	-0.084** (0.032)
R <sup>2</sup>	0.03	0.03	0.04	0.03	0.03	0.03
Observations	76,813	76,813	76,813	76,813	76,813	33,762

Note: The dependent variable ranges from 0-10, but 94.7% of responses are between 5 and 10. All specifications without fixed effects include gender, married spouse present, any child in household, number of children in household, interactions of child variables with gender, year of education, years of full time experience, years of part-time experience, years of unemployment, firm tenure, foreign born, hourly-paid status, 22 industry dummies, SOEP sample dummies, year dummies. Some of these variables are not identified when fixed effects are added. Standard errors clustered by person.

Table 7: Transitions between overtime states

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	N-N	U-U	P-P	N-U	U-N	N-P	P-N	P-U	U-P	$\Sigma$ H	$\Sigma$
2005/6- 2004/5	-2.1	3.5	-0.8	0.3	-0.6	-0.7	1.9	-0.5	-0.4	-0.6	0.0
2006/7- 2005/6	-5.2	4.2	0.5	-1.1	-1.7	1.4	-0.8	-1.2	3.0	1.0	0.0
2007/8- 2006/7	-7.3	-4.2	2.3	2.7	4.1	0.7	2.3	-0.0	-1.3	0.6	0.0
2008/9- 2007/8	5.9	-4.4	-4.1	-3.0	5.2	-1.1	2.5	0.2	-0.8	-0.4	0.0

Note: N-N represents transitions from no overtime to no overtime; P represents paid overtime; U unpaid overtime; H both paid and unpaid overtime (hybrid).  $\Sigma$ H represents the sum of values involving H: the individual values are presented in the Appendix Table. Each row sums to zero, subject to rounding error. Values are based on transition matrices whose cells sum to one. Each entry is the difference in corresponding cell values for transition matrices in adjacent pairs of years.

Appendix Table 1: Means of covariates for sample used in job satisfaction regressions  
(1984-2009 except 1987)

Variable	Mean	Standard deviation
Log net wage	2.30	0.41
Sex	0.32	--
Married	0.62	--
Married $\times$ sex	0.15	--
Any children under 18	0.41	--
Any children $\times$ sex	0.07	--
Number children under 18	0.69	0.98
Number children $\times$ sex	0.10	0.41
Education in years	11.7	2.6
Full time experience in years	15.1	9.6
Part time experience in years	0.68	2.3
Past unemployment in years	0.35	1.02
Tenure at firm	10.1	8.6
Foreign born	0.23	--
Hourly-paid worker	0.44	--
Year	1997.3	7.4

Note: 76,813 observations. Unweighted means.

Appendix Table 2: Transitions between overtime states involving hybrid overtime (H)

	H-H	H-N	N-H	H-U	U-H	H-P	P-H	$\Sigma$ H
2005/6- 2004/5	0.5	0.7	-0.6	-0.8	-0.4	1.1	-1.0	-0.6
2007/6- 2006/5	0.5	-1.0	1.2	0.2	0.8	-0.8	0.1	1.0
2008/7- 2007/6	0.3	0.0	-0.6	-0.0	0.9	0.5	-0.5	0.6
2009/8- 2008/7	-0.4	0.6	-0.1	0.9	-1.8	-0.6	0.9	-0.4

Note: H-H represents transitions from hybrid overtime to the same state; N represents no overtime; P represents paid overtime; U unpaid overtime; Each row sums to  $\Sigma$  H, subject to rounding error, a value reported in Table 7. Values are based on transition matrices whose cells sum to one. Each entry is the difference in corresponding cell values for transition matrices in adjacent pairs of years.