

TIME AND ECONOMIC WELL-BEING—A PANEL ANALYSIS OF DESIRED VERSUS ACTUAL WORKING HOURS

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Individual well-being has its resources by income and time. Though income traditionally is on the focuses of well-being analyses, the connected time dimension is often neglected. One important dimension of individual welfare regarding time and income is the possibility to harmonize desired with actual working hours connected with the income dimension. This paper will analyze this working hour tension by a ten year panel analysis for Germany. Besides descriptive measures of the subjective tension over a decade from the mid 1980s to the mid 1990s, the panel econometric analyses will quantify personal and household influences in explaining the working hour tension as one further important economic well-being measure.

1. TIME AND ECONOMIC WELL-BEING—INTRODUCTION

Individual (economic) well-being has its resources by income *and* time. Though income traditionally is on the focus of well-being analyses, the connected time dimension is often neglected. One important dimension of individual welfare regarding time is on harmonizing desired and actual working hours. However, the working hour tension—the difference between desired and actual working hours—has to be connected with its income consequences and dimension to be predicative.

This paper ties time and economic well-being by analysing the working hour tension with its possible consequences on income as paid working hours for Germany from the mid 1980s to the mid 1990s. Analyzing this tension (satisfaction), our economic well-being analysis is beyond and in addition to traditional economic well-being analyses, which are restricted to actual income and its distribution. We analyze the working hour tension in two steps: based on central labor market developments from 1984 to 1995, in the first step we describe the situation

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An earlier version of this paper is Merz and Lang, 1999. The extensions here are according to new descriptive as well as new panel econometric results.

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of two snapshots in Germany incorporating all respective cross section information. The individual dynamics in a ten year harmonization process are analyzed in a second step by descriptive mobility indices and then by panel econometric estimates quantifying explanatory hypotheses based on microeconomic labor supply modeling. The database is the German Socio-Economic Panel (GSOEP).

There has been little research in recent years examining preferences for working hours. There are, however, studies by Holst and Schupp (1994) and Schramm and Schlese (1995) for Germany, or for the U.S. with a more sociological point of view, Jacobs and Gerson (1998), Clarkberg and Moen (2000) and Townsend (2001). Merz and Ehling (1999) conducted a recent survey on time use research topics and results. In particular, there has been no research on tying together time and economic well-being, two central living condition dimensions. In this paper we investigate labor market dynamics according to this individual time balance of active people in a strong connection with their economic consequences with focus on the self-employed, as professions and entrepreneurs, and employees.

Background Questions

Facing a still problematic labor market situation with high unemployment and an ongoing discussion about international competitiveness, cost pressure, personal reduction and shareholder value questions regarding the individual satisfaction about the working time of the active people, seems—at a first glance—to be of minor importance. However, there are a number of reasons why the working hour tension of the active people is important: for the active people themselves; for the unemployed with their desire to work; for an enterprise's success; and for active economic and social policy.

At the micro level, work productivity is dependent on work satisfaction, including satisfaction concerning the balance of actual and preferred working hours. In times of high unemployment, labor market pressures lead to a growing individual overtime situation, resulting in social conflicts and stress. From the perspective of the working individual, the amount of working hour tension describes the degree of job satisfaction with all its consequences on the individual's living circumstances according to "non-material" spheres such as health, partnership, etc. and according to the individual's material standard of living conditions.

At the macro level, policies with shorter individual working hours for new jobs was not only a central claim of the German unions in the 1980s. In the 1990s, how to handle the labor market problems was still an open question of economic and social policy (Holst and Schupp, 1994). Is there any individual willingness for a redistribution of working hours by working less? And if there is, is there any changed behavior in the course of time and changing circumstances for men and/or women? Was there an expansion of part-time occupation from the 1980s to the 1990s and how did full-time occupation develop in this decade? Furthermore, do full-time occupied persons prefer working part-time; are part-time workers satisfied with their working hours or do they want to work longer? These are questions we try to answer in this paper.

If any economic and social policy, and in particular, any labor market policy—such as raising or diminishing working hours, flexibility with regard to part-time and full-time jobs, etc.—is based and burdened by the persons concerned, knowledge about the individual judgment of their working hours and their preferences on the background of the actual situation is essential. And, on a more general level, such an empirical based knowledge is essential for any successful economic and social policy targeted at the individual.

Connected with the above arguments and new labor market forms and individual well-being is the question of “time sovereignty”—whether self-employed or employed: Does working time sovereignty really lead to a satisfied balance of the desired and actual hours of work? Thus, one important socio-economic breakdown in our analysis will be the occupational status as self-employed—as (liberal) professional (“Freiberufler,” such as architects, lawyers, doctors, consultants, etc.) or entrepreneurs—and employees. In addition, changing individual working hours pattern will influence and will be dependent on the entire household an individual is situated in. Therefore, the household situation of the individual will be incorporated in our analyses.

Our paper on time and economic well-being adds an important aspect to the traditional income centered inequality and well-being discussion in economics, taking into account the necessary amount of scarce individual time for a satisfied income situation.

Paper Organization

To deal with the above questions and problems, we analyze the individual working hour tension of the active people, based on a relatively ambitious longitudinal microdatabase. We first characterize the database—the German Socio-Economic Panel, and describe the empirical operationalization of time use as desired versus actual working hours and the connected economic well-being. Then we analyze working hour (including part- and full-time) preferences and the actual working hour situations before and after a decade, with two respective cross-sections of the mid 1980s (1985) and the mid 1990s (1994). We discuss the gender-specific development in actual part-time and full-time occupation in general, and the respective working hour tension in particular. Then, the desire to work more, the same or less for professions, entrepreneurs and employees is discussed for the mid 1980s and ten years later.

The two cross-sections so far show the situations as two snapshots for all over Germany, including East Germany in 1994 in particular. Though this type of cross-sectional analysis can be shown by macro developments, the individual changes and developments are still hidden. Therefore, we extend the analysis by individual longitudinal developments with our panel data. In addition to the descriptive transition analysis we quantify socio-economic hypotheses—including the individual domestic (non-market) working pattern and the further household situation—by multivariate panel econometric estimates. In particular, we quantify market *and* non-market influences on working hour tension based on labor supply modeling. In order to choose a “best” model, we compare fixed and random effects models to the results of the pooled model. In addition, we discuss the

results of two factor fixed and random effects models to further disentangle individual and time period effects. Only this kind of empirical based information allows economic and social policy to effectively target individual behavior with some chances of success.

In the conclusion we discuss some impacts of our results for economic and social policies and labor market strategies.

2. TIME AND ECONOMIC WELL-BEING: THE EMPIRICAL OPERATIONALIZATION

To analyze our topic on an individual level, an ambitious database is necessary: we need the tight empirical connection between time use as desired versus actual working hours *and* economic well-being, and we need panel data with as a set of socio-economic background variables to explain the instant. Such a microdatabase is at hand: the German Socio-Economic Panel (GSOEP) with its specific question on desired working hours tied to economic consequences and the further background. To describe the empirical operationalization in this section we briefly characterize our ten years panel-microdatabase, describe the central question of investigation and set the general definitions for our cross-sectional and longitudinal analyses.

2.1. *Microdatabase: The German Socio-Economic Panel*

The GSOEP is a longitudinal microdatabase containing socio-economic information on private households in the Federal Republic of Germany. The representative sample of households, persons and families has been repeated yearly since 1984. All adult persons in a household aged 16 years and older (Germans and foreigners) are surveyed. Since 1990 the GSOEP has been expanded with regard to the former German Democratic Republic (DDR, East Germany) by 4,453 persons in 2,179 households. The first wave in 1984 consisted only of 6,000 households, with more than 12,000 persons interviewed. With demographic information, the household situation, individual labor force participation and occupational mobility data, the GSOEP questionnaire in general contains objective measures such as use of time, wages, income components, benefit payments, etc. as well as subjective measures such as level of satisfaction with various aspects of life, hopes and fears, political involvement, etc. of the German population (Wagner *et al.*, 1991). An English version of the GSOEP is available at Syracuse University (Burkhauser and Wagner, 1996).

2.2. *Desired and Actual Working Hours and Economic Well-Being Questions*

Time use information is available from the GSOEP within different approaches. There is a normal day time-budget question with stylized time information for several market and non-market activities (household, child-caring, do-it-yourself, leisure, etc.). There is frequency information for different activities within some months, and there are direct questions concerning the working hours situation.

We are focussing our analysis on the following two working hour questions (here from wave 11 (K, 1994) kp60 and kp66)¹:

- What is the average amount of your *actual working hours*, including possible overtime (hours per week)?
- If you could choose the extent of your working hours, considering that your income would change according to your working hours, what is the amount of your *preferred working hours per week*?

Thus, the desired hours question is linked to and affected by their economic impact. The answer therefore is the result of the individual valuing of the substitution and opposite income effect of working hour changes accounting for income consequences. We define the difference “desired or preferred working hours minus the actual working hours” as the working hour tension (wht). Since the question concerning preferred working hours was first asked in 1985, our analysis starts with the second GSOEP wave that year.

2.3. *General Definitions for Our Cross-sectional and Longitudinal Microanalyses*

One of our interests is to analyze whether a “working time sovereignty” is of influence with regard to working hour tension. We therefore divide our socio-economic groups into the self-employed—i.e. (liberal) professional (“Freie Berufe” such as architects, lawyers, doctors, consultants, etc.), and entrepreneurs (self-employed up to and with more than nine employees, excluding farmers, and without the assistance of family members)—and employees (civil servants, blue- and white-collar workers). When speaking about “working time sovereignty” we are aware of market needs and constraints influencing the self-employed working hours. However, these constraints are somehow different to contract constraints in the employee situation. We ignore the unemployed, since their wish to work (more) is obvious; they may benefit from an overall working hours reduction of the active people.

Additionally, in the longitudinal section we concentrate on the harmonization process within the same occupational status to get rid of the disturbances by new status specific requirements. Thus, there will be no occupational mobility but the same occupational status ten years later (longitudinal section).

In general, our descriptive analyses are based on weighted data with a specific refinement of the adjustment for the self-employed (Merz, 1993; Merz and Lang, 1997). All panel econometric analyses are based upon the not weighted cases.

3. DESIRED VERSUS ACTUAL WORKING HOURS IN THE 1980s AND 1990s— WORKING HOUR TENSION CROSS-SECTIONAL EVIDENCE

Let us start with the overall employment structure in the mid 1980s (1985)—and ten years later—in the mid 1990s. With two snapshots, two cross-sections,

¹kp60: “Wieviel beträgt im Durchschnitt Ihre tatsächliche Arbeitszeit einschließlich eventueller Überstunden?”

kp66: “Wenn Sie den Umfang Ihrer Arbeitszeit selbst wählen könnten und dabei berücksichtigen, daß sich Ihr Verdienst entsprechend der Arbeitszeit ändern würde: Wieviele Stunden in der Woche würden Sie dann am liebsten arbeiten?”

we show the West-German situation in the 1980s, and after the reunification, the situation in the 1990s, including East Germany. Thus quite a different labor market situation is to be expected for a changing Germany. More than 5,300 persons (weighted: 21 Mio.) built the 1985 database; more than 6,300 interviews (weighted 29 Mio.) are available for 1994.

3.1. *Employment Structure Development, Part-time and Full-time Work, 1985 and 1994*

Analysis of the overall employment development will provide the general labor market background for our further working hour tension analyses. First we investigate the two main working time schedules: full-time and part-time work. The question is whether there is a more or less stable situation in between these two broad groups or whether there is a change over the regarded decade. A more flexible labor market—from the supply as well the demand side—would probably result in an increased portion of part-time work.

Table 1 describes the gender-specific development in part- and full-time occupation from the mid 1980s to the mid 1990s. The overall development in Germany shows the same magnitude of full- and part-time occupation increase by 37 percent; thus there is no remarkable change between the part-time and full-time pattern, with overall 17.8 percent in both years working part-time. However, there are remarkable gender-specific differences. More than a third of the women were working part-time, whereas only about 4.4 percent of men had such a job in 1994. The remarkable labor force participation increase of women by 55 percent from the 1980s to the 1990s is mainly due to an increase of full-time jobs (58 percent) followed by an almost 50 percent increase of part-time labor force participation. There is practically no change of the part-time situation of men, but an increase of about 30 percent in full-time occupation.

There are different dynamics with regard to the occupational status: *Professional*: the number of women has more than doubled (index: 230 percent) whereas the entrepreneurship situation shows only an increase of 7 percent (women) and 2 percent for men. Professionals show the highest part-time quota of all occupation (men and women) for both years. *Entrepreneurs*: part-time is increased, full-time is slightly diminished for men and women. *Employees*: whereas professionals and entrepreneurs are still a male domain, the women working quota is highest within the employees.

The situation in 1994 for West Germany compared to East Germany is not very different regarding the gender-specific quota in the three occupational groups; however, there are remarkable differences with respect to the part- and full-time situation. Compared to the “Alte Länder” (West Germany) the part-time quota, regardless of whether self-employed or as an employee, is pronounced smaller in the “Neue Länder” (East Germany).

To summarize: there are remarkable changes in the employment structure with different dynamics in female and male labor force participation. Women’s part-time and full-time labor force participation have increased more than men’s participation. The labor force participation of women increased in particular in the professionals. Whereas the overall part-time picture (17.8 percent) is

TABLE 1
EMPLOYMENT STRUCTURE: GENDER-SPECIFIC DEVELOPMENT IN PART- AND FULL-TIME OCCUPATION IN GERMANY, 1985 AND 1994

	1985						1994						Development-Index Germany (N ₁₉₈₅ = 100)		
	Germany			Germany			West Germany			East Germany			All	Men	Women
	All	Men	Women	All	Men	Women	All	Men	Women	All	Men	Women			
Professionals ¹	1.3 ⁵	75.9 ⁶	24.1	1.6	65.7	34.3	1.7	66.1	33.9	1.2	63.5	36.5	162.2	140.5	230.7
Part-time ⁴	31.6 ⁶	20.5	66.2	36.3	20.5	66.7	42.2	23.7	78.4	—	—	—	186.9	140.3	232.3
Full-time	68.4	79.5	33.8	63.7	79.5	33.3	57.8	76.3	21.6	100.0	100.0	100.0	150.9	140.5	227.4
Entrepreneurs ²	6.1	75.5	24.5	4.6	74.4	25.6	4.5	73.5	26.5	4.8	78.4	21.6	103.3	101.9	107.8
Part-time	17.0	10.2	37.9	20.5	12.0	45.2	24.1	13.8	52.7	5.5	5.1	6.8	124.5	119.7	128.5
Full-time	83.0	89.8	62.1	79.5	88.0	54.8	75.9	86.2	47.3	94.5	94.9	93.2	99.0	99.9	95.2
Employees ³	92.6	61.5	38.5	93.8	57.0	43.0	93.8	57.5	42.5	94.0	54.4	45.6	139.3	129.1	155.6
Part-time	17.7	5.1	37.7	17.4	3.6	35.7	19.4	3.8	40.5	8.7	2.5	16.2	137.1	90.2	147.2
Full-time	82.3	94.9	62.3	82.6	96.4	64.3	80.6	96.2	59.5	91.3	97.5	83.8	139.8	131.2	160.7
All working	21,025,587	13,143,854	7,881,733	28,894,480	16,730,395	12,164,085	81.6 ⁷	58.4 ⁶	41.6	18.4	55.6	44.4	137.4	127.3	154.3
Part-time	3,746,458	751,740	2,994,718	5,154,523	729,487	4,425,036	91.2	13.9	86.1	8.8	17.2	82.8	137.6	97.0	147.8
Full-time	17,279,129	12,392,114	4,887,015	23,739,957	16,000,908	7,739,049	79.5	69.5	30.5	20.5	59.2	40.8	137.4	129.1	158.4

¹Self-employed professionals.

²Self-employed without professionals, without farmers and without assistance of family members.

³Blue-collar workers, white-collar workers, civil servants, without trainees.

⁴Part-time: <35 hours; full-time: ≥35 hours.

⁵In percent of all working (professionals, entrepreneurs and employees).

⁶In percent of the respective occupational status.

⁷In percent of N all over Germany 1994.

⁸In percent of the respective row group.

⁹N of respective group (1994)/N of respective group (1985) × 100.

Source: German Socio-Economic Panel (GSOEP), weighted cross-sectional datasets, own calculations, n₁₉₈₅ = 5,307, N₁₉₈₅ = 21,025,587, n₁₉₉₄ = 6,331, N₁₉₉₄ = 28,894,480.

unchanged, there are remarkable shifts, at least for the occupational groups analyzed here, with particular dynamics in the labor force participation of women. There are differences in 1994 for West and East Germany: the part-time quota in East Germany both for the self-employed and the employees is smaller than in West Germany.

3.2. *Part- and Full-time Desired and Actual Working Hours, 1985 and 1994*

Is the changing labor force situation shown above accompanied by a more or less satisfied individual working hour situation in Germany? Is there a change of preferences from economically better times in the 1980s to the tougher situation in the 1990s? Is the labor market flexible enough to allow the workload that is wanted? Are there remarkable differences between West and East Germany after four years of reunification? Table 2 shows the congruence/divergence of the desired and actual working hours aggregated in part-time and full-time blocks in 1985 and 1994.

The main result for West Germany: the working hour preference strongly corresponds in both years to the actual part-time and full-time situation (the block diagonals are dominant). This correspondence is even stronger ten years later for professionals and only slightly stronger for entrepreneurs. For employees, the correspondence (block diagonal) is still dominant but compared to 1985, with an increased tendency to part-time occupation.

The picture is different in East Germany compared to West Germany four years after the German reunification: in 1994 for professionals and entrepreneurs there is a strong desire for full-time work, both for full- and part-time workers; no professional in the sample for East Germany wishes to work part time. Although for employees the correspondence between desired and actual hours of work is dominant, compared to West Germany, relatively more part- and full-time workers want to work full time.

To summarize: the part-time/full-time threshold is evident in the mid 1980s and in the mid 1990s and is even stronger ten years later for West Germany. Thus, for West Germany there is a dominant and increasing division of labor desired by the active people. The picture is different for East Germany in 1994, with a strong (especially for the professionals' and entrepreneurs' start ups) desire to work full time. For a further general discussion of part-time working in Germany, see Holst and Schupp (1994) and Schupp (1991).

3.3. *Single Desired versus Actual Working Hours, 1985 and 1994: Overall Germany*

After our brief discussion of the part-time and full-time (block) situation we now go into more detail with regard to the single hours situation. We ask how the working hour tension—measured as the relative (to the actual situation) difference between desired and actual weekly working hours—is gender- and occupation-specifically distributed according to the desire to work less (being overemployed), to work the same (being satisfied) or to work more (being underemployed).

TABLE 2
PART- AND FULL-TIME DESIRED AND ACTUAL WORKING HOURS IN GERMANY, 1985 AND 1994

Actual Working Hours	1985 Desired Working Hours				1994 Desired Working Hours											
	Germany				Germany				West Germany				East Germany			
	N	%	Part-time	Full-time	N	%	Part-time	Full-time	N	%	Part-time	Full-time	N	%	Part-time	Full-time
Professionals ¹	281,429	1.3 ⁵	31.5 ⁷	68.5	456,561	1.6	36.8	63.2	86.0	1.7	42.5	57.5	14.0	1.2	2.3	97.7
Part-time ⁴	88,806	31.6 ⁶	63.8	36.2	165,957	36.3	86.3	13.7	100.0	42.2	86.3	13.7	–	–	–	–
Full-time	192,623	68.4	16.7	83.3	290,604	63.7	8.6	91.4	78.0	57.8	10.3	89.7	22.0	100.0	2.3	97.7
Entrepreneurs ²	1,282,660	6.1	19.0	81.0	1,325,590	4.6	19.4	80.6	80.6	4.5	22.5	77.5	19.4	4.8	6.5	93.5
Part-time	217,899	16.0	70.1	29.9	271,376	20.5	67.2	32.8	94.8	24.1	70.3	29.7	5.2	5.5	9.4	90.6
Full-time	1,064,761	83.0	8.6	91.4	1,054,214	79.5	7.1	92.9	77.0	75.9	7.3	92.7	23.0	94.5	6.4	93.6
Employees ³	19,461,498	92.6	28.2	71.8	27,112,329	93.8	27.8	72.2	81.5	93.8	29.9	70.1	18.5	94.0	18.6	81.4
Part-time	3,439,753	17.7	77.0	23.0	4,717,190	17.4	89.3	10.7	90.7	19.4	91.5	8.5	9.3	8.7	67.6	32.4
Full-time	16,021,745	82.3	17.7	82.3	22,395,139	82.6	14.8	85.2	79.6	80.6	15.1	74.9	20.4	91.3	13.9	86.1

¹Self-employed professionals.

²Self-employed without professionals, without farmers and without assistance of family members.

³Blue-collar workers, white-collar workers, civil servants, without trainees.

⁴Part-time: <35 hours; full-time: ≥35 hours.

⁵In percent of all working (professionals, entrepreneurs and employees).

⁶In percent of the respective occupational status (actual situation).

⁷In percent of the respective occupational status (desired situation).

⁸In percent of N all over Germany, 1994.

Source: German Socio-Economic Panel (GSOEP), weighted cross-sectional datasets, own calculations, $n_{1985} = 5,307$, $N_{1985} = 21,025,587$, $n_{1994} = 6,331$, $N_{1994} = 28,894,480$.

The situation in overall Germany is as follows: in 1985, 56 percent of all working people want to work less, 32 percent are satisfied with their working hours situation and 12 percent want to work more than they do (Table 3). The stress and dissatisfaction overall has grown within the following decade: for the re-united Germany, only 21 percent are now satisfied with their current working hours, more than 62 percent want to work less and only 16 percent want to work more. Thus, taking into account possible income reductions by working less hours, the amount of dissatisfied working people with the desire to diminish their working hours (let us call it “negative” dissatisfaction), in particular, has grown remarkably in Germany. This is so for both men and women, with a slightly more balanced situation in 1994.

The answer to the question “why are so many dissatisfied” is certainly quite complex. The range will encompass explanations like tougher markets with more competition, pressure and higher unemployment figures, changing individual and societal demands and living conditions. What we can provide in this paper is a description of the evidence to a certain extent and a quantification of some of the explanatory patterns by panel econometric analyses based on socio-economic household data (Section 5), leaving behind many further possible influences.

The trend to an unbalanced and stressed situation, with desires to work less in particular, shown by the respective participation figures, is supported by the amount of the discrepancies between desired and actual working hours: whereas in 1985 the overall mean working hour tension (wht) was positive (9.3 percent), indicating the on average dominant desire to work more than the desire to work less hours, even the sign has reversed in 1994 (mean wht: -2.9 percent). The mean actual working hours are diminished over the decade by 0.7 hours (= 42 minutes) roughly by the same degree for men and women.

Pronounced differences are given according to the occupational status (see Figure 1):

- *Employees*: The proportion of the balanced situation diminished from 32.8 percent to 20.9 percent, with changes mainly to the desire to work less situation (“negative” dissatisfaction).
- *Entrepreneurs*: The proportion of the balanced situation diminished only slightly from 22.1 percent to 20.4 percent, with an increased proportion being “negatively” dissatisfied (from 65.9 percent in 1985 to 68.1 percent in 1994).
- *Professionals* (“*Freie Berufe*”): The proportion of the balanced situation has risen remarkably from 14.4 percent to 46.7 percent, mainly with a diminishing proportion of people with a desire to work less.

Thus, time sovereignty via the occupational status seems to be an important factor for working hour harmonization. In addition, the group of professions seems to be most successful in reaching a balanced working hour situation.

Obviously the amount of weekly working hours between these occupational groups has quite a different level but is diminishing for all over that decade. From more distributional details according to the amount of working hour tension dependent on the actual part- and full-time situation for 1985 and 1994 it will be evident that the strongest (relative!) negative working hour tension, the strongest

TABLE 3
DESIRED VERSUS ACTUAL WORKING HOURS IN GERMANY 1985 AND 1994: OVERALL AND GENDER- AND OCCUPATION SPECIFIC INDICATORS

	1985 Germany					Germany					1994 West Germany					East Germany				
	Desire to Work			Mean		Desire to Work			Mean		Desire to Work			Mean		Desire to Work			Mean	
	Less (%)	Same (%)	More (%)	wht ⁵ (%)	Working Hours ⁶	Less (%)	Same (%)	More (%)	wht (%)	Working Hours	Less (%)	Same (%)	More (%)	wht ⁵ (%)	Working Hours ⁶	Less (%)	Same (%)	More (%)	wht (%)	Working Hours
All working	56.1 ⁴	31.9	12.0	9.3	40.1	62.4	21.3	16.3	-2.9	39.4	61.5 ⁴	21.0	17.5	-1.9	38.4	66.0	22.8	11.2	-7.4	43.7
Men	57.6	31.1	11.2	7.3	44	64.9	19.2	15.9	-5.4	43.5	64.4	18.5	17.0	-4.6	42.9	67.2	22.3	10.5	-9.3	46.4
Women	53.6	33.2	13.2	12.8	34	58.9	24.2	17.0	0.6	33.6	57.5	24.4	18.2	1.9	32.0	64.5	23.4	12.0	-5.0	40.2
Professionals ¹	65.2	14.4	20.4	12.3	40.2	41.7	46.7	11.6	5.4	37.2	34.9	51.6	13.5	9.5	34.5	83.6	16.4	-	-20.2	54.1
Men	70.0	12.5	17.5	9.0	45.0	51.0	38.9	10.0	8.1	44.0	46.1	42.3	11.6	12.5	42.3	82.5	17.5	-	-20.1	55.1
Women	49.8	20.5	29.6	22.5	27.0	23.8	61.5	14.6	0.2	24.2	13.0	69.8	17.2	3.8	19.2	85.5	14.5	-	-20.3	52.4
Entrepreneurs ²	65.9	22.1	11.9	-4.9	52.3	68.1	20.4	11.6	-0.0	49.6	65.7	22.2	12.1	1.8	47.9	78.0	12.5	9.5	-7.5	56.7
Men	69.0	20.7	10.3	-5.0	55.0	75.2	14.4	10.5	-3.8	54.1	74.4	15.2	10.4	-3.0	53.0	78.0	11.1	10.9	-6.9	58.4
Women	56.3	26.6	17.1	-4.7	43.0	47.4	37.8	14.8	10.9	36.7	41.4	41.8	16.8	14.9	34.0	78.0	17.6	4.4	-9.7	50.2
Employees ³	55.3	32.8	11.9	10.2	39.2	62.4	20.9	16.7	-3.2	38.9	61.8	20.3	17.8	-2.2	38.0	65.2	23.4	11.4	-7.2	42.9
Men	56.5	32.3	11.2	8.3	43.0	64.5	19.1	16.4	-5.8	42.8	64.2	18.3	17.6	-5.0	42.3	66.2	23.2	10.6	-9.3	45.4
Women	53.5	33.5	12.9	13.4	33.0	59.7	23.3	17.1	0.3	33.7	58.6	23.2	18.2	1.5	32.1	64.0	23.7	12.3	-4.7	39.9

¹Self-employed professionals.

²Self-employed without professionals, without farmers and without assistance of family members.

³Blue-collar workers, white-collar workers, civil servants, without trainees.

⁴In percent of the respective row group.

⁵Working hour tension (wht) = (desired - actual weekly working hours)/actual weekly working hours × 100.

⁶In hours per week.

Source: German Socio-Economic Panel (GSOEP), weighted cross-sectional datasets, own calculations, n₁₉₈₅ = 5,307, N₁₉₈₅ = 21,025,587, n₁₉₉₄ = 6,331, N₁₉₉₄ = 28,894,480.

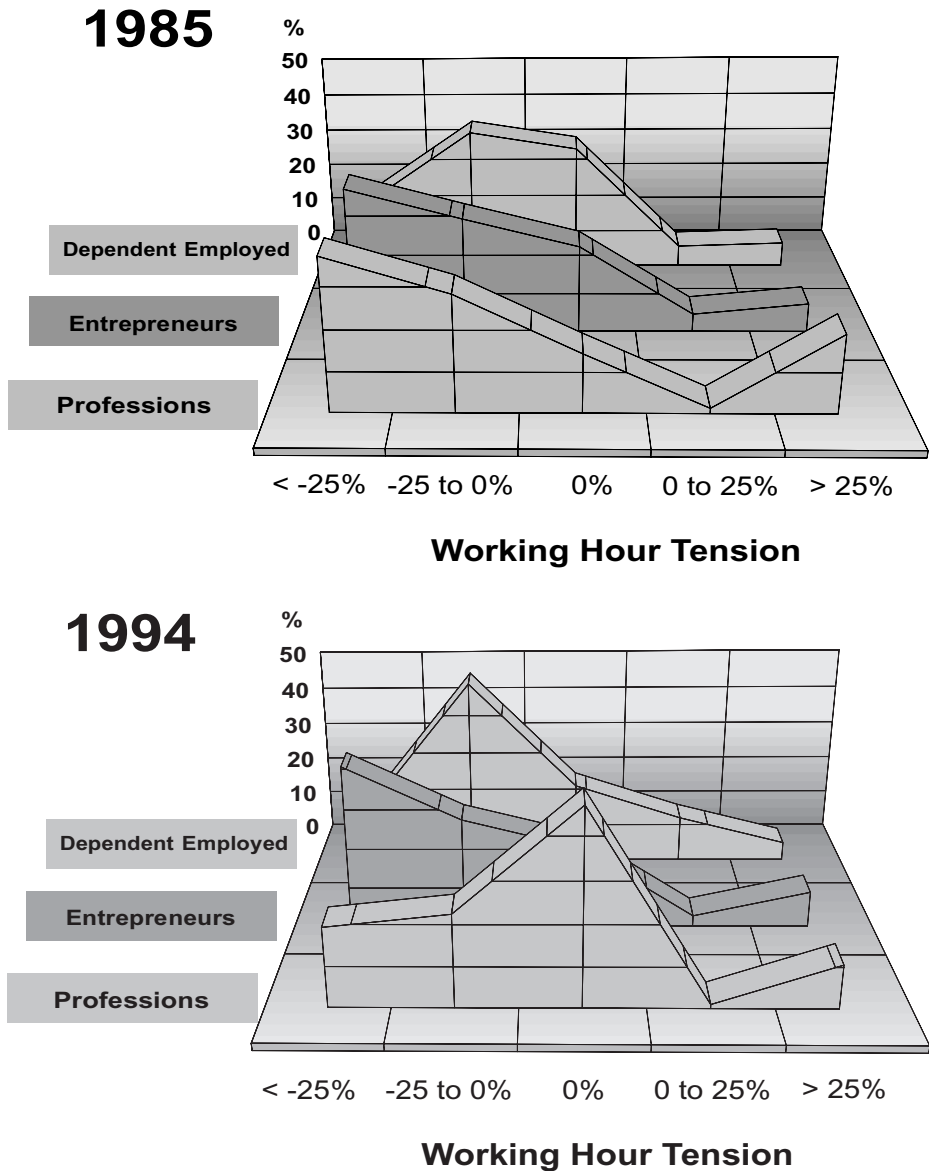


Figure 1. Desired versus Actual Working Hours—1985 and 1994

Source: German Socio-Economic Panel (GSOEP), weighted cross-sectional datasets, own calculations (see Table 3).

desire to work less than actually done, are given for those who work the most (with working hours >40 hours per week). Thus, it is not only time sovereignty as given by occupational status, but also the level of actual working hours which is important in explaining working hour tension; one descriptive result which has

to be respected by the further inferential analyses with our panel econometric analyses in Section 5 of this paper.

3.4. *Single Desired versus Actual Working Hours, 1985 and 1994: West and East Germany*

Is the above picture for overall Germany in the mid 1990s different between West and East Germany four years after the reunification? The answer is yes (Table 3). The actual working hours for all occupational groups and for both men and women are higher—about 4 hours per week—in East Germany than in West Germany. From that level on the desire to work less is more pronounced for all groups considered in East Germany: overall mean working hour tension reduction by -7.4 percent (West Germany: -1.9 percent).

In particular, the self-employed, as professionals (83.6 percent) and as entrepreneurs (78 percent), remarkably want to reduce their hours of work. Thus, there is no relative balanced situation for professions in East Germany compared to the relatively balanced situation in West Germany.

With regard to gender and the working hour desires, in East Germany there are not such big differences between men and women. The mean working hours of women in East Germany are higher in East Germany. The less/same/more structure of the working hour desires of women in East Germany is not very different to the men's desires. For further details see Table 3.

To summarize: the two cross-sectional snapshots show a growing (“negative”) dissatisfaction for employees and (less) for entrepreneurs. In particular, there is a growing balance of desired and actual working hours for professions for overall Germany. However, the picture is different in East Germany, where the self-employed, professionals and entrepreneurs—from a relatively high number of working hours—show a pronounced desire to work less than they do.

4. ON THE INDIVIDUAL PROCESS OF HARMONIZATION OF DESIRED AND ACTUAL WORKING HOURS DURING A DECADE—A PANEL ANALYSIS OF INDIVIDUAL LONGITUDINAL DEVELOPMENTS

The two cross-sections above describe the respective general situation where a lot of different developments finally lead to a certain sum of effects. In addition, the picture is influenced by the new situation within the “Neue Länder” where a brand new labor market was installed. To disentangle these macro sum effects of two different populations, panel data, in particular, allows individual development to be followed. The following longitudinal analysis will answer the question of who—on the individual, personal level—was able to harmonize the desired with the actual situation within a decade from the mid 1980s to the mid 1990s. Obviously, our individual longitudinal analysis therefore has to be restricted to West Germany.

To describe the individual convergence/divergence process in the course of time from 1985 to 1994, we start with a description of the transition processes of the professionals, entrepreneurs and employees. The next section provides a multivariate panel econometric analysis, which quantifies explanatory patterns of the socio-economics behind that process.

There are three main reasons why we analyze the situation just “ten years after”: firstly, ten years seems to be a reasonable time span to expect results for time consuming “real” changes of the working situation; secondly, ten years mark another decade in the individual life cycle with all its expectations and developments for the overall working life; and thirdly, with the microdata at hand we are restricted but also able to center the analyses to the overall decade’s (business cycle) process. Analyzing the individual situation ten years after, however, we fade out the ups and downs for each year within this time period. We shall consider the single years influence by our panel econometric analyses in Section 5.

The working hour tension process in Table 4a and Figure 2 is expressed by movers and stayers in a transition matrix with three working hour tension states: desire to work less (–), the same (0), and more (+) than actual. The transition matrix, above all, disentangles the movement process describing from where they come and where they are ten years after. The mover index MI (Table 4a) relates all movers from one of the three 1985 tension states to their final state after that decade. Note that all the individuals in 1994 belong to the same occupational status as ten years ago. Thus, among others, the following question will be answered; how many (in relative terms) of the professionals, entrepreneurs and employees were able to change their working hour tension position and reach a promised land of a balanced situation?

Overall and for all occupational groups: there is a large amount of movement, about half the population (professionals, as well as entrepreneurs and employees) has changed its tension state ten years after. However, there are differences for the self-employed and employees.

We begin with the largest active group, the *employees*: with MI = 82.2 percent, the most transitions are seen for those employees who wanted to work more in 1985. Or in other words: only 17.8 percent still want to work more ten years after; 25.3 percent of them were able to reach a balanced position. But more than half (56.9 percent) of them are in the opposite situation (–) ten years later. Next in line of the transition frequencies are those who were balanced in 1985. MI = 72.9 percent left their satisfied situation, 54.2 percent wish to work less ten years after. Only MI = 29.3 percent of those who wanted to work less were able to balance (18.1 percent), respectively, the wish to work more (11.2 percent) within the course of time; 70.7 percent could not change the dissatisfaction (–) state from 1985 to 1994. Thus, the individual transition analysis of the employees underlines the cross-sectional evidence with the stated process to dissatisfaction and the desire to work less, accepting shortages in their income situation.

Employees face a contracted working hours situation which might restrict the actual desires to change and might influence the “as if situation” and answer. At least with regard to the contract situation the self-employed have another kind of time sovereignty. Do they show a different picture compared to the employees?

For *entrepreneurs* the picture, to some extent, is similar to the employees’ development: most movers are from those who want to work more than they do in 1985 (MI+ = 89.8 percent). The second amount of movers come from balanced entrepreneurs with 1994 desires to work less than they do (MI0 = 72.8 percent). Last in the mover line are those entrepreneurs who want to work less 1985: only 25.7 percent were able to change this tension state ten years after.

TABLE 4a
INDIVIDUAL LONGITUDINAL CHANGES IN WORKING HOUR TENSION DESIRED VERSUS
ACTUAL WORKING HOURS, 1985 TO 1994: MOVER AND STAYER

	1985	1994	Working Hour Tension ⁴		Σ	Mover Index ⁵
Professionals ¹			–	0	+	
	–	54.5	(45.5) ⁶	–	97,441	45.5
	0	41.9	(58.1)	–	74.9 (20,348)	41.9
	+	(55.3)	(44.7)	–	(15.7) (12,250)	100.0
	Σ	68,424	61,615	–	130,039	50.1
		52.6	47.4		100.0	
Entrepreneurs ²			–	0	+	
	–	74.3	(19.7)	(6.1)	228,023	25.7
	0	72.8	(27.2)	–	59.4 63,460	72.8
	+	55.4	(34.4)	(10.2)	16.5 92,477	89.8
	Σ	266,828	93,877	23,264	383,969	48.9
		69.5	24.4	6.1	100.0	
Employees ³			–	0	+	
	–	70.7	18.1	11.2	5,599,815	29.3
	0	54.2	27.1	18.7	56.5 3,458,924	72.9
	+	56.9	25.3	17.8	32.5 1,166,804	82.2
	Σ	6,780,833	2,320,148	1,524,562	10,625,543	49.3
		63.8	21.8	14.4	100.0	

¹Self-employed professionals.

²Self-employed without professionals, farmers and family workers.

³Blue-collar workers, white-collar workers, civil servants, without trainees.

⁴(desired – actual) working hours: < 0(–), > 0(+), = 0(0).

⁵MI = Σ (non-diagonal values = Mover) / Σ (+ 0 –) × 100.

⁶Values in parenthesis: n < 5.

Source: German Socio-Economic Panel (GSOEP), weighted longitudinal dataset (1985 and 1994), same occupation in both years, own calculations.

For *professionals* the transitions are remarkably different: the wish to work less and the balanced situation are the predominant states; no one of the professionals in the longitudinal sample want to work more than they do ten years after (no underemployment in 1994). MI– = 45.5 percent moved from the overemployed to the balanced situation. This is almost twice the entrepreneurs' and employees' percentage points. Last in the mover line are the 1985 balanced professionals (MI0 = 41.9 percent).

It is obvious that the relatively small groups of self-employed in the population and thus in the sample, too, ask for a restricted interpretation of the results.

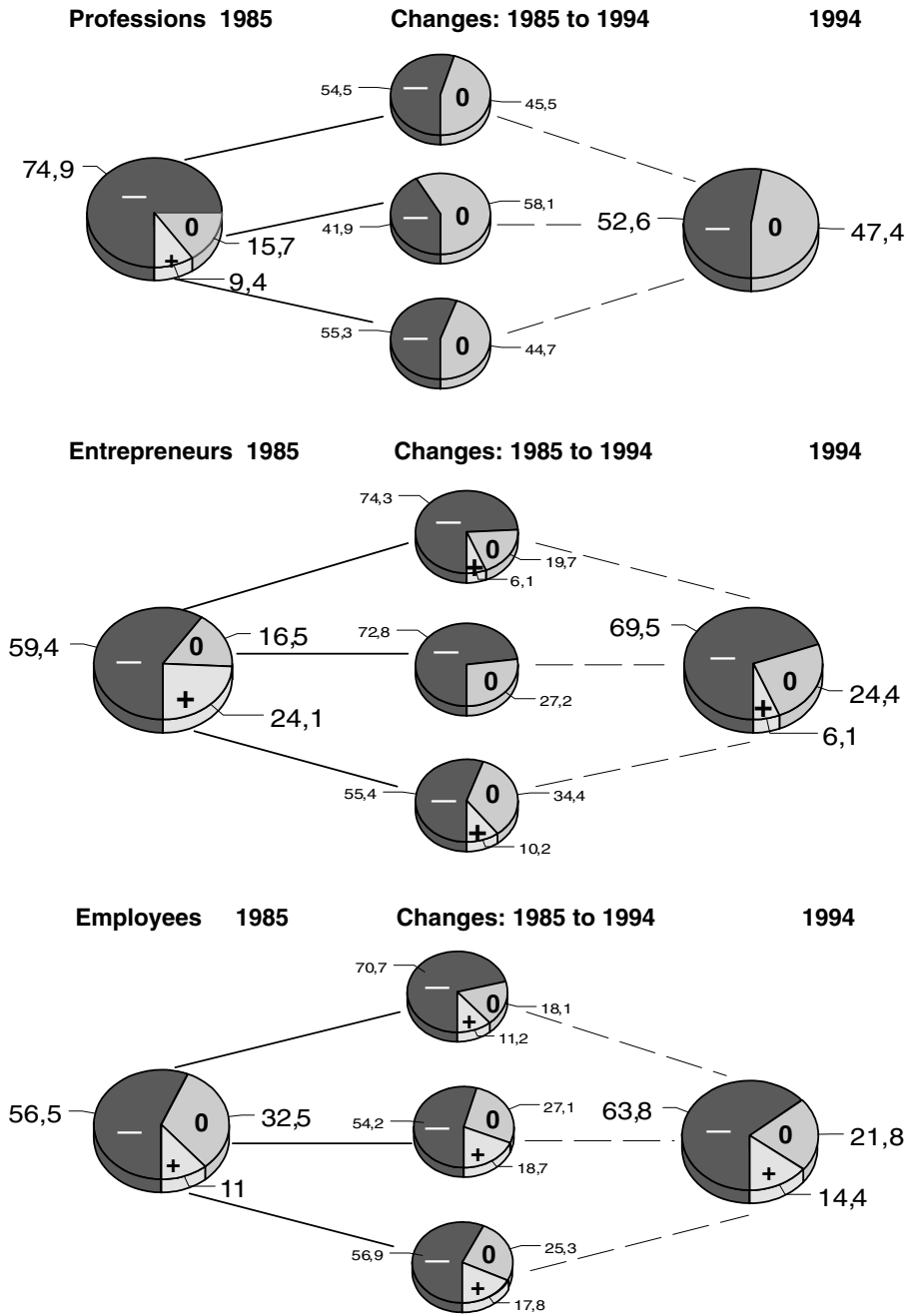


Figure 2. Individual Longitudinal Changes in Working Hour Tension

Source: German Socio-Economic Panel (GSOEP), weighted longitudinal dataset, own calculations.

However, the differences between the professionals and the other groups are also remarkable in the longitudinal view with a growing balanced situation of the professionals (West Germany). Thus, time sovereignty expressed by being self-employed is a driving factor for the working hour tension development.

Table 4b deepens the transition analysis with a broader set of mover indices. In addition, we construct a chi-square statistic to determine the significance of the occupational transition differences. Compared to MI-total with all movers, MI-extreme with non-diagonal corners, MI-ups and MI-downs with above and below diagonal elements and MI-balance with movers to wht = 0, specific cells of the transition tables are detailed in Table 4a.

TABLE 4b
WORKING HOUR TENSION¹ DYNAMICS—INDIVIDUAL LONGITUDINAL CHANGES OF DESIRED VERSUS ACTUAL WORKING HOURS, 1985 TO 1994: MOVER INDICES (MI in %)

	MI- Total ⁵	MI- Extreme ⁶	MI- Ups ⁷	MI- Downs ⁸	MI- Balance ⁹	$a - \chi^2$ ¹⁰
<i>Professionals</i> ²	50.1	5.2	34.1	16.0	47.4	73.79***
<i>Entrepreneurs</i> ³	48.9	17.0	15.3	33.7	24.4	27.84***
<i>Employees</i> ⁴	49.3	12.6	22.6	26.7	21.8	0.06
<i>All</i>	49.3	12.6	22.5	26.8	22.2	—

¹Working hour tension: (desired or preferred – actual) working hours: <0(–), <0(+), = 0(0).

²Self-employed professionals.

³Self-employed without professionals, farmers and family workers.

⁴Blue-collar workers, white-collar workers, civil servants, without trainees.

⁵MI-Total = Σ (non-diagonal values = Mover)/n.

⁶MI-Extreme = Σ (non-diagonal corners)/n.

⁷MI-Up = Σ (above diagonal values)/n.

⁸MI-Downs = Σ (below diagonal values)/n.

⁹MI-Balance = Σ (balance (0) column)/n.

¹⁰ $a - \chi^2 = \Sigma i = 1, r \Sigma j = 1, s (p_{ij} - p^*_{ij})/p^*_{ij}$, where * is for all active (no breakdowns) movers and stayers ($p = n_{ij}/n \cdot 100$).

H0: distributed like all; significance: $\alpha < 0.1\%$ is ****

Source: German Socio-Economic Panel (GSOEP), weighted longitudinal dataset (1985 and 1994), same occupation in both years, Table 4; own calculations.

The results: the most extreme movers can be found within the entrepreneurs, most ups are for professionals, most downs for entrepreneurs and most movements to balance are visible for the professionals.

The last column of Table 4b represents chi-square values which compare the respective socio-economic group situation to the overall situation incorporating all transition cells. It becomes obvious that professionals and entrepreneurs—and professionals in particular—show a *significant* different transition behavior compared to the general working picture which is dominated by employees.

5. WHAT EXPLAINS THE WORKING HOUR TENSION: PANEL ECONOMETRIC ESTIMATES

Our descriptive analyses have already shown many differences with regard to different socio-economic groups such as occupational status and gender. A few single effects can be analyzed by two or three-dimensional tables. A multivariate

analysis allows distinguishing between a large set of competing explanatory variables and approaches. The following multivariate panel econometric analysis, in addition, allows intertemporal stochastic analysis and investigation of unobserved heterogeneity, which describes specific individual differences in productivity and skills.

The (intertemporal) neo-classical labor supply theory under quantity constraints could be the underlying theoretical approach to investigate working hour tension. Examples are the papers by Ham (1982), van Soest, Woittiez, and Kapteyn (1989) and Osberg and Phipps (1993). We use this approach for the microeconomic analysis of over- and underemployment in a separate paper (Merz, 2002). Given, above all, labor supply information by the socio-economic information of our microdata base, in this paper we use the microeconomic labor supply model as the theoretical background and use its empirical results as the general basket for testing hypotheses.

In the following we analyze and explain working hour tension by reduced form panel econometric approaches. They focus on two interesting factors: firstly, the unobserved heterogeneity, describing specific individual differences in productivity; and secondly, individual socio-economic aspects and impacts in the dynamics of time.

As it is well known, there are different panel econometric approaches. In order to find a “best” and data adequate model we estimated pooled models, and models where the time development is covered explicitly by the regression coefficients (fixed effects models) and respectively by an appropriate error decomposition (random effects models). In addition, we estimated two factor fixed and random effects models, which further explicitly disentangle individual and time effects and in particular allow incorporation of the influence of non-varying variables (in our case: occupational status) into the model. We will perform summarizing estimating results of all the above approaches, however, the discussion will be centered on the respective “best” statistical approach. For a survey of panel models in general, see e.g. Hsiao (1986) or Greene (2000).

5.1. *The Panel Econometric Approaches: Pooled, Fixed and Random Effects One and Two Factor Models*

In particular, we shall analyze the following panel econometric specifications where the left hand side (y_{it}) will be the working hour tension (wht = desired minus actual working hours), x_{it} the set of explanatory variables, α , β , γ the regression coefficients to be estimated and ε_{it} the error term (individuals: $i = 1, \dots, N$; time: $t = 1, \dots, T$):

Pooled Model

$$(1) \quad y_{it} = \alpha + \beta'x_{it} + \varepsilon_{it}.$$

In the pooled model all observations are put together and the regression coefficients describe an overall influence with no specific time or individual aspect. The pooled model will be simply estimated by ordinary least squares (OLS).

Fixed Effects Model

$$(2) \quad y_{it} = \alpha_i + \beta'x_{it} + \varepsilon_{it}$$

The fixed effects model allows control for unobserved heterogeneity which describes individual specific skills not captured by the observed variables. In our context we can interpret the individual specific regression coefficients estimated by the ten periods respectively as describing individual market and non-market productivity skills. The estimation procedure will be partitioned OLS.

Random Effects Model

$$(3a) \quad \varepsilon_{it} = u_i + v_{it}$$

$$(3b) \quad y_{it} = \alpha + \beta'x_{it} + \varepsilon_{it}$$

Within the random effects model the unobserved heterogeneity is captured by the error term consisting of an individual specific one and an overall component. This model will be estimated by two stage feasible generalized least squares (GLS).

Two Factor Fixed Effects Model

$$(4) \quad y_{it} = \alpha_0 + \alpha_i + \gamma_t + \beta'x_{it} + \varepsilon_{it} \quad \sum_i \alpha_i + \sum_t \gamma_t = 0$$

The above specifications are so called one factor models: one factor describes a specific effect. The two factor models will further disentangle the individual and time effects by separate coefficients. Within the fixed effects approach these two factors are the specific individual and time constant terms. Again, the estimation procedure is partitioned OLS.

Two Factor Random Effects Model

$$(5) \quad y_{it} = \alpha + \beta'x_{it} + \varepsilon_{it} + u_i + w_t$$

Within the two factor random effects model the two individual and time effects are captured by separate error components. Two stage feasible GLS will be the estimation procedure. All estimates are done with the LIMDEP, version 7.0 (Greene, 1998) program package.

Our panel econometric investigation strategy is as follows: after introducing a set of explanatory variables operationalizing different theoretical hypotheses, we first ask which model is the “best” one when estimating the male and female working hour tension. Then we separately estimate the working hour tension for professionals, entrepreneurs and employees and analyze the respective wage elasticities.

It might be expected that over- and underemployment are different situations and have to be explained by different approaches. We therefore analyze these different situations by their explicit panel estimates. Finally, an overall two factor approach will be able to include individual-specific variables, such as sex, occupation, and socio-economic background, which vary across individual units, but do not vary over time. In particular, we use this approach to incorporate the occupational status within the set of explanatory, right-hand side variables and investigate among others the competitive influence of being a professional, entrepreneur or an employee.

5.2. *Hypotheses and the Set of Explanatory Variables: Market and Non-Market Influences*

The GSOEP provides a large number of individual and household variables. Based in general on the well proven human capital approach by Mincer and others within the microeconomic labor supply model, we analyze the following hypotheses and its variables' counterparts divided by personal and household characteristics.

Personal characteristics: Human capital will be expressed besides age by the schooling variables "Abitur" (high school diploma) and a possible university diploma. We give specific attention to job experience variables and generate the recent job duration (months within the past two years) and the job duration within this firm (in years) describing specific on the job trained skills. In addition we could compute not potential but factual part-time and full-time experience (in years) from the end of schooling without possible interruptions. By counting the factual experience we widen common labor supply specifications which do not disentangle factual working periods from interruptions when they regard potential labor market experience. The microeconomic labor supply model stresses the importance of prices, here wages. We shall test the wage influence and additionally quantify a subjective "satisfaction about working hours" indicator. Following Becker's (1965) household production model we also regard time spent in non-market activities for housework, child care and do-it-yourself (DIY) as exogenous personal variables.

Household characteristics: Following again a scarce modeling strategy and accounting for proven explanatory variables in many labor supply analyses our household characteristics encompass the household size and the number of children as indicators of household time consuming burden. As an indicator of economic needs for additional income ("additional work(er)ing effect") we test the influence of a remaining household net income as household net income minus income gained by the person under investigation.

5.3. *Males and Females: Are there Gender-specific Differences in Explaining the Working Hour Tension?*

Because of different roles within the family situation and in society, labor market behavior might be different for males and females as it has been indicated by our descriptive analysis and many other microanalyses. We therefore discuss gender-specific differences in explaining the working hour tension by separate regressions including all the above mentioned hypotheses and variables. Tables 5 and 6 (first columns, the other columns are discussed in the next paragraph) show the results for the male and female separate estimates under different pooled, fixed and random effects model specification.

What is the "Best" Model?

Let us begin to answer the question: which one of these specifications is the "best" model to explain the male and female working hour tension (first columns of Tables 5 and 6)? There are many indicators describing "the best". We restrict our judgment for the present to *goodness-of-fit* measures, the non-adjusted and

TABLE 5

PANEL ECONOMETRIC ESTIMATES OF WORKING HOUR TENSION (DESIRED MINUS ACTUAL WORKING HOURS), 1985 TO 1994, FIXED EFFECTS (POOLED, RANDOM EFFECTS) ONE FACTOR MODEL, FEMALE, OCCUPATIONAL STATUS

	All	Professionals	Entrepreneurs	Employees
Endogenous variable: Desired – actual weekly working hours				
Personal characteristics				
Age	-0.86873***	5.2997	-1.0909	-0.99802***
Age**2/100	0.65043***	-6.1006	0.19065	0.65058***
Abitur	0.00007	0.00232	-0.00674	0.00044
University diploma	0.00012	-0.00893	0.00345	0.00034
Market				
Job duration, past 2 years (m)	-0.00043	-0.07134	-0.08660	0.00026
Job duration, this firm (y)	0.00286	0.07432	0.35903	0.00969
Part-time (life) experience (y)	0.18241	-1.1838	-0.14877	0.31074***
Full-time experience (y)	0.15178	-1.5395	0.36941	0.27357*
Wage	0.18282***	0.25143	-0.08436	0.21149***
Work satisfaction	0.18442***	-0.06616	0.23419	0.17221***
Actual working hours (w)	-0.62168***	-0.46608*	-0.60605***	-0.61634***
Non-market				
Housework hours	-0.00323	-0.35900	0.52382	-0.02530
Child care hours	-0.29625***	0.02257	-0.62330	-0.22912***
DIY hours	0.05716	-0.96434	0.71966	0.10003
Household characteristics				
Household size	-0.02804	-10.607***	-1.5679	-0.03059
Number of children	-0.37238**	-0.08604	0.33557	-0.50145***
Rest household net income/10	-0.01787***	0.21766	0.74116	-0.02053***
Constant	fixed effects	fixed effects	fixed effects	fixed effects
n	11,313	97	308	10,498
Fixed				
R ² (%)	64.8 (57.7)	89.0 (64.8)	82.6 (70.4)	63.8 (56.2)
Log-likelihood	-35,108	-262	-1,001	-32,116
Pooled				
R ² (%) (adj. R ² (%))	40.9 (40.8)	60.6 (52.2)	60.0 (57.7)	37.2 (37.1)
Log-likelihood	-38,043	-324	-1,129	-35,009
Random				
R ² (%)	40.1	60.4	59.2	36.1
Fixed vs. pooled: LR-test, chi ²	1,882***	124***	255***	5,787***
Random vs. pooled: LM-test	2,082***	1	59***	2,077***
Fixed vs. random: Hausman test	285***	29***	10	301***

Level of significance: * (90%), ** (95%), *** (99%), same regressors for the pooled model and random effects model; years (y), months (m), weeks (w).

Source: German Socio-Economic Panel (GSOEP), waves 1985 (B) to 1994 (K); own calculations.

adjusted R², and the value of the log-likelihood at the optimum. Results (bottom of Tables 5 and 6): for both male and female estimates the fixed model is superior to the pooled and the random effects model. With an adjusted R² of 67.6 percent (males) and 57.7 percent (females) the fit is remarkably good with respect to over 11,000 and 18,000 observations respectively.

Specification Tests

We use the likelihood ratio test for testing the fixed versus the pooled model, the Breusch and Pagan's Lagrange multiplier test for testing the random versus the pooled model, and the Hausman test for testing the fixed over the random effects model. Results: the large and significant chi-squared values of the likelihood ratio test are in favor of the fixed compared to the pooled model. The large and significant Lagrange multiplier values are in favor of the random

TABLE 6

PANEL ECONOMETRIC ESTIMATES OF WORKING HOUR TENSION (DESIRED MINUS ACTUAL WORKING HOURS), 1985 TO 1994, FIXED EFFECTS (POOLED, RANDOM EFFECTS) ONE FACTOR MODEL, MALE, OCCUPATIONAL STATUS

	All	Professionals	Entrepreneurs	Employees
Endogenous variable: Desired – actual weekly working hours				
Personal characteristics				
Age	-0.06582	1.0835	4.1825	-0.05310
Age**2/100	0.33927***	-0.17486	-1.2920	-0.28193***
Abitur	0.00009	-0.00497	-0.0071	0.00025
University diploma	0.00023	0.00591	-0.00023	0.00027
Market				
Job duration, last 2 years (m)	-0.00120	-0.07466	0.00740	-0.00106
Job duration, this firm (y)	0.00477	0.11035	-0.01370	0.01066
Part-time (life) experience (y)	0.19761	-0.62318	-1.8840	-0.05534
Full-time (life) experience (y)	0.15343	-0.65444	-3.6495	0.08536
Wage	0.12624***	0.07227	0.08868	0.12395***
Work satisfaction	0.07263***	0.30365	-0.03143	0.08468***
Actual working hours (w)	-0.77341***	-0.74803***	-0.84521***	-0.77790***
Non-market				
Housework hours	-0.00154	-0.27501	0.81156	-0.00784
Child care hours	-0.04401	0.91544	-0.82969	-0.06675
DIY hours	-0.11871**	1.4971	-0.59754	-0.11839**
Household characteristics				
Household size	-0.01108	-2.3237	1.4364*	0.05996
Number of children	0.10890	4.2015*	-0.72350	0.05489
Rest household net income/10	-0.00268	0.11248*	-0.02413	-0.00675
Constant	fixed effects	fixed effects	fixed effects	fixed effects
n	18,126	238	672	16,699
Fixed				
R ² (%)	72.0 (67.6)	81.6 (69.1)	79.5 (70.3)	69.1 (64.2)
log-likelihood	-53,853	-755	-2,294	-48,468
Pooled				
R ² (%) (adj. R ² (%))	52.9 (52.9)	53.1 (49.5)	61.2 (60.2)	47.0 (47.0)
Log-likelihood	-58,547	-866	-2,508	-52,983
Random				
R ² (%)	52.4	51.3	60.9	46.4
Fixed vs. pooled: LR-test, chi ²	9,388***	223***	427***	9,029***
Random vs. pooled: LM-test	4,537***	18***	38***	4,369***
Fixed vs. random: Hausman test	269***	21	19	256***

Level of significance: * (90%), ** (95%), *** (99%), same regressors for the pooled model and random effects model; years (y), months (m), weeks (w).

Source: German Socio-Economic Panel (GSOEP), waves 1985 (B) to 1994 (K); own calculations.

compared to the pooled model. So both the fixed and random model which explicitly count for the unobserved heterogeneity are both “better” than the pooled model: further unobserved market and non-market skills do count.

The Hausman test finally helps us to distinguish between the fixed and the random effects model: with large and significant values the fixed model provides better results compared to the random effects model. To summarize: goodness-of-fit as well as the specification tests are to be preferred for the fixed effects model for males and females in explaining the working hour tension within the observed decade.

Explaining the Working Hour Tension for Males and Females

The “best” approach regression coefficients, the fixed effects model coefficients, are given in the upper part of Tables 5 and 6 with fixed effects for all

individuals estimated based on all of the ten periods. As the overall explanatory power was different for males and females (better for males) the significance of the various *personal* and household *characteristics* are different for males and females: there is a different non-linear age influence—more of a u-type for women, but inverse for men, showing more dissatisfaction in younger and older years for women and more in the mid-ages for men. The wage, work satisfaction (positive) and the actual working hours coefficients (negative) are of the same sign and significance level for both genders. Thus, the larger the wage the larger is the difference between the desired and actual working hours of the overemployed persons. We shall come back to a further differentiation of the over- and under-employed situation in Table 7.

TABLE 7
WAGE ELASTICITIES REGARDING THE WORKING HOUR TENSION (WHT), PANEL ECONOMETRIC ESTIMATES, 1985 TO 1994, FIXED EFFECTS MODELS, FEMALE AND MALE, OCCUPATIONAL STATUS

	Elasticities		wht (h)	
	Female	Male	Female	Male
Overall		-0.5288***		-4.11
All	-0.5348***	-0.4220***	-3.63	-4.42
Professionals	-1.0863	-0.1466	-3.03	-9.41
Entrepreneurs	0.0827	-0.0894	-9.56	-14.52
Employees	-0.670***	-0.4811***	-3.42	-3.86

ε (wht, wage) = b (wage) * grand mean wage/grand mean wht
 Interpretation: negative ε : 1% wage increase decreases wht by $\varepsilon\%$
 (increases hours supplied (because of negative wht))
 wht = desired – actual weekly working hours
 Level of significance: * (90%), ** (95%), *** (99%).

Source: German Socio-Economic Panel (GSOEP), waves 1985 (B) to 1994 (K); own calculations.

As it might be expected, the *household situation* is of different influence for men and women: the female negative significant regression coefficient of hours spent for child care indicates the desire to work less in the underemployed situation (desired > actual working hours) as in the overemployed situation (desired < actual working hours, wht < 0). The financial situation of the entire household influences the female working hour tension: the greater the remaining household net income, the less is the working hour tension, and the more balanced is the working hour situation.

It is astonishing that neither for males nor for females do schooling and on the job-training variables play an important role, such as would be expected from the labor supply literature. Thus the working history seems to be of no overall importance in explaining the actual working hour tension, a remarkable result.

5.4. Professionals, Entrepreneurs and Employees: Are there Specific Occupational Differences in Explaining the Working Hour Tension?

Our descriptive analysis gave us a hint of a different behavior with regard to occupational status. To deepen the analysis and to ask what the specific underlying influences are, we run separate panel regressions for professionals, entrepreneurs and employees. Table 5 shows the female, and Table 6 the male results.

Again we tried different specifications as a pooled, fixed and random one factor model for the different gender-specific occupational groups. The result is shown in the lower part of Tables 5 and 6. The goodness-of-fit and specification tests—as in the pure gender case—are in favor of the fixed effects model whose resulting coefficients are given in the upper parts of Tables 5 and 6 and will be discussed below.

The overall female and male picture within the different occupational groups is mainly influenced by the dominant employee group and coefficients. Although the overall fit is best for entrepreneurs, professionals and then employees (for both genders), the simple inspection of stars indicating the coefficients' significance show that we find more significant explanations for employees. Whereas some work history indicators (part- and full-time experience for women, age for both genders) are of importance for employees, these work and living historical influences are not important in explaining the working hour tension for the self-employed as professionals and entrepreneurs. Wage and work satisfaction is highly significant for employees but not for the self-employed. However, the level of actual working hours is significant for all occupations: the longer the actual working hours the larger is the gap between desire and the actual situation.

For females, but not for males, the household situation (child care hours, number of children, remaining household net income) is important in explaining the working hour tension.

To summarize: the working hour tension for the self-employed as professionals and entrepreneurs is mainly explained by their actual working load, whereas additional economic and non-economic variables are important for employees. It is remarkable that human capital variables and further labor supply studies variables do not play a significant role in explaining the working hour tension. Thus, time sovereignty as expressed by the self-employed or employee status is important in explaining the working hour tension, with further differences and influences not given by typical labor supply factors in the case of professions and entrepreneurs.

5.5. *Wage Elasticities on the Working Hour Tension of Professionals, Entrepreneurs and Employees*

One of the most discussed variables in economics is prices. Within labor supply analyses the price of labor, the wage influence is in the focus of interest. Based on the estimated coefficients of Tables 5 and 6 (fixed effects model, female and male, occupational status), Table 7 shows the appropriate wage elasticities. They are calculated as the regression coefficient multiplied by the grand mean wage divided by the grand mean working hour tension.

Table 7, in addition, shows the grand mean of the weekly working hour tension: entrepreneurs have the strongest desire to work less, and the strongest tension (male –14.5 hours/week, female –9.6 hours/week). With –3.9 hours/week male employees have only a slight stronger tension than women with –3.4 hours/week.

As discussed, wages are not significant for the self-employed men and women. However, wages are highly significant for the employees' working hour

tension. The interpretation of the negative signed elasticity is as follows: a 1 percent wage increase decreases the working hour tension by 0.67 percent for females, and 48 percent for males. Thus, the female *working hour tension* is more wage elastic than its male counterpart.

In addition to the working hour tension interpretation, the wage elasticities can also be interpreted for the supplied *working hours itself*. Because of the negative grand mean working hour tension, a 10 percent wage increase increases hours supplied by 7 percent (female) and 5 percent (male). The labor supply elasticities for the working hours (not tension) are thus positive for males and females. Thus, the substitution effect dominates the income effect within the decade from the mid 1980s to the mid 1990s.

5.6. *Under- and Overemployed: Are there Different Explanatory Patterns?*

So far our concern was to explain the working hour tension as a phenomenon of the overall negative, balanced and positive working hour tension. To be more detailed we analyze the following question: are there differences with regard to an underemployed situation ($wht > 0$, desired hours $>$ actual hours) and an overemployed situation where they want to work less than he/she does ($wht < 0$, desired hours $<$ actual hours)? Are there differences in explaining a “positive” and “negative” stress? Is the unbalanced situation itself important? Table 8 shows the separate female and male panel regression results for the under- and overemployed situation. Again, the fixed effects model is superior (see the goodness-of-fit and specification tests in the lower part of Table 8) to the pooled and random effect model. Again, the overall explanatory power is remarkable and better for the male estimates.

To give a short answer to the above questions: yes, both for the under- and overemployed situation and for both genders, there are different explanations on the personal and on the household characteristics level.

Let us begin with the female background in explaining the under- and overemployed situation: schooling and job history is of (almost) no importance, but age influences the overemployed situation, not the underemployed one. The desire to work less is influenced by the non-market situation with housework and child care hours. Workplace satisfaction is important for the overemployed only. Wage and the financial situation are not important for the underemployed women: reasons other than economic ones are driving female labor supply in the situation desiring to work more (see also Merz, 1990), an interesting result.

The male situation is as follows: as for women, age is only important for the overemployed situation. There are no schooling and only minor work history influences for both tension situations. The wage influence differs compared to the women’s situation: the wage rate is important for the underemployed men: a higher wage strengthens the desire to work even more; wages are a high incentive. However, for those who want to work less than they do, other variables such as age, the actual working hours and the non-market DIY-activities are significant in explaining the working hour tension.

TABLE 8
 PANEL ECONOMETRIC ESTIMATES WORKING HOUR TENSION (WHT), 1985 TO 1994, FIXED
 EFFECTS (POOLED, RANDOM EFFECTS) MODEL, FEMALE AND MALE, UNDER- AND
 OVEREMPLOYMENT

	Female Underemployed d > a	Female Overemployed d < a	Male Underemployed d > a	Male Overemployed d < a
Endogenous variable: Desired – actual weekly working hours				
Personal characteristics				
Age	-0.88388	-0.82098***	-0.12888	0.39830** (*)
Age**2/100	0.24845	0.94746***	0.03238	-0.58702***
Abitur	0.00265	-0.00039	0.00093	-0.00017
University diploma	-0.00023	-0.00032	0.00016	0.00008
Market				
Job duration, last 2 years (m)	0.00244	0.00038	-0.00097	-0.00181 (*)
Job duration, this firm (y)	0.14507*	-0.01198	-0.06836	0.03634*
Part-time (life) experience (y)	0.47404	0.13005	-0.99747*	-0.19396
Full-time (life) experience (y)	-0.20522	0.20394	-0.36160	0.14712
Wage	0.10093	0.10006* (*)	0.16053***	0.01101
Work satisfaction	0.01110	0.19909***	-0.00406	0.06384* (*)
Actual working hours (w)	-0.48257***	-0.54982***	0.46568***	-0.75979***
Non-market				
Housework hours	0.08672	-0.09699*	0.26195*	0.01266
Child care hours	-0.15263	-0.28594**	-0.08303	-0.00616
DIY hours	-0.42299	-0.03933	0.02592	-0.14386**
Household characteristics				
Household size	0.32696	-0.22000	-0.22306	0.04683
Number of children	-1.1777*	-2.26222	-0.24138	0.13749
Rest household net income/10	-0.03400	-0.00557	0.00775	-0.00573
Constant	fixed effects	fixed effects	fixed effects	fixed effects
n	1,373	6,090	2,133	10,961
Fixed				
R ² (%)	80.6 (56.6)	66.0 (54.6)	87.4 (75.8)	75.7 (69.4)
Log-likelihood	-3,691	-18,008	-5,354	-30,853
Pooled				
R ² (%) (adj. R ² (%))	31.5 (30.7)	33.3 (33.1)	47.7 (47.2)	56.0 (56.0)
Log-likelihood	-4,562	-20,063	-6,876	-34,102
Random				
R ² (%)	31.2	32.8	47.2	55.7
Fixed vs. pooled: LR-test, chi ²	1,742***	4,108***	3,044***	2,246***
Random vs. pooled: LM-test	204***	1,009***	489***	2,103***
Fixed vs. random: Hausman test	39***	92***	83***	111***

Level of significance: * (90%), ** (95%), *** (99%), same regressors for the pooled model and random effects model; years (y), months (m), weekly (w), d = desired, a = actual working hours.

Source: German Socio-Economic Panel (GSOEP), waves 1985 (B) to 1994 (K); own calculations.

5.7. Competing Occupational Groups: A Global Approach by the Random Effects Two Factor Panel Model

Because of their expected and proved specific importance we estimated and discussed above separate regressions for males and females and professionals, entrepreneurs and employees. Though we could trace the group-specific pattern with these estimates, however, an overall approach with competing group-specific influences is missing. We therefore conclude the panel econometric section with such an overall approach which allows us to discuss the relative importance of the occupational groups in an enhanced and overall encompassing approach.

The appropriate panel econometric approach to capture non-varying variables (in our case the occupational status) is the two factor panel model. This model provides an individual effect for each individual *and* a time effect for each period. The problem of multicollinearity—the time and individual dummy variables both sum to one—is avoided by imposing the restriction that each of them sum up to zero.

The superior resulting estimated model is now a random effects two factor model with separate male and female and under- and overemployed estimates (see the test results in the lower parts of Table 9). The non-varying variables are the occupational ones: professionals, entrepreneurs and employees.

The first result (see Table 9): male under- and overemployed working hour tension is better explained (R^2) than the female regressions. The size of R^2 indicates that our explanation approach is comparably good. So, let us start with the male situation. We again see the discussed influences by age, job duration (this firm), job lifetime experience, wage, work satisfaction, actual working hours and some non-market household influences by DIY, number of children and the lasting financial situation of the household.

One striking result with regard to the relative importance of the occupational status is the difference between the under- and overemployed situation: there are significant differences by occupation for the overemployed; significant differences are also found for the underemployed.

In general, the coefficients of the self-employed (as professionals and entrepreneurs) compared to the employees show a stronger desire to work more than they do within the decade under investigation. The employees, however, even in the underemployed situation and compared to the self-employed, want to reduce their labor supply. Thus, it is important not only to look to the overall working hour tension situation but also to carefully differentiate between these two states of an unbalanced situation.

What about the female situation? Again, for both situations we have significant age, schooling influences and job lifetime experiences that count, the wage and actual working hours situation, and a broader—compared to men—influence of non-market and household influence. However, there is not such a clear cut difference between the under- and overemployed with regard to the occupational status as for men: the occupational status is important for both under- and overemployed women. Female entrepreneurship determines overemployment compared to professionals and employees. Female professionals and employees diminish the underemployed working hour tension.

Altogether our panel econometric analyses have shown:

- that unobserved heterogeneity—as further individual productivity and skills—is important;
- that the fixed effects model is in many cases superior to the pooled and random effects model;
- that the labor supply based human capital approach, with its working history and experience indicators, is not (always) the central factor to explain the working hour tension;
- that economic *and* non-economic determinants are important for explanation;

TABLE 9

PANEL ECONOMETRIC ESTIMATES WORKING HOUR TENSION (WHT), 1985 TO 1994, RANDOM EFFECTS TWO FACTOR MODEL WITH PROFESSIONALS, ENTREPRENEURS, EMPLOYEES, FEMALE AND MALE, UNDER- AND OVEREMPLOYMENT

	Female Underemployed > a	Female Overemployed d < a	Male Underemployed d > a	Male Overemployed d < a
Endogenous variable: Desired – actual weekly working hours				
Personal characteristics				
Age	-0.17723***	-0.14754***	-0.25429***	-0.07280***
University diploma	-0.00124***	-0.00117***	0.00007	0.00023
Market				
Job duration, last 2 years (m)	0.00205	-0.00014	-0.00182	-0.00042
Job duration, this firm (y)	-0.04788	0.01358	-0.12072***	0.01979**
Job (life) experience (y)	0.07553**	0.06182***	0.14911***	0.6884***
<i>Professionals</i>	-4.4844**	1.2670	5.6269***	-0.45507
<i>Entrepreneurs</i>	-1.2399	1.4498**	5.4199***	-0.09258
<i>Employees</i>	-3.7433***	0.61931	-1.1682*	-0.01437
Wage	0.19900***	0.16240***	0.16509***	0.03429***
Work satisfaction	-0.05822	0.14616***	0.2496	0.11014***
Actual working hours (w)	-0.34317***	-0.48317***	-0.44712***	-0.71734***
Non-market				
Household hours	-0.04948	-0.11644** (*)	0.06364	0.01619
Child care hours	-0.12678*	-0.29199***	-0.09152	-0.01976
DIY hours	-0.21939	-0.17071 (*)	0.09357	-0.16143***
Household characteristics				
Household size	0.95416**	-0.10163	0.01730	0.063757
Number of children	-1.6434***	-0.58090***	-0.11885	0.18260*
Rest household net income/10	-0.06926***	-0.00997	-0.00613	-0.01042**
Constant	24.154***	11.666***	30.273***	23.863***
n	1,373	6,090	2,133	10,961
Random $v(i, t) = e(i, t) + u(i)$				
R ² (%)	32.6	30.0	48.3	55.8
Estd. Autocorrelation of e(i, t)	-0.24016	-0.10761	-0.23777	-0.14000
Pooled				
R ² (%) (adj. R ² (%))	32.8 (31.9)	31.1 (30.9)	49.1 (48.7)	56.1 (56.0)
Random vs. pooled: LM-test	192***	1,076***	495***	2,049***

Level of significance: * (90%), ** (95%), *** (99%), years (y), months (m), weekly (w), d = desired, a = actual working hours.

Source: German Socio-Economic Panel (GSOEP), waves 1985 (B) to 1994 (K); own calculations.

- that there are market *and* non-market influences which are of different importance for men and women; and
- that the occupational situation, as self-employed (professionals and entrepreneurs) and as employees, via their time sovereignty and further factors is a key socio-economic factor to explain the working hour tension.

6. CONCLUDING REMARKS: SOME ECONOMIC POLICY IMPLICATIONS

With our ten years based microanalyses of time and economic well-being which focus on the working hour tension—the gap between desired and actual working hours and strongly tied with its income situation—we could detect a lot of interesting results and differences with regard to the gender and the employment situation as professionals, entrepreneurs and employees. Overall the tension has risen to more than 62 percent in the mid 1990s for those who want to work

less (overemployed). In particular, professionals were able to harmonize their desires and their actual working situation over a ten year period. There are remarkable differences in the working hour tension between West and East Germany in the mid 1990s with a pronounced wish to work less from a relatively high actual working hour level. Though the economic situation was going to be tougher within the decade from the 1980s to the mid 1990s—and that may be an additional reason why stress had increased—the majority of the active people would like to work less although this would diminish their earnings (see also Schramm and Schlese, 1995).

Thus, there seems to be an even growing capacity for active people to shorten the working hours in favor for an employment of the unemployed (Bussing and Seifert (1995) discuss policy aspects of working hours arrangements).

In addition, our panel econometric analyses of the individual processes have elaborated significant factors on the personal and household level in explaining the sign and the magnitude of the working hour tension. Explicit individual firm side information should be incorporated in further research when this information is available in a survey on the individual level. Overall, there are remarkable differences with respect to the time sovereignty of the active persons as self-employed or as employees.

To be more general: the scientific and political discussion of economic well-being is still concentrated first on the monetary aspect of inequality and well-being. Empirical evidence has shown, however, that the time aspect connected with its income and many further dimensions of satisfaction with the living conditions is important to describe individual well-being. As we have shown, dissatisfaction/satisfaction with labor market working hours is unequally distributed and has different importance for many socio-economic groups. Time *and* economic well-being should therefore be the allied package for individual well-being analyses in the future.

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