



**Forschungsinstitut  
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**Preferred vs. Actual Working Hours -  
A Ten Years Paneleconometric Analysis for Professions,  
Entrepreneurs and Employees in Germany**

**Joachim Merz and Rainer Lang**

**FFB Discussion Paper No. 23**

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# **Preferred vs. Actual Working Hours - A Ten Years Paneleconometric Analysis for Professions, Entrepreneurs and Employees in Germany**

Joachim Merz and Rainer Lang

## **ABSTRACT**

Labour market dynamics according the individual working hour tension (preferred working hours minus actual working hours) of active people with focus on the self-employed, as professions and entrepreneurs, and employees are investigated in our study. The individual longitudinal analysis based on panel data allows us to follow the individual process of working time preferences and actual outcomes in its individual convergence/divergence balancing process in the course of time. Our microanalytic and paneleconometric results (with pooled, one and two factor fixed and random effects models) quantify the working hour tension developments and its determinants in a decade from the mid 80s to the mid 90s. Microdata base is the German Socio-Economic Panel with ten waves from 1985 to 1994. Finally, we discuss impacts of our results for labour market strategies and a targeted economic and social policy.

**JEL:** J22, J23, J28

**Keywords:** *Labour market dynamics, working hour tension, desired and actual working hours, paneleconometric analyses, professions, entrepreneurs and employees*

## **ZUSAMMENFASSUNG**

Die Arbeitsmarktdynamik hinsichtlich der individuellen Arbeitszeit-(An)Spannung (Arbeitszeitwunsch minus Arbeitszeitwirklichkeit) der Erwerbstätigen mit Fokus auf die Selbständigen, als Freie Berufe und Unternehmer, sowie die abhängig Beschäftigten ist das Thema unserer Studie. Die individuelle Längsschnittanalyse auf der Basis von Paneldaten erlaubt es uns, die individuelle Entwicklung zwischen gewünschter und tatsächlicher Arbeitszeit in ihrem Konvergenz/Divergenzprozeß im Wandel der Zeit zu verfolgen. Unsere mikroanalytischen und panelökonometrischen Resultate (mit pooled, ein und zwei Faktor fixed und random Effektmodellen) quantifizieren die Entwicklung und ihre Determinanten in der Dekade von Mitte der 80er bis Mitte der 90er Jahre. Mikrodatenbasis ist das Sozio-ökonomische Panel mit zehn Wellen von 1985 bis 1994. Abschließend diskutieren wir Folgerungen unserer Ergebnisse für Arbeitsmarktstrategien und eine zielgerichtete Wirtschafts- und Sozialpolitik.

**JEL:** J22, J23, J28

**Keywords:** *Arbeitsmarktdynamik, Arbeitsmarkt(an)spannung, gewünschte und tatsächliche Arbeitszeit, panelökonometrische Analysen, Freie Berufe, Unternehmer und abhängig Beschäftigte*

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# **Preferred vs. Actual Working Hours - A Ten Years Paneleconometric Analysis for Professions, Entrepreneurs and Employees in Germany**

Joachim Merz and Rainer Lang<sup>1</sup>

## **1 Introduction**

Labour market dynamics according the individual working hour tension (preferred working hours minus actual working hours) of active people with focus on the self-employed, as professions and entrepreneurs, and employees are investigated in our study. The individual longitudinal analysis based on panel data allows us to follow the individual process of working time preferences and actual outcomes in its individual convergence/divergence balancing process in the course of time. Our microanalytic and paneleconometric results (with pooled, one and two factor fixed and random effects models) quantify the working hour tension developments and its determinants in a decade from the mid 80s to the mid 90s. Microdata base is the German Socio-Economic Panel with ten waves from 1985 to 1994.

Facing still a problematic labour market situation with high unemployment and an ongoing discussion about international competitiveness, cost pressure, personal reduction and shareholder values questioning the individual satisfaction about the working time of the active people - at a first glance - seems to be of minor priority. However, there are a number of reasons why the working hour tension (the difference between desired and actual working hours) of the active people is important, for the active people themselves as well as for the unemployed.

At the micro level it is pinpointed that working productivity is dependent on working satisfaction including the satisfaction concerning the balance of actual and preferred working

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hours. Just because in times of high unemployment, labour market pressures lead to a growing individual overtime situation reasoning social conflicts. Solving labour market issues on a macro level, a policy with diminishing individual working hours in favour for new jobs was a central claim of the German unions in the 80s. In the 90s it is still an open question of economic and social policy how to handle the labour market problems. Is there any individual willingness for a redistribution of working hours by working less? And if, is there any changed behaviour in the course of time and changing circumstances? Is there an expansion of part-time occupation from the 80s to the 90s and how is the development of full-time occupation 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?

If any labour market policy - as by raising or diminishing working hours, flexibility with regard to part-time and full-time jobs etc. - shall be based and burdened by the persons concerned, the knowledge about the individual judgement of their working hours and their preferences on the background of the actual situation - in a longitudinal view accounting for different macro situations, in particular - is essential for any successful economic and social labour market policy.

Very connected with the above arguments and new labour market forms and individual well-being is the question of time sovereignty as being 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, professions (Freiberufler) and entrepreneurs, and employees. Last, but by far not least, changing individual working hours pattern will influence and will be dependent on the living conditions and labour force situation of the entire household an individual is situated in.

If there is a remarkable working hour tension for certain socio-economic groups at least two consequences therefore are evident and important. First, either a positive or negative tension shows individual stress and unbalanced well-being in the labour market with many further consequences for the individual itself as well as for a firm's and society's productivity. Second, economic and social policy will get important information about the possibility and acceptance of labour market working hours policies: if there is willingness to work less even connected with less income then there would be accepted room for targeted working hours policies in favour for the unemployed.

Our problem is embedded within the more general discussion of labour market flexibility. To mention only some papers and perspectives the reader is referred for instance to Holst and Schupp 1994 (part-time work and preferences), Bielenski and Strümpel 1988 (restricted employment), Garhammer 1994 (impacts of flexible working hours to living conditions), Schramm and Schlese 1995 (employment and working hours shortening desires) and Büssing and Seifert 1995 (working hours policies). For a further discussion of the professions (Freie Berufe) in particular, see e.g. Merz, Rauberger and Rönna 1994.

In our paper we contribute to the above questions and problems analyzing the individual working hour tension of the active people based on a relatively broad longitudinal microdata base. We will focus in the descriptive and paneconometric parts on the working hour tension

itself. Our topic under the microeconomic view of rationed labour supply shall be discussed in a forthcoming paper.

We first characterize the data base: the German Socio-Economic Panel as our ten years base, state the questions defining the working hour tension and give general definitions for the following analyses.

The substantial part 1 is investigating working hour (including part- and full-time) preferences and the actual situations before and after a decade with two respective cross-sections of the mid 80s (1985) and the mid 90s (1994). We discuss the genderspecific development in part-time and full-time occupation in general and the respective working hour tension in particular. Further distributional aspects show the spread of tension for different part-time and full-time employment situations.

The two cross-sections show the situations as two snapshots for all over Germany, including East-Germany 1994 in particular. Though macro developments as ‘saldo’-effects can be shown by this type of analysis, however, the individual changings and developments are still hidden. Therefore we extend the analysis by individual longitudinal developments with our panel data which describe the process of the working hour tension on the individual level.

In addition to the descriptive transition analysis we quantify socio-economic influences (including individual domestic (non-market) working pattern and the further household situation) by multivariate paneconometric estimates. We estimate fixed and random effects models and compare the results to a pooled model. In addition, we estimate two factor fixed and random effects models to further disentangle individual and time period effects. The paneconometric analysis with ten years individual developments show the importance of singular explanatory factors in competition to other explaining patterns. In particular, we quantify market *and* non-market influences on the working hour tension. Only this kind of information allows any economic and social policy to effectively target individual behaviour with some chances of success.

Finally, we discuss some impacts of our results for targeted economic and social policies and labour market strategies.

## 2 Microdatabase: The German Socio-Economic Panel (GSOEP)

In this section we briefly characterize our ten years microdatabase, describe the main question of our investigation and set the general definitions for our cross-sectional and longitudinal analyses.

### 2.1 General Characteristics

The German Socio-Economic Panel (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 is yearly repeated since 1984. All adult persons in a household aged 16 years and older (Germans, foreigners and institutional population) are surveyed. Since 1990 the GSOEP has been expanded with regard to the former German Democratic Republic (by 4.453 persons in 2.179 households). The first wave in 1984 consisted of merely 6.000 households with more than 12.000 persons interviewed. With demographic information, the household situation, individual labour force participation and occupational mobility data, the GSOEP questionnaire contains objective measures like 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 Questionnaire

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 are frequency information for different activities, 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):

Wave 11	personal questionnaire	KP	p. 15/32
KP 60	60.	What is the average amount of your <i>actual working hours</i> including possible overtime ?	
		hours per week	
KP 66	66.	If you could choose the extent of your working hours by yourself considering analogous changes of your wage: What is the amount of your <i>preferred working hours</i> ?	
		hours per week	



Note that the preferred hours question is linked to an appropriate wage compensation. We shall define the difference between desired or preferred working hours and the actual working hours as the working hour tension ( $wht = \text{desired} - \text{actual working hours}$ ). Since the question concerning preferred working hours was first asked in 1985, our analysis starts with the second wave.

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

As stated in the introduction one of our interests is to analyze whether the possibility to divide the working hours by yourself or not (time sovereignty) is of influence with regard to the working hour tension. We therefore divide our socioeconomic groups in self-employed professionals (Freie Berufe), entrepreneurs (self-employed up to and with more than nine employees, without farmers, without the assistance of family members) and employees (civil servants, blue- and white-collar workers). We discard the unemployed, since their wish to work (more) is obvious; they may benefit from a working hours reduction of the active people.

Additionally, in the longitudinal section we concentrate on the harmonization process within the same occupation not to be disturbed by new jobs' specific requirements. Thus, there will be no occupational mobility but the same occupational position ten years after (longitudinal section).

In general, our descriptive analyses are based on weighted data with a specific refinement of the adjustment for the self-employed (Merz and Lang 1997). All panel econometrics are based upon the unweighted cases.

## **3 Working Hour Tension: Desired vs. Actual Working Hours in the 80s and 90s – Cross-sectional Evidence**

Let us start and look to the overall employment structure in the mid 80s (1985) - and ten years after – in the mid 90s. With two snapshots, two cross-sections, we show the West-German situation in the 80s and after the reunification the situation in the 90s including East Germany. Thus quite a different labour market situation it is to be expected for the entire Germany. More than 5300 persons (weighted: 21 Mio.) build the 1985 database, more than 6300 interviews (weighted 29 Mio.) are available for 1994.

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

To start our analysis we focus on 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 groups or whether there is a changing. A more flexible labour market – from the supply as well demand side - would probably result in an increased part of part-time work. Table 1 describes the genderspecific development in part- and full-time occupation from the mid 80s to the mid 90s.

insert Table 1 about here

The overall development shows the same magnitude of full- and part-time occupation increase by 37%; thus there is no remarkable change in between the part-time and full-time pattern: overall 17,8% in both years are working part-time. However, there are remarkable genderspecific differences. More than each third women is working part-time whereas only about 4,4% of men have such a job in 1994. The remarkable labor force participation increase of women by 55% from the 80s to the 90s is mainly due to an increase of full-time jobs (58%) followed by almost 50% increase of part-time labour force participation. There is practically no changing of men's part-time situation but an increase of about 30% in full-time occupation.

There are different dynamics with regard to the occupational status: *Professions* by women have more than doubled (Index: 230%) whereas the entrepreneurship-situation show only an increase by 7% (women) and 2% for men. Professions 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 professions and entrepreneurs are still a male domain, the women working quota is highest within the employees.

To summarize: there are remarkable changes in the employment structure with different dynamics in female and male labour force participation. Women in professions in particular, part-time and full-time, have increased. The labour force participation of women increased in particular with full-time jobs as entrepreneurs and employees. Overall we still have 17,8% working in a part-time situation. Thus whereas the overall picture is unchanged but there are remarkable shifts at least for the socioeconomic groups analyzed here with particular dynamics in the labour force participation of women.

### **3.2 Desired vs. Actual Working Hours in Part- and Full-time Occupation 1985 and 1994**

Is the changing labour force situation accompanied by a more or less satisfied individual situation? Is there a changing of preferences from economically better times in the 80s to the tougher situation in the 90s? Is the labour market flexible enough to allow the workload which is wanted? Table 2 shows the congruence/divergence of part-time and full-time desires compared to the actual situation 1985 and 1994.

The main result: the working hour preference strongly correspond to the actual part-time and full-time situation (the block diagonals are dominant). This correspondence is even stronger ten years after for professions and employees with more than 85% satisfied with their part-time/full-time situation. For entrepreneurs ten years after only 67,2% are satisfied with their part-time situation.

To summarize: The part-time/full-time threshold is still and ten years after even a stronger division of labour which is desired by the active people. For a further discussion of part-time in Germany see Holst and Schupp 1994 and Schupp 1991.

insert Table 2 about here

### 3.3 Working Hour Tension 1985 and 1994: More Distributional Aspects

Going now more into detail with Table 3, we first divide the working hours into four classes: part time work till 20 hours and from 21 to 34 hours; full-time work from 35 to 40 and above 40 hours. Secondly, the working hour tension (as desired minus actual working hours) is subdivided into five classes of relative deviations (until and more than  $\pm 25\%$ ) from a balanced working hour situation. This table contains therefore a deeper insight according to distributional aspects.

Overall (first row of Table 3) the working hour tension of zero decreased, the dissatisfaction with the working hours situation increased over the decade: in 1985 31,9% were satisfied with their working hours, in 1994 only each fifth (21,3%) are satisfied with his/her working hours arrangement. In 1994 62,4% of all gainful employed want to work less than they do compared to 56,1% ten years ago. Although the desire to work less – taking into account less money – is dominant, the group of those people who want to work more is slightly increased from 12% 1985 to 16,3% in the mid 1990s. Thus the entire situation is less balanced.

However, there are remarkable differences within our socioeconomic groups: professions gain the most in balancing the working hour situation: from 14,4% in 1985 to 46,7% in 1994 the share of balanced people ( $wht=0$ ) for them has remarkably increased. There is a slight decrease for the further self-employed (22,1% to 20,4%) but a remarkable decrease of satisfied people within the group of employees (from 32,8% to 20,9%).

The strongest negative working hour tension, the strongest desire to work less than they do, 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 the occupational status but also the level of actual working hours which is important in explaining the working hour tension; a descriptive result which has to be respected by the further inferential analyses.

Figure 1 summarizes the main results of Table 3: The harmonization of working hour tension has been achieved in particular by the professionals. From 1985 to 1994 the positive and negative working hour tension has been remarkably diminished for them. The preference of entrepreneurs and employees for working less has increased from 1985 to 1994.

Table P7 provides an overview of under- and overemployment inequality. The actual working hours in general are more equally distributed in 1994 than 10 years ago. The 10 percent most under- and overemployed build a far most larger group 1994, i.e. more people are in the extreme positions in the mid 90's than in 1985 (90/10 ratio).

Alltogether: The two cross-sectional snapshots shows a growing dissatisfaction for employees and (less) for entrepreneurs. In particular, there is a growing balance of desired and actual working hours for professions.

insert Table 3 about here

insert Figure 1 about here

insert Table P7 about here



## 4 On the Individual Harmonization of Working Hours Preferences and the Actual Working Situation During a Decade – A Panelanalysis of Individual Longitudinal Developments

The two cross-sections of the above paragraphs describe a general situation where a lot of different developments finally leads to a certain saldo of effects. In addition, the picture is influenced by the new situation within the ‚Neue Länder‘ where a brand new labour market is going to be settled. To disentangle those saldo effects, panel data in particular allows to follow the individual development. The following longitudinal analysis allows to answer the question, whether it was able to harmonize desires with the actual situation on the personal, individual level.

### 4.1 Mover and Stayer: Mover Indices from 1985 to 1994

To describe the individual convergence/divergence process in the course of time from 1985 to 1994, the working hour tension process is expressed by mover and stayer indices (MI) out a transition table. The mover index relates all movers from one of the three states (wht negative, balanced, positive) to all persons (movers and stayers) belonging to a state 1985 (Table 4).

We start with the employees‘ development: With 82,2% the most transitions are seen for those employees who wanted to work more in 1985. More than each second (56,9%) of them are dissatisfied (-) ten years later. 72,9% leave their satisfied situation, 54,2% wish to work less ten years after. Only 29,3% of the dissatisfied (wht=-) employees were able to balance (18,1%) respectively wish to work more within the course of time. Thus, the individual transition analysis of the employees underlines the process to dissatisfaction and to work less though there might be shortages in their income situation. Note, all the individuals belong to the same occupational status as ten years ago. Further movings out of the employee situation at all might even stronger express the labour market dynamics.

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

For entrepreneurs the picture is similar to the employees‘ development: the relatively most movers are from those who ‚starts‘ with desires to work more (89,8%), followed by balanced entrepreneurs with now desires to work less than they do (72,8%). Note, the different occupational groups might have another level of working hours (in 1985 more than 72% entrepreneurs work more than 40 hours a week compared to 41% employees, see Table 3); so it is always a relative measure to the actual situation.

For professions a certain underemployed situation (with wht=+) changed to a balanced one. In addition, 58,1% could stay in their balanced situation. It is clear, that the relatively small groups of self-employed in the population and thus in the sample too do not allow to overinterpret the results. Hoiwever, the differences between the professions and the other groups are remarkable also in the longitudinal view with a growing balanced situation of the

professions. Thus, time sovereignty expressed by the self-employed situation is a driving factor for the working hour tension development.

Table 4a deepens the transition analysis: 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 regarded respectively. The most extreme movers can be found within the entrepreneurs, most ups are for professions, most downs for entrepreneurs and most movements to balance are visible for the professions.

The last column of Table 4a represents chi-square values which compares the respective socioeconomic group to the overall situation incorporating all transition cells. It becomes obvious that professions and entrepreneurs – the most professions – show a significant different transition behaviour compared to the general picture which is dominated by the employees' situation.

#### **4.2 Further Transitional Aspects for Professions, Entrepreneurs and Employees**

The starting, the final situation and the transitions in between are put together in Figure 2. The overemployed situation ( $wht < 0$ ) is remarkably growing for employees and entrepreneurs with dominant movements to a negative working hour tension from all three states. With almost 70% entrepreneurs are overemployed the most in 1994. Employees have the highest balanced share in 1985. Ten years later they have the lowest balanced share underlining the unsatisfied situation with their working hour situation.

Again, dramatic changes are for professions: whereas in 1985 three of four (74,9%) professions wanted to work less this relation diminishes to almost one of two (52,6%) in 1994. The growing part of balanced professions stems from all of the three states with a certain dominance of those who are balanced yet in 1985.

Many further single movements are available from Figure 2 and underlines the drawn picture of socioeconomic differences.

To explain working hour tension by valuating different approaches, paneleconometric estimates of socio-economic impacts are presented in the following chapter. Within the panel design there are two interesting factors to analyse: First the unobserved heterogeneity, describing specific individual differences in productivity and secondly, of course, individual aspects in the dynamics of time.

insert Table 4 about here

insert Table 4a about here

insert Figure 2 about here

## 5 What Explains the Working Hour Tension: Panel Econometric Estimates

Our descriptive analyses have already shown a lot of socioeconomic differences with regard to the occupational status. More or less single effects could only be analyzed via two or threedimensional tables. A panel econometric analysis, however, allows to distinguish between a large set of competing explanatory variables and approaches. In addition, unobserved heterogeneity, which describes specific individual differences in productivity and skills, can be detected within the dynamics of time.

As it is well known, there are different panel econometric approaches. We shall investigate pooled models, models with fixed and random effects and two factor fixed and random effects models, which further disentangle individual and time effects (for a survey see e.g. Hsiao 1986 or Greene 1993).

### 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),  $\mathbf{x}_{it}$  the set of explanatory variables,  $\alpha$ ,  $\mathbf{b}$ ,  $\gamma$  the regression coefficients to be estimated and  $\varepsilon_{it}$  is the error term (individuals:  $i = 1, \dots, N$ ; time:  $t = 1, \dots, T$ ):

#### *POOLED MODEL*

$$(1) \quad y_{it} = \alpha + \mathbf{b}'\mathbf{x}_{it} + \varepsilon_{it}.$$

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 is simply estimated by Ordinary Least Squares (OLS).

#### *FIXED EFFECTS MODEL*

$$(2) \quad y_{it} = \alpha_i + \mathbf{b}'\mathbf{x}_{it} + \varepsilon_{it}$$

The fixed effects model allows the control for unobserved heterogeneity which describe 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 is partitioned OLS.

#### *RANDOM EFFECTS MODEL*

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

$$(3b) \quad y_{it} = \alpha + \mathbf{b}'\mathbf{x}_{it} + \varepsilon_{it}$$

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***

$$(4) \quad y_{it} = \alpha_0 + \alpha_i + \gamma_t + \mathbf{b}'\mathbf{x}_{it} + \varepsilon_{it} \quad \sum_i \alpha_i + \sum_t \gamma_t = 0$$

The above specifications are so called one factor models: one factor describe 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***

$$(5) \quad y_{it} = \alpha + \mathbf{b}'\mathbf{x}_{it} + \varepsilon_{it} + u_i + w_t$$

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 LIMDEP, Version 7.0 (Greene 1995), a fine program package for panel analyses too.

Our paneleconometric investigation strategy is as follows: after introducing the possible set of explanatory variables first we 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 professions, entrepreneurs and employees and analyze the respective wage elasticities. It might be expected, that over- and underemployment is to be explained by different influences. We therefore analyze these different situations. Finally an overall two factor approach is able to incorporate not changing variables over time, here the occupational status. Thus we are able to analyze the competitive power of the working hour tension explanation by the occupational status as professions, entrepreneurs and employees.

## **5.2 The Set of Explanatory Variables: Market and Non-Market Influences**

The German Socio-economic Panel (GSOEP) provides a large number of individual and household variables. Following in general the well proved human capital approach by Mincer and others within the labour supply approaches we concentrate on the following hypotheses and variables divided by personal and household characteristics. Though we are already within the microeconomic labour supply framework, we postpone the explicit microeconomic circumstances within the next main chapter under the topic ,the labour supply bias).

### *Personal characteristics:*

Besides age human capital will be expressed by the schooling variables Abitur (high school diploma) and a possible university diploma. We give specific attention to job experience variables and generated the recent job duration (months within the last two years) and the job duration within this firm (in years) describing specific non the job trained skills. In addition we were able to compute the entire actual part-time and full-time experience (in years) from the end of schooling under consideration of all possible interruptions. Labour supply in form of our

working hour tension might be influenced by the wage rate and the satisfaction about working hours seems to be of importance. Under the hypothesis that the market situation is the dominant part in investigating the working hour tension we regard time spent in non-market activities for housework, child care and Do-it-yourself (DIY) as exogeneous.

#### *Household characteristics:*

Following again a scarce modelling strategy and accounting for proven explanatory variables in many labour supply analyses our household characteristics encompass the household size, the number of children as indicators of household time consuming burden and a rest household net income as household net income minus income gained by the person under investigation as an indicator of economic needs to earn additional money.

### **5.3 Males and Females: Are there Genderspecific Differences in Explaining the Working Hour Tension?**

Because of different roles within the family situation and in the society different labour market behaviour might be expected by males and females. Table 1 shows the results for the male and female separate estimates under different pooled, fixed and random effects model specification.

Let us start to answer the question which one of these specifications fits the best? As a measure of *goodness-of-fit* we use the non-adjusted and adjusted R<sup>2</sup> and the value of the log-likelihood at the optimum. Results: for both male and female estimates the fixed model is superior to the pooled and the random effects model. With an adj. R<sup>2</sup> of 67,6% (males) and 57,7% (females) the fit is remarkably good with respect to over 11.000 respectively 18.000 observations.

#### *Specification tests:*

We use the likelihood ratio test for testing the fixed vs. the pooled model, the Breusch and Pagan's Lagrange multiplier test for testing the random vs. the pooled model and the Hausman test for testing the fixed over the random effects model. Results: The large and significant chi<sup>2</sup> values of the likelihood ratio test are in favour for the fixed compared to the pooled model. The large and significant Lagrange multiplier values are in favour for the random compared to the pooled model. So both, the fixed and random model which explicitly counts 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 is in favour compared to the random effects model. To summarize: goodness-of-fit as well the specification tests are in favour for the fixed effects model for males and females in explaining the working hour tension within the observed decade.

Further estimates with an first order autoregressive disturbance (AR1) specification to take into account further dynamics were not succesful because appropriate cells had almost no observations in many cases. Thus our panel data are 'too unbalanced' for that type of modelling.



insert Table P1 (female, male) about here

Following the ‚best‘ approach in Table P1 the regression coefficients of the fixed effects model are given with fixed effects for all individuals estimated by the ten periods of our analysis. As the overall explanatory power was different for male and females (better for males) the significance of the various personal and household characteristics are different for male and female: there is a different non-linear age influence: more of a u-type for women but invers for men showing more dissatisfaction in younger and older years for women and more in the mid-ages for men. The wage, work satisfaction (pos.) and the actual working hours coefficients (neg.) 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 underemployed situation with Table P4.

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 as well 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 is influencing the female working hour tension: the greater the rest household net income the less is the working hour tension, the more balanced is the working hour situation.

It is astonishing that neither for males nor for females schooling and on the job-training variables play an important role like it is known from the labour supply literature. Thus the working history seems to be of no overall importance in explaining the actual working hour tension.

#### **5.4 Professions, Entrepreneurs and Employees: Are there Occupational Specific Differences in Explaining the Working Hour Tension?**

Again we tried different specifications as a pooled, fixed and random one factor model for the different genderspecific occupational groups. The result is shown in the lower part of Table P2 and P3. The goodness-of-fit and specification tests – as in the pure gender case – are in favour for the fixed effects model whose resulting coefficients are given in the upper part of Tables P2 and P3.

The overall female and male picture (first column, the same as in Table P1) is mainly influenced by the dominant employee coefficients. Although the overall fit is best for entrepreneurs, professions and then employees (for both genders) the simple inspection of stars indicating the coefficients‘ significance show that we find more significant explanation 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 for the self-employed, professions and entrepreneurs, in explaining the working hour tension. 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 desires and the actual situation.

For females, not for males, the household situation (child care hours, number of children, rest household net income) is important being satisfied with the paid working situation.

insert Tables P2 (female, occup.)

and P3 (male, occup.) about here

To summarize: the working hour tension for the self-employed is mainly explained by their actual working load, whereas further economic and non-economic variables are important for employees. Thus time sovereignty as expressed by the self-employed or employee status is important in explaining the working hour tension with further differences according the status as a professional or as an entrepreneur.

### 5.5 Wage Elasticities on the Working Hour Tension of Professions, Entrepreneurs and Employees

One of the most discussed variables in economics are prices. Within the labour supply analyses the price of labour, the wage influence is in the focus of interest. Based on the estimated coefficients of Tables P2 and P3 (fixed effects model, female and male, occupational status) Table P4 shows the appropriate wage elasticities. They are calculated as the regression coefficient time the grand mean wage divided by the grand mean working hour tension.

**Table P4: Wage Elasticities, Regarding the Working Hour Tension (wht), Panelconometric estimates 1985 to 1994, Fixed Effects Models, Female and Male, Occupational Status**

	Elasticities		wht (h)	
	Female	Male	Female	Male
Overall	-.5288***		-4.11	
All	-.5348***	-.4220***	-3.63	-4.42
Professionals	-1.0863	-.1466	-3.03	-9.41
Entrepreneurs	.0827	-.0894	-9.56	-14.52
Employee	-.6700***	-.4811***	-3.42	-3.86

$$\varepsilon(\text{wht}, \text{wage}) = b(\text{wage}) * \text{grand mean wage} / \text{grand mean wht}$$

Interpretation: negative  $\varepsilon$ : 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 computations

In addition, Table P4 shows the grand mean of the weekly working hour tension: entrepreneurs have the strongest desire to work less, 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% wage increase decreases the working hour tension by .67% for females respectively .48% 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 working hours supplied itself. Because of the negative grand mean working hour tension a 10% wage increase increases hours supplied by 7% (female) resp. 5% (male). The labour supply elasticities thus are positive for male and female, the substitution effect dominates the income effect within the decade under investigation.

## 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 an unbalanced situation of desired and actual working hours. The question we now raise: are there differences with regard to an underemployed situation ( $wht < 0$ , desired hours  $>$  actual hours) and an overemployed situation where somebody wants to work less than (s)he does ( $wht > 0$ , desired hours  $<$  actual hours)? Are there differences in explaining a 'positive' and 'negative' stress? Is the unbalanced situation itself important?

Table P5 shows the female and male panel regression results for the under- and overemployed situations.

Again the fixed effects model is superior (goodness-of-fit and specification tests) 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 question: yes, for both genders there are different influences within the personal and household characteristics.

Let us start with the female situation: schooling and job history is of (almost) no importance, but age is influencing 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. The workplace satisfaction is important for the overemployed only. Wage and the financial situation are not important for the underemployed women: other than economic reasons are driving female labour supply (in general) in the situation to work more (see also Merz 1990).

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 strength the desire to work even more; wage is highly incentive. However, for those who wants to work less than they do, age the actual working hours and the non-market DIY-activities are important.

**Table P5**

## 5.7 A Global Approach: Results of the Random Effects Two Factor Panel Model

Because of their specific importance above we estimated separate regressions for male and female and professions, entrepreneurs and employees. Though we could find and discuss their specific explanation pattern, however, an overall approach is missing. We therefore conclude the paneconometric section with such an overall approach which allows us to discuss the relative importance of the socio-economic groups.

To capture non-varying variables the appropriate approach is the two factor panel model. This model has an overall constant as well as an individual effect for each individual and a time effect for each period. As stated in section 5.1 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 model now is a random effects two factor model with separate male and female and under- and overemployed estimates (Table P6). The non-varying variables are the occupational ones: professions, entrepreneurs and employees.

The first result is: male under- and overemployed working hour tension are better explained ( $R^2$ ) than the female regressions. 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, however, significant differences are found for the underemployed. In general, professions and entrepreneurs, the self-employed, have 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 labour supply. Thus, it is important not only to look to the overall working hour tension situation but carefully to differentiate between these two states of unbalance.

What's about the female situation? Again, for both situations we have significant age and schooling influences, job lifetime experiencees which 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 bothe under- and overemployed women. Female entrepreneurship determines overemployment compared to professions and employees. Female professions and employees diminish the underemployed working hour tension.



Table P6

Alltogether our paneconometric 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 labour supply based human capital approach with its working history and experience indicators are not the central variables to explain the working hour tension,
- ✓ that economic and non-economic determinants are important for explanation,
- ✓ that there are market and non-market influences which are of different importance for men and women,
- ✓ and that the occupational situation as within the self-employed as professions and entrepreneurs and as employees via their time sovereignty and the further explanation are key socio-economic factors in explaining the working hour tension.

## **6 Some Economic Policy Implications and Concluding Remarks**

Our analyses of the working hour tension – of the gap between desired and actual working hours – based on ten years paneldata have shown a lot of interesting results and differences with regard to the gender situation and the employment as professions, entrepreneurs and employees. Overall the tension has raised to more than 62% in the mid 90s who want to work less (overemployed). Though the economic situation was going to be tougher within the decade from the 80s to the mid 90s – and may be that's why stress has growing – the majority of the active people would like to work less accepting diminished their earnings. This is a remarkable result which should encourage economic and social policy and policy makers.

To stress the political point: there seems to be an even growing space from the active peoples' perspective for shortening the working hours accepting less income. This willingness should be used in favour for an employment of the unemployed. Büssing and Seifert 1995 for instance further discuss policy aspects of working hours arrangements.

In addition, our paneconometric analyses have elaborated significant factors on the personal, household and regional level in explaining the sign and the magnitude of the working hour tension for professions, entrepreneurs and employees. These quantified results allows targeted economic and social policies since with them there is significant empirical incidence that these factors actually counts and do have impacts on the individual behaviour.

Overall, there are remarkable differences with respect to the time sovereignty of the active persons as self-employed or not. Professions (Freie Berufe), in particular, were able to harmonize their desires and their actual working situation over a ten years period.

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