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Keeping in Touch: A Benefit of Public Holidays

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ABSTRACT

Keeping in Touch: A Benefit of Public Holidays*

This paper argues that public holidays facilitate the co-ordination of leisure time but do not constrain the annual amount of leisure. Public holidays therefore have benefits both in the utility of leisure on holidays and (by enabling people to maintain social contacts more easily) in increasing the utility of leisure on normal weekdays and weekends. The paper uses the variation (13 to 17) in public holidays across German Länder and the German Time Use Survey of 2001-02 to show that public holidays have beneficial impacts on social life on normal weekdays and weekends. Since these benefits are additional to the other benefits of holidays, it suggests that there is a case to be made for more public holidays.

JEL Classification: J22, I31, Z13, H40

Keywords: public holidays, social contacts, social leisure time, time allocation, time use diaries, German Time Budget Survey 2001/02

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Introduction

How many public holidays should we have?

This paper argues that – within the range of variation now observed in affluent economies – the major social function of public holidays is to facilitate co-ordination in the timing of leisure. Co-ordination of leisure time has costs (e.g. in congestion of leisure facilities) and benefits (in making it easier for people to arrange to get together socially). In this paper, we focus on one aspect of the benefits. We argue that the easier socialization enabled by public holidays has benefits that extend beyond time use on public holidays to time use on normal workdays and normal weekends, because "keeping in touch" on holidays helps maintain social contacts and enables easier social matching on normal workdays and weekends. Hence, if public holidays facilitate social leisure time matching and increase the marginal utility of leisure on normal workdays and weekends, the increase in the utility value of leisure time on those days should be counted as a benefit. The focus of this paper is, therefore, on illustrating the size and significance of the role which public holidays play in time use on "normal" (i.e. non-holiday) weekdays and weekends.

Public holidays ensure that (with the exception of workers in essential public services) individuals all have leisure time at the same time, but public holidays do not typically force individuals to consume more leisure in any given year. In, for example, the German data which we use, Bavaria has the most public holidays (17), while other Länder have from 13 to 16 public holidays (see Appendix A) – but even Bavarian workers still have 348 other days each year in which they could vary their working time to compensate for any unwanted "excess" leisure on their 17 public holidays. Employers and employees can agree to shorter private vacations, weekend working or longer hours of work on normal workdays if that is in their mutual interest, or workers can look for new jobs with different hours, or for second jobs. Both workers and firms have multiple possible margins of adjustment to enable them to optimize their total annual consumption of leisure time[1] - but public holidays are a unique type of leisure time which is co-ordinated with others.

[1] The predictability and long standing nature of public holiday entitlements means that workers and firms have had lots of opportunity to adjust at other margins of labour supply. If, as we argue below, the marginal utility of

From this co-ordination perspective, the fact that Bavarians have 17 public holidays, while residents of Berlin, Bremen, Hamburg and some other Länder have only 13, can be seen as a 30% differential in non-weekend[2] co-ordinated leisure time (i.e. public holidays) across German Länder. What implications might this variation in leisure co-ordination have?

Section 2 of this paper extends the model of social leisure time matching advocated in Osberg (2002) and Jenkins and Osberg (2004) to recognize the fact that having a social life requires social contacts, which typically atrophy if people "don't keep in touch". It conjectures that in Länder with more public holidays, greater possibilities for leisure co-ordination will mean that individuals typically have a longer list of social contacts, and will consequently be able to match more easily with others to consume social leisure on normal non-holiday workdays, Saturdays and Sundays. Section 3 uses the German Time Use Study 2001/02 to test these hypotheses – Section 3.1 describes the data, while Section 3.2 presents simple summary statistics and Section 3.3 uses a regression approach to assess the impacts of greater leisure co-ordination on social time, arts and cultural activities and community meetings. The literatures on social capital, health and culture have separately emphasized the social value of each of these types of time use, and our model of time use is unambiguous in predicting higher levels of individual utility where individuals can choose from more leisure time options. Section 4 therefore discusses the public policy implications. Although we recognize that we have only considered some of the benefits of public holidays, and that a fuller analysis should also consider the costs of more public holidays and the extent of diminishing returns to the number of public holidays, we conclude that there is a case to be made for more public holidays.

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leisure time increases when the number of public holidays increases, total desired consumption of leisure – and total utility – will rise, but it still remains true that the number of public holidays is typically not a binding constraint on total annual leisure consumption.

[2] Although religious duty to observe the Sabbath can explain the historic origins of the 'weekend', in a secular and multi-cultural society the co-ordination of leisure time is its primary social function. In the recent literature, Jacobsen and Kooreman (2005) have examined the implications of relaxation of constraints on shopping hours in Holland for market work, shopping, and "leisure" (the aggregate of all other activities) while Skuterud (2005) has analyzed Sunday shopping regulation in Canada. In general, the more that weekend days come to resemble weekdays, the greater is the relative importance of public holidays as a leisure time co-ordination device.

2. The Utility Value of "Keeping in Touch"

The core hypothesis of this paper, and of Jenkins and Osberg (2005), is that an individual's time use choices are typically contingent on the time use choices of others, because the utility derived from leisure time often benefits from the presence of companionable others. Jenkins and Osberg argued that although the labour supply literature has often started from the premise that individuals maximize the utility they derive from their own consumption of market goods and non-work time, time spent in isolation is, for most people, only pleasurable in small doses. Many of the things that people actually want to do in their non-work time are more pleasurable if done with others – foreign travel or choral singing are particularly clear examples. Indeed, many activities (such as playing soccer or bridge) are impossible without others. However, the huge variety of leisure tastes that people have means that individuals have the problem of locating Suitable Leisure Companions – 'somebody to play with' – and of scheduling simultaneous free time. Consequently, if paid work absorbs more of other people's time, each person will find their own leisure time scheduling and matching problem more difficult to solve (i.e. their leisure hours will be of less utility). As a result, there is an externality to individual labour supply choices that implies the possibility of multiple, sometimes Pareto-inferior, labour market equilibria.

Jenkins and Osberg, however, took the number of social contacts of each individual as given. In this paper, we add to the previous model the realistic assumption that social contacts will depreciate if not used for an actual match. This endogeneity of social contacts implies that localities where individuals are more easily able to renew their social contacts will, ceteris paribus, also be localities where the marginal utility of leisure time (and total utility) is greater..

2.1 A model of the division of time between work time, and solo and social leisure time

Traditional labour supply theory starts, in a one period model, with each individual maximizing a utility function, as in equation (1):

$$U = u(C, L) \tag{1}$$

where C represents consumption and L represents non-work time. Jenkins and Osberg (2005) worked with the more general formulation of a two-person household, using the subscripts m and f to represent the individual partners. Since one can expand the individual model to a unitary household model by simply adding 'm' or 'f'' subscripts, nothing is lost by emphasizing the individual's utility maximization problem.

In this model, the wage rate available in the paid labour market (w) and the total time available for hours of paid work (H) and non-work time (L) are seen as the fundamental constraints.[3]

$$H + L = T \tag{2}$$

$$C \leq wH. \tag{3}$$

Suppose now that individuals can spend their non-work time either alone or in social leisure[4] and denote the non-work hours spent alone as A and the non-work time spent in social leisure as S. Suppose further that in order to enjoy social leisure, each individual must arrange a leisure match with some other individual (or group of individuals) from among the list of possible contacts that they have at the start of each period. We assume as well that before arranging their social life, individuals have to commit to a specific duration and timing of their work hours.[5] In this revised model, individuals decide how many hours they want to work, and must start each period by making a commitment to a specific number of work hours, at specific times. This decision determines money income, which determines the utility from material consumption. However, at the start of the period, the utility to be derived from social life is uncertain because the search process for Suitable Leisure Companions involves

[3] Clearly, this formulation assumes that work hours are available without quantity constraint at a constant real wage, without progressive taxation. Non-labour income (from capital or transfer payments) and any complications of human capital investment through on the job training are ignored.

[4] We shall ignore issues of time spent in household production in order to focus on the leisure time dimension. Alternatively, one can think of household production choices as being part of H, and the goods produced by household labour as part of C.

[5] To keep things simple, we assume that the process of arranging one's social life takes no time at all, even if its results are uncertain, *ex ante*, at the start of each period (one could call this a 'speed dialling' assumption).

uncertainty, since some desired social matches may not be feasible. Time spent alone, and not working, is the residual after work and social commitments are honoured.

Total utility experienced during the period will be given by (4)[6]:

$$U = u(C, A, S_1, \ldots, S_n,) \quad (4)$$

where A represents non-work time spent alone, and $S_1, \ldots, S_n$ represent social leisure when the number of realized social leisure matches is n.

This revised model is, therefore, a generalization of the traditional model, and nests the traditional model. In the traditional model, it is only the total amount of non-work time (the sum of social and solo leisure) that matters: the division of that time between time spent with others and time spent alone is irrelevant.[7] A testable empirical implication of the traditional model is that, in any regression in which time-use explanatory variables appear, coefficients on social leisure time and solo leisure time variables should be identical.

However, the problem with wanting to have a social life is that one cannot do it unilaterally. Arranging a social life involves a search process which is constrained by the social contacts available to each person, and by the availability of other people. We can denote the list of such social contacts at each point in time as k_t for each individual (and this paper will argue that k_t depends in part on the number of public holidays in the jurisdiction of residence of each individual). Each match with a possible Suitable Leisure Companion from a person's list of contacts has a given level of utility associated with it but, in order for there to be a match, both parties must agree on its timing, duration and purpose.[8] Social leisure therefore comes in discrete engagements, and it is not certain – at the point in time when the individual must commit to a given number and timing of work hours – which social matches will prove feasible.[9]

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[6] To avoid excess notation, we suppress for now the subscript t denoting the time period.

[7] Taken literally, this implies that, with a given amount of consumption goods and work time, a person's utility level would be unaffected were they to be deprived of social leisure altogether – as, for example, in solitary confinement.

[8] When utility from a possible contact falls short of the reservation utility of being alone, no match will be sought with those individuals.

[9] One can think of each potential social match as involving some implicit bargaining between the participants as to duration. In this paper we do not need to enquire as to the solution algorithm. It could be Nash bargaining or determined by some other mechanism, such as social norms of protocol (e.g. the UK convention that the Queen always is the last to arrive at a social function and the first to leave). All that is

The probability that a specific leisure match will be feasible can be denoted by p_i, where the subscript i indexes the identities of possible Suitable Leisure Companions, and the utility associated with that match as $u(S_i)$.[10] The expected utility of a specific social leisure match is then given by $p_i u(S_i)$. Individuals will then maximize their expected utility as in (5):

$$\max \mathrm{E}(U) \;=\; u(C) + \Sigma_i \hat{I}_k \, p_i u(S_i) \;+\; u_A[T - H - \Sigma_i \hat{I}_k \, p_i(S_i)] \tag{5}$$

where u_A is the utility of non-work time spent alone.

Non-work time comes in a variety of forms – paid public holidays (P), paid vacation days (V) and unpaid leisure time (L_U) [e.g. on weekends and evenings]. The total time constraint can be represented by equation 6, and the non-work time constraint is therefore given by equation 7.

$$T \;= H + P + V + L_U \tag{6}$$

$$T - H \;=\; A + \Sigma_i \hat{I}_k \, (S_i) = A + S = \; P + V + L_U \tag{7}$$

When firms pay for both time actually worked (H), public holidays (P) and vacations (V), hourly compensation for time actually worked (w) has to be distinguished from the nominal hourly wage (w_N), as Equation 8 makes precise. However, the revised model retains the same financial constraint as in the traditional model – i.e. that material consumption cannot exceed earned income ($C = wH$ – see equation 3). This constraint is expressed in terms of actual hours worked (H) and labour compensation per hour actually worked (w), since presumably workers can see through the packaging of their nominal hourly compensation.

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needed for this paper is that the duration cannot be unilaterally determined by *both* parties, which implies that individuals typically cannot equate exactly the marginal utility of social leisure time and their reservation utility of time. This implies that individuals compare the *average* utility per hour of a given social leisure time match with their reservation price of time, which can be thought of as the 'I would have liked to have left half an hour ago but, on the whole, I'm glad I attended' phenomenon.

[10] Without loss of generality one could index potential matches by timing, duration, and purpose, as well as by the identity of the other leisure companions.

$$w = [(H+V+P)* w_N] / H \quad (8)$$

To illustrate how this model compares with the traditional model, consider first how an individual's labour supply decision is usually pictured. The traditional model assumes that paid work hours are continuously available and can be decided with certainty at the start of each period[11] and that there are only two possible uses of total time – which implies that the hours of work decision directly determines hours of leisure time, whose utility is known with certainty. Both goods consumption and leisure time are assumed to have diminishing marginal utility, so utility is maximized when the marginal utility of time used for work and for leisure is equal. One can denote the implied optimal labour supply as H^* hours.

In the revised model, the returns to paid work are represented in exactly the same way as in the traditional model, and as implying the same amount of paid working time (H^*). We assume that each period must be started with a decision about working hours, which determines total hours of non-work time. However, the revised model assumes that individuals will try to maximize the utility to be derived from any given amount of non-work time by comparing the utility to be derived from solo and social leisure time. Figure 1 presents a diagrammatic treatment of the choice process. It represents the marginal utility derived from the allocation of time for each individual.

<Figure 1 near here>

In order for a decision about total work hours (H^*) to be optimal, the expected marginal utility of all three uses of time (work, solo leisure and social leisure) must be equal for each individual. The optimal ex ante division of time between desired solo and social leisure is pictured in the right hand side of Figure 1. Figure 1 presumes a given set of decisions by *other* people as to their working hours, which determines the probability vector p_i defining the chances that specific leisure matches will be feasible. At any point in time the available contacts of an individual k_t are determined by his or her past history of social life. Together, the probability vector p_i and the contact list k_t determine, for

[11] For our present purposes, we can assume either a constant money wage per hour with diminishing marginal utility to additions to material consumption, and/or that the marginal productivity (and wage) of each worker decline with greater working hours.

each individual, the marginal utility of social leisure function MU_S. The diminishing marginal utility of solo leisure is represented by the line labelled MU_A.

In order to indicate the uncertainty of the search process for Suitable Leisure Companion(s), dashed lines are used. The marginal utility of social leisure is drawn in discrete steps to represent the idea that because social leisure time must, by definition, involve an agreement with others about the duration of time to be spent together, it will typically come in discrete lumps. Clearly there is a hierarchy in the expected utility to be derived from specific possible leisure matches, and the downward slope of the MU_S function represents the idea that potential social matches can be ordered by their expected utility. Matches at the top of the steps of the MU_S function represent social engagements with highest expected utility, whereas social matches on the bottom steps (where MU_S is below u^*) correspond to engagements that would be rejected as having less expected utility than time spent alone. The MU_S function is conditional on the labour supply decisions of others, and on the own labour supply decision made at the start of each period. Utility-maximizing individuals will want to choose the division of total time which equates (as nearly as possible) the marginal utility from working, and from social leisure and solo leisure time. Hence, Figure 1 is drawn to illustrate the equilibrium condition that $MU_{H^*} = MU_{A^*} = MU_{S^*}$.

All individuals have the problem of arranging a satisfactory social life – a problem which can be summarized in terms of:

(1) "who do you know that you could call?" – which we summarize as the contact list k_t available at any point in time; and

(2) "what are the chances they would be available and agree to a date?" – which we summarize in the probability vector p_i defining the chances that specific leisure matches will be feasible.

The probability vector p_i depends on the amount of time potentially available when neither party to the potential match is committed to working. Since the timing and the duration of their mutual engagement cannot overlap with the working time of either party, p_i is clearly negatively associated with both own work hours (H), and the work hours of Suitable Leisure Companion i that do not overlap with the own work hours

(H_{in}).[12] Together H and H_{in} characterise the time which is not available for a social match:

$$p_i = g(H + H_{in}) \tag{9}$$

where $g'(H) < 0$, and $g'(H_{in}) < 0$.

On a public holiday, or on weekends, $H = H_{in} = 0$. Social leisure matches are then easier to arrange – and it is clear that these activities are highly valued by many people. It is observable that despite the predictable congestion surrounding many public holidays, people do choose to bear greater travel costs in order to spend time with friends and relatives. The greater social activity of individuals on public holidays, compared to other days, is pretty obvious.

However, this paper focuses not on what people do during their public holidays, but on how a greater or smaller number of public holidays influences what they do on other days – Saturdays, Sundays and "normal" (i.e. non-holiday) weekdays. For present purposes, we assume that the marginal utility derived from the consumption enabled by own working hours (MU_H) remains unchanged. However, if fewer public holidays means that the probability of arranging good leisure matches (on workdays and normal Saturdays and Sundays) falls, then the marginal utility of social leisure time (MU_S) will decline, which can be represented in Figure 1 by the downward shift to the new schedule labelled $MU_{S\ell}$.[13] Why might this be the case?

This paper argues that social life is typically characterized by feedback. Acquaintanceships typically start with an introduction by some other acquaintance. The more one goes out, the more people one meets – and the more invitations to go out one receives. Close friendships develop as the result of repeated contact, which increases the

[12] Since some people are in 'on-call' work situations or have jobs with involuntary overtime or rotating shifts, one should really think of 'hours available for work', rather than 'hours actually worked' in analysing scheduling issues. Equation (9) writes the probability of a successful leisure match as dependent only on the time available to each potential pair of leisure companions. This ignores any capital or other inputs required for a specific leisure activity (e.g. squash court availability) and the consequent possibility of short run congestion effects in leisure industries. If leisure activities require capital inputs and if there were a general decline in working hours, greater congestion in leisure facilities would be likely to produce both some substitution of activities and capital inflow. Strictly speaking, (6) represents the probability of a specific (marginal) leisure match. We leave the specification of a full model of the leisure production function, and the supply of leisure facilities, to further work.

[13] There is no necessary reason to assume that all potential leisure matches are affected equally. All that matters is that the marginal leisure match is affected. Hence Figure 1 is drawn so that $MU_S = MU_{S\ell}$ over an initial range.

desire for more contact. In many ways, the social life that individuals have today depends on the social life that they have had in the past. Although some contacts are made every day by anyone who participates in society, it takes repeated contact to maintain a relationship. Since other people may move, change phone numbers or decline an invitation from somebody with whom they have had no contact for a while, contacts that are not revisited will eventually expire. A parsimonious approach to modelling this feedback is to suppose that some amount of social contact (?) is always exogenously available to individuals, but other social contact is endogenously determined, because after some period of time (D) a social relationship will expire, if not revisited. If so, one can write the contacts of an individual in any given period (k_t) as a positive function of total social leisure time in the past D periods, as in equation (7).[14]

$$k_t = ? + f(\Sigma^{t}_{i,t-D}(S_{it})) \qquad f' > 0 \qquad (10)$$

Localities with fewer public holidays will therefore be localities where individuals have had less chance in the past to "keep in touch" – and because individuals in such localities have fewer contacts (i.e. d k_t / d (PUBHOL) > 0), they will have a lower current marginal utility of leisure time. Given the equilibrium condition $MU_{H*} = MU_{A*} = MU_{S*}$, and the decline in the marginal utility of social leisure time (MU_{St}), the model in Figure 1 predicts that the marginal utility of solo leisure schedule (MU_A) shifts to the right, but its shape remains the same (since nothing has happened that would affect the pleasures of a marginal hour of solitary leisure). This implies that the individual's social leisure time declines from S^* to S^{**} and hours of work increase from H^* to H^{**}.

This model does not presume that social leisure always generates more utility than solo leisure, just that it *sometimes* does. (Since it is easy to observe that people both want

[14] Alternatively, one could write k_t as dependent on the *number* of successful social matches (n_t) in the last D periods, or one could argue that more time spent together in the past will imply a greater readiness on the part of others to accept an individual's social invitations (i.e. dp_i /d($\Sigma^{D}_{it}(S_{it})$) > 0) or one could argue that individuals get greater utility from interaction with closer friends (i.e. d$u(S_i)$)/d($\Sigma^{D}_{it}(S_{it})$) > 0) – but all these formulations have the same qualitative impact on the expected utility from social leisure – i.e. on $\Sigma_i \hat{\imath}_k p_i u(S_i)$. The verbal interpretation of Equation 10 is that some level of contacts (?) is always available but people who have spent more time socializing in the past have a longer list of social contacts, which expire if not used for some time – i.e. only the last D periods produce currently valuable social contacts.

some time alone and also voluntarily choose some social leisure, this hypothesis seems obvious to us.) Given that proposition, the unambiguous prediction is that an individual's working time will increase and social leisure time will decrease when social leisure time becomes harder to arrange because there are fewer common leisure days and some social contacts therefore atrophy from disuse. Conversely, if social leisure time becomes easier to arrange because there are more common leisure days, this model predicts a decrease in working time and an increase in social leisure time – on normal working days, as well as on holidays and weekends.

3.1 Data

To test this perspective, we use the German Time Use Study 2001/02 which collected 37700 time use diaries from 12600 persons in 5400 households. The core tool was a diary kept by all household members - from the age of ten – in which respondents recorded the course of the day in their own words for three days, i.e. two weekdays and one Saturday or Sunday. Survey days were randomly selected and the duration of individual activities was indicated in ten-minute intervals. In addition to what the respondents considered their primary activity, a secondary activity could be entered and respondents were asked with whom activities were performed (this had to be marked in preset categories - children under 10 years, spouse/partner, other household members, other acquainted persons). The location of activities and any mode of travel was recorded in connection with the primary activity. The population sampled comprises all private households shown in the micro-census at their place of main residence, i.e. the German speaking foreign population was included. Total sample size is evenly distributed over 12 months. Activities were described by the respondents, and coded into preset categories – Appendix C lists the independent variables while Appendix D lists the coding descriptions of dependent variables used in this study.

Every participating household filled in a household questionnaire, covering household composition, housing situation and infrastructure of the housing environment, information on time spent providing unpaid help to members of other households in the last four weeks and other assistance received, etc. All persons keeping a diary also filled in an additional personal questionnaire, with detailed questions on the situation of

individual household members (e.g. educational qualification, conditions of labour force participation, health, personal ideas regarding time use, etc.). Field work started in April 2001 and was finished in May 2002.

3.2 Preliminary Data Analysis

On average, how much time do people of working age (25 to 54) spend going out for entertainment, participating in civic, political and religious meetings or in any type of non-work activity that involves persons beyond their immediate household? Table 1 compares the responses of Germans by Länder type, where 0 denotes Länder with only the minimum 13 national public holidays, while Länder types 1 to 4 refer to the number of extra public holidays in the Länder in which the respondent lived. It reports the average time spent in each type of activity separately for "normal" (i.e. non-holiday) weekdays and for Saturdays and Sundays, because time usage clearly differs so much on weekends and weekdays.

< …. Table 1 about here … >

In general, the relationship between average time usage and Länder type is not monotonic (with the exception of social time on Sundays, which increases steadily from an average 150 minutes in the Länder with least holidays to 199 minutes in the Länder with most holidays). Nevertheless, it is almost always true that the average time spent in these three different types of social activity is greater in Länder with more public holidays that in those Länder with the minimum holidays – and the differences can be fairly substantial, in a proportionate sense. In, for example, Länder with three extra public holidays, on a normal non-holiday weekday the average 25 to 54 year old spent 37% more time going out for entertainment, 21% more time going to meetings and 6% more time in all types of non-work activity involving others outside the household.

In the example of time spent on entertainment outside the home on weekdays cited above, the difference between residents of Länder with three extra holidays and those in Länder with zero extra holidays was 37% (= (14.37 – 10.48)/10.48). Expressed on an "average, minutes per day" basis this was only 3.89 minutes daily, but there are

roughly 240 normal working days in a year and social engagements normally come in discrete time commitments. Hence, if entertainment events outside the home are normally about two hours in length, another way to express the difference between residents of Länder with three extra holidays and those in Länder with zero extra holidays is to say that it amounts to about 7.5 additional social engagements per year[15]. However, how sure can one be that there is a statistically significant difference associated with more holidays, given all the many other influences that also affect the time usage of individuals?

To assess this, Tables 2 to 4 present multiple regression results. Their format is similar, because each reports the results of regressing four variables on Länder type and a vector of control variables. In all Tables, the regression coefficients are rounded to two significant digits and reported in standard type, while the probability that particular coefficient is statistically different from zero using a simple T test is reported in smaller, bold face italics. In presenting the average time spent on each activity among all people, Table 1 averaged the time usage of those who participated to some degree in an activity and those who did none of it. Because it might be argued that the determinants of any participation can be different from the factors influencing additional time usage, conditional on participation[16], sample selection bias is a concern. Tables 2 to 4 therefore report the results both of Ordinary Least Squares estimation and the Heckman correction for sample selection bias[17]. As the bottom row in each Table indicates, in almost every case the inverse Mills ratio is not statistically significant, implying that sample selection bias is not an issue and that it is the OLS coefficients which are the results of interest.

The model of time use presented in Section 2 argues that the greater availability of social contacts in Länder with more public holidays will mean that, ceteris paribus, individuals will participate more in social life (i.e. the net impact of Länder type on time spent in Entertainment, Meetings and Social Time will be positive). Primary interest therefore centres on the variable "ltype" (Länder type), which is entered as a quadratic in order that the "ltypesq" (Länder type squared) term can pick up any non-linearities in the

[15] Calculated as (3.89*240)/120 = 7.78, but rounding down to avoid false precision.
[16] In the labour supply literature, the analogous decision to participate in the labour force has been called the "extensive margin" while the hours of work decision of workers has been called the "intensive margin".
[17] The probit model from which the inverse Mills ratio is derived is not reported here for space reasons, but is available on request from the authors.

relationship between Länder type and time use. This implies that the net impact of more public holidays must be read as the joint impact of both linear and quadratic terms.

For example, in Table 2, the marginal impact of going from one to two additional public holidays on Entertainment time outside the home on normal non-holiday weekdays can be calculated as +1.46 minutes (= $3.56 - 0.71*(2^2-1^2)$) – or about three additional social engagements per year, on average.

The marginal impact on Social Time on normal non-holiday weekdays would be + 2.84 minutes per day (= 8.96 – 2.04(4-1), which implies about 5.5 additional social engagements per year). Although in both cases the linear and quadratic relationships are both statistically significant at normal (5%) levels, the estimated quantitative importance is small in absolute amount (as one might have expected, since the issue is leisure time usage on a normal workday, when little non-work time is available). Looking to Table 4, which examines time use on Sundays, the comparable calculation of the marginal impact of additional public holidays on Entertainment time outside the home would be nil, since neither term is statistically significant. However, the marginal impact of an additional public holiday on Social Time on normal Sundays is significantly estimated at + 18.37 minutes, since the statistical insignificance of the quadratic term indicates there is no evidence for diminishing returns to additional extra public holidays.

< …. Tables 2 to 4 about here … >

In assessing whether the number of public holidays plays a role influencing individuals' time use on other days, it is important to control for potentially confounding variables – such as age, gender and education – which might plausibly influence time use. Tables 2 to 4 indicate that their impact is not strong or consistent (e.g. age has no statistically significant impact on Entertainment, Meetings or Social Time on weekdays and is only correlated with Entertainment time on Saturdays and Social Time on Sundays, and education is generally statistically insignificant.) On the other hand, health status clearly matters. Bad Health (as subjectively evaluated) makes it more difficult for

individuals to engage in social activities – the consistently negative and significant impact indicated in Tables 2 to 4 is plausible.

As well, it is conceivable that differences between individuals in their social time are really driven by aspects of their work life. Although entrepreneurs or free lancers may have more flexibility in their working time, they may also face more demands on their time outside normal working hours, implying that scheduling a social life may be harder for them. In general, workers who put in more time on the job clearly have less time available to allocate to all non-work purposes, and workers whose jobs are scheduled outside the normal working day (7AM to 5PM weekdays) or whose working hours are fragmented in their timing can be expected to find it harder to arrange Social Time, to attend meetings or to go out with friends[19]. In this paper, we control for the impact of all these variables. Relative to workers who have a standard, non-fragmented workday, social time on normal weekdays is 7.79 minutes less for workers with fragmented but core working time and 27.04 minutes less for non-core continuous workers. For meetings and entertainment, however, these variables are statistically insignificant – and if expressed in terms of social engagements per year, the differences are non-trivial in magnitude.

Income differences[20] are associated with statistically significant, but fairly modest, differences in total social time on weekdays - particularly with regard to time spent with others from outside the household in entertainment. The coefficient on "eqiincome" reported in column 1 of Table 2 corresponds to (very roughly) 2.5 additional social engagements per year for somebody making an additional 12,000 Euro per year,[21] . There is, a clear impact of the presence of young children in the household – as any parent could predict, they reduce time spent on other social interaction. The number of co-residents in the household also offers an easy alternative to going out of the household for social time on Saturdays and weekdays, and is statistically significant. Finally, to

[19] See Merz and Burgert 2004 for analysis of fragmented working hour arrangements in Germany and Merz, Böhm and Burgert 2005 for the impact of working hour arrangements on income and its distribution.
[20] In this paper, we use equivalent individual income, defined as total household net income divided by the square root of household size.
[21] If an additional 1000 Euros of monthly income on average means an additional 1.17 minutes of entertainment on each of 240 working days per year, and each engagement lasts two hours.
[23] [-22.87 = 64.73 –17.52* (9-4)] ; [-57.91 = 64.73-17.52*(16-9)]

control for the impact on time use which weather conditions can have, we match the location of the interview to meteorological data (at the regional level). Our control for rainfall is usually insignificant, but the temperature and sun light hours are often statistically significant.

In summary, more public holidays are significantly and positively associated with more leisure time spent with others for entertainment and meetings - and with more enhanced total social time. Other statistically significant socio-economic control variables include the individual's health situation, occupation (particularly self-employed status), the fragmentation of a work day, number of cohabitants and household equivalent income .

Tables 2 to 4 are based on the coding of self-reported time use diaries on three specific days, in which activities were reported at ten minute intervals. This time diary methodology, because it forces individuals to walk through the sequence of events in a given day, has significant advantages in ensuring the completeness and consistency of responses. The disadvantage is a high cost of administration, which mandates relatively few days observed per respondent and the possibility that a survey will miss low frequency events. The German Time Use study therefore also asked a series of summary questions on time use "in a typical week".

< …. Table 5 about here … >

Table 5 reports the results of two Ordinary Least Squares regressions – one in which the "normal work week" is regressed on Länder type and control variables and the other in which the dependent is the active personal help given per week to other households (in minutes, for childcare, care, household work, do it yourself). Our model is clear in suggesting that if individuals have more social contacts, and hence their non-work time has greater marginal utility, their desired work week will be less. Over most of the range of additional public holidays in Germany, that is the case – the coefficients in column 1 of Table 5 imply that moving from 2 to 3 additional holidays is associated with

a decline of 23 minutes in the normal work week, and moving from 3 to 4 additional holidays per year is associated with a decline of 58 minutes.[23]

Although the model of Section 2 considers the demand for leisure (social and solo), and does not directly discuss the "Social Capital" which repeated social interaction produces, it is plausible that in localities with stronger social ties, individuals will spend more of their time helping other households (in childcare, care, household work, home repairs, etc.). The evidence from Table 5 is however mixed, since the quadratic specification and the OLS coefficients estimated imply a maximum, across länder type, at 2.41 additional public holidays.

4. Public Policy Implications

Many labour market outcomes (e.g. the unemployment rate) are influenced in complex and interdependent ways by a variety of socio-economic trends and policy variables. By contrast, the number of public holidays per year is a fairly direct issue – and one which is clearly amenable to legislative decision. Around the world, different legislatures have made somewhat different decisions – Appendix B presents a summary table of the number of national public holidays in the European Union and other countries. Within the majority of countries, the number of public holidays also varies at the sub-national level, and most countries have something in the range of 10 to 15 public holidays each year. The fact that Germany is at the higher end of this range is useful for the analysis of possible public policy change, since German data may indicate what countries with fewer holidays (e.g. Canada or the USA) might expect, were they to increase the number of their public holidays.

However, the variation in public holidays across countries also suggests the question: what is the optimal number of public holidays?

This paper has constructed a model of social time use which predicts an increase in utility for those whose social life is easier to arrange because they live in a locality with a greater number of public holidays. It has also estimated the impact on time use patterns of more public holidays across German Lander and it has emphasized the increase in the marginal utility of leisure on normal workdays and weekends associated with more holidays.

In doing so, this paper seeks to draw attention to a previously unrecognized benefit – but one should also not lose sight of the historic reasons for, and benefits of, public holidays.

The public holidays that now exist in different countries have a wide range of specific historic origins, but if there is a general explanation, it would be the common enjoyment of festivals. Historically, festivals and holidays have combined time away from work with unifying social rituals – ceremonies, parades and family gatherings that bring people together in an event with common symbolic meaning. Enjoying oneself in this way adds to the utility of participants[24] on the day which implies that for many people the utility of the leisure consumed on holidays includes some additional direct utility value to the common enjoyment of that time, as well as building social cohesion and social capital. The benefits of greater social capital and social cohesion in outcomes such as faster economic growth, better health and lower social costs have been emphasized in a growing literature – see, for example, Putnam (2000); Knack & Keefer (1997); or Osberg (2004).

Clearly, however, several caveats are in order.

A marginal net benefit of increasing the number of holidays over the range from 13 to 17 days cannot be extrapolated indefinitely. At some point (unobserved in current cross-sectional data, but presumably considerably less than 365 days) an increase in the number of public holidays will overwhelm the ability of individuals to adjust their hours of work on other margins and will become a binding constraint on aggregate leisure consumption for a significant number of people, and not just a co-ordination device for leisure time. "Out of sample prediction" is, in general, something to be approached cautiously. This paper is concerned with the impacts of additional public holidays, over the 13 to 17 day range and does not make a general statement about the impacts of additional public holidays at any level of holidays.

When firms pay both for hours actually worked and for public holidays and vacations, the wage per hour actually worked includes, as a form of "fringe benefit" the worker's

[24] If, for example, public holidays are often celebrated with parades, but people have the option of not attending, a revealed preference approach would argue that the opportunity for common celebration must increase the utility of parade participants and parade watchers, while non-attendees enjoy, at minimum, more easily co-ordinated leisure time.

entitlement to paid holidays and vacations[25]. If workers can see through the packaging of their total hourly compensation into [wages + fringes], it is reasonable to think that firms can too. A legislated public holiday may change the proportions, but there are at least three margins of adjustment for any given employer – normal working hours (which imply non-paid leisure time (*L)* on work days), paid vacation days (*V*) and nominal wages (w_N) – to enable firms and workers to co-ordinate a mutually desired equilibrium (*w, H*) of wages and actual labour hours.

Even if workers are, in general, not meaningfully constrained in their total annual working hours by public holidays, firms may protest that they will be constrained in their usage of the capital stock. Any resulting costs associated with lower capital utilization must be counted as a cost of public holidays. However, firms which operate during "normal working hours, Monday to Friday" are not now actually attempting to utilize their capital stock in the evening or overnight or on weekends (e.g. universities typically do not try to use lecture halls at 4 AM). For such establishments, the margins of adjustment in capital usage are plausibly quite similar to the margins of aggregate labour supply adjustment by workers, and would presumably be largely determined by such adjustments, since an important reason why these firms now use their capital stock only during standard working hours is because it is then that workers are available at standard pay rates.

As well, the legislation establishing worker entitlement to a paid public holiday does not generally prevent firms from paying a wage premium to obtain labour, if it is profitable to do so. Firms would clearly prefer not to have to pay such a wage premium, but since it is a worker-firm transfer, the social cost is the loss in consumer surplus of any change in behaviour it induces – which is likely to be small. A firm which now finds it profitable to operate 24 hours a day, 7 days a week and to pay the wage premium necessary to attract workers on weekends and holidays, rather than bear the costs of downtime, will have to pay a holiday premium to their workers' wages for a working day which is now paid at normal pay rates. For such "24/7" (*"24 hours per day, 7 days per week")* employers[26], the marginal private cost of an additional public holiday is easily calculated as the additional holiday pay

[25] As equation 9 discussed, in any given period of time, such as a year, $w = [(H+V+P)* w_N] / H$

[26] Examples would include plants which face a large fixed cost to start up or to shut down (e.g. nuclear or thermal electricity generation plants, oil refineries or blast furnaces) or services (like police, fire and hospitals) which must be offered on holidays.

premium required in the annual wage bill. If, for example, working on a public holidays was paid at double time, an additional day of holidays would imply an increase in the firms annual wage bill of about $1/380^{th}$.[27] However, since this overtime premium is a firm-worker transfer, it is not a social cost. The social cost is any loss in consumer and producer surplus from any change in aggregate investment in such 24/7 firms which might be caused by an increase of about 0.00263 ($=1/380^{th}$) in labour costs. Since establishments which choose to bear the costs of utilizing capital for fewer days in the year could have chosen the option of paying the necessary holiday pay premium for the additional day of holidays, the upper bound for their private loss is the $1/380^{th}$ increase in annual wage bill which the firm could have chosen to pay.

Even if the legislation establishing public holidays were of unprecedented severity and actually prohibited <u>any</u> form of work on the holiday, the social welfare implications would depend on the net general equilibrium changes in the capital stock and returns to capital. If one defines r as the rate of return and K as the capital stock before legislation of holidays and r' as the rate of return and K' as the capital stock after the legislation of holidays, a legal requirement not to operate for h days in the year can be seen as equivalent to a reduction in the stream of capital services received by a firm – from rK to $\{ [(365 - h)/365] * r' * K' \}$. Clearly, we would expect investment to fall somewhat, (i.e. $K' < K$) and the marginal product of capital would rise as its scarcity increased ($r' > r$). If the production technology were approximately Cobb-Douglas, we know that $rK=r'K'$, so if $h=1$, the reduction in stream of capital services would be just $1/365^{th}$ or about 0.00273. Hourly wages might be expected to fall if workers have, in the end, less capital to work with, during each hour of work – but the size of the change in capital stock would be 0.00273*(interest elasticity of investment), which is likely to be small, and the impact on wages and the effect of lower hourly wages on voluntary labour supply would similarly depend on the size of impact elasticities.

In summary, this paper has argued that public holidays facilitate the co-ordination of leisure time but do not constrain the annual amount of leisure. Better co-ordination of leisure

[27] If there were previously 15 public holidays, which increased to 16, the firm would previously pay for 15 days at double time and 350 at normal rates (total days paid = 380) but would now pay 16 days at double time and 349 at normal rates (i.e. 381 days paid).

has benefits because it increases the utility of leisure both on holidays and (by enabling people to maintain social contacts more easily) on normal weekdays and weekends. The paper has used German Time Use data from 2001-02 to show that over the range of public holidays (13 to 17) observed in Germany, public holidays have beneficial impacts on social life on normal weekdays and weekends. Since these benefits are additional to the direct utility gains of the holidays, it suggests that there is a case to be made for more public holidays in those countries (like the USA or Canada) which now have fewer holidays than Germany.

TABLE 1a

Time Spent in Social Activity by Länder type

Average minutes per day
(including zeroes)

	Länder type					
weekdays	0	1	2	3	4	all Länder
entertainment	10.48	9.00	12.91	14.37	11.67	12.00
meetings	2.30	2.09	2.36	2.90	2.78	2.48
social time	110.41	109.94	119.92	117.07	107.44	114.34

	Länder type					
saturdays	0	1	2	3	4	all Länder
entertainment	31.28	42.63	40.15	49.86	35.08	39.54
meetings	3.67	4.19	3.14	2.86	7.36	3.99
social time	214.76	197.49	225.06	214.81	190.84	212.26

	Länder type					
sundays	0	1	2	3	4	all Länder
entertainment	29.03	24.65	36.27	30.30	38.31	32.46
meetings	6.93	5.49	7.12	6.82	12.53	7.55
social time	149.59	162.17	171.56	180.40	199.11	171.57

Source: German Time Budget Survey 2001/02, own computation

TABLE 1b

Time Spent in Social Activity by Länder type

Average minutes per day
(without zeroes, positive
values only)

	Länder type					
weekdays	0	1	2	3	4	all Länder
entertainment	131,22	161,59	154,02	165,14	147,60	151,36
meetings	102,17	82,39	76,16	90,90	74,86	83,65
social time	131,85	132,97	141,95	137,69	130,32	136,28

	Länder type					
saturdays	0	1	2	3	4	all Länder
entertainment	154,27	212,60	189,55	227,00	195,80	193,02
meetings	122,86	71,65	71,91	107,83	82,42	85,63
social time	248,99	225,51	269,02	244,75	237,53	249,89

	Länder type					
sundays	0	1	2	3	4	all Länder
entertainment	146,26	125,41	164,18	149,07	160,30	152,87
meetings	75,35	76,52	68,62	71,64	72,25	71,81
social time	183,65	198,78	210,16	213,33	223,96	206,31

Source: German Time Budget Survey 2001/02, own computation

Table 2
Time Use on Non-Holiday Weekdays - Germany 2001-02

	Entertainment		Meetings		Social Time	
	OLS	**HECK**	**OLS**	**HECK**	**OLS**	**HECK**
age	0.11 ***0.89***	-4.16 ***0.67***	0.14 ***0.64***	6.93 ***0.44***	1.25 ***0.52***	0.87 ***0.69***
age2	-0.00 ***0.75***	0.05 ***0.70***	-0.00 ***0.75***	-0.08 ***0.41***	-0.02 ***0.32***	-0.02 ***0.58***
woman	-5.57 ***0.00***	-46.47 ***0.16***	-0.73 ***0.11***	-9.98 ***0.48***	-14.39 ***0.00***	-25.10 ***0.01***
intermediate	0.33 ***0.80***	10.86 ***0.33***	-0.01 ***0.99***	-3.40 ***0.72***	-2.85 ***0.36***	-3.65 ***0.29***
supper	-0.43 ***0.77***	-13.84 ***0.27***	0.51 ***0.36***	-6.08 ***0.59***	0.71 ***0.84***	-5.40 ***0.17***
university	2.25 ***0.20***	12.30 ***0.38***	-0.39 ***0.55***	-0.06 ***1.00***	-6.00 ***0.15***	-7.16 ***0.12***
health	-2.99 ***0.00***	-31.74 ***0.20***	-0.34 ***0.24***	-4.27 ***0.45***	-10.36 ***0.00***	-10.03 ***0.01***
freelancer	5.23 ***0.16***	54.81 ***0.07***	-0.80 ***0.57***	69.11 ***0.08***	32.88 ***0.00***	30.63 ***0.00***
entrepre	0.57 ***0.87***	59.28 ***0.09***	0.20 ***0.88***	49.48 ***0.12***	29.28 ***0.00***	26.18 ***0.01***
employee	-1.39 ***0.53***	28.33 ***0.17***	-0.14 ***0.87***	27.79 ***0.16***	25.06 ***0.00***	14.24 ***0.02***
Core/frag	-2.37 ***0.14***	-20.54 ***0.20***	-0.17 ***0.78***	7.43 ***0.65***	-7.79 ***0.05***	-7.25 ***0.09***
Nocor/nofrag	-3.92 ***0.20***	-42.19 ***0.19***	-0.15 ***0.90***	6.98 ***0.80***	-27.04 ***0.00***	-29.63 ***0.00***
Nocor/frag	-7.56 ***0.06***	-63.01 ***0.29***	2.26 ***0.14***	8.01 ***0.78***	-10.81 ***0.26***	-11.82 ***0.27***
cohabits	-0.16 ***0.74***	2.69 ***0.50***	0.58 ***0.00***	-2.03 ***0.54***	-6.32 ***0.00***	-5.15 ***0.00***
youngkid	-5.57 ***0.00***	-23.51 ***0.08***	-1.71 ***0.00***	-4.07 ***0.75***	-6.99 ***0.06***	-11.57 ***0.01***
Eqincome (10^{-3})	1.17 ***0.00***	0.00 ***0.83***	-0.20 ***0.17***	-0.00 ***0.95***	0.01 ***0.00***	0.01 ***0.00***
temper	0.34 ***0.00***	4.19 ***0.11***	0.01 ***0.75***	0.01 ***0.99***	0.09 ***0.62***	0.39 ***0.10***
sunhours	-0.87 ***0.00***	-7.65 ***0.19***	-0.03 ***0.81***	-0.98 ***0.68***	-2.18 ***0.00***	-1.67 ***0.18***
rainfall	0.11 ***0.41***	1.11 ***0.42***	0.23 ***0.00***	3.46 ***0.04***	0.01 ***0.98***	0.08 ***0.84***
workday	-0.03 ***0.00***	-0.33 ***0.13***	-0.00 ***0.00***	-0.11 ***0.25***	-0.18 ***0.00***	-0.18 ***0.00***

Table 2 cont.

ltype	3.56 ***0.01***	38.57 ***0.06***	-0.81 ***0.10***	-16.65 ***0.11***	12.97 ***0.00***	8.96 ***0.25***
ltypesq	-0.71 ***0.03***	-7.09 ***0.09***	0.31 ***0.01***	4.18 ***0.24***	-2.85 ***0.00***	-2.04 ***0.27***
_cons	27.07 ***0.10***	-102.02 ***0.71***	0.50 ***0.94***	-127.54 ***0.77***	171.69 ***0.00***	223.66 ***0.00***
Mills lambda		230.27 ***0.28***		49.34 ***0.69***		-59.65 ***0.69***
n n censored adj. R^2 (%) Wald Chi^2 p-value	*9757* *2,6* 	*751* *10546* *283,4 0,000*	*9757* *0,96* 	*308* *11060* *103,6 0,000*	*9757* *7,58* 	*8122* *1874* *691,11 0,000*

Note: In Tables 2 to 5, P>|t| reported in ***boldface italics***

Table 3
Time Use on Saturdays - Germany 2001- 02

	Entertainment		Meetings		Social Time	
	OLS	**HECK**	**OLS**	**HECK**	**OLS**	**HECK**
age	-8.65 ***0.00***	-22.71 ***0.14***	0.14 ***0.86***	-8.29 ***0.70***	-7.96 ***0.17***	-8.83 ***0.17***
age2	0.10 ***0.00***	0.26 ***0.15***	-0.00 ***0.96***	0.09 ***0.74***	0.08 ***0.26***	0.10 ***0.19***
woman	-2.29 ***0.54***	1.15 ***0.94***	-0.96 ***0.41***	-45.88 ***0.09***	-8.60 ***0.29***	-19.63 ***0.08***
intermediate	0.27 ***0.95***	6.42 ***0.65***	-0.13 ***0.92***	0.83 ***0.97***	-8.01 ***0.40***	-2.67 ***0.80***
supper	1.12 ***0.82***	-7.67 ***0.62***	4.03 ***0.01***	5.01 ***0.86***	-0.59 ***0.96***	3.22 ***0.79***
university	2.67 ***0.65***	-2.63 ***0.88***	-3.13 ***0.09***	-17.68 ***0.59***	-22.27 ***0.08***	-28.99 ***0.03***
health	-2.18 ***0.39***	-8.20 ***0.44***	-0.72 ***0.37***	-14.38 ***0.44***	-14.82 ***0.01***	-11.12 ***0.22***
freelancer	-8.48 ***0.58***	95.99 ***0.11***	-5.11 ***0.29***	 ***0.00***	-40.82 ***0.23***	-37.49 ***0.34***
entrepre	-15.06 ***0.28***	-5.52 ***0.93***	-1.42 ***0.75***	-70.11 ***0.47***	12.71 ***0.67***	14.50 ***0.67***
employee	-8.92 ***0.32***	21.54 ***0.55***	-1.16 ***0.68***	-49.08 ***0.43***	2.97 ***0.88***	-11.53 ***0.59***
Core/frag	-8.29 ***0.46***	-71.09 ***0.08***	0.07 ***0.98***	-45.87 ***0.61***	-18.14 ***0.45***	-16.01 ***0.55***
Nocor/nofrag	2.27 ***0.85***	-15.75 ***0.71***	7.94 ***0.04***	38.87 ***0.55***	-23.03 ***0.39***	-22.90 ***0.42***
Nocor/frag	-22.32 ***0.21***	-138.10 ***0.27***	-2.02 ***0.72***	 ***0.00***	-45.14 ***0.25***	-65.98 ***0.11***
cohabits	1.10 ***0.48***	-2.01 ***0.66***	1.48 ***0.00***	13.25 ***0.09***	-8.12 ***0.02***	-7.34 ***0.05***
youngkid	-17.70 ***0.00***	-17.34 ***0.34***	-1.00 ***0.55***	1.41 ***0.97***	-16.29 ***0.16***	-16.64 ***0.18***

Table 3 cont.

eqincome	0.00	-0.00	-0.00	0.00	0.01	0.00
	0.95	***0.64***	***0.63***	***0.68***	***0.01***	***0.21***
temper	1.38	5.27	0.16	1.07	2.25	1.97
	0.00	***0.06***	***0.04***	***0.65***	***0.00***	***0.02***
sunhours	-1.99	-8.48	0.55	7.25	0.51	1.33
	0.03	***0.09***	***0.06***	***0.28***	***0.80***	***0.57***
rainfall	0.15	1.54	-0.12	2.48	3.48	3.21
	0.77	***0.45***	***0.46***	***0.60***	***0.00***	***0.01***
workday	-0.01	-0.13	-0.00	0.22	-0.15	-0.14
	0.79	***0.24***	***0.57***	***0.21***	***0.00***	***0.04***
ltype	6.29	29.27	-2.88	-33.02	19.56	27.40
	0.15	***0.13***	***0.04***	***0.37***	***0.04***	***0.01***
ltypesq	-1.50	-5.86	0.97	1.90	-5.67	-7.08
	0.17	***0.23***	***0.00***	***0.87***	***0.02***	***0.01***
_cons	225.75	372.10	-6.17	743.80	402.73	459.71
	0.00	***0.06***	***0.72***	***0.32***	***0.00***	***0.00***
mills lambda		190.93		-199.01		-72.61
	0.00	***0.16***	***0.00***	***0.30***	***0.00***	***0.65***
n	*2575*	*492*	*2575*	*104*	*2575*	*2102*
n censored		*2421*		*2861*		*508*
adj. R^2 (%)	*2,5*		*0,84*		*4,3*	
Wald Chi^2 p-value		*99,01 0,000*		*39,5 0,000*		*120,8 0,000*

Table 4
Time Use on Sundays - Germany 2001-02

	Entertainment		Meetings		Social Time	
	OLS	**HECK**	**OLS**	**HECK**	**OLS**	**HECK**
age	-2.97	-3.85	-0.31	-12.09	-17.71	-45.76
	0.24	***0.61***	***0.69***	***0.13***	***0.00***	***0.66***
age2	0.03	0.03	0.01	0.13	0.21	0.54
	0.29	***0.73***	***0.51***	***0.12***	***0.00***	***0.67***
woman	-7.70	-9.88	0.26	-9.67	1.36	33.88
	0.02	***0.45***	***0.81***	***0.12***	***0.84***	***0.81***
intermediate	2.88	18.64	-3.08	1.51	-4.88	-2.93
	0.47	***0.10***	***0.02***	***0.79***	***0.54***	***0.93***
supper	5.95	14.58	-0.33	-1.42	17.32	12.82
	0.19	***0.25***	***0.82***	***0.83***	***0.06***	***0.75***
university	-4.27	-17.53	-1.32	1.46	-28.85	-24.35
	0.43	***0.23***	***0.44***	***0.86***	***0.01***	***0.61***
health	-8.18	-18.67	0.24	3.36	-13.42	-40.34
	0.00	***0.06***	***0.75***	***0.42***	***0.00***	***0.69***
freelancer	9.49	7.28	5.58	93.19	20.45	-0.10
	0.54	***0.85***	***0.25***	***0.00***	***0.51***	***1.00***
entrepre	-5.87	-18.02	-2.38	46.92	1.92	22.46
	0.65	***0.65***	***0.56***	***0.09***	***0.94***	***0.85***
employee	9.97	31.07	3.82	75.80	16.38	2.68
	0.32	***0.26***	***0.23***	***0.00***	***0.41***	***0.98***
Core/frag	-0.16	-8.98	-4.40	-90.49	-15.50	0.82
	0.99	***0.81***	***0.25***	***0.00***	***0.53***	***0.99***

Nocor/nofrag	7.24 ***0.55***	13.05 ***0.71***	-2.97 ***0.44***	-77.28 ***0.00***	-2.87 ***0.91***	-0.30 ***1.00***
Nocor/frag	-3.40 ***0.82***	20.54 ***0.67***	10.19 ***0.03***	-9.38 ***0.65***	40.23 ***0.17***	26.86 ***0.83***

cohabits	0.88 ***0.56***	7.24 ***0.07***	2.19 ***0.00***	2.25 ***0.26***	-2.18 ***0.47***	0.38 ***0.98***
youngkid	-3.34 ***0.48***	-26.98 ***0.03***	-3.06 ***0.04***	-12.47 ***0.10***	-10.14 ***0.28***	-23.40 ***0.57***
eqincome	-0.00 ***0.50***	-0.00 ***0.79***	-0.00 ***0.00***	-0.00 ***0.11***	0.00 ***0.21***	0.01 ***0.63***
temper	1.07 ***0.00***	2.96 ***0.03***	-0.06 ***0.41***	-0.17 ***0.69***	0.79 ***0.08***	2.31 ***0.64***
sunhours	-3.28 ***0.00***	-6.72 ***0.04***	-0.02 ***0.95***	0.06 ***0.97***	-1.32 ***0.44***	-5.35 ***0.75***
rainfall	-0.63 ***0.25***	-2.45 ***0.17***	-0.08 ***0.66***	-0.40 ***0.74***	-0.18 ***0.87***	1.38 ***0.87***
workday	-0.06 ***0.01***	-0.22 ***0.01***	-0.01 ***0.03***	-0.19 ***0.03***	-0.17 ***0.00***	-0.21 ***0.34***
ltype	4.19 ***0.29***	6.96 ***0.58***	-2.34 ***0.06***	6.54 ***0.62***	18.37 ***0.02***	35.56 ***0.63***
ltypesq	-0.97 ***0.33***	-2.76 ***0.36***	0.99 ***0.00***	-3.43 ***0.52***	-1.04 ***0.61***	-0.37 ***0.97***
_cons	126.35 ***0.01***	173.80 ***0.25***	10.23 ***0.52***	460.54 ***0.19***	532.98 ***0.00***	848.67 ***0.48***
mills lambda	***0.00***	84.81 ***0.30***	***0.00***	-59.79 ***0.54***	***0.00***	837.43 ***0.77***
n	*2409*	*524*	*2409*	*266*	*2409*	*1990*
n censored		*2235*		*2519*		*479*
adj. R^2 (%)	*2,6*		*2,8*		*3,3*	
Wald Chi^2 p-value		*20,76 0,000*		*80,39 0,000*		*24,02 0,8437*

Table 5 Time use during a "normal workweek" and for active personal help – Germany 2001-02		
	workweek	**active personal help**
age	113.64 ***0.00***	-16.78 ***0.04***
age2	-1.43 ***0.00***	0.26 ***0.01***
woman	-918.96 ***0.00***	95.18 ***0.00***
intermed	56.79 ***0.00***	-11.73 ***0.38***
supper	-3.05 ***0.89***	-14.69 ***0.34***
universi	192.42 ***0.00***	-57.35 ***0.00***
health	-110.33 ***0.00***	48.65 ***0.00***
freelanc	279.96 ***0.00***	93.25 ***0.02***
entrepre	798.65 ***0.00***	61.06 ***0.10***
employee	102.94 ***0.00***	48.45 ***0.04***
core/frag	49.82 ***0.07***	23.74 ***0.23***
nocro/nofrag	-125.40 ***0.01***	-37.14 ***0.26***
nocor/frag	38.22 ***0.53***	79.00 ***0.07***
cohabits	-65.92 ***0.00***	-51.19 ***0.00***
youngkid	-75.10 ***0.00***	41.85 ***0.01***
eqincome	0.16 ***0.00***	-0.02 ***0.00***
temper	-0.80 ***0.46***	3.04 ***0.00***
sunhours	-12.49 ***0.00***	-9.45 ***0.00***
rainfall	-1.09 ***0.60***	1.18 ***0.43***
workday	1.41 ***0.00***	-0.18 ***0.00***
ltype	64.73 ***0.00***	41.28 ***0.00***
ltypesq	-17.52 ***0.00***	-8.56 ***0.01***
_cons	-287.65 ***0.22***	600.12 ***0.00***

* active personal help given per week to other households (in minutes, for childcare, care, household work, do it yourself).

References

Becker, G.S. (1991). *A Treatise on the Family*. Cambridge MA: Harvard University Press.

Corneo, G. (2005) "Work and television" *European Journal of Political Economy* Vol. 21 . 99– 113.

Ermisch, J.F. (2003). *The Economics of the Family*. Princeton NJ: Princeton University Press.

Gratton, C., & Taylor, P. (2000). *The Economics of Sport and Leisure*. London: Spon Press.

Hallberg, D. (2003). Synchronous leisure, jointness, and household labor supply. *Labour Economics*, *10*, 185–202.

Hamermesh, D. (1996). The timing of work time: evidence from the US and Germany. *Konjunkturpolitik*, *42*, 1–22.

Hamermesh, D. (2002). Timing, togetherness and time windfalls. *Journal of Population Economics*, *15*, 601–623.

Jacobsen Joyce P. and Peter Kooreman (2005). Timing constraints and the allocation of time: The effects of changing shopping hours regulations in The Netherlands. *European Economic Review, 49/1,* 9-27

Jenkins, S. and L. Osberg (2005) "Nobody to Play With ? The Implications of Leisure Co-ordination" in *The Economics of Time Use,* D.S. Hamermesh and G.A. Pfann (Editors) Elsevier B.V.. 113-145.

Juster, T. (1985). Changes in work, leisure and well-being for men and women. Paper presented at the 19th General Conference, International Association for Research in Income and Wealth, Noordwijkerhout NL.

Killingsworth, M. (1983). *Labor Supply.* Cambridge: Cambridge University Press.

Knight, F.H. (1933). *The Economic Organization*. Chicago IL: University of Chicago.

Knack, S., & Keefer, P. (1997). Does social capital have an economic payoff? A cross-country investigation. *The Quarterly Journal of Economics*, *112*, 1251–1288.

Merz, J., Böhm, P. and D. Burgert (2005), Timing, Fragmentation of Work and Income Inequality – An Earnings Treatment Effects Approach, FFB-Discussionpaper

No. 48, Department of Economics and Social Sciences, University of Lüneburg, Lüneburg.

Merz, J. and D. Burgert (2005). Wer arbeitet wann? – Arbeitszeitarrangements von Serlbständigen und abhängig Beschäftigten: Eine mikroökonometrische Analyse deutscher Zeitbudgetdaten, in *Perspektiven der MittelstandsForschung – Ökonomische Analysen zu Selbständigkeit, Freien Berufen und KMU*, Merz, J. and J. Wagner (Eds.), CREPS-Schriftenreihe Vol. 1, Lit-Verlag. Münster. 303-330.

OECD (2001). *The Well-being of Nations: The Role of Human and Social Capital*. Paris: Organization for Economic Co-operation and Development.

Osberg, L. (2003*a*). Understanding growth and inequality trends: the role of labour supply in the U.S.A. and Germany. *Canadian Public Policy, 29* (Supplement 1), S163–S183.

Osberg, L. (ed.) (2003*b*). *The Economic Implications of Social Cohesion*. University of Toronto Press, Toronto.

Putnam, R.D. (1993). *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton NJ: Princeton University Press.

Putnam, R.D. (2000). *Bowling Alone: The Collapse and Revival of the American Community*. New York: Simon and Schuster Publishers.

Skuterud, Mikal (2005). The impact of Sunday shopping on employment and hours of work in the retail industry: Evidence from Canada *European Economic Review* Volume 49, Issue 8 , November 2005, 1953-1978.

Sullivan, O. (1996). Time co-ordination, the domestic division of labour and affective relations: time use and the enjoyment of activities with couples. *Sociology*, *30*, 79–100.

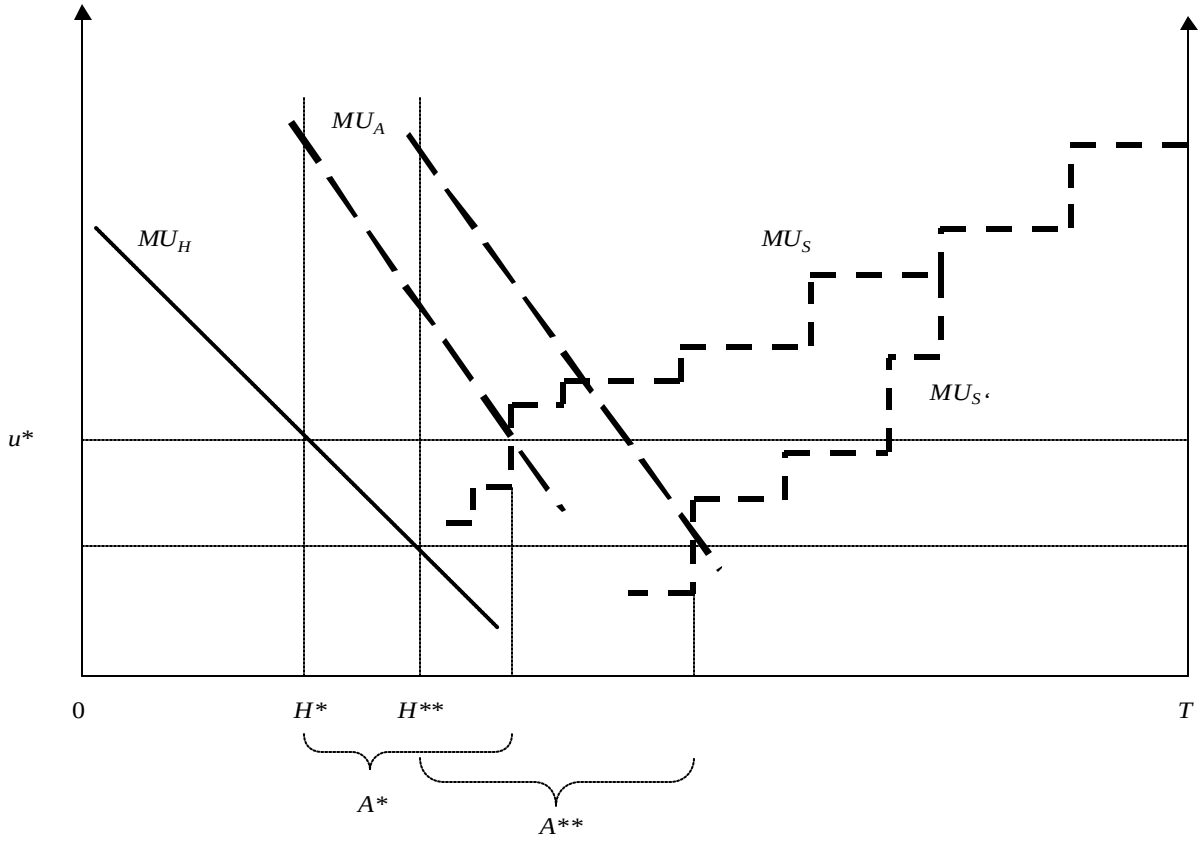
Uhlaner, C.J. (1989). "Relational goods" and participation: incorporating sociability into a theory of rational action. *Public Choice*, *62*, 253–285.

van Velzen, S. (2001). *Supplements to the Economics of Household Behaviour*. Tinbergen Institute Research Series No. 242. Amsterdam: University of Amsterdam.

Weiss, Y. (1996). Synchronisation of work schedules. *International Economic Review, 37,* 157–179.

Figure 1

The Implications of Fewer Current Contacts



Appendix A

Public Holiday (Feiertag)		Date 2001		Date 2002	Bundesweit	Baden-Württemberg	Bayern	Berlin	Brandenburg	Bremen	Hamburg	Hessen	Mecklenburg-Vorpommern	Niedersachsen	Nordrhein-Westfahlen	Rheinland-Pfalz	Saarland	Sachsen	Sachsen-Anhalt	Schleswig-Holstein	Thüringen
Neujahr	Mo	01/01/2001	Di	01/01/2002	x																
Heilige Drei Könige	Sa	06/01/2001	So	06/01/2002		x	x												x		
Karfreitag	Fr	13/04/2001	Fr	29/03/2002	x																
Ostersonntag	So	15/04/2001	So	31/03/2002	x																
Ostermontag	Mo	16/04/2001	Mo	01/04/2002	x																
Tag der Arbeit	Di	01/05/2001	Mi	01/05/2002	x																
Christi Himmelfahrt	Do	24/05/2001	Do	09/05/2002	x																
Pfingstsonntag	So	03/06/2001	So	19/05/2002	x																
Pfingstmontag	Mo	04/06/2001	Mo	20/05/2002	x																
Fronleichnam	Do	14/06/2001	Do	30/05/2002		x	x					x			x	x	x	x			x
Mariä Himmelfahrt	Mi	15/08/2001	Do	15/08/2002			x										x				
Tag der deutschen Einheit	Mi	03/10/2001	Do	03/10/2002	x																
Reformationstag	Mi	31/10/2001	Do	31/10/2002					x				x					x	x		x
Allerheiligen	Do	01/11/2001	Fr	01/11/2002		x	x								x	x	x				
Buß- und Bettag	Mi	21/11/2001	Mi	20/11/2002														x			
Heiligabend	Mo	24/12/2001	Di	24/12/2002	x																
1. Weihnachtsfeiertag	Di	25/12/2001	Mi	25/12/2002	x																
2. Weihnachtsfeiertag	Mi	26/12/2001	Do	26/12/2002	x																
Silvester	Mo	31/12/2001	Di	31/12/2002	x																

Appendix B

Country - EU	Total No. of National Public Holidays	Footnote
Sweden	15,5	yes
Portugal	15	yes
Cyprus	15	
Luxembourg	14	yes
Spain	14	yes
Italy	13	yes
France	13	yes
Germany	13	yes
Slovakia	13	
Slovenia	13	
Greece	13	yes
Denmark	12,5	
Belgium	12	
Latvia	12	
Hungary	11	
Poland	11	
Czech Republic	11	
Netherlands	11	
United Kingdom	9	yes
Country - Non-EU	**Total No. of National Public Holidays**	**Footnote**
Israel	34	
Brazil	18	yes
Chile	17	yes
Mexico	15	
Norway	14	
Taiwan	14	
Philippines	14	yes
Japan	14	yes
Ukraine	13	
Bulgaria	13	
Canada	12	yes
New Zealand	11	
Russia	11	
Switzerland	10	yes
USA	10	yes
Australia	10	yes
Singapore	8	
Thailand	8	yes
Egypt	7	

footnote:
holidays only for certain regions or banks excluded from total number of national holidays
source:
1. www.tyzo.com
2. ww.holidayfestival.com

Appendix C

Definition of Independent Variables

age	age
age2	age squared
woman	woman=1, man=0
elementary	Education: elementary (Hauptschule, 9 school years)
intermediate	Education: intermediate (Realschule, 10 school years)
supper	Education: special upper (specuppe, Gymnasium 13 school years) or upper (upper Fachgymnasium 13 school years)
universi	Education: university
health	health info (1=very poor, …, 5=very good)
notempl	not employed, not active (category=0)
freelancer	freelancer status1=1 (and working, category not 0)
entrepre	entrepreneur status1=2 (and working, category not 0)
employee	employee status1=3 (and working, category not 0)
	Work Timing and Fragmentation
	core = working hours 7AM to 5PM weekdays
	not fragmented = no break in working > 60 minutes
	core/not fragmented = reference category
Core/frag	core/fragmented =1; else = 0
Nocor/nofrag	non-core/not fragmented =1; else = 0
Nocor/frag	non-core/fragmented =1; else = 0
cohabits	Number cohabitants (persons in household -1)
youngkid	household with kids aged <= 6 =1; else = 0
eqincome	equivalent individual net income ((household income/square root number household members))
temper	Temperature (daily max of respective state) on survey day
sunhours	Sunhours on survey day in the living region
rainfall	Rainfall on survey day in the living region
workday	Daily working hours at all jobs + daily commuting time for work,
Ltype =0	all Länder with only the 13 national public holidays
=1	Länder with one additional public holiday
=2	Länder with two additional public holidays
=3	Länder with three additional public holidays
=4	Länder with four additional public holidays.

Appendix D

Definition of *Dependent Variables*

(code numbers by the German Federeal Statistical Office, Zeitbudgeterhebung 2001/02) conditioning on: done with other acquaintances ('Bekannte')

entertain = 52

52 UNTERHALTUNG UND KULTUR
520 Nicht genauer bezeichnete Tätigkeit
521 Kino
522 Besuch von Theater und Konzerten
523 Kunstausstellungen und Museen
524 Bibliotheken
525 Besuch sportlicher Ereignisse
526 Ausflüge, Zoo, Zirkus, Vergnügungsparks, Kirmes, Besichtigungen etc.
527 Ausgehen (z. B. Cafes, Bistros, Kneipen, Discos, ohne Essen, z. B. Gaststätten)
529 Andere eindeutig bestimmte Tätigkeiten

meetings = 44

44 TEILNAHME AN V VERSAMMLUNGEN
440 Nicht genauer bezeichnete Tätigkeiten
441 Politische und soziale Versammlungen
442 Teilnahme an religiösen Aktivitäten/ Zeremonien
443 Gebete, geistliche und geistige Entspannung
449 Andere eindeutig bestimmte Tätigkeiten

social time = 021+233+234+41+42 +44+51+52+61+64+71 +72+73+94+95

02 ESSEN UND TRINKEN
020 Nicht genauer bezeichnete Tätigkeiten
021 Mahlzeiten einnehmen

23 QUALIFIKATION/FORT- UND WEITERBILDUNG AUS PERSÖNLICHEN GRÜNDEN (nicht für Beruf oder Schule/Universität)
230 Nicht genauer bezeichnete Tätigkeiten
231 Besuch von Unterricht und Lehrveranstaltungen aus persönlichen Gründen (Seminare, Kurse, Vorlesungen, Konferenzen u. ä. (z. B. Sprachkurs für den Urlaub, Kurs zur Geburtsvorbereitung)
232 Besuch von Informationsveranstaltungen, Messen u. ä. (z. B. Ausstellungen und Messen aus persönlichen Gründen)
233 Lernen in selbstorganisierten Gruppen (z. B. mit Freund(inn)en, Eltern/Kindern)
234 Selbstlernen, insbesondere durch Nutzung von Fachbüchern und –zeitschriften, Unterrichts-, Fernunterrichtsmaterialien, Lehrbriefen u. ä. Druckerzeugnissen)

41 AUSÜBUNG VON ÄMTERN ODER EHRENAMTLICHEN FUNKTIONEN
410 Nicht genauer bezeichnete Tätigkeiten
411 Ehrenamtliche oder freiwillige Arbeit für eine Organisation
412 Ehrenamtliche Mithilfe und Unterstützung
419 Andere eindeutig bestimmte Tätigkeiten

42 INFORMELLE HILFE FÜR ANDERE HAUSHALTE
420 Nicht genauer bezeichnete Tätigkeiten
421 Kinderbetreuung
422 Gartenarbeit
423 Putzen, aufräumen
424 Einkaufen und Besorgungen
425 Bei Nachbarn, Freunden, Verwandten nach dem Rechten sehen
426 Versicherungs-, Ämter- und Behördenangelegenheiten
427 Gespräche, Ratschläge bei Sproblemen
428 Alten- und Krankenpfelege
429 Reparieren und Bauen
430 Reparatur und Wartung von Fahrzeugen
431 Tierpflege
432 Zubereitung von Mahlzeiten
433 Transport und Umzüge
434 Finanzielle Hilfe
439 Andere genauer bezeichnete Tätigkeiten

44 TEILNAHME AN VERSAMMLUNGEN
440 Nicht genauer bezeichnete Tätigkeiten
441 Politische und soziale Versammlungen
442 Teilnahme an religiösen Aktivitäten/ Zeremonien
443 Gebete, geistliche und geistige Entspannung
449 Andere eindeutig bestimmte Tätigkeiten

51 SOZIALE KONTAKTE
510 Nicht genauer bezeichnete Tätigkeiten
511 Gespräche
512 Zu Besuch/Besuch empfangen
513 Familienfeiern und Feste privater Art
514 Telefonate
519 Andere eindeutig bestimmte Tätigkeiten

52 UNTERHALTUNG UND KULTUR
520 Nicht genauer bezeichnete Tätigkeit
521 Kino
522 Besuch von Theater und Konzerten
523 Kunstausstellungen und Museen
524 Bibliotheken
525 Besuch sportlicher Ereignisse
526 Ausflüge, Zoo, Zirkus, Vergnügungsparks, Kirmes, Besichtigungen etc.
527 Ausgehen (z. B. Cafes, Bistros, Kneipen, Discos, ohne Essen, z. B. Gaststätten)

6 TEILNAHME AN SPORTLICHEN AKTIVITÄTEN BZW. AKTIVITÄTEN IN DER NATUR
600 Nicht genauer bezeichnete Tätigkeiten

61 KÖRPERLICHE BEWEGUNG
610 Nicht genaue bezeichnete Tätigkeiten
611 Spazieren gehen
612 Wandern
613 Joggen, Walking
614 Fahrrad fahren, Radwandern, Mountainbiking
615 Ski fahren, Schlittschuh laufen, Rodern, Eishockey
616 Ballspiele
617 Rückschlagspiele
618 Gymnastik, Turnen
619 Fitness, Aerobic
620 Körperliche Entspannungsübungen
621 Schwimmen, Wassergymnastik
622 Rudern, Kanu, Segeln, Surfen
623 Inline-Skating, Skateboard
624 Kampfsport (Judo, Karate, Aikida, Boxen)
625 Kegeln, Bowling, Boule spielen
626 Tanzen/Tanzsport
626 Schießsport, Sportschützen
628 Leichtathletik, Reiten
639 Andere eindeutig bestimmte Tätigkeiten

64 JAGEN, FISCHEN UND SAMMELN
639 Nicht genauer bezeichnete Tätigkeiten
640 Jagen und Fischen
641 Beeren, Pilze und Kräuter sammeln
649 Andere eindeutig bestimmte Tätigkeiten

7 HOBBY UND SPIELE
700 Nicht genauer bezeichnete Tätigkeiten

71 KÜNSTLERISCHE TÄTIGKEITEN
710 Nicht genauer bezeichnete Tätigkeiten
711 Visuelle und handwerkliche Künste
712 Darstellende Künste, Musizieren
713 Literatur und Schreiben
719 Andere eindeutig bestimmte Tätigkeiten

72 TECHNISCHE UND ANDERE HOBBYS
720 Nicht genauer bezeichnete Tätigkeiten
721 Sammeln etc.
722 Modellbau und Basten
723 (Video-)Filmen/Fotografieren
724 Experimentieren (z. B. Elektro-, Chemiebaukasten
725 Korrespondenz
729 Andere eindeutig bestimmte Tätigkeiten

73 SPIELE
730 Nicht genauer bezeichnete Spiele
731 Gesellschaftsspiele
732 Spiele allein
733 Computerspiele
734 Glücksspiele
739 Andere eindeutig bestimmte Tätigkeiten

94 WEGEZEITEN EHRENAMTLICHE TÄTIGKEIT
941 Ausübung von Ämtern oder ehrenamtlichen Tätigkeiten
942 Informelle Hilfe für andere Haushalte
944 Teilnahme an Veranstaltungen
949 Andere/unbestimmte Wegezeiten in Verbindung mit Ehrenamtlicher Tätigkeit oder Informeller Hilfe für andere Haushalte

95 WEGEZEITEN SOZIALES LEBEN UND UNTERHALTUNG (BEREICH 5)
951 Soziale Kontakte
952 Unterhaltung und Kultur (ohne Besuch von Sportveranstaltungen)
953 Besuch von Sportveranstaltungen
959 Andere/unbestimmte Wegezeiten in Verbindung mit Sozialem Leben und Unterhaltung