Institut für Agrarpolitik und Marktforschung
der Justus-Liebig-Universität Giessen

Arbeitsbericht

Nr. 54

MELANIE VELARDE

The Retirement-Consumption Puzzle: Theory and Empirical Evidence on Food Production and Food Consumption with Time Budget Data[*]

Gießen 2011

Bestell-Nr. 11/02

Anschrift des Instituts:

Senckenbergstr. 3
35390 GIESSEN

Tel. Nr. 0641/99-37020; Fax: 0641/99-37029
email: Sekretariat.Marktlehre@agrar.uni-giessen.de

[*] Dem Statistischen Bundesamt sei für die Nutzung der Zeitbudgetdaten 2001/02 im Rahmen des Vertrages ZD/44210010-07D042 gedankt. Dadurch wurde diese Arbeit erst ermöglicht.

Table of Contents

List of Figures ..... **II**

List of Tables ..... **IV**

Abbreviations ..... **V**

1 Introduction **1**

2 Theories of Consumption Behaviour **3**

2.1 Modigliani's Life-Cycle Hypothesis 3

2.2 Becker's Theory of Household Production 5

3 The Retirement-Consumption Puzzle **8**

4 Empirical Analysis **16**

4.1 Data Source 16

4.2 Data Preparation 18

4.3 Data Problems 26

4.3.1 Heteroscedasticity 26

4.3.2 Multicollinearity 28

4.3.3 Other Data Problems 29

4.4 Descriptive Analysis 30

4.5 Regression Analysis 45

4.5.1 Food Production at Home 45

4.5.2 Food Consumption at Home 49

4.5.3 Food Consumption Away from Home 52

4.6 Interpretation and Discussion of the Results 56

5 Summary and Conclusion **63**

List of Literature **65**

Appendix **68**

List of Figures

Figure 1: The behaviour of income, consumption, saving and wealth according to the basic version of the LCH 4

Figure 2: Simplified illustration of the structure of the German 2001/02 TUS database containing the information from the time use diaries 18

Figure 3: Frequency distribution of [FPAH]....27

Figure 4: Frequency distribution of [FCAH]....27

Figure 5: Frequency distribution of [FCAFH] 27

Figure 6: Frequency distribution of [FPAH] excluding zero observations 27

Figure 7: Frequency distribution of [FCAH] excluding zero observations 27

Figure 8: Frequency distribution of [FCAFH] excluding zero observations 27

Figure 9: Frequency distribution of the natural logarithm of [FPAH] 27

Figure 10: Frequency distribution of the natural logarithm of [FCAH] 27

Figure 11: Frequency distribution of the natural logarithm of [FCAFH]....27

Figure 12: Share of participants in FPAH, FCAH and FCAFH in the course of the day (all diary days) 30

Figure 13: Degree of participation in FPAH, FCAH and FCAFH in 24h (all diary days) 30

Figure 14: Sample average for FPAH (unweighted, weighted, and weighted restricted) 31

Figure 15: Sample average for FCAH (unweighted, weighted, and weighted restricted) 31

Figure 16: Sample average for FCAFH (unweighted, weighted, and weighted restricted) 31

Figure 17: Relative frequency of age groups 33

Figure 18: Cumulative percent of retired, working and not working observations with age....33

Figure 19: Age and degree of participation in the activities FPAH, FCAH and FCAFH 33

Figure 20: Age and time use for the activities FPAH, FCAH and FCAFH....33

Figure 21: Social status and degree of participation in the activities FPAH, FCAH and FCAFH 35

Figure 22: Social status and time use for the activities FPAH, FCAH and FCAFH....35

Figure 23: Gender and degree of participation in the activities FPAH, FCAH and FCAFH 36

Figure 24: Gender and time use for the activities FPAH, FCAH and FCAFH 36

Figure 25: Health status and degree of participation in the activities FPAH, FCAH and FCAFH 37

Figure 26: Health status and time use for the activities FPAH, FCAH and FCAFH ...37

Figure 27: Education and degree of participation in the activities FPAH, FCAH and FCAFH 38

Figure 28: Education and time use for the activities FPAH, FCAH and FCAFH 38

Figure 29: At risk of monetary poverty and degree of participation in the activities FPAH, FCAH and FCAFH 39

Figure 30: At risk of monetary poverty and time use for the activities FPAH, FCAH and FCAFH 39

Figure 31: Share of household sizes, and household size and degree of participation in the activities FPAH, FCAH and FCAFH 40

Figure 32: Share of household sizes, and household size and time use for the activities FPAH, FCAH and FCAFH 40

Figure 33: Region of residence and degree of participation in the activities FPAH, FCAH and FCAFH.....41

Figure 34: Region of residence and time use for the activities FPAH, FCAH and FCAFH 41

Figure 35: Weekday and degree of participation in the activities FPAH, FCAH and FCAFH 42

Figure 36: Weekday and time use for the activities FPAH, FCAH and FCAFH 42

Figure 37: Course of the day and degree of participation in the activities FPAH, FCAH and FCAFH.....43

Figure 38: Course of the day and time use for the activities FPAH, FCAH and FCAFH 43

List of Tables

Table 1: Definition of food production at home in terms of selected activities and locations, based on the German 2001/02 TUS activities and locations list 19

Table 2: Definition of food consumption at home in terms of selected activities and locations, based on the German 2001/02 TUS activities and locations list 19

Table 3: Definition of food consumption away from home in terms of selected activities and locations, based on the German 2001/02 TUS activities and locations list..... 19

Table 4: Modified OECD equivalence scale 23

Table 5: Summary of results derived from the descriptive analyses..... 44

Table 6: Double-hurdle model estimated for food production at home 48

Table 7: Linear model estimated for food consumption at home 51

Table 8: Double-hurdle model estimated for food consumption away from home 54

Table 9: Definition of the dependent and independent variables specified in the estimated models 55

Abbreviations

ATUS	American Time Use Survey
BHPS	British Household Panel Survey
BLUE	Best Linear Unbiased Estimator
CAMS	Consumption and Activities Mail Survey
CEX	Consumer Expenditure Survey
CSFII	Continuing Survey of Food Intake of Individuals
e.g.	for example
Eurostat	Statistical Office of the European Communities
EVS	Expenditure Survey
FCAFH	Food consumption away from home
FCAH	Food consumption at home
FES	Family Expenditure Survey
FPAH	Food production at home
GSOEP	German Socio-Economic Panel
HRS	Health and Retirement Study
i.e.	that is
LCH	Life-Cycle Hypothesis
NHAPS	National Human Activity Pattern Survey
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
PSID	Panel Study of Income Dynamics
RCP	Retirement-Consumption Puzzle
SHARE	Survey of Health, Ageing and Retirement in Europe
SPSS	Statistical Software
Stata	Statistical Software
TUS	Time Use Survey

1 Introduction

The Life-Cycle Hypothesis of consumption and saving states that rational, forward-looking households keep a constant level of consumption throughout life and across predictable changes in income, such as retirement (AGUILA et al., 2011, p. 1094). However, a growing body of evidence suggests that expenditures, especially on food, decline sharply when individuals transition to retirement. This is referred to as the Retirement-Consumption Puzzle, and it has been documented for various countries (e.g. BANKS et al., 1998, p. 782; BERNHEIM et al., 2001, p. 844; BATTISTIN et al., 2009, p. 2217 and LÜHRMANN, 2010, p. 238).

It has been argued that the drop in consumption expenditures is attributable to households planning insufficiently to provide adequately for retirement years (BERNHEIM et al., 2001, p. 855). This is a disturbing finding in view of an ageing society in most industrialised countries (BURZIG and HERRMANN, 2012). Much research has been conducted with the scope of giving a rational explanation for the fall in consumption expenditures at retirement. Most recent approaches stress the importance of household production in rationalising the Retirement-Consumption Puzzle (e.g. AGUIAR and HURST, 2005, pp. 920-939). However, studies addressing this issue deal predominantly with Anglo-Saxon households. For Germany, empirical evidence is scarce. To fill this gap, an empirical analysis on home production of German households is conducted within this work. Focus is laid on food production at home, as it has proven to be the component most affected by retirement (LÜHRMANN, 2010, p. 241). Complementary to food production at home, food consumption at home and away from home is evaluated, too.

The remainder of the present work is organised as follows: two theories of consumption behaviour – the Life-Cycle Hypothesis and the Theory of Household Production – are studied in the next chapter, in order to lay theoretical foundations for the understanding of the empirical application of these theories. More precisely, Chapter 3 describes the so-called Retirement-Consumption Puzzle, which arose from the empirical testing of the Life-Cycle Hypothesis. One of the most recent explanatory approaches to the solving of this puzzle is the Theory of Household Production. As mentioned above, evidence for Germany is scarce. This constitutes the motivation for the realisation of the empirical analysis presented in Chapter 4. Here, the time use for food production at home, food consumption at home and food consumption away

from home is studied for German households. The German 2001/02 Time Use Survey, which is described in the first part of Chapter 4, is the database employed. Then, the extensive process of data preparation is explained in detail. Subsequently, problems associated with the data and the solution of these is discussed. Herewith, the data processing is concluded and a descriptive analysis of time use for food production and consumption by various determinants is provided. It is followed by the regression analyses which have the objective of providing an answer to the following research question:

> What impact does retirement have on the time use for food production at home, food consumption at home and food consumption away from home of German households?

The results are interpreted and discussed in the last section of Chapter 4. Finally, a summary and conclusion is given in Chapter 5.

2 Theories of Consumption Behaviour

The present chapter reviews two theories of consumption behaviour constituting the basis of the question to be studied in the present work. Section 2.1 describes the Life-Cycle Hypothesis of consumption and saving, developed by Nobel laureate Franco Modigliani and collaborators in the 1950s. Furthermore, in section 2.2 Nobel laureate Gary S. Becker's Theory of Household Production, originated in the 1960s, is discussed.

2.1 Modigliani's Life-Cycle Hypothesis

Modigliani's basic version of the Life-Cycle Hypothesis – LCH hereafter – starts from the assumption that an individual receives utility (U) only from present (C_t) and future consumption (C_{t+1},…, C_T) (MODIGLIANI and BRUMBERG, 1962, p. 390; LANDSBERGER, 1970, p. 176):

(1) $$U = U(C_t, C_{t+1}, \dots, C_T)$$

The consumer's preferences are such that a constant level of consumption throughout life is desired, and no intention of leaving any bequests to heirs exists, as equally no wealth is inherited (MODIGLIANI and BRUMBERG, 1962, pp. 394-397).

Lifetime consumption is, however, limited by the resources available to the individual. The lifetime budget constraint the consumer faces comprises present (Y_t) and future (Y_{t+1},…, Y_N) income earned up to retirement (N) and current wealth (A_t). As the interest rate is assumed to be zero, the lifetime budget constraint can be written as (MODIGLIANI and BRUMBERG, 1962, p. 391):

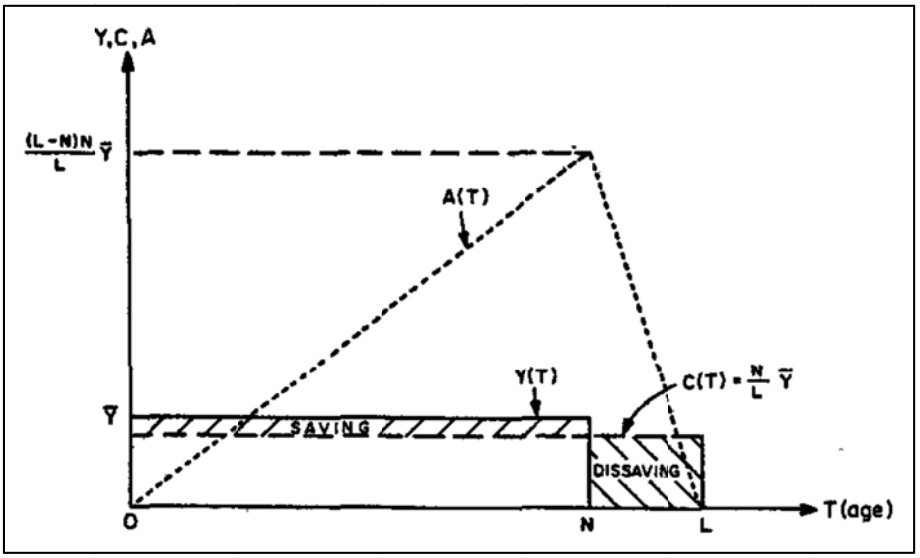
(2) $$\sum_{\tau=t}^{L} C_\tau = A_t + \sum_{\tau=t}^{N} Y_\tau$$

That is, lifetime consumption (left-hand expression) must equal lifetime resources (right-hand expression). Consequently, the individual strives for consumption that maximizes lifetime utility (1) subject to the lifetime budget constraint (2). The desired constant consumption path that yields the highest level of lifetime utility is achieved when current consumption (C_t) is determined by current income (Y_t), presently expected average income (Y_t^e) over the balance of the earning span until retirement (N-t), current wealth (A_t) and the presently expected remaining years of life (L_t) (MODIGLIANI and BRUMBERG, 1962, p. 397; LANDSBERGER, 1970, p. 176):

(3) – —— –

From this it follows that present consumption is a function of wealth and expected lifetime income, and that permanent income changes have a greater impact on consumption compared to temporary income changes (GORDON, 2009, p. 488).

Figure 1: The behaviour of income, consumption, saving and wealth according to the basic version of the LCH



Income (Y), consumption (C), assets (A), income as a function of age (Y(T)), consumption as a function of age (C(T)), assets as a function of age (A(T)), constant income ( ), age at retirement (N), age of death (L), T = 0 stands for the beginning of the earning span (MODIGLIANI and BRUMBERG, 1962, p. 390).

Source: MODIGLIANI, 1986, p. 300

The life-cycle path of income, consumption, saving and wealth according to the basic version of the LCH is described in Figure 1. The individual achieves a higher level of lifetime utility (enjoyment) when smoothing consumption over life (C(T)). However, a constant income (Y(T)) is earned only up to retirement (N). Thereafter, a stable consumption pattern can be maintained only by (DISSAVING) and running down wealth (A(T)). During working years (0-N), when income (Y(T)) exceeds consumption (C(T)), wealth (A(T)) is accumulated by (SAVING) in preparation for retirement years (N-L). By the end of life (L), savings (A(T)) are completely depleted (see Figure 1). Thus, income varies over a consumer's life and saving allows individuals to transfer it from periods in life when earnings are high to periods in life when earnings are low (MANKIW, 2010, pp. 509-513).

However, in practice the interest rate is greater than zero, which means that interests earned from saving need to be taken into account. Also, average labour income is

not constant throughout life. Instead, earnings rise steadily until after the age of 50, and fall sharply with retirement, but never reach the zero level. Likewise, consumption varies with age (MODIGLIANI, 1986, pp. 303-304). In early years, for instance, consumption spending is subject to a liquidity constraint, since income is low and banks do not provide unlimited quantities of financial resources to accomplish the predicted constant level of consumption throughout life (GORDON, 2009, p. 505). During child-raising years, on the contrary, consumption expenditures will be high, reflecting at the same time, consumption smoothing per equivalent adult (MODIGLIANI, 1986, p. 304). During retirement years, evidence suggests that savings are not entirely used for consumption. Bequests are actually left behind and the main reason is thought to be precautionary saving, which may arise from uncertainty about the age of death, and from the possibility of sickness and associated high medical expenses. Finally, and more importantly, it has been documented that after retirement consumption declines, as opposed to the prediction of the LCH that it is smoothed throughout life (GORDON, 2009, pp. 505-509). This finding is central to the present work and is discussed extensively in Chapter 3.

2.2 Becker's Theory of Household Production

Becker's Theory of Household Production emphasizes that households receive utility only from so-called basic commodities, and not from goods purchased on the market as traditional theory suggests (BECKER, 1965, p. 495). Basic commodities (Z_i) are goods, which are not acquired or sold on the market (FEBRERO, 2004, p. 21), but produced by households themselves combining market purchased goods (x_i) and time (T_i) through production functions (f_i) (BECKER, 1965, p. 495):

$$(1) \quad Z_i = f_i(x_i, T_i)$$

For instance, the satisfaction of nutritional needs through a tasty meal is not achieved by the simple purchase of potatoes, meat and vegetables. It requires, additionally, time to cook, a stove, dishes and time to eat (DEMMLER, 2000, p. 167)[1].

Thus, basic commodities (Z_i) constitute the arguments of the household's utility function (U) (BECKER, 1965, p. 495):

[1] According to BECKER (1965), sleeping is also a basic commodity which requires the input of a bed, a house and time (BECKER, 1965, p. 495).

(2) $U = U(Z_i, \dots, Z_m)$

The household's consumption decision is, however, constrained in two ways. First, the household's income (I), which is the product of market working time (T_w) and a constant wage rate (w) plus other income (V), limits the expenditures on market goods, i.e. the unit prices (p_i) times the quantity (x_i) of market goods purchased, required for the production of basic commodities (BECKER, 1965, p. 496):

(3) $\sum_1^m p_i x_i = I = V + T_w w$

Second, total time available (T) during a given period (e.g. one day) is of fixed size (i.e. 24 hours) (DEMMLER, 2000, p. 168), and must be distributed among market working time (T_w) and home production time (T_c), which in turn is required to be allocated to the production of diverse basic commodities (T_i) (BECKER, 1965, p. 496):

(4) $\sum_1^m T_i = T_c = T - T_w$

Provided that market working time (T_w) and home production time (T_c) are interchangeable, equation (4) can be incorporated into equation (3) resulting in a single restriction of household consumption (BECKER, 1965, p. 497):

(5) $\sum_1^m p_i x_i = V + (T - \sum_1^m T_i) w$

or equivalently

(6) $\sum_1^m p_i x_i + \sum_1^m T_i \, w = V + Tw$

Taking the household's production technology into account, that is the amount of time (t_i) and market goods (b_i) required per unit of basic commodity (BECKER, 1965, p. 496),

(7) $T_i = t_i Z_i$

(8) $x_i = b_i Z_i$

yields the final constraint

(9) $\sum_1^m p_i (b_i Z_i) + \sum_1^m w \, (t_i Z_i) = V + Tw$

or equivalently

(10) $\sum_1^m (p_i b_i + w t_i) Z_i = V + Tw$

The term (V+Tw) in equation (9) and (10) is the so-called full income, which represents the maximum achievable money income, if all time available were

dedicated only to market work. The full income is used for the purchase of market goods ($\sum p_i b_i Z_i$) and – by reducing market work and forgoing income – for time to produce basic commodities ($\sum wt_i Z_i$) (BECKER, 1965, pp. 497-498).

The so-called full price (BECKER, 1965, p. 497) or shadow price (FEBRERO, 2004, p. 21) per unit of basic commodity (Z_i) is reflected by the term ($p_i b_i + wt_i$) in equation (10). It is composed of the price for market goods (p_i) and the price of time (w), and the respective quantities (b_i) and (t_i) required for the production of a basic commodity unit (Z_i) (BECKER, 1965, pp. 496-497). Here, the price of time is estimated by the wage rate (w) for market work (FEBRERO, 2004, p. 21), also denoted as the opportunity cost of household production (DEMMLER, 2000, p. 170). Thus, according to equation (10) expenditures on basic commodities, i.e. the full price ($p_i b_i + wt_i$) times the quantity (Z_i) of basic commodities produced, must equal full income (V+Tw).

The household produces quantities of basic commodities that are derived from the maximization of the household's utility function (2) subject to the full budget constraint (10). The resulting equilibrium condition from maximization is (BECKER, 1965, p. 497):

$$(11)\quad U_i = \frac{\partial U}{\partial Z_i} = \lambda(p_i b_i + wt_i) = \lambda \pi_i$$

with (λ) standing for the marginal utility of market work income (BECKER, 1965, p. 497). Thus, Becker's Theory of Household Production takes into account that "consuming market goods takes time" (FEBRERO, 2004, p. 21) and that "time is money" (FEBRERO, 2004, p. 21).

Becker's Theory of Household Production implies that a rise in the wage rate leads to a reduction in the time used for home production, because it becomes more expensive (BECKER, 1965, p. 517). Time-saving measures the consumer adopts are, on the one hand, the replacement of time in the production of basic commodities by market goods (BECKER, 1965, p. 517), e.g. by the purchase of convenience products or fast-food meals and domestic appliances such as dishwashers (DEMMLER, 2000, p. 172), and on the other hand, the substitution of more time-intensive basic commodities by less time-intensive commodities (BECKER, 1965, p. 517), e.g. by forgoing pot roast in favour of a hamburger (DEMMLER, 2000, p. 171). However, at retirement, the relative price of time falls and the consumer will, to the extent possible, seek to substitute market expenditures by time (AGUIAR and HURST, 2005, p. 920).

3 The Retirement-Consumption Puzzle

The so called Retirement-Consumption Puzzle – RCP hereafter – refers to the observed fall in consumption expenditures associated with retirement which has been documented for the UK (e.g. BANKS et al., 1998, p. 782), the United States (e.g. BERNHEIM et al., 2001, p. 844), Italy (e.g. BATTISTIN et al., 2009, p. 2217) and Germany (e.g. LÜHRMANN, 2010, p. 238). It questions the validity of the LCH as one of its central implications is that rational, forward-looking individuals and households should smooth consumption across predictable changes in income, such as retirement (AGUILA et al., 2011, p. 1094).

The literature on the RCP which emerged primarily out of the contributions of BANKS et al. (1998) and BERNHEIM et al. (2001) is wide-ranging. It is beyond the scope of this chapter to provide a complete overview of the work that has been done in this field. Instead, key publications and findings are discussed, to outline the direction of development.

BANKS et al. (1998) used the cross-sectional British Family Expenditure Survey (FES) from the years 1968 to 1992, to create a synthetic panel and model growth in non-durable consumption expenditures over the life-cycle. They find that the predictions of a consumption growth model that allows for demographics, mortality risk and labour-market status reflect very well the consumption growth observed in the data during middle age, yet it cannot explain the full extent of the fall in consumption growth at retirement ages (BANKS et al., 1998, pp. 771 et seq.). That is, “consumption is predicted to fall by just over 2 percent a year at age 63, compared to an actual fall of around 3 percent” (BANKS et al., 1998, p. 783). Moreover, the decomposition of non-durable consumption expenditures shows that not only work-related expenditures (canteen and meals at restaurants, transport, and clothing) fall at retirement, but also expenditures on basic necessities (home food and domestic energy). The overall impact of retirement on average non-durable consumption is a 35% decline in expenditures (BANKS et al., 1998, pp. 780-782). BANKS et al. (1998) conclude that, within the life-cycle model, the unexplained part of the fall in consumption growth can only be explained by the arrival of “unanticipated shocks occurring around the time of retirement” (BANKS et al., 1998, p. 784).

BERNHEIM et al. (2001) analysed data on wealth, income and consumption for the United States, drawn from the Panel Study of Income Dynamics (PSID) from 1978 to 1990, and from the cross-sectional Consumer Expenditure Survey (CEX) for the years 1982 to 1989. They define a household to be retired, if no household member works more than 500 hours per year, neither in the current nor in any subsequent period. A mean reduction in consumption expenditures (food at home, food away from home, and housing services) is documented by 14% between the two preretirement years and the two postretirement years. Moreover, the drop is shown to be larger for households with lower retirement savings and lower income replacement rates. The separate analysis of expenditures on food consumed at home and food consumed away from home (excluding meals at school or work) yields broadly similar results to those previously observed for total consumption expenditures. However, the magnitude of the negative consumption growth is larger for expenditures on food consumed at home than for food consumed away from home. Thus, contrary to what the theory predicts, the decline in consumption at retirement is not restricted to work-related costs or leisure substitutes (BERNHEIM et al., 2001, pp. 843-852). Consequently, BERNHEIM et al. (2001) conclude that their findings are better explained outside a model of rational and forward-looking consumption behaviour: “If, for example, households follow heuristic rules of thumb to determine saving prior to retirement, and if they take stock of their financial situation and make adjustments at retirement (so that the adequacy of saving is "news"), then one would expect to observe the patterns documented in this paper” (BERNHEIM et al., 2001, p. 855).

SMITH (2006) explored the impact of unexpected shocks, such as an involuntary early retirement, on food expenditures. The data used for this study is from the 1991 to 2001 British Household Panel Survey (BHPS) and the analysis is restricted to men aged 45 to 64 years in the first wave of the survey. Retirement is defined as the first period in which an individual is not working and specifies retirement as employment status. Moreover, a distinction between voluntary and involuntary retirement is drawn. SMITH (2006) finds that expenditures on food at home (including take-away eaten at home) fall significantly only for individuals retiring involuntarily early due to unemployment (exit labour market permanently) or long-term illness/ disablement by 11% (SMITH, 2006, pp. C133-C142). “This is consistent with the hypothesis that

involuntary retirement is associated with a negative wealth shock that causes a fall in spending" (SMITH, 2006, p. C142).

HURD and ROHWEDDER (2003) address the question whether the decrease in consumption expenditures at retirement can be attributed to individuals finding themselves surprised by the low levels of economic resources available. For this purpose, data from the biennial panel Health and Retirement Study (HRS) of the year 2000 and the 2001 cross-sectional Consumption and Activities Mail Survey (CAMS) – an additional survey to the HRS – were utilized. This data indicates that by comparing the expected change in expenditures of non-retirees to the actual change in expenditures as recalled by retirees (self-defined retirement status) reductions in total consumption expenditures with transition to retirement are fully anticipated. As a matter of fact, the average anticipated drop of 20% is found to be larger than the average experienced decline of 12% to 17%. Accordingly, HURD and ROHWEDDER (2003) examined the use of time in activities that might act as substitutes for market purchased goods or services, and find it to be higher for retirees than for non-retirees. They conclude that the absence of work-related expenditures and the substitution of market purchased goods or services by home production could account for the decline in spending at retirement (HURD and ROHWEDDER, 2003, pp. 9 et seq.).

AMERIKS et al. (2007) also explored the hypotheses of BANKS et al. (1998) and BERNHEIM et al. (2001) and report similar outcomes to those of HURD and ROHWEDDER (2003). They state that the "results do not support the claim that the fall in spending at retirement represents a surprise to households" (AMERIKS et al., 2007, p. 265).

The conclusions of HURD and ROHWEDDER (2003) are in line with the results of AGUIAR and HURST (2008), who examined the lifecycle profile of non-durable expenditure by categories (food, alcohol and tobacco, clothing and personal care, utilities, domestic services, transportation, entertainment, gambling, charitable giving, housing services and other non-durables), using data from the CEX for the years 1980 to 2003. They document that the fall in non-durable spending over the second half of the lifecycle is driven by declining expenditures on food and the work-related expenses transportation and, clothing and personal care. Breaking the food category down into its two components, food purchased for home consumption and food

consumed out of home, it becomes clear that expenditures incurred on food away from home decrease steeper during retirement years than spending on home food. The remaining components such as entertainment, housing services, charitable giving, and utilities, comprising nearly 50% of total non-durable expenditures, do not decrease but several categories, particularly entertainment, even increase late in the lifecycle. The high and positive correlations calculated between the life-cycle profiles of expenditures on food, transportation, clothing and personal care and the life-cycle profile of work-hours, support the hypothesis of a substitute relationship between food expenditures and time spent on home production, as well of a complement relationship of transportation, clothing and personal care with market work (AGUIAR and HURST, 2008, pp. 1-14).

Similarly, MINIACI et al. (2003) and BATTISTIN et al. (2009) have emphasized that declining work-related and food expenditures can account for the RCP documented for Italy (MINIACI et al., 2003, p. 38; BATTISTIN et al., 2009, p. 2224).

AGUIAR and HURST (2005) explored the impact of retirement status on food expenditures, actual food consumption and time dedicated to food production by analysing households with heads aged 57 to 71 years within two United States cross-sectional datasets: the 1989-1991/1994-1996 Continuing Survey of Food Intake of Individuals (CSFII) and the 1992-1994 National Human Activity Pattern Survey (NHAPS). Despite a significant decline in household expenditures of 17% on total food, 15% on home food and 31% on food away from home, neither the households' quantity (calories) nor quality (more vitamins and less cholesterol) of actual food consumption deteriorates with retirement. Though retired households are less likely to eat out of home, this change originates mainly from a decline in visits to fast-food restaurants, whereas the probability of eating at a restaurant with table service does not change with retirement status. Moreover, time spent on food production (shopping for and preparing meals) is observed to increase with retirement. Retired households are more likely to go shopping for food at least once a week, and dedicate additional 18 minutes per day to food production in comparison to their non-retired counterparts. Provided food production is positive, a 53% increase in time is identified. Differentiating food production by its components reveals that retirees devote 54% more time to food preparation and 42% more time to shopping for food, conditional on the activity being positive (AGUIAR and HURST, 2005, pp. 920-939).

Thus, AGUIAR and HURST (2005) suggest that at the onset of retirement households are able to maintain a constant consumption despite a reduction in expenditures as a result of increasing time used for preparation of meals and shopping for groceries (AGUIAR and HURST, 2005, pp. 920-939).

The shopping intensity and the variation in prices paid for identical goods over the lifecycle were studied by AGUIAR and HURST (2007) through the use of price data from ACNielsen's Denver Homescan Panel from January 1993 to March 1995 and of cross-sectional time-use data from the 2003 American Time Use Survey (ATUS), for households (or the "primary shopper") aged between 25 and 74 years. The authors find that, up to middle age, the prices paid for a certain grocery item are constant and decline significantly thereafter. For instance, households whose primary shopper is between the ages 65 and 74, pay on average 4% less for identical goods than households whose primary shopper is between the ages 45 and 49. The lower prices paid by older households arise predominantly from a higher amount of minutes per week spent on grocery shopping, a higher shopping frequency at the same stores and a higher propensity to use store and manufacturer's discounts, as compared to their younger counterparts. Altogether, the shopping intensity and the use of discounts explain 75% of the difference in prices paid for the same goods between older and middle-aged or younger households (AGUIAR and HURST, 2007, pp. 1536-1546).

BRZOZOWSKI and LU (2010) evaluated the impact of retirement on food expenditures, production and consumption for Canadian households, adopting the approach of AGUIAR and HURST (2005). In contrast to the results reported for the United States by AGUIAR and HURST (2005), BRZOZOWSKI and LU (2010) find no evidence of a RCP for Canada. Nevertheless, home food production increases and nutritional improvements are observed with transition to retirement (BRZOZOWSKI and LU, 2010, pp. 112-121).

SCHWERDT (2005) and LÜHRMANN (2010) investigated the RCP and home production around retirement for German households. SCHWERDT (2005) made use of the German Socio-Economic Panel (GSOEP) of the years 1992 through 2002, and restricted the sample to households with heads that retired between the years 1994 and 2000. The time of retirement is determined to be the year before which individuals indicated to be full-time employed and to work more than 30 hours a week, and after which individuals specified to work less than 10 hours a week, are

not registered as unemployed and aged over 50 years. Monthly consumption expenditures were estimated based on the difference of monthly household income and monthly savings. Home production is the sum of daily hours spent on the activities shopping, housework and yard work. SCHWERDT (2005) documents that average consumption expenditures drop by 8.5% with retirement. The decline is, however, restricted to households with a low income replacement. Individuals with a high income replacement actually increase consumption expenditures. The time allocated to home production is found to be higher at retirement, even for households with a high income replacement (SCHWERDT, 2005, pp. 300 et seq.). Thus, SCHWERDT (2005) concludes that "the observed increase in home production after retirement is not entirely driven by the substitution of consumption" (SCHWERDT, 2005, p. 304).

LÜHRMANN (2010) conducted her analysis using two different cross-sectional surveys, the German Expenditure Survey (EVS) from the years 1978 to 1998, and the German Time Use Survey (TUS) from the years 1991/92 and 2001/02. To study consumption expenditures in repeated cross-sectional data, the standard method of constructing a synthetic panel was applied. Home production constitutes the total amount of minutes per day that are used for the preparation of meals, washing and fixing of clothes, maintenance, fixing and cleaning of house and garden, taking care of children and elderly individuals and shopping. For the expenditure survey, retirement status is defined on the basis of a self-assessed work status and the question on whether the main income source is pension income. In the time use survey, a self-assessed work status is not reported within the 2001/02 wave, consequently retirement is imposed on those aged 65 and older if not found to be self-employed or farmers, and unemployed or non-working with a partner who is retired. A significant fall of 17% in non-durable expenditures is documented for German households with a retired head. This is met by a significant increase of 89 minutes per day in home production. An analysis by components reveals that households with a retired head intensify home production mainly in the preparation of meals. The significant increase amounts to additional 20 minutes per day (LÜHRMANN, 2010, pp. 225 et seq.). LÜHRMANN (2010) concludes that "the significant increase in overall home production indicates that households flexibly adapt to the change in time and money resources in retirement" (LÜHRMANN, 2010, pp. 241-242).

Further results on the RCP in Germany are provided by the contribution of BURZIG and HERRMANN (2012). The authors analysed food expenditure patterns of the generation 50+ in Germany, using the 2004 data from the Survey of Health, Ageing and Retirement in Europe (SHARE). Though it is not conceived as a study on the RCP in Germany, the control variable on retirement status (self-assessed employment situation) allows drawing conclusions on it. Accordingly, BURZIG and HERRMANN (2012) show that per-capita expenditures on food consumed at home rise significantly by 8% at retirement. Moreover, the probability of spending money on food out of home increases significantly with transition to retirement. However, provided an individual is involved in the consumption of food away from home, actual per-capita expenditures decline significantly by 15% for retirees as compared to the non-retired group. Thus, it appears that individuals of the generation 50+ consume away from home more frequently when they retire but, as they do so, have lower expenses (BURZIG and HERRMANN, 2012). Consequently, BURZIG and HERRMANN (2012) conclude that "no general retirement-consumption puzzle exists in the German generation 50+" (BURZIG and HERRMANN, 2012).

In summary, the RCP has been studied for a number of countries and different time periods, using diverse measures of consumption expenditures and various definitions of retirement, which explains the high variation in results reported in the literature. For Germany, SCHWERDT (2005) and LÜHRMANN (2010) find declining expenditures for non-durable consumption between 8% and 17% (SCHWERDT, 2005, p. 302; LÜHRMANN, 2010, p. 238), whereas BURZIG and HERRMANN (2012) document an increase in home food expenditures of 8% and a decline in expenses on food away from home of 15%, provided consumption away from home takes place (BURZIG and HERRMANN, 2012). Many approaches to solving the puzzle and to reconcile it with the LCH have been put forward. In particular, the importance of work-related expenses and home production in explaining the RCP has become evident. For Germany, SCHWERDT (2005) and LÜHRMANN (2010) show that the reduction in consumption expenditures at retirement is met by an increased home production (SCHWERDT, 2005, pp. 303-304; LÜHRMANN, 2010, p. 240).

In order to shed further light on the RCP in Germany, the present work examines home production following the approach of BURZIG and HERRMANN (2012). More specifically, food production at home is analysed. Additionally, the use of time for

food consumption at home and food consumption away from home, as a proxy for work-related spending, is investigated in the subsequent chapter.

4 Empirical Analysis

This chapter begins with a description of the German 2001/02 TUS which serves as the basis for analysis. Subsequently, the extensive data preparation is explained in detail, followed by the presentation of problems associated with the data along with their solution. This is followed by a comprehensive descriptive analysis of food production at home and food consumption at home and away from home. Lastly, the regression analysis and the interpretation of the estimates conclude this section.

4.1 Data Source

The data used for the analysis on the RCP is drawn from the German 2001/02 TUS, conducted by the Federal Statistical Office together with the statistical offices of the federal states (DESTATIS, 2011) for the Federal Ministry for Family Affairs, Senior Citizens, Women and Youth (STATISTISCHES BUNDESAMT, 2005, p. 2). It is the second and most recent TUS in Germany, the first dates back to 1991/92 (DESTATIS, 2011). Both are regarded as "one of the most comprehensive time use studies in Germany" (DESTATIS, 2011).

The German 2001/02 TUS was carried out as a representative quota sample of private households throughout Germany over a time period of one year, from April 2001 to March 2002, in order to avoid seasonal (weather-related) distortions (STATISTISCHES BUNDESAMT, 2005, p. 2) and to consider certain population groups disproportionately (e.g. fewer households with a retired household head) (EHLING, 2001, p. 223). The microcensus formed the basis for the quotation and projection (STATISTISCHES BUNDESAMT, 2005, p. 2). To achieve representative results when working with the German 2001/02 TUS, sampling weights are supplied by the Federal Statistical Office (HOLZ, 2005, p. 8). The data was collected in written form through time use diaries, personal questionnaires and household questionnaires (STATISTISCHES BUNDESAMT, 2005, p. 2).

Time use diaries were kept by all household members aged ten years or older. Three days, comprising of two workdays and one weekend day, were documented by each participant. All relevant household members were asked to keep the time use diaries on the same days. During a 24-hour period the main activity, the side activity, the location or the means of transportation used and the individuals present whilst

performing the indicated activity were recorded in ten-minute intervals starting at 04:00 a.m. (STATISTISCHES BUNDESAMT, 2001d, pp. 2 et seq.). Subsequently, around 230 activities (STATISTISCHES BUNDESAMT, 2002, pp. 2 et seq.), 9 locations and 20 different means of transportation were derived from the diary entries (STATISTISCHES BUNDESAMT, 2001a, p. 1). As to other people present during the activities, children under 10 years, spouse, other household members and other known persons, were predetermined as categories to be ticked by the respondents. The time use diary was concluded by giving additional details on the day as a whole, for instance whether the course of the day could be characterized as normal or unusual (STATISTISCHES BUNDESAMT, 2001d, pp. 2 et seq.).

Personal questionnaires were filled in by all household members aged ten years or older. Information on the subjective assessment of the personal time use, health, education, labour force participation, personal income, assistance rendered to other households and voluntary work was provided. Age, gender, nationality, marital status and the relationship of the household members to each other (e.g. son or daughter, brother or sister, etc.) were collected through the household questionnaire for all household members i.e. including those aged less than ten years (STATISTISCHES BUNDESAMT, 2001c, pp. 3 et seq.).

The household questionnaire was completed by all participating households. In addition to the composition, it was asked to give details on the housing and living conditions (e.g. homeowner status, ownership of consumer durables), assistance received by private individuals outside the own household, the infrastructure of the residential surroundings (e.g. availability of shopping facilities) and the total income (STATISTISCHES BUNDESAMT, 2001b, pp. 2 et seq.).

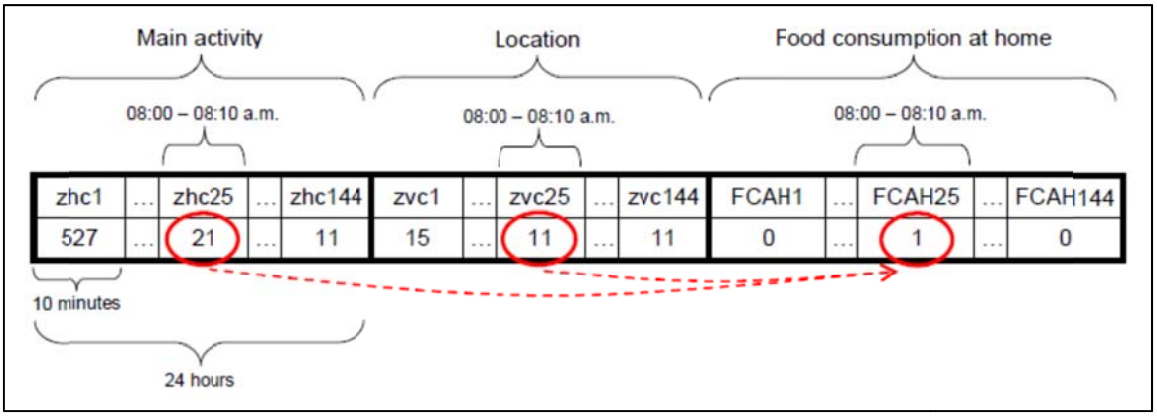
The design of the German 2001/02 TUS is such that the methodological requirements set by the Statistical Office of the European Communities (Eurostat) for European TUS are met. Hence, comparability with other European countries is warranted (STATISTISCHES BUNDESAMT, 2005, p. 2).

Altogether, approximately 5,400 private households, 12,600 individuals and 37,700 diary days were covered (STATISTISCHES BUNDESAMT, 2005, p. 2).

4.2 Data Preparation

The German 2001/02 TUS data is provided by the German Federal Statistical Office in four files, three corresponding to the survey instruments (time use diaries, personal questionnaires and household questionnaires) and one additional file containing time use information aggregated by activity categories according to the survey's activities list. Here is made use of the first three documents. For the data preparation, the software SPSS was used. It involved the computation of new variables, and the recoding and renaming of existing ones, as described next in more detail. Relevant variables were chosen following AGUIAR and HURST (2005), BURZIG and HERRMANN (2012), and from own considerations.

Figure 2: Simplified illustration of the structure of the German 2001/02 TUS database containing the information from the time use diaries



Note – Variable for main activity performed from 04:00 – 04:10 a.m. [zhc1], variable for main activity performed from 08:00 – 08:10 a.m. [zhc25], variable for main activity performed from 03:50 – 04:00 a.m. of the following day [zhc144], variable for location from 04:00 – 04:10 a.m. [zvc1], variable for location from 08:00 – 08:10 a.m. [zvc25], variable for location from 03:50 – 04:00 a.m. of the following day [zvc144], variable for food consumption at home from 04:00 – 04:10 a.m. [FCAH1], variable for food consumption at home from 08:00 – 08:10 a.m. [FCAH25], variable for food consumption at home from 03:50 – 04:00 a.m. of the following day [FCAH144], activity code for going out (e.g. café, bistro, pub, disco) (527), activity code for having a meal (21), activity code for sleeping (11), location code for restaurant, café or pub (15), location code for home (11), code for no food consumption at home (0), code for food consumption at home takes place (1), variables representing the same time period (red circle), activity variable with activity code 21 and location variable with location code 11, both representing the same time period lead to code 1 in the variable for food consumption at home representing the same time period (red arrows), 144 variables – each standing for 10 minutes – sum up to 24 hours tracking the main activity (Main activity), 144 variables – each standing for 10 minutes – sum up to 24 hours tracking the location (Location), 144 variables – each standing for 10 minutes – sum up to 24 hours tracking the occurrence of food consumption at home (Food consumption at home).

Source: Own illustration

First, it should be noted that in what follows, when speaking of variables, the corresponding name or abbreviation is set in square brackets and highlighted by a

different front type. Otherwise, when referring to an activity, only the abbreviation is indicated in the text.

In the context of this work, the activities food production at home (FPAH), food consumption at home (FCAH) and food consumption away from home (FCAFH) are of central interest. However, these specific types of time use are not directly available in the time use database. One can track either the activity or the location over a 24-hour period separately, as shown in Figure 2.

Table 1: Definition of food production at home in terms of selected activities and locations, based on the German 2001/02 TUS activities and locations list

Food production at home			
Code	Main activity	Code	Location
311	Prepare a meal	11	At home
312	Bake	12	Second or weekend home, permanent camping
313	Dishwashing, set/clear the table		
314	Preserve food		

Source: Own illustration based on STATISTISCHES BUNDESAMT, 2001a, p. 1 and STATISTISCHES BUNDESAMT, 2002, pp. 2 et seq.

Table 2: Definition of food consumption at home in terms of selected activities and locations, based on the German 2001/02 TUS activities and locations list

Food consumption at home			
Code	Main activity	Code	Location
21	Have a meal	11	At home
		12	Second or weekend home, permanent camping

Source: Own illustration based on STATISTISCHES BUNDESAMT, 2001a, p. 1 and STATISTISCHES BUNDESAMT, 2002, pp. 2 et seq.

Table 3: Definition of food consumption away from home in terms of selected activities and locations, based on the German 2001/02 TUS activities and locations list

Food consumption away from home			
Code	Main activity	Code	Location
21	Have a meal	13	Own place of work or school outside home
		15	Restaurant, café or pub
		16	Hotel, vacation apartment
		18 19 90	Other known or unknown location, either traveling or not traveling

Source: Own illustration based on STATISTISCHES BUNDESAMT, 2001a, p. 1 and STATISTISCHES BUNDESAMT, 2002, pp. 2 et seq.

In order to follow a certain activity (e.g. food consumption) in a certain location (e.g. at home) over a 24-hour period, new variables which combine the information from

the existing ones, had to be computed (see Figure 2). For this purpose, FPAH, FCAH, and FCAFH were first defined in terms of constituting time use categories and locations, on the basis of the survey's activities and locations list (see Table 1 to Table 3). It must be noted that the activity food shopping was not taken into account, given that it was not tracked separately from other kinds of shopping.

Subsequently, a program containing the arithmetic instructions for the computation of the new variables was written. Exemplified in Figure 2, the arithmetic instruction for the calculation of minutes spent on food consumption at home per day [FCAH] states that if the activity variable [zhc25], corresponding to the ten-minute interval 08:00 – 08:10 a.m., contains the code 21, and if the location variable [zvc25], corresponding to the ten-minute interval 08:00 – 08:10 a.m., contains the code 11 or 12, then food consumption at home is taking place. Consequently, the variable [FCAH25], corresponding to the ten-minute interval 08:00 – 08:10 a.m., is assigned the value one. If this combination of codes does not occur, the condition is not met and [FCAH25] equals zero. In other words, if [FCAH25] assumes the value one, ten minutes are being spent on food consumption at home, from 08:00 to 08:10 in the morning. This computation is repeated for all activity variables [zhc1] to [zhc144] and all location variables [zvc1] to [zvc144], resulting in [FCAH1] to [FCAH144]. Finally, to estimate the total amount of minutes spent on FCAH during the 24 hours [FCAH], the occurrence of the number one from [FCAH1] to [FCAH144] is counted and then multiplied by ten, as each variable stands for ten minutes. The same procedure was employed for the computation of [FPAH] and [FCAFH].

(1) [FPAH] (Minutes spent on food production at home per day)

(2) [FCAH] (Minutes spent on food consumption at home per day)

(3) [FCAFH] (Minutes spent on food consumption away from home per day)

In addition, as alternative dependent variables, the dummies [DFPAH], [DFCAH] and [DFCAFH] were generated. If [FPAH], [FCAH] or [FCAFH] were greater than zero, the corresponding dummy variable was assigned the value one, otherwise zero. [DFPAH], [DFCAH] and [DFCAFH] reflect the degree of participation that is whether an individual is at all involved in the given activity, regardless of how much time is actually used.

(4) [DFPAH] (0 = No FPAH; 1 = Positive FPAH)

(5) [DFCAH] (0 = No FCAH; 1 = Positive FCAH)

(6) [DFCAFH] (0 = No FCAFH; 1 = Positive FCAFH)

Within the German 2001/02 TUS, the participants were explicitly asked to keep a time use diary during two workdays and on one day of the weekend as it can be expected that the time use for certain activities differs. Therefore, it is considered reasonable to take this distinction further into account. For this purpose a dummy variable [WEEKEND] was created, with workdays being the reference group.

(7) [WEEKEND] (0 = Workday; 1 = Weekend)

In addition, it was observed that many of the diary days were characterized as unusual. An impact on FPAH, FCAH and FCAFH is most likely and therefore a dummy variable [UNUSUAL_DAY] was generated as well.

(8) [UNUSUAL_DAY] (0 = Normal day; 1 = Unusual day)

Due to the large amount of variables available in the time use file, this database was prepared first, and subsequently only the previously mentioned variables were pooled with the personal and household data.

The most important explanatory variable for the empirical analysis is the retirement status, for it allows drawing conclusions on the RCP. The corresponding dummy variable [RETIRED], with non-retirees being the control group, was generated by recoding the social-status variable. Individuals indicating to be retired within the social-status variable are no longer involved in any way in the labour market. Thereby, a clear-cut distinction is made between employment and retirement.

(9) [RETIRED] (0 = Working; 1 = Retired)

However, the social-status variable includes also a non-working group for which an additional dummy variable [NOT_WORKING] was created. The non-working group was not merged with the retirement group, because it comprises predominantly female spouses from 35 years on, i.e. housewives, who can clearly not be categorized as retired.

(10) [NOT_WORKING] (0 = Working; 1 = Not working)

Moreover, given the wide range of ages covered by the sample, the age [AGE] is taken into consideration for further analysis, in order to model the process of ageing

itself. It is used as a metric variable, given that many of the other control variables are binary.

(11) [AGE] (Age in years)

Other than age, gender seems an obvious variable to be included, as the target sample is composed of both male and female observations. A high explanatory contribution is expected especially in relation to FPAH, since predominantly older generations are examined and a traditional gender-based division of labour can be expected. Consequently, the gender variable was recoded [MALE], with females being the reference group.

(12) [MALE] (0 = Female; 1 = Male)

To differentiate a household head from the spouse or life partner in the sample, a dummy variable [HHHEAD] was generated, with the control group being the spouse or life partner.

(13) [HHHEAD] (0 = Spouse or life partner; 1 = Household head)

Moreover, as is common in the literature, a dummy variable for the educational status [HIGH_SCHOOL] was created. [HIGH_SCHOOL] refers to the highest school education certificate attainable and it is contrasted to lower or no education certificate at all.

(14) [HIGH_SCHOOL] (0 = Not highest school education certificate;
1 = Highest school education certificate)

With age, health becomes an increasingly important issue and it might limit daily activities. It is conceivable that in this context, poor health results in less time spent on consumption away from home. The self-assessed health status variable comprises the categories very good, good, moderate, poor and very poor. It appears reasonable to group, on the one hand, very good health and good health, and on the other hand, moderate health, poor health and very poor health, in order to obtain a dummy variable. The reference group for the health status dummy variable [POOR_HEALTH] is established to be good health.

(15) [POOR_HEALTH] (0 = Good health; 1 = Poor health)

Furthermore, the household size [HHSIZE] is taken into account, given that apart from single-person households and two-person households, also three-person

households, four-person households and a few even larger multi-person households are present in the target sample. In addition to the spouse or life partner and children, one can also find the household head's brother or sister, mother or father, mother-in-law or father-in-law, grandchild, and so on, among the household members. Consequently, the household size was considered more appropriate than a variable for the number of children.

(16) [HHSIZE] (Number of individuals)

Also – to be in line with the standard practice of papers studying the country Germany – the household's region of residence, whether it is Eastern Germany or Western Germany, is included as a dummy variable [WEST] with Eastern Germany as the region of reference.

(17) [WEST] (0 = Eastern Germany; 1 = Western Germany)

The household's income might play a role as well, especially in connection with FCAFH, as it might act as a restriction when resources are low. The monthly net household income was captured by the household questionnaire in two ways. The household could either specify the exact amount or indicate an income group. In order to break the monthly net household income down to the individual level, the monthly net equivalent income was computed [EQUIVALENT_INCOME], however, only for those individuals for whom the exact amount was available. All others were coded as missing values. The monthly net equivalent income equals the monthly net household income divided by the number of household members, who are weighted according to the modified OECD equivalence scale in Table 4 (EUROSTAT, 2011b)[2].

Table 4: Modified OECD equivalence scale

Household members	Weight
Household head	1.0
Additional household members aged 14 years and older	0.5
Additional household members aged less than 14 years	0.3

Note – Organisation for Economic Co-operation and Development (OECD)

Source: Own illustration based on EUROSTAT, 2011b

[2] Exemplified, the monthly net equivalent income of an individual out of a three-headed household comprising two adults and a child aged 13 years equals the monthly net household income divided by 1.8.

Hence, the monthly net equivalent income takes into account, on the one hand, the different size of households, and on the other hand, the fact that household needs do not grow proportionally to the household size, due to economies of scale in consumption (OECD, 2009, p. 1).

(18) [EQUIVALENT_INCOME] (Equivalent income in Euro per person)

Additionally, an alternative measure of income was computed to avoid the loss of the observations that indicated an income group. A dummy variable was computed which determines if the household is at risk of monetary poverty [MONETARY_POOR].

(19) [MONETARY_POOR] (0 = Not at risk of monetary poverty;
1 = At risk of monetary poverty)

The indicator taken as a basis for this categorization is the so called at-risk-of-poverty threshold which per definition corresponds to 60% of the national median net equivalent income. It is noted that the at-risk-of-poverty threshold is not a measure of wealth or poverty, but of low income as compared to other residents in the considered country (EUROSTAT, 2011a). In 2001, a German single-person household was considered at risk of monetary poverty if the monthly income fell below the at-risk-of-poverty threshold of 716 Euro. The indicator amounted to 731 Euro in the year 2002 (ENGELS and SCHELLER, 2005, p. 1).

In order to compute the dummy variable, it was first required to determine the at-risk-of-poverty threshold for all household constellations in the database. It was calculated by multiplying the at-risk-of-poverty threshold for a single-person household[3] by the sum of the equivalence scales of the household members[4]. Subsequently, for households having specified the exact monthly net household income, it was only a matter of comparing it to the corresponding monthly at-risk-of-poverty threshold previously calculated. If the monthly net household income fell below the household's individual at-risk-of-poverty threshold, the dummy variable assumed the value one, otherwise zero. For households having indicated only an income group, a further step was necessary. The household's individual at-risk-of-poverty threshold was assigned to an income group. Then, if the households income

[3] Whether the value for 2001 or 2002 was used depended on the household's participation year within the German 2001/02 TUS.
[4] Exemplified, the monthly at-risk-of-poverty threshold for a three-headed household comprising two adults and a child aged 13 years that participated in the German 2001/02 TUS in the year 2001 equals 1288.8 Euro (716 Euro times 1.8).

group fell below the income group assigned to the household's individual at-risk-of-poverty threshold, the dummy variable assumed the value one, otherwise zero. This approach was adopted from HOLZ (2004).

Finally, the original sample was restricted to household heads aged 50 to 80 years and, if applicable, the respective spouse or life partner, in order to take account of within-household interactions in time use. The lower age limit was chosen for reasons of comparability with the analysis of BURZIG and HERRMANN (2012). An upper age limit was set in consequence of inappropriate data availability, as from 81 years on the age was no longer reported but coded with 9999 which stands for 81 years and older. Hence, households comprising a spouse or a life partner aged 81 years and older had to be excluded altogether from the sample as well, to maintain consistency in considering both partners. After imposing these restrictions, the size of the original sample was reduced to 11,073 unweighted or 14,195 weighted diary observations.

Sampling weights are used throughout this work, in order to obtain representative results (HOLZ, 2005, p. 8). A sampling weight is the number of individuals in a population which are represented by an individual in the sample (STATACORP, 2005, p. 271). Because the evaluations are conducted on the diary day level, time use weights are used (HOLZ, 2005, p. 9).

An overview of variables employed is given in Table A1 of the Appendix. Before proceeding with a descriptive analysis of the dependent and independent variables, the handling of data problems is discussed in the following chapter.

4.3 Data Problems

When working with cross-sectional surveys, two major problems are commonly encountered in estimating a regression model: heteroscedasticity and multicollinearity. The treatment of these and other less serious problems associated with the German 2001/02 TUS data is discussed in the following subsections.

4.3.1 Heteroscedasticity

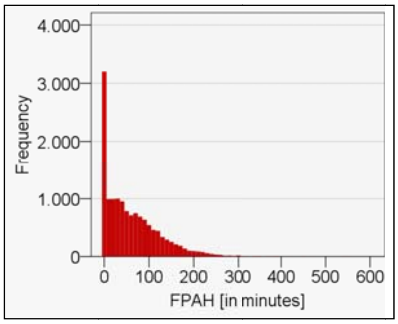
Heteroscedasticity refers to the violation of the homoscedasticity assumption in a linear regression model. That is, the variance of the errors, given the independent variables, is not constant (WOOLDRIDGE, 2003, p. 837). In the presence of heteroscedasticity, OLS estimators are still unbiased and consistent, but inefficient and hence no longer BLUE. In consequence of biased and inconsistent estimates of the variance and covariance of the regression coefficients, tests of hypotheses are no longer valid (RAMANATHAN, 2002, p. 347).

Frequently heteroscedasticity is present if the dependent variable is not symmetric (KOHLER and KREUTER, 2009, p. 219). The symmetry can be tested by generating a frequency distribution of the dependent variables [FPAH], [FCAH] and [FCAFH] as in Figure 3 to Figure 5. Here, it can be seen that many zero observations are present, especially for [FPAH] and [FCAFH]. In Figure 6 to Figure 8, the zero observations are excluded for all three dependent variables. The frequency distributions reveal that [FPAH], [FCAFH] and to a lesser extent [FCAH] exhibit a right-skewed distribution. This lack of symmetry entails the risk of violating the homoscedasticity assumption (KOHLER and KREUTER, 2009, p. 220).

Heteroscedasticity can often be removed by transforming the dependent variable. The aim is to achieve a symmetric distribution. For right-skewed variables, as is the case of [FPAH], [FCAH] and [FCAFH], a logarithmic transformation is suitable (KOHLER and KREUTER, 2009, p. 221).

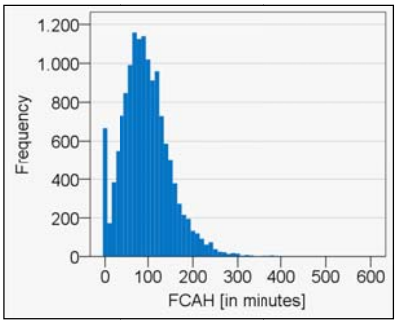
As shown in Figure 9 to Figure 11, the logarithmic transformation of the dependent variables did not lead to a symmetric frequency distribution. Therefore, the problem of heteroscedasticity remains unsolved and the standard errors of estimated regression coefficients cannot be used for significance tests (KOHLER and KREUTER, 2009, p. 221).

Figure 3: Frequency distribution of [FPAH]



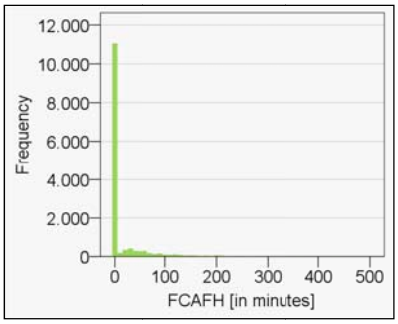
Note – Frequency distribution of minutes spent on food production at home per day [FPAH].

Figure 4: Frequency distribution of [FCAH]



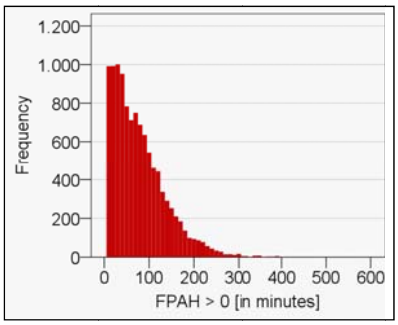
Note – Frequency distribution of minutes spent on food consumption at home per day [FCAH].

Figure 5: Frequency distribution of [FCAFH]



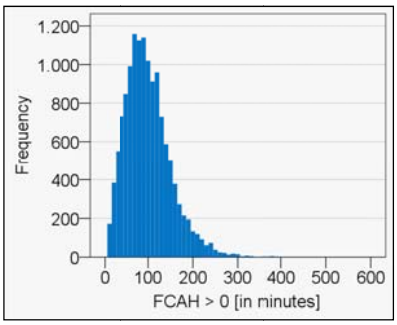
Note – Frequency distribution of minutes spent on food consumption away from home per day [FCAFH].

Figure 6: Frequency distribution of [FPAH] excluding zero observations



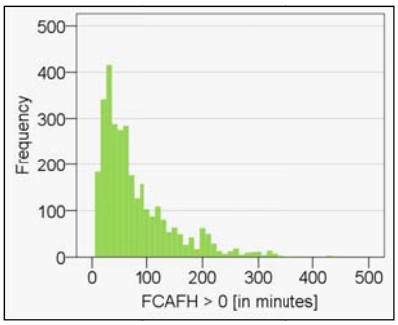
Note – Frequency distribution of minutes spent on food production at home per day [FPAH], observations included only if the variable exhibits a value greater than zero (>0).

Figure 7: Frequency distribution of [FCAH] excluding zero observations



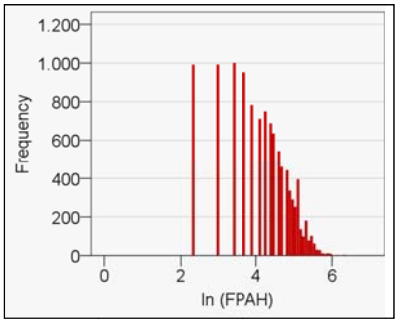
Note – Frequency distribution of minutes spent on food consumption at home per day [FCAH], observations included only if the variable exhibits a value greater than zero (>0).

Figure 8: Frequency distribution of [FCAFH] excluding zero observations



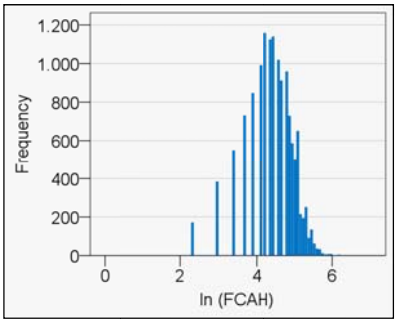
Note – Frequency distribution of minutes spent on food consumption away from home per day [FPAH], observations included only if the variable exhibits a value greater than zero (>0).

Figure 9: Frequency distribution of the natural logarithm of [FPAH]



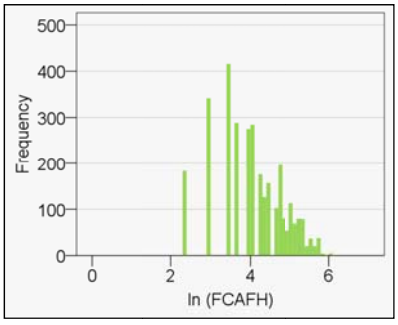
Note – Frequency distribution of the natural logarithm of minutes spent on food production at home per day [ln(FPAH)].

Figure 10: Frequency distribution of the natural logarithm of [FCAH]



Note – Frequency distribution of the natural logarithm of minutes spent on food consumption at home per day [ln(FCAH)].

Figure 11: Frequency distribution of the natural logarithm of [FCAFH]



Note – Frequency distribution of the natural logarithm of minutes spent on food consumption away from home per day [ln(FCAFH)].

Source: Own computations based on the German 2001/02 TUS

However, given that hypothesis testing constitutes an important part of an econometric analysis, heteroscedasticity-robust standard errors and test statistics are computed by many regression packages. That is, they are valid – at least in large samples – whether or not the homoscedasticity assumption is met (WOOLDRIDGE, 2003, p. 262). When working with the regression package Stata, there are two ways of computing heteroscedasticity-robust standard errors, depending on the regression command employed. In the non-survey context it is obtained by incorporating the key word *robust* in the estimation command. The corresponding term in the survey context is *linearized*. By default, heteroscedasticity-robust standard errors are computed when estimating with the survey data command (STATACORP, 2005, p. 11).

Consequently, the upcoming estimations are performed with the non-logarithmic dependent variables [FPAH], [FCAH] and [FCAFH] and using the command for the heteroscedasticity-robust computation of the standard errors, in order to be able to make inference on the regression coefficients.

4.3.2 Multicollinearity

The problem of multicollinearity denotes the correlation between two or more explanatory variables in a multiple regression model (WOOLDRIDGE, 2003, p. 97). In the presence of multicollinearity, OLS estimators are still BLUE, that is unbiased, efficient, and consistent. However, multicollinearity increases the variance and thus the standard errors of the regression coefficients and reduces the t-statistics, resulting in less significant or even insignificant coefficients. Nevertheless, tests of hypotheses are valid (RAMANATHAN, 2002, p. 215).

The high variance of regression coefficients arises from little information available on the correlating variables, given that the estimation procedure excludes information common to both. That is, when two variables exhibit a high correlation, the proportion of information that is unique to each variable is small and the proportion of information that is common to both variables is large. Consequently, it is almost as if a small sample size was employed to calculate the regression coefficients (KENNEDY, 2003, pp. 206-207).

In order to identify multicollinearity, a matrix of correlation coefficients can be helpful. The matrix of correlation coefficients displays the pairwise correlation among all variables considered for the analysis. A high correlation coefficient between

independent variables is not desired, as multicollinearity arises and affects the regression results (RAMANATHAN, 2002, pp. 215-217). From the matrix of correlation coefficients in Table A2 of the Appendix it becomes evident that a high correlation exists between the variables [RETIRED] and [AGE]. Though [RETIRED] constitutes the central explanatory variable of the analysis, [AGE] is also considered as important, since it captures the process of ageing which cannot be neglected given the wide age range subject to examination within this work. With the aim of reducing this high correlation, alternative [AGE] variables were tested. First, [AGE] was transformed into an ordinal-scaled variable by creating five-year age groups [AGE_Gr_5]. This, however, did not reduce the high correlation with [RETIRED]. Therefore, again, [AGE] was transformed into an ordinal-scaled variable, but this time ten-year age groups were generated [AGE_Gr_10]. Despite the larger age-range, a high correlation with [RETIRED] persisted (see Appendix Table A2). As the transformation of [AGE] did not contribute to the removal of the high correlation, [RETIRED] and the metric variable [AGE] are both retained in the analysis, given that even in the presence of multicollinearity, if the signs are logical and the regression coefficients are significant, an impact on the dependent variable can be confirmed (RAMANATHAN, 2002, pp. 217-218). Moreover, the variables [MALE] and [HHHEAD] exhibit a somewhat high correlation. This can be explained by the fact that 65% of the household heads are male (see Appendix Table A3). Therefore, [HHHEAD] is considered as redundant and omitted from further analysis.

4.3.3 Other Data Problems

The variable [EQUIVALENT_INCOME] provides information only for those individuals for whom the exact monthly net household income was available. Consequently, those individuals, for whom only an income group was given, were coded as missing values. However, it is a substantial magnitude of missing values that are present in [EQUIVALENT_INCOME]. This affects regression results, as it reduces the precision of estimators (WOOLDRIDGE, 2003, p. 97). Therefore, it is considered best to omit [EQUIVALENT_INCOME] from further analysis.

Thus, two variables – [HHHEAD] and [EQUIVALENT_INCOME] – are dropped and it can be proceeded to the descriptive analysis of the remaining variables in the following chapter.

4.4 Descriptive Analysis

The present chapter provides insights into the time spent on FPAH, FCAH and FCAFH, and into the degree of participation in these activities, out of different points of view, in order to identify relevant factors. First, an overall description of the time use and the degree of participation in the activities is given. Then, a descriptive analysis is provided for each explanatory variable individually.

Figure 12: Share of participants in FPAH, FCAH and FCAFH in the course of the day (all diary days)

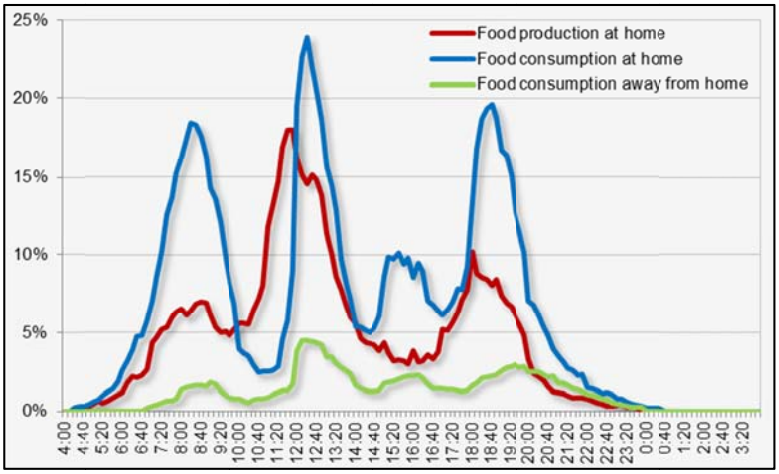
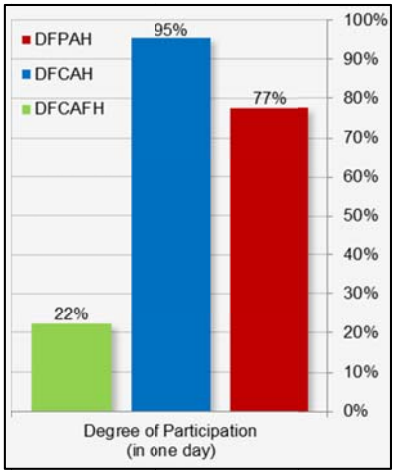


Figure 13: Degree of participation in FPAH, FCAH and FCAFH in 24h (all diary days)



Note – Share of participants in the activities food production at home (FPAH), food consumption at home (FCAH) and food consumption away from home (FCAFH) in every ten minutes of a day (Figure 12). – Variables for the degree of participation per day in food production at home [DFPAH], food consumption at home [DFCAH] and food consumption away from home [DFCAFH] (Figure 13).

Source: Own computations based on the German 2001/02 TUS

To begin, a look is taken at the sample's production and consumption habits over the day. Figure 12 illustrates the share of observations that indicated to have been involved (i.e. that spent more than zero minutes) either in FPAH, FCAH or FCAFH in every ten minutes of the day, starting at 04:00 a.m. and ending at 04:00 a.m. of the following day. Figure 13 shows the share of observations that spent more than zero minutes on FPAH, FCAH or FCAFH in a day. In Figure 12, it can clearly be recognized that the main meal times are around 08:30 a.m., 12:00 p.m. and 18:30 p.m., as the degree of participation is the highest at these times of the day. Moreover, a coffee break can be identified in the afternoon around 15:30 p.m. As expected, the curve for food production at home exhibits the same peaks, though lower and earlier, as the line for food consumption at home, given that prior to consumption, the meal needs to be prepared. Both Figure 12 and Figure 13 reveal that the participation in food consumption at home is the highest of all three activities, since at some point

most individuals have at least one meal at home. Not so common is to have at least one meal outside home, which is also reflected in both diagrams, as the share of observations in food consumption away from home is low. The degree of participation in food production at home lies in between both time use categories for food consumption. In Figure 13, 77% of the 14,195 cases present in the sample indicated having been engaged in the production of meals during the day. The share is not as high as for food consumption at home with 95%, given that it is not very likely that each individual prepares meals. Especially in older generations, which make up a large portion of this sample, the preparation of meals is more of a gender-specific activity.

Figure 14: Sample average for FPAH (unweighted, weighted, and weighted restricted)

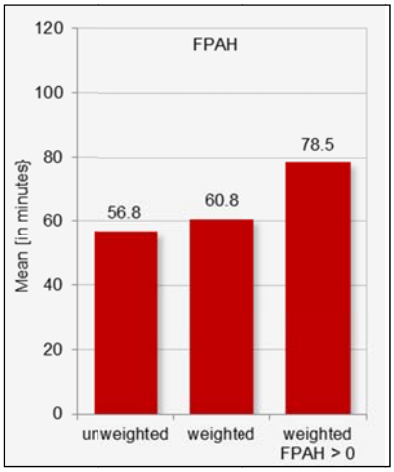


Figure 15: Sample average for FCAH (unweighted, weighted, and weighted restricted)

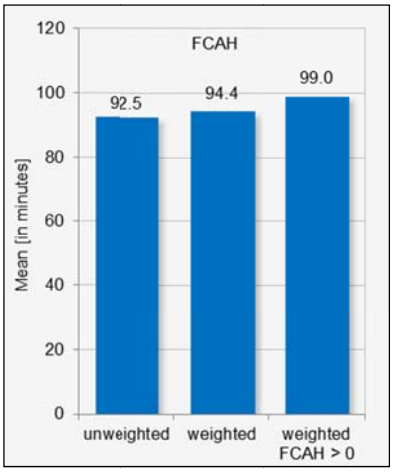
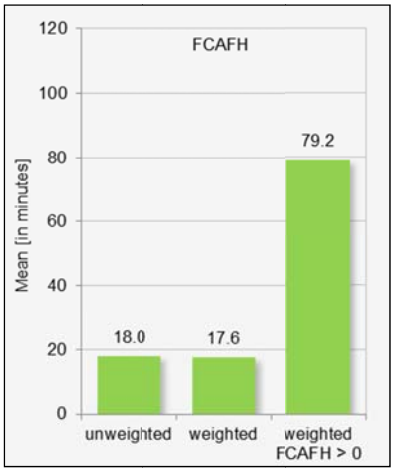


Figure 16: Sample average for FCAFH (unweighted, weighted, and weighted restricted)



Note – Variables for minutes spent on food production at home per day [FPAH], minutes spent on food consumption at home per day [FCAH], minutes spent on food consumption away from home per day [FCAFH]. – No sampling weights are used (unweighted), sampling weights are used (weighted), observations are included only if the variable exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

From Figure 13 it becomes evident that, given the low degree of participation in food production at home per day [DFPAH] and the low degree of participation in food consumption away from home per day [DFCAFH], a substantial amount of zero observations is present in the sample. This finding is important when considering the average amount of time spent on the activities, for too many zero observations lead to distortions in the calculated values, as shown in Figure 14 to Figure 16. When sampling weights are used, the sample size (see Appendix Table A4 to Table A6) and, generally, the average values increase (see Figure 14 and Figure 15). Restricting the sample to those cases where the time use is greater than zero, the

average increases as well, but the magnitude of the rise depends on the amount of zero observations present in the sample. For instance, the degree of participation in food consumption away from home per day [DFCAFH] equals 22% (see Figure 13) and this means that 78% of all observations exhibit the value zero. Calculating the sample average for [FCAFH] without a restriction results in 17.6 minutes per day. When all zero observations are excluded and the value is recalculated, an average of 79.2 minutes per day is obtained (see Figure 16). In contrast, for [DFCAH] only 5% of the observations are equal zero minutes (see Figure 13) and therefore restricting the sample hardly makes a difference in the average value (see Figure 15). Consequently, evaluations on [FPAH] and [FCAFH] are henceforth done using restricted samples that is excluding the cases exhibiting the value zero for the variable under consideration. The complete sample is, however, further employed for evaluations on [FCAH], given that for this variable the frequency of zero observations is low.

Altogether, the largest amount of time is dedicated to food consumption at home with averagely 94.4 minutes per day (see Figure 15). The quantity of time spent on food production at home (78.5 minutes per day) and food consumption away from home (79.2 minutes per day) is nearly the same (see Figure 14 and Figure 16), but it must be noted that the restricted sample of [FCAFH] is considerably smaller (see Appendix Table A6), which in turn means that it is a less common activity. All three time use categories display a high standard deviation (see Appendix Table A4 to Table A6). This suggests that many factors stand behind this variation.

A wide range of ages, from individuals in their thirties to individuals in their eighties, is found in the sample. The average age is 62 years, which is also the mean age for men and women in the sample (see Appendix Table A7). The most strongly represented age group are the 60 to 65 year-olds, comprising 23% of all observations (see Figure 17).

Figure 17: Relative frequency of age groups

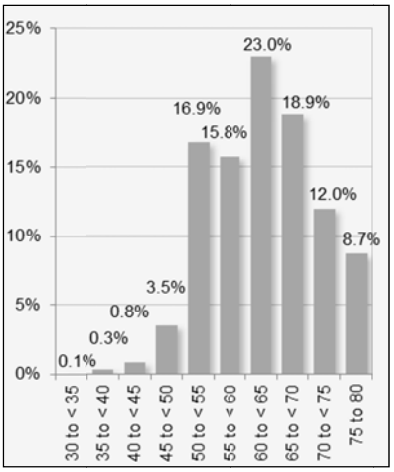
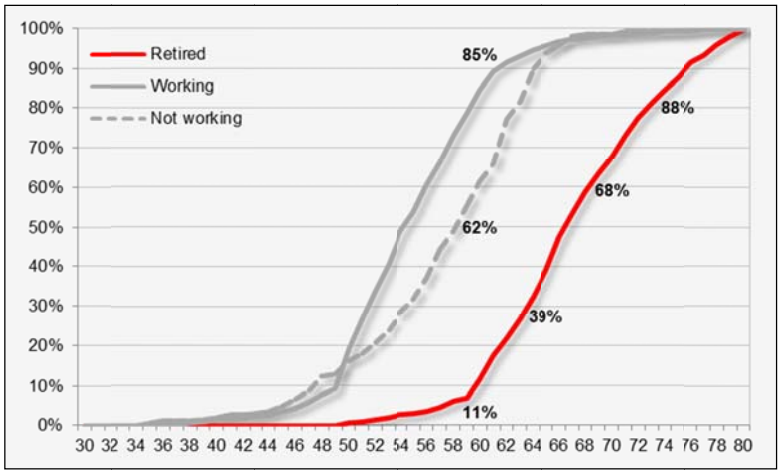


Figure 18: Cumulative percent of retired, working and not working observations with age



Source: Own computations based on the German 2001/02 TUS

In Figure 19 and Figure 20 the degree of participation and the average time use with age are illustrated. It can be seen that up to 50 years the curves in both diagrams exhibit strong fluctuations which is mostly due to the small amount of observations available. From 50 years on, however, the lines in both charts become more stable and a clear tendency can be recognized.

Figure 19: Age and degree of participation in the activities FPAH, FCAH and FCAFH

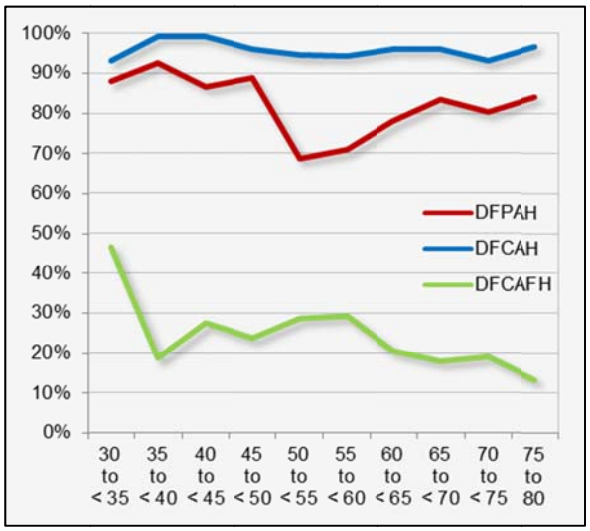
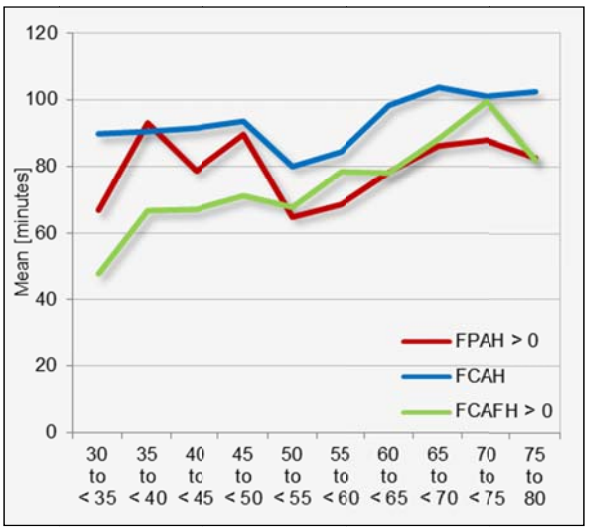


Figure 20: Age and time use for the activities FPAH, FCAH and FCAFH



Note – Variables for minutes spent on food production at home per day [FPAH], minutes spent on food consumption at home per day [FCAH], minutes spent on food consumption away from home per day [FCAFH], degree of participation per day in food production at home [DFPAH], degree of participation per day in food consumption at home [DFCAH], degree of participation per day in food consumption away from home [DFCAFH]. – Observations are included only if the variable exhibits a value greater than zero (>0). – Sampling weights are used.

Source: Own computations based on the German 2001/02 TUS

The involvement in the production of meals at home [DFPAH] grows with age, whereas the degree of participation in home consumption [DFCAH] appears to remain constant. On the contrary, the probability of consuming meals out of home [DFCAFH] declines continuously (see Figure 19). To verify whether a significant connection exists between the [AGE] variable and the variables for the degree of participation, the contingency coefficient is employed, given the nominal scale of [DFPAH], [DFCAH] and [DFCAFH]. A significant correlation is identified for all variables, but the direction is not known, since the contingency coefficient can assume only positive values (see Appendix Table A8 to Table A10). On average, with rising age [FPAH], [FCAH] and [FCAFH] tend to increase (see Figure 20). A positive and significant correlation between [AGE] and [FPAH], [FCAH] and [FCAFH] exists, too (see Appendix Table A11 to Table A13).

In Figure 18, the cumulative proportion of retired, working and non-working observations at different ages is depicted. The graph is to be understood as follows: up to the age of 60, one can find 11% of the retired, 85% of the working and 62% of the non-working observations. Retirement begins around the age of 60, as can be identified by the steep increase of the red curve, and the proportion of retirees out of all retired observations rises steadily up to the age of 80, which explains the strong correlation between [AGE] and [RETIRED].

Altogether, retired observations constitute 54% of the sample. From the 46% non-retirees, 78% are working and 22% are not. Among the non-working individuals one can find mainly female spouses (see Appendix Table A17).

Figure 21: Social status and degree of participation in the activities FPAH, FCAH and FCAFH

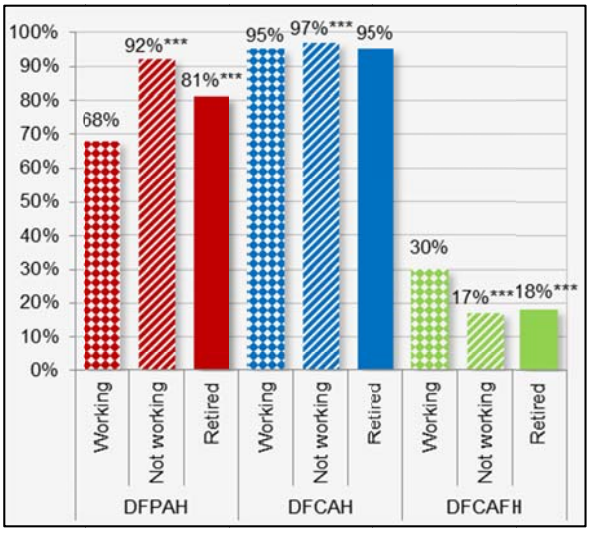
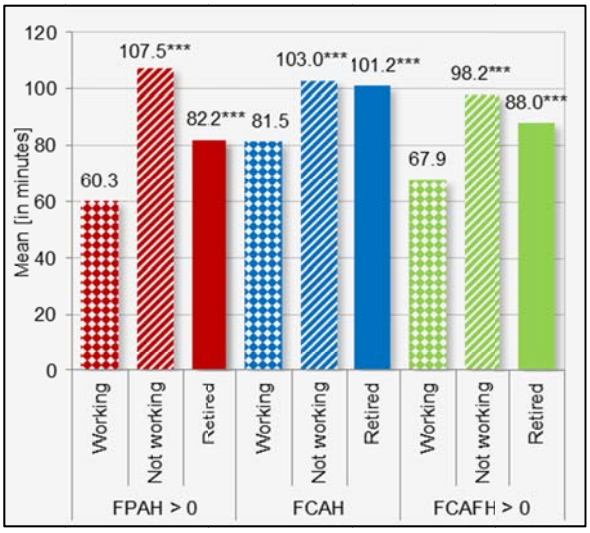


Figure 22: Social status and time use for the activities FPAH, FCAH and FCAFH



Note – Variables for minutes spent on food production at home per day [FPAH], minutes spent on food consumption at home per day [FCAH], minutes spent on food consumption away from home per day [FCAFH], degree of participation per day in food production at home [DFPAH], degree of participation per day in food consumption at home [DFCAH], degree of participation per day in food consumption away from home [DFCAFH]. – Observations are included only if the variable exhibits a value greater than zero (>0). – Sampling weights are used. – *** Significantly different from working individuals at the 0.1%-level.

Source: Own computations based on the German 2001/02 TUS

A significant difference in [DFPAH] and [DFCAFH] is found between retired and non-retired individuals. That is, retirees are more likely to be involved in the preparation of meals at home and less likely to consume away from home. The probability of consuming food at home [DFCAH] is not significantly influenced by retirement status (see Figure 21). Moreover, retirees dedicate significantly more minutes to the production of food at home [FPAH] and to the consumption of meals, either at home [FCAH] or out of home [FCAFH], than working persons (see Figure 22).

Non-workers and workers display a significant divergence in the degree of participation and the time use as well, but in all three activities (see Figure 21 and Figure 22). Non-working individuals are more likely to produce [DFPAH] and consume food at home [DFCAH], but the frequency of dining out [DFCAFH] is lower than that of working individuals (see Figure 21). As seen in Figure 22, non-workers spend, on average, a substantially higher amount of minutes on the preparation [FPAH] and consumption of meals both at home [FCAH] and away from home [FCAFH] (see Appendix Table A14 to Table A29 for all evaluations).

Figure 23: Gender and degree of participation in the activities FPAH, FCAH and FCAFH

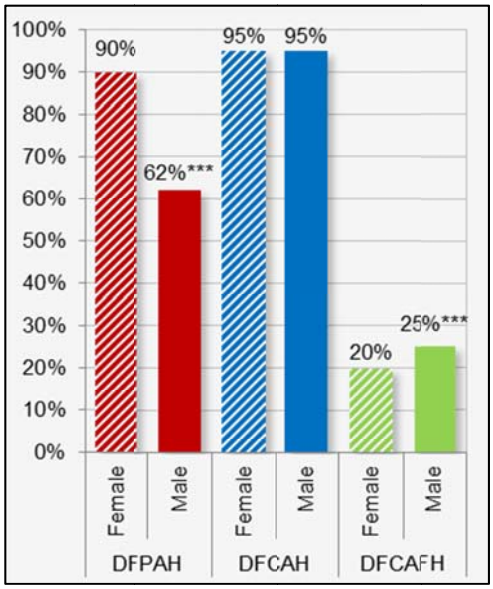
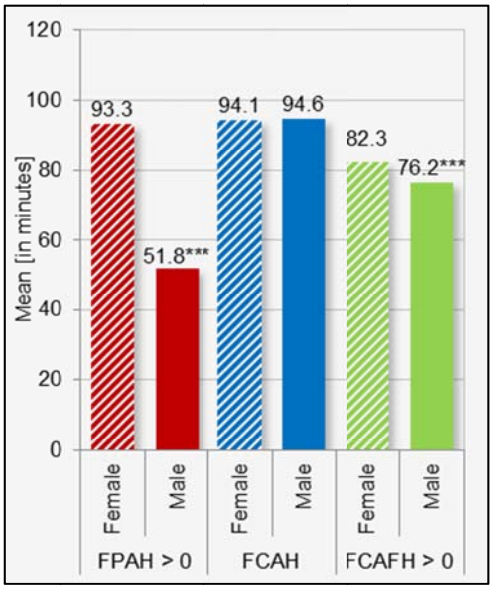


Figure 24: Gender and time use for the activities FPAH, FCAH and FCAFH



Note - Variables for minutes spent on food production at home per day [FPAH], minutes spent on food consumption at home per day [FCAH], minutes spent on food consumption away from home per day [FCAFH], degree of participation per day in food production at home [DFPAH], degree of participation per day in food consumption at home [DFCAH], degree of participation per day in food consumption away from home [DFCAFH].– Observations are included only if the variable exhibits a value greater than zero (>0). – Sampling weights are used. – *** significantly different from females at the 0.1%-level.

Source: Own computations based on the German 2001/02 TUS

The sample is composed of 56% female and 44% male observations. The data reflects the traditional gender-based division of labour, given that a significant difference in the degree of participation in the production of meals [DFPAH] is found between men and women. In Figure 23, nearly every female observation (90%) is engaged in this activity, in contrast to 62% of the male observations. Also, a significant difference in [FPAH] exists. Females dedicate with, on average 93.3 minutes per day, almost twice as much time to food production at home than males with 51.8 minutes per day (see Figure 24). When it comes to the consumption of food at home, neither in the degree of participation [DFCAH] nor in the time use [FCAH] a significant gender-specific difference exists (see Figure 23 and Figure 24). However, males are more likely to dine out [DFCAFH] than females (see Figure 23), but spend, on average, significantly less time on the consumption of meals out of home [FCAFH], as observable in Figure 24 (see Appendix Table A30 to Table A38 for all evaluations).

Figure 25: Health status and degree of participation in the activities FPAH, FCAH and FCAFH

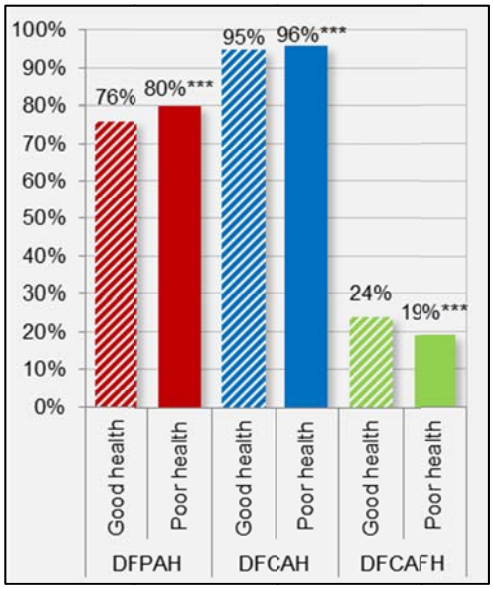
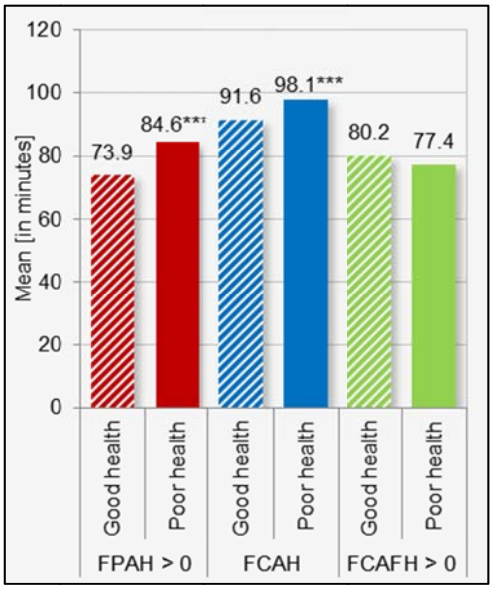


Figure 26: Health status and time use for the activities FPAH, FCAH and FCAFH



Note - Variables for minutes spent on food production at home per day [FPAH], minutes spent on food consumption at home per day [FCAH], minutes spent on food consumption away from home per day [FCAFH], degree of participation per day in food production at home [DFPAH], degree of participation per day in food consumption at home [DFCAH], degree of participation per day in food consumption away from home [DFCAFH]. – Observations are included only if the variable exhibits a value greater than zero (>0). – Sampling weights are used. – *** significantly different from good health at the 0.1%-level.

Source: Own computations based on the German 2001/02 TUS

The health status is reported to be good by 58% of the observations, while 42% assess their health as poor.

The degree of participation of individuals with good and with poor health is significantly different in [DFPAH], [DFCAH] and [DFCAFH]. Individuals with poor health are more likely to prepare and consume food at home than their counterparts. Also, with poor health the probability of dining out is lower than with good health (see Figure 25). A significant difference between individuals with good and with poor health is found in [FPAH] and [FCAH]. As shown in Figure 26, with poor health, on average, more time is devoted to the production and consumption of meals at home, as compared to good health. Though it appears in Figure 26 that with poor health, on average, less time is spent on food consumption away from home [FCAFH] as with good health, the difference is not statistically significant (see Appendix Table A39 to Table A47 for all evaluations).

Figure 27: Education and degree of participation in the activities FPAH, FCAH and FCAFH

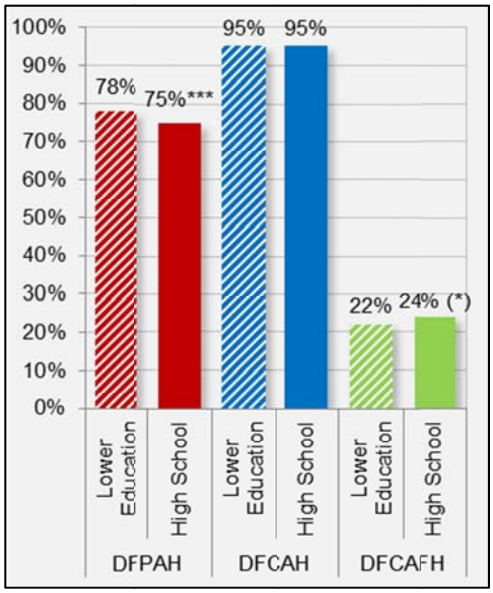
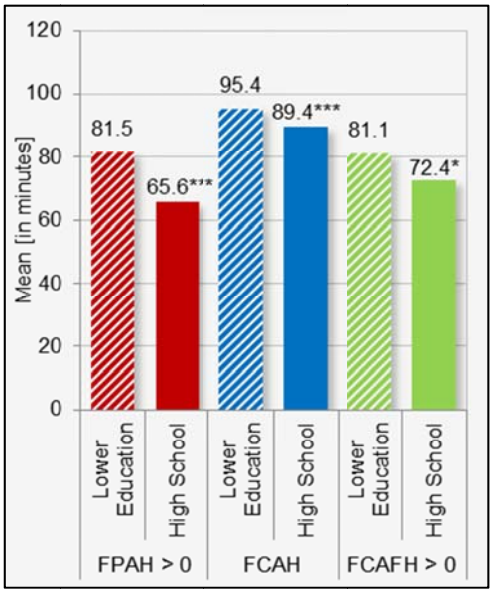


Figure 28: Education and time use for the activities FPAH, FCAH and FCAFH



Note - Variables for minutes spent on food production at home per day [FPAH], minutes spent on food consumption at home per day [FCAH], minutes spent on food consumption away from home per day [FCAFH], degree of participation per day in food production at home [DFPAH], degree of participation per day in food consumption at home [DFCAH], degree of participation per day in food consumption away from home [DFCAFH]. – Observations are included only if the variable exhibits a value greater than zero (>0). – Sampling weights are used. – ***, *, (*) significantly different from lower education level at the 0.1%-, 5%- and 10%-level.

Source: Own computations based on the German 2001/02 TUS

When it comes to the education level, 20% of the observations hold the highest school education certificate whereas 80% of the sample has a lower education certificate or no education certificate at all.

In the degree of participation a significant difference is present in [DFPAH] and, at a lower level of significance, in [DFCAFH]. Individuals with the highest school education are less probable to produce food at home and consume more frequently out of home. As to the consumption of meals at home [DFCAH], no significant difference in the degree of participation is identified (see Figure 27). Both educational groups employ a significantly different amount of time on all three activities. Notable in Figure 28 is that, on average, with a higher education level the time devoted to the production of food at home [FPAH] and to the consumption of meals, either at home [FCAH] or out of home [FCAFH] , is lower (see Appendix Table A48 to Table A56 for all evaluations).

Figure 29: At risk of monetary poverty and degree of participation in the activities FPAH, FCAH and FCAFH

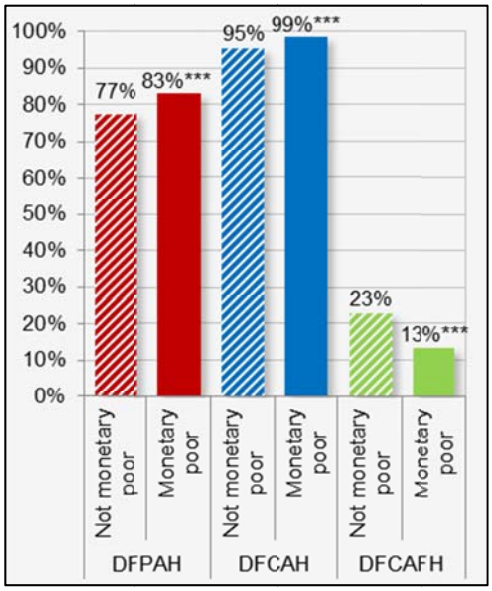
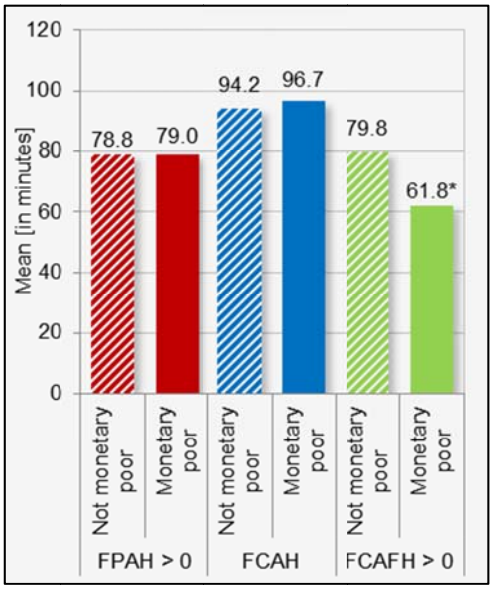


Figure 30: At risk of monetary poverty and time use for the activities FPAH, FCAH and FCAFH



Note - Variables for minutes spent on food production at home per day [FPAH], minutes spent on food consumption at home per day [FCAH], minutes spent on food consumption away from home per day [FCAFH], degree of participation per day in food production at home [DFPAH], degree of participation per day in food consumption at home [DFCAH], degree of participation per day in food consumption away from home [DFCAFH]. – Observations are included only if the variable exhibits a value greater than zero (>0). – Sampling weights are used. – ***, * significantly different from not monetary poor at the 0.1%- and 5%-level.

Source: Own computations based on the German 2001/02 TUS

In the sample, 6% of the observations belong to a household at risk of monetary poverty.

The degree of participation diverges significantly in all three activities between both income groups. Individuals living in a household at risk of monetary poverty are more often involved in the preparation [DFPAH] and consumption of meals at home [DFCAH] and less likely to consume out of home [DFCAFH] than individuals coming from households not at risk of monetary poverty (see Figure 29). A significant difference in the use of time between individuals appertaining to a household at risk of monetary poverty as compared to individuals belonging to a household that is not at risk of monetary poverty is found only in [FCAFH]. It can be seen in Figure 30 that observations out of a household at risk of monetary poverty spend, on average, less time on the consumption of meals out of home (see Appendix Table A57 to Table A65 for all evaluations).

Figure 31: Share of household sizes, and household size and degree of participation in the activities FPAH, FCAH and FCAFH

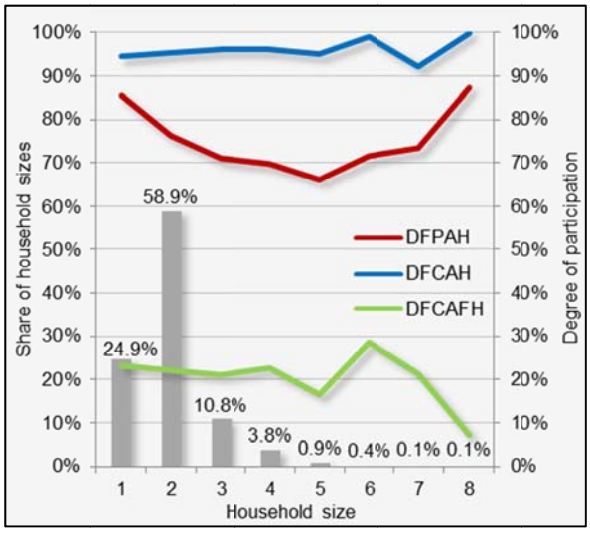
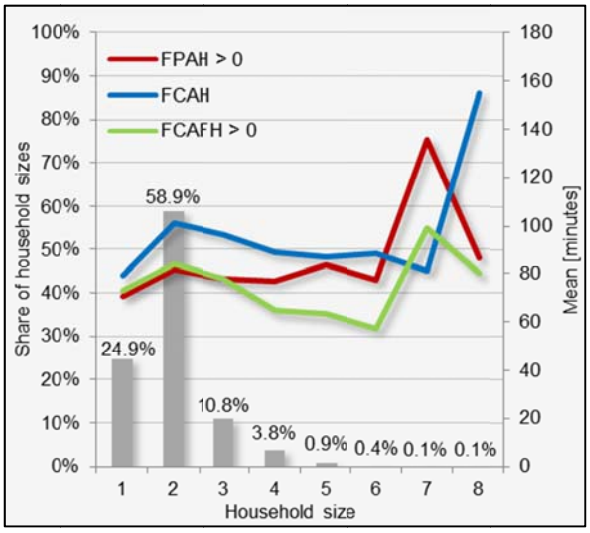


Figure 32: Share of household sizes, and household size and time use for the activities FPAH, FCAH and FCAFH



Note - Variables for minutes spent on food production at home per day [FPAH], minutes spent on food consumption at home per day [FCAH], minutes spent on food consumption away from home per day [FCAFH], degree of participation per day in food production at home [DFPAH], degree of participation per day in food consumption at home [DFCAH], degree of participation per day in food consumption away from home [DFCAFH]. – Observations are included only if the variable exhibits a value greater than zero (>0). – Sampling weights are used.

Source: Own computations based on the German 2001/02 TUS

A multitude of household sizes are present in the sample, but the most common type is the two-person household with a share of 58.9% (see Figure 31).

In order to measure the intensity of the relationship between the household size and the degree of participation in the three activities of interest, the contingency coefficient is once again used. A significant correlation is identified only between the household size and [DFPAH], but the direction is not known. In this respect, however, no definite trend can be observed in Figure 31. The minutes used for the production [FPAH] and consumption of meals at home [FCAH] correlate positively and significantly with the household size, though no clear tendency is recognizable from Figure 32. For [FCAFH] no significant correlation with the household size is found (see Appendix Table A66 to Table A71 for all evaluations).

Figure 33: Region of residence and degree of participation in the activities FPAH, FCAH and FCAFH

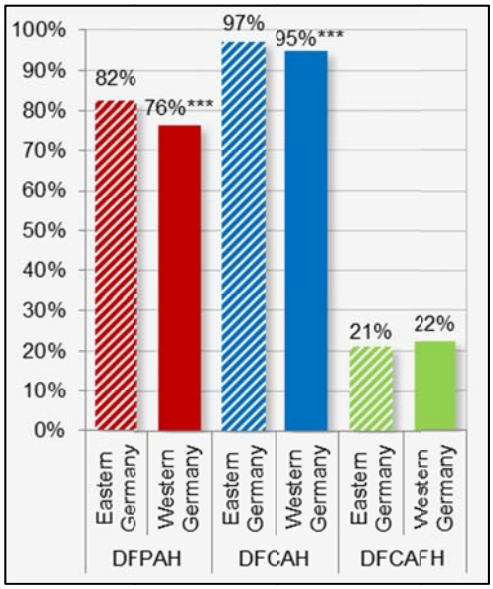
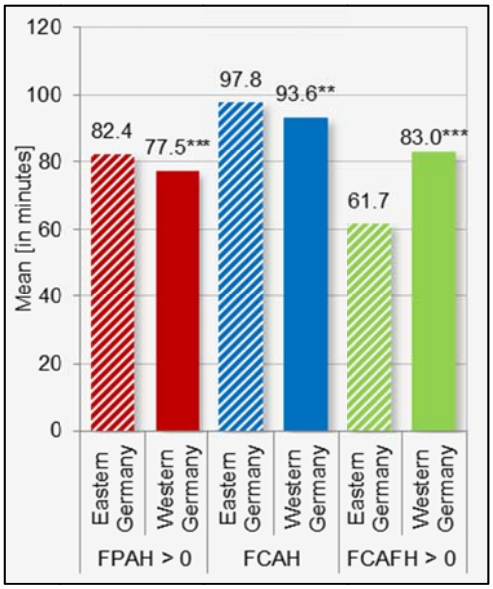


Figure 34: Region of residence and time use for the activities FPAH, FCAH and FCAFH



Note - Variables for minutes spent on food production at home per day [FPAH], minutes spent on food consumption at home per day [FCAH], minutes spent on food consumption away from home per day [FCAFH], degree of participation per day in food production at home [DFPAH], degree of participation per day in food consumption at home [DFCAH], degree of participation per day in food consumption away from home [DFCAFH]. – Observations are included only if the variable exhibits a value greater than zero (>0). – Sampling weights are used. – ***, ** significantly different from Eastern Germany at the 0.1%- and 1%-level.

Source: Own computations based on the German 2001/02 TUS

The household's region of residence, whether it is Eastern Germany (19%) or Western Germany (81%), has a significant impact on [DFPAH] and [DFCAH]. Persons living in a Western German household show a lower involvement in the production and consumption of meals at home than persons from Eastern German households. The probability of eating out is, however, not significantly different for both groups (see Figure 33). The use of time diverges significantly in all three activities between Eastern Germany and Western Germany. As shown in Figure 34, individuals residing in Western German households devote, on average, a lower amount of minutes to the production and consumption of meals at home, and more time to consumption out of home (see Appendix Table A72 to Table A80 for all evaluations).

Figure 35: Weekday and degree of participation in the activities FPAH, FCAH and FCAFH

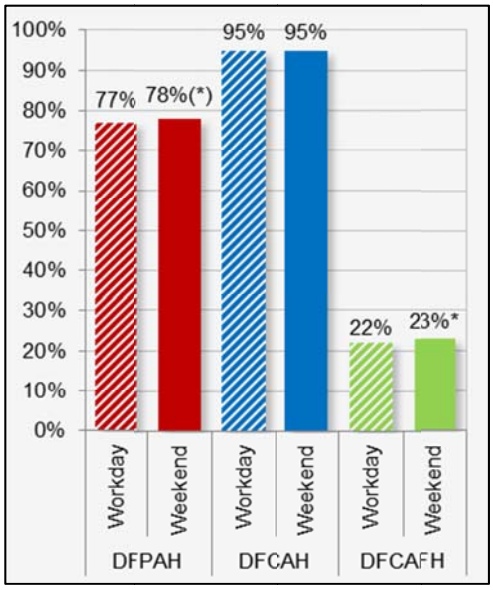
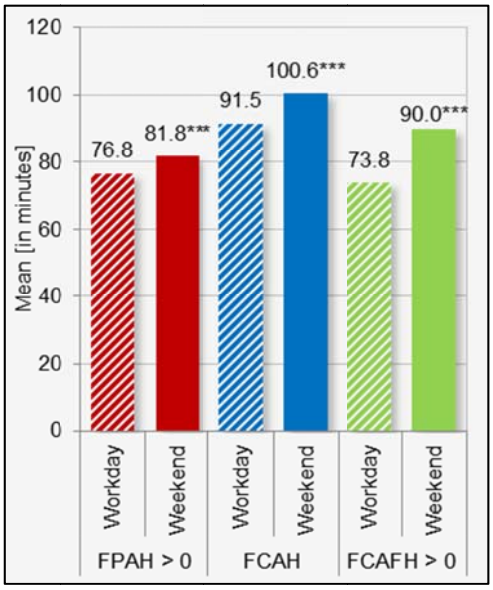


Figure 36: Weekday and time use for the activities FPAH, FCAH and FCAFH



Note - Variables for minutes spent on food production at home per day [FPAH], minutes spent on food consumption at home per day [FCAH], minutes spent on food consumption away from home per day [FCAFH], degree of participation per day in food production at home [DFPAH], degree of participation per day in food consumption at home [DFCAH], degree of participation per day in food consumption away from home [DFCAFH]. – Observations are included only if the variable exhibits a value greater than zero (>0). – Sampling weights are used. – ***, *, (*) significantly different from workdays at the 0.1%-, 5%-, 10%-level.

Source: Own computations based on the German 2001/02 TUS

The time use diaries were kept to 68% on workdays and to 32% on weekends. The degree of participation in the consumption of meals at home [DFCAH] is not affected by the weekday. For [DFPAH] and [DFCAFH], however, a significant difference exists. It appears that the probability of producing meals at home [DFPAH] and consuming meals out of home [DFCAFH] is slightly higher at weekends (see Figure 35). Between the workweek and the weekend a significant difference in the amount of minutes devoted to the production [FPAH] and consumption of meals, at home [FCAH] or out of home [FCAFH], is present (see Figure 36). More minutes per day are dedicated to all three activities on weekends, given the higher availability of time (see Appendix Table A81 to Table A89 for all evaluations).

Finally, the characterisation of the course of the day displays a strong impact on the degree of participation in the three activities of interest and the amount of time used (see Figure 37 and Figure 38). In the sample, 78% of the observations described the diary day as normal, whereas 22% considered it as unusual. As evident from Figure

37, an unusual day is distinguished by a lower participation in home activities and a substantial increase in the participation in out-of-home activities. In the same way, on average less time is allocated to the production [FPAH] and consumption of meals at home [FCAH], whereas the use of time for food consumption away from home [FCAFH] increases strongly (see Figure 38). All these evaluations are provided in the Appendix Table A90 to Table A98.

Figure 37: Course of the day and degree of participation in the activities FPAH, FCAH and FCAFH

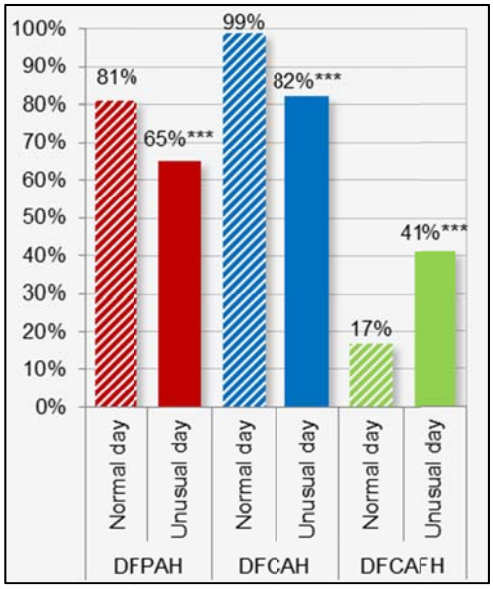
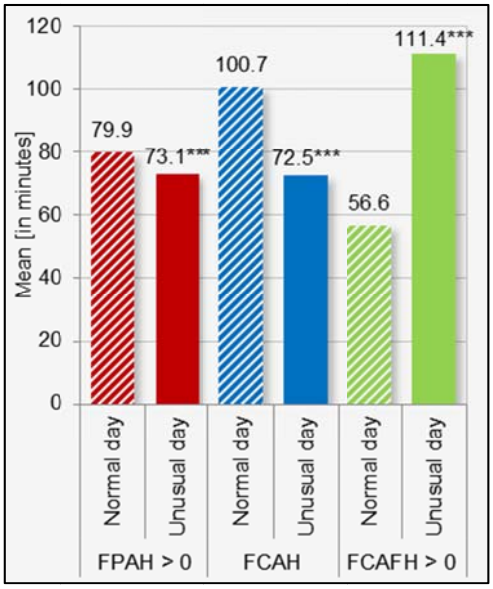


Figure 38: Course of the day and time use for the activities FPAH, FCAH and FCAFH



Note - Variables for minutes spent on food production at home per day [FPAH], minutes spent on food consumption at home per day [FCAH], minutes spent on food consumption away from home per day [FCAFH], degree of participation per day in food production at home [DFPAH], degree of participation per day in food consumption at home [DFCAH], degree of participation per day in food consumption away from home [DFCAFH]. – Observations are included only if the variable exhibits a value greater than zero (>0). – Sampling weights are used. – ***, *, (*) significantly different from normal days at the 0.1%-level.

Source: Own computations based on the German 2001/02 TUS

In summary, the descriptive analysis has revealed that most of the preselected control variables for the upcoming regression analysis appear to have an explanatory contribution to the variation in use of time and degree of participation in food production at home, food consumption at home, and food consumption out of home, given that significant differences between groups were ascertained.

An overview of the identified explanatory variables' effects on the time use and participation variables is presented in Table 5.

Table 5: Summary of results derived from the descriptive analyses

Independent variables	Dependent variables					
	[DFPAH]	[DFCAH]	[DFCAFH]	[FPAH] > 0	[FCAH]	[FCAFH] > 0
[AGE]	+/-	+/-	+/-	+	+	+
[MALE]	-	o	+	-	o	-
[RETIRED]	+	o	-	+	+	+
[NOT_WORKING]	+	+	+	+	+	+
[POOR_HEALTH]	+	+	-	+	+	o
[HIGH_SCHOOL]	-	o	+	-	-	-
[HHSIZE]	+/-	o	o	+	+	o
[MONETARY_POOR]	+	+	-	o	o	-
[WEST]	-	-	o	-	-	+
[WEEKEND]	+	o	+	+	+	+
[UNUSUAL_DAY]	-	-	+	-	-	+

Note – Impact on dependent variable ascertained, but direction of relationship is not known (+/-), positive impact on dependent variable ascertained (+), negative impact on dependent variable ascertained (-), no impact on dependent variable ascertained (o), observations are included only if the variable exhibits a value greater than zero (>0).

Source: Own illustration

4.5 Regression Analysis

In this section, a general model is specified for FPAH, FCAH, and FCAFH, respectively. Moreover, the applied econometric methods of estimation of the formulated general models are described and the regression results are presented. The interpretation and discussion of the final models is given in Chapter 4.6.

It is anticipated that all upcoming regressions are performed with Stata. Given the nature of the sample, Stata's special estimation commands for complex survey data are applied. Sampling weights are taken into account, in order to obtain unbiased regression coefficients and unbiased standard errors (StataCorp, 2005, p. 7). The data is clustered at the household level, so that within-household homogeneity in the use of time is considered, which also affects standard errors (Kohler and Kreuter, 2009, p. 234). The linearized variance estimator is used for the computation of heteroscedasticity-robust standard errors (StataCorp, 2005, p. 11).

4.5.1 Food Production at Home

The decision to produce food at home can be represented by two models, following Cragg's (1971) double-hurdle approach.

The first model describes the decision of participation in food production at home. More precisely, it explains the decision of whether food is to be produced at home or not:

(1) $$[\mathrm{DFPAH}] = \beta_0 + \beta_1[\mathrm{AGE}] + \beta_2[\mathrm{MALE}] + \beta_3[\mathrm{RETIRED}] + \beta_4[\mathrm{NOT\_WORKING}] + \beta_5[\mathrm{POOR\_HEALTH}] + \beta_6[\mathrm{HIGH\_SCHOOL}] + \beta_7[\mathrm{HHSIZE}] + \beta_8[\mathrm{MONETARY\_POOR}] + \beta_9[\mathrm{WEST}] + \beta_{10}[\mathrm{WEEKEND}] + \beta_{11}[\mathrm{UNUSUAL\_DAY}] + u$$

The model includes following elements: the dependent variable [DFPAH], which assumes the value one if food production at home takes place and zero if food is not produced at home; a set of eleven independent variables, which explain the variation in the dependent variable; an intercept β_0 that gives the value to be expected for [DFPAH], when all explanatory variables equal zero; eleven regression coefficients β_1 to β_{11} that measure the impact of the corresponding explanatory variable on [DFPAH], when all other independent variables are held constant and an error term u that captures the effect of unobserved factors on [DFPAH].

The second model stands for the decision of production intensity, provided participation in food production at home is granted. That is, it explains the decision of how much time is to be dedicated to food production at home, when the first decision established that food is to be produced at home:

(2) $$[\mathrm{FPAH}] = \beta_0 + \beta_1[\mathrm{AGE}] + \beta_2[\mathrm{MALE}] + \beta_3[\mathrm{RETIRED}] + \beta_4[\mathrm{NOT\_WORKING}] + \beta_5[\mathrm{POOR\_HEALTH}] + \beta_6[\mathrm{HIGH\_SCHOOL}] + \beta_7[\mathrm{HHSIZE}] + \beta_8[\mathrm{MONETARY\_POOR}] + \beta_9[\mathrm{WEST}] + \beta_{10}[\mathrm{WEEKEND}] + \beta_{11}[\mathrm{UNUSUAL\_DAY}] + u$$

It differs from the first-stage model only in the dependent variable, which is now [FPAH] and measures the minutes devoted to the production of food at home per day.

CRAGG's (1971) double-hurdle approach was designed to model "variables having a non-negligible probability of exactly equalling zero" (CRAGG, 1971, p. 829). The first-stage model is estimated by running a probit regression on the complete sample. The second-stage model is estimated by omitting from analysis all the cases that exhibit the value zero in [FPAH] and running a truncated regression. Thus, it is in the second stage where the problem of high proportion (23%) of zero observations is addressed.

Table 6 presents the estimations of the intercept – denoted as constant – and the regression coefficients for each variable considered in the above specified model. The full set of variables is retained in the estimations for comparison of the two stages of the double-hurdle approach and with the models estimated for FCAH and FCAFH. Except for the coefficients corresponding to the variables [AGE] and [RETIRED], the results are robust to different specifications. The exclusion of [AGE] from the model has no impact neither on the sign nor on the level of significance of the regression coefficient calculated for [RETIRED]. However, the size of the coefficient increases, given that it captures not only its own effect on the dependent variable but also that of the omitted variable [AGE]. When [RETIRED] is left out of the model, the regression coefficient for [AGE] turns highly significant at the first stage, whereas the sign and the level of significance remain unchanged at the second stage. Here, however, the size of the regression coefficient increases, since it captures not only the effect of [AGE] on the dependent variable but also that of the excluded variable [RETIRED]. Thus, it is safer not to attempt an interpretation of the [AGE] coefficient on the first stage of the double-hurdle model, since it is sensitive to

the exclusion of [RETIRED]. It is considered best to keep both [AGE] and [RETIRED] in the model, in order to obtain regression coefficients computed on the basis of information unique to each variable (see Chapter 4.3.2).

McKelvey and Zavoina's R^2 (see Table 6) is a measure of goodness-of-fit reported by Stata for probit regressions. It states that 0.331 or 33.1% of the variability in [DFPAH] is explained by the variables included in the model. For truncated regressions, Stata reports no goodness-of-fit measures when applying the estimation commands for complex survey data. This, however, is not an issue, since the focus in this work is on the effects of the variables considered in the model.

The F-values in Table 6 indicate that some of the variables included in the model have a statistically significant contribution to the explanation of the dependent variable. This is confirmed by taking a look at the significance of the coefficients.

Number of observations refers to the actual number of cases used in the analysis, whereas the population size reflects the number of cases when sampling weights are employed. That is, for instance, in the probit regression 10,157 sample observations represent 13,196 cases in the population, from which the sample was drawn (see Table 6).

The decomposition of the decision process allows the stages or hurdles (decision of participation and decision of production intensity) to be influenced by different factors (CRAGG, 1971, p. 829), as is the case in Table 6. While the decision of participation in food production at home is significantly determined by the gender, the social status, the household size, the household's region of residence and the diary days features, the decision of the actual amount of time to be devoted to food production is additionally significantly influenced by the individual's age, health status and educational attainment. Financial resources have no significant effect on neither of the two decisions. However, a more precise interpretation of the coefficients is given in Chapter 4.6.

Table 6: Double-hurdle model estimated for food production at home

	Dependent variable	
	Probit regression	Truncated regression
Independent variables	[DFPAH]	[FPAH] (if [FPAH] > 0)
[AGE]	0.0021 (0.50)	1.3356*** (3.62)
[MALE]	-0.9371*** (-19.15)	-95.8023*** (-11.38)
[RETIRED]	0.2725*** (4.17)	37.3534*** (5.23)
[NOT_WORKING]	0.6067*** (5.15)	62.7008*** (6.54)
[POOR_HEALTH]	0.0371 (0.70)	12.0693* (2.42)
[HIGH_SCHOOL]	0.0655 (1.15)	-26.7282*** (-4.12)
[HHSIZE]	-0.0718** (-2.64)	20.5757*** (7.58)
[MONETARY_POOR]	0.0733 (0.61)	-10.9247 (-1.22)
[WEST]	-0.1995** (-2.88)	-15.1109* (-2.33)
[WEEKEND]	0.1063*** (3.31)	13.8218*** (3.89)
[UNUSUAL_DAY]	-0.6217*** (-10.89)	-4.3203 (-0.67)
Constant	1.3454*** (4.92)	-92.5944*** (-3.62)
McKelvey and Zavoina's R^2	0.331	-
F	67.07***	19.46***
No. of observations	10,157	6,896
Population size	13,196	9,332

Note – The number of observations and the population size reported here differ from the unweighted/ weighted sample size reported in Chapter 4.2, given that Stata excludes from the estimation all cases that exhibit a missing value in either of the variables included in the model.
***, **, *, (*) Statistically significant at the 0.1%-, 1%-, 5%- and 10%-level. – Heteroscedasticity-robust t-statistics clustered at the household level in parentheses. – Variables are defined in Table 9.

Source: Own computations based on the German 2001/02 TUS

4.5.2 Food Consumption at Home

In contrast to [FPAH], the proportion of zero observations in [FCAH] is negligible. Consequently, this activity is described by a single multiple linear regression model:

(1) $$[\text{FCAH}] = \beta_0 + \beta_1[\text{AGE}] + \beta_2[\text{MALE}] + \beta_3[\text{RETIRED}] + \beta_4[\text{NOT\_WORKING}] + \beta_5[\text{POOR\_HEALTH}] + \beta_6[\text{HIGH\_SCHOOL}] + \beta_7[\text{HHSIZE}] + \beta_8[\text{MONETARY\_POOR}] + \beta_9[\text{WEST}] + \beta_{10}[\text{WEEKEND}] + \beta_{11}[\text{UNUSUAL\_DAY}] + u$$

The dependent variable is [FCAH] and it measures the minutes dedicated to the consumption of food at home per day. The right-sided expression of the equation is identical to that of the models specified above. That is, the same set of control variables is used to explain the variation in [FCAH].

The model is estimated by running a standard linear regression on the complete sample. The results are presented in Table 7.

Again, the full set of variables is retained in the estimations for comparison with the models estimated for FPAH and FCAFH. Except for the coefficients corresponding to the variables [AGE] and [RETIRED], the results are robust to different specifications.

The exclusion of [AGE] from the model has no impact neither on the sign nor on the level of significance of the regression coefficient calculated for [RETIRED]. However, the size of the coefficient increases, given that it captures not only its own effect on the dependent variable but also that of the omitted variable [AGE]. The same is true for the [AGE] coefficient when [RETIRED] is omitted from the model. Thus, one can derive that the results for [AGE] and [RETIRED] are quite robust. It is considered best to keep both [AGE] and [RETIRED] in the model, in order to obtain regression coefficients computed on the basis of information unique to each variable (see Chapter 4.3.2).

The measure of goodness-of-fit reported by Stata for a standard linear regression is R-Squared or R^2 in Table 7, which reports that 0.102 or 10.2% of the variation in [FCAH] is explained by the variables considered in the model.

The estimation shows that age, social status, household size and diary day characteristics have an impact of high significance on the quantity of time that is spent consuming food at home. Health status, educational attainment and the household's region of residence influence time use for food consumption as well, but

the significance is lower. On the contrary, gender and financial resources have no statistically significant effect on [FCAH]. The individual regression coefficients are interpreted and discussed in Chapter 4.6.

Table 7: Linear model estimated for food consumption at home

	Dependent variable OLS regression
Independent variables	[FCAH]
[AGE]	0.6945*** (4.63)
[MALE]	1.4699 (1.05)
[RETIRED]	14.2886*** (5.89)
[NOT_WORKING]	19.9946*** (6.30)
[POOR_HEALTH]	4.0336* (2.15)
[HIGH_SCHOOL]	-4.6804* (-2.20)
[HHSIZE]	10.0355*** (8.97)
[MONETARY_POOR]	0.3897 (0.10)
[WEST]	-5.2090(*) (-1.79)
[WEEKEND]	10.7664*** (7.73)
[UNUSUAL_DAY]	-27.1722*** (-10.11)
Constant	26.5079** (2.73)
R^2	0.102
F	36.72***
No. of observations	10,157
Population size	13,196

Note – The number of observations and the population size reported here differ from the unweighted/ weighted sample size reported in Chapter 4.2, given that Stata excludes from the estimation all cases that exhibit a missing value in either of the variables included in the model.
***, **, *, (*) Statistically significant at the 0.1%-, 1%-, 5%- and 10%-level.– Heteroscedasticity-robust t-statistics clustered at the household level are included in parentheses. – Variables are defined in Table 9.

Source: Own computations based on the German 2001/02 TUS

4.5.3 Food Consumption Away from Home

[FCAFH] is characterized by a substantial amount of zero observations (78%) which, again, calls for CRAGG's (1971) double-hurdle model.

The first model stands for the decision of participation in food consumption away from home. That is, it explains the decision of whether to consume food out of home or not:

(1) $$[\mathrm{DFCAFH}] = \beta_0 + \beta_1[\mathrm{AGE}] + \beta_2[\mathrm{MALE}] + \beta_3[\mathrm{RETIRED}] + \beta_4[\mathrm{NOT\_WORKING}] + \beta_5[\mathrm{POOR\_HEALTH}] + \beta_6[\mathrm{HIGH\_SCHOOL}] + \beta_7[\mathrm{HHSIZE}] + \beta_8[\mathrm{MONETARY\_POOR}] + \beta_9[\mathrm{WEST}] + \beta_{10}[\mathrm{WEEKEND}] + \beta_{11}[\mathrm{UNUSUAL\_DAY}] + \mathrm{u}$$

The dependent variable is [DFCAFH]. It assumes the value one if time is used for food consumption out of home and zero if no time is devoted to food consumption away from home. The right-sided expression of the equation is identical to that of the previous models. That is, the same set of control variables is used to explain the variation in [DFCAFH].

The second model stands for the decision of consumption intensity, provided participation in food consumption away from home is given. That is, it explains the decision of how much time is to be dedicated to food consumption away from home, when the first decision determined that food is to be consumed out of home:

(2) $$[\mathrm{FCAFH}] = \beta_0 + \beta_1[\mathrm{AGE}] + \beta_2[\mathrm{MALE}] + \beta_3[\mathrm{RETIRED}] + \beta_4[\mathrm{NOT\_WORKING}] + \beta_5[\mathrm{POOR\_HEALTH}] + \beta_6[\mathrm{HIGH\_SCHOOL}] + \beta_7[\mathrm{HHSIZE}] + \beta_8[\mathrm{MONETARY\_POOR}] + \beta_9[\mathrm{WEST}] + \beta_{10}[\mathrm{WEEKEND}] + \beta_{11}[\mathrm{UNUSUAL\_DAY}] + \mathrm{u}$$

This model diverges from the first-stage model only in the dependent variable, which is now [FCAFH] and measures the minutes devoted to the consumption of food away from home per day.

The first model is estimated by running a probit regression on the complete sample. The second model is estimated by excluding from the analysis all cases that exhibit the value zero in [FCAFH] and running a truncated regression. The results are presented in Table 8.

Once more, the full set of variables is retained in the estimations for comparison with the models estimated for FPAH and FCAH. Except for the coefficients corresponding

to the variables [AGE] and [RETIRED], the results are robust to different specifications.

On the first stage of the double-hurdle model, the exclusion of [AGE] from the model has no impact neither on the sign nor on the level of significance of the regression coefficient calculated for [RETIRED]. However, the size of the coefficient increases, given that it captures not only its own effect on the dependent variable but also that of the omitted variable [AGE]. The same is true for the [AGE] coefficient when [RETIRED] is left out of the model. On the second stage of the model, both variables turn significant and are positive when the other variable is excluded from the model. Consequently, it is safer not to attempt an interpretation of neither the [AGE] nor the [RETIRED] coefficient on the second stage of the double-hurdle model, given the instability of the results obtained. For the purpose of interpretation in the first stage of the double-hurdle approach, both [AGE] and [RETIRED] are kept in the model, so regression coefficients computed on the basis of information unique to each variable can be obtained (see Chapter 4.3.2).

McKelvey and Zavoina's R^2 reports that 0.176 or 17.6% of the variation in [DFCAFH] is explained by the variables included in the model (see Table 8).

Unlike the double-hurdle model for FPAH where in both stages several variables had a significant effect on the dependent variable, the double-hurdle model estimated for FCAFH shows that most of the variables taken into account affect only the first stage. This proves the existence of other factors that are not studied within this work but have an impact on the length of time spent consuming out of home. This, however, is left to future research. An interpretation of the findings in Table 8 is given in what follows.

Table 8: Double-hurdle model estimated for food consumption away from home

	Dependent variable	
	Probit regression	Truncated regression
Independent variables	[DFCAFH]	[FCAFH] (if [FCAFH] > 0)
[AGE]	-0.0112**	2.0416
	(-3.06)	(1.55)
[MALE]	0.1643***	2.0984
	(4.49)	(0.16)
[RETIRED]	-0.2805***	27.0445
	(-4.92)	(1.07)
[NOT_WORKING]	-0.3525***	50.0154(*)
	(-4.22)	(1.67)
[POOR_HEALTH]	-0.0979*	-5.9572
	(-2.22)	(-0.36)
[HIGH_SCHOOL]	-0.0027	-48.9466*
	(-0.05)	(-2.34)
[HHSIZE]	-0.1217***	7.7543
	(-4.51)	(0.97)
[MONETARY_POOR]	-0.3036**	-65.5444
	(-3.07)	(-1.44)
[WEST]	-0.0137	85.8099**
	(-0.21)	(2.89)
[WEEKEND]	-0.0347	5.1233
	(-0.86)	(0.38)
[UNUSUAL_DAY]	0.7554***	210.3249***
	(13.63)	(6.29)
Constant	0.1426	-392.1185***
	(0.60)	(-4.16)
McKelvey and Zavoina's R^2	0.176	-
F	30.47***	5.78***
No. of observations	10,157	2,194
Population size	13,196	2,744

Note – The number of observations and the population size reported here differ from the unweighted/ weighted sample size reported in Chapter 4.2, given that Stata excludes from the estimation all cases that exhibit a missing value in either of the variables included in the model.
***, **, *, (*) Statistically significant at the 0.1%-, 1%-, 5%- and 10%-level. – Heteroscedasticity-robust t-statistics clustered at the household level are included in parentheses. – Variables are defined in Table 9.

Source: Own computations based on the German 2001/02 TUS

Table 9: Definition of the dependent and independent variables specified in the estimated models

Dependent variables	
[FPAH]	Minutes spent on food production at home per day
[FCAH]	Minutes spent on food consumption at home per day
[FCAFH]	Minutes spent on food consumption away from home per day
[DFPAH]	0 = No food production at home per day 1 = Positive food production at home per day
[DFCAFH]	0 = No food consumption away from home per day 1 = Positive food consumption away from home per day
Independent variables	
[AGE]	Age in years
[MALE]	0 = Female 1 = Male
[RETIRED]	0 = Working 1 = Retired
[NOT_WORKING]	0 = Working 1 = Not working
[POOR_HEALTH]	0 = Good health 1 = Poor health
[HIGH_SCHOOL]	0 = Not highest school education certificate 1 = Highest school education certificate
[HHSIZE]	Number of individuals
[MONETARY_POOR]	0 = Not at risk of monetary poverty 1 = At risk of monetary poverty
[WEST]	0 = Eastern Germany 1 = Western Germany
[WEEKEND]	0 = Workday 1 = Weekend
[UNUSUAL_DAY]	0 = Normal day 1 = Unusual day

Source: Own illustration

4.6 Interpretation and Discussion of the Results

This chapter provides a comprehensive interpretation and discussion of the computed regression coefficients in Table 6 to Table 8, for each variable individually.

In Chapter 4.3.2 it was identified that age and retirement status are highly correlated, based on the matrix of pairwise correlations presented in Table A2 of the Appendix reporting a coefficient of 0.7. As expected, multicollinearity emerged between [AGE] and [RETIRED] when estimating the models. However, the regression coefficients calculated are predominantly found to be highly significant and to exhibit meaningful signs. This highlights the great importance of age and retirement status in explaining food production and consumption at home, and food consumption away from home. Although multicollinearity reduces the precision of the regression coefficients (see Chapter 4.3.2), the sample used is considered large enough to obtain reliable coefficients for the variables [AGE] and [RETIRED] and to enable interpretation.

[RETIRED] – Retirement has a highly significant impact on the production of food at home. Retirees are more likely to produce food at home (p-value < 0.001) than workers and allocate significantly more time to this activity (p-value < 0.001). Retirement is associated with an increase of 37 minutes per day in the time used for the production of food at home. This magnitude is nearly twice the amount of time reported by LÜHRMANN (2010) who finds that retirees devote 20 more minutes per day to cooking and preparing meals (LÜHRMANN, 2010, p. 241). This difference may arise from the definitions of food production and from the approaches used. It appears that LÜHRMANN (2010) refers to the activity of cooking and preparing meals itself (LÜHRMANN, 2010, p. 241) whereas the complete process of food production is considered in the context of the present work. That is, time-consuming activities such as setting and clearing the table, and washing the dishes, which may fully explain the 20-minute-difference in results, are also taken into account. Moreover, it is not clear whether LÜHRMANN (2010) excludes zero-observations from computations. This would distort estimates downwards and could also partly account for the difference in calculated coefficients. Nevertheless, the predicted tendencies of retirement's impact on production of home food coincide. The changes observed in home and out-of-home consumption are consistent with the increased probability of home food production and time allocated to it at retirement. Retirees consume food at home 14 minutes per day longer (p-value < 0.001) than individuals still involved in the labour

market. Moreover, the likelihood of consuming food away from home is significantly lower at retirement (p-value < 0.001). These findings support the argument of a cessation of work-related expenses and an increase in home production due to a decline in the relative price of time. However, the present results are not easily reconciled with the findings of BURZIG and HERRMANN (2012) who find an 8% growth in home food expenditures and a higher probability of spending on food away from home with retirement (BURZIG and HERRMANN, 2012). Most likely, the increased expenditures on home food are due to the purchase of larger product quantities, given that the number of meals within the household rises. The purchase of more high-quality products may also play a role. Another explanation might be that, contrary to what AGUIAR and HURST (2007) suggest, German retirees do not increase grocery-shopping frequency and go bargain hunting, which theoretically speaking would lead to a reduction in expenditures (AGUIAR and HURST, 2007, pp. 1536-1546). No explanation can be given for the opposite findings in the probability of consuming away from home.

Nevertheless, the models estimated within the context of this work tell a consistent story. Namely, that a shift away from market purchased goods – measured by the probability of spending time on food consumption away from home –, and hence from work-related expenditures takes place, which is met by an increase in the participation in and intensity of home production of food.

[AGE] – Among the individuals that participate in the production of meals at home, age is found to have a significant impact on the time devoted to this activity (p-value < 0.001). A one-year increase in age leads to a rise of 1.3 minutes per day in the time used for the preparation of meals at home. Or, put differently, a person of age 70 spends 26 minutes additionally per day on food production at home compared to an individual of 50 years, other things being equal. Similarly, the time devoted to food consumption at home increases significantly by 0.7 minutes per day with a one-year increase in age (p-value < 0.001). Exemplified, a person of age 70 consumes food at home 14 minutes per day longer than a 50-year-old individual. The likelihood of consuming food away from home decreases significantly with age (p-value = 0.002), as one might expect.

[NOT_WORKING] – Individuals not participating in the labour market are predominantly female spouses, i.e. housewives. Thus, it is not surprising to find that

non-workers are more likely to participate in food production at home (p-value < 0.001), and, when doing so, use additional 63 minutes per day (p-value < 0.001) for the preparation of meals as compared to workers (see Table 6). Moreover, a non-working person spends 20 minutes longer consuming food at home than a working individual (p-value < 0.001) (see Table 7). In contrast, the participation in food consumption away from home is lower for non-workers (p-value < 0.001). However, when having decided to do so, not working individuals consume food out of home 50 minutes longer than workers (p-value = 0.095) (see Table 8). This suggests that for non-workers, consuming food out of home is rather an extraordinary event, since it takes place less frequently but is more time-intensive, whereas for working individuals it is rather a work-related activity, given that it takes place more often but less time is allocated to it.

[MALE] – A traditional gender-based division of labour exists in food production at home, as males are less likely to produce food at home than females (p-value < 0.001). If participation in food production at home takes place, men devote on average 96 minutes less per day (p-value < 0.001), compared to women (see Table 6). The use of time for food consumption at home is not significantly different between genders (see Table 7). Males, however, are more likely to consume food out of home than females (p-value < 0.001), but the actual amount of time spent when consuming out of home is statistically not different between genders (see Table 8).

[POOR_HEALTH] – The health status has no significant impact on the likelihood of producing food at home. That is, whether a person is of good or of poor health, changes nothing about the fact that in a household food needs to be produced. However, individuals of poor health use, on average, 12 minutes more per day (p-value = 0.016) when producing meals (see Table 6) and spend, on average, 4 extra minutes per day consuming food at home (p-value = 0.032) (see Table 7). As one might expect, special emphasis is placed on the health status when deciding whether to perform an activity out of home or not. In fact, poor health is associated with a lower probability of consuming out of home (p-value = 0.026). However, once chosen to consume away from home and having overcome the first hurdle, health status is no longer an issue when deciding on the length of time to be ultimately spent (see Table 8).

[HIGH_SCHOOL] – Individuals holding the highest school education certificate have no significantly different degree of participation in food production at home than individuals with a lower level of school education. They do, however, devote 27 minutes less per day to home production of meals (p-value < 0.001) (see Table 6) and 5 minutes less to consumption of food at home (p-value = 0.028) (see Table 7). Similarly, no significant difference in the degree of participation in food consumption away from home is found between the groups, but individuals with the highest educational attainment consume 49 minutes less out of home than individuals of a lower educational level (p-value = 0.02) (see Table 8). At first glance it appears to make no sense that individuals holding the highest school education level reduce their time in all three activities. However, taking a closer look at the definition of the activities yields some explanations. The education groups are both equally likely to produce food at home, but differ in the actual amount of time dedicated to it. When speaking of food production at home it is not in the narrow sense of the word. Food production at home refers to an entire process which includes the preparation of food itself, but also dishwashing, setting and clearing the table. This process can be affected by the state of household production technology. For instance, the possession of a dishwasher can reduce the time spent washing the dishes after having cooked and eaten. Thereby, food production at home is reduced, but not necessarily the preparation of meals itself. A higher education level gives reason to expect a higher income, and a higher income might enable a household to improve household technology. Thus, it is assumed that the lower amount of time spent on food production at home is attributable to a higher state of household production technology and not to a reduction in actual consumption time. This conjecture is supported by the pattern of food consumption away from home. Here, both groups are again equally likely to consume food away from home, but differ in the actual amount of time dedicated to it. This suggests that, due to the equal probability but lower amount of time allocated to food consumption away from home, individuals holding the highest school education level snack, whereas actual meals are postponed to home production. It requires, however, an analysis by components of food production at home, and information on the households' equipment with domestic appliances to confirm these assumptions. Though the German 2001/02 TUS provided information on the equipment with home appliances such as a dishwasher, the data is – in the author's opinion – of inadequate quality for analytical

purposes given the unfortunate coding of the information. More precisely, households indicating the number zero for a given home appliance and households giving no specification are both coded equally in the data set with 9999 meaning object not used/not specified. In the author's opinion, not using a particular home appliance versus not providing any information about its utilization are qualitatively not the same, since a household giving no specification might have overseen or chosen not to give any details and still possess the item in question. Thus, as the two groups cannot be separated, it would have required defining an object not used/not specified as missing values. This, however, is connected with a considerable loss of information, as one might expect a larger divergence in food production at home between zero dishwashers and one dishwasher, than between one dishwasher and two dishwashers. For this reason and the substantial number of missing values that would have arisen, household appliances were not included in the empirical analysis.

[HHSIZE] – An increasing household size is associated with a decreasing participation in the production of meals at home (p-value = 0.008). However, when food production happens, the time allocated to it rises with each additional household member by 20 minutes per day on average (p-value < 0.001) (see Table 6). Also the consumption of food at home takes, on average, 10 minutes per day (p-value < 0.001) longer with each additional person living in the household (see Table 7). The probability of consuming food away from home declines with growing household size (p-value < 0.001), but as it takes place the time actually spent does not vary significantly (see Table 8). The negative relationship between household size and participation in home production of food is initially found to be counterintuitive, but can be rationally explained when combining it with the information of the second stage of the double-hurdle model. The decreasing probability of producing food with increasing household size suggests, for instance, that in larger families fixed mealtimes exist. It is supported by the fact that when food production takes place, a higher amount of time is employed in larger households and that more time is spent consuming food at home. The likelihood of consuming meals away from home is higher for smaller households. For a single-person household, for instance, it might reflect the possibility of maintaining social connection, whereas in larger households members keep each other company.

[MONETARY_POOR] – The financial resources available to a household have no significant impact on food production and food consumption at home (see Table 6 and Table 7). However, financial resources act as constraint on food consumption away from home. An individual living in a household at risk of monetary poverty is less likely to participate in food consumption away from home than a person coming from a household that is not at risk of monetary poverty (p-value = 0.002). Once having decided to consume food out of home, financial resources play no longer a role in the decision of how much time is to be spent (see Table 8).

[WEST] – Individuals residing in Western Germany are less likely to produce food at home (p-value = 0.004) and, when the activity is carried out, devote on average 15 minutes per day less (p-value = 0.02) than individuals living in Eastern Germany (see Table 6). Also, individuals from Western Germany use 5 minutes per day less on average for food consumption at home (p-value = 0.074) as compared to a person originating from Eastern Germany (see Table 7). Though the region of residence has no impact on the probability of consuming food out of home, a Western German person spends on average 85 minutes longer (p-value = 0.004) when consuming food away from home than an Eastern German individual (see Table 8).

[WEEKEND] – The weekday has a significant impact on food production at home. On weekends food production at home is more likely than at work days (p-value = 0.001), and on average 14 extra minutes per day (p-value < 0.001) are used by those involved in the activity (see Table 6). Similarly, on weekends 10 more minutes per day (p-value < 0.001) are used for food consumption at home (see Table 7). Thus, given the higher availability of time on weekends, time-consuming home activities are carried out. Food consumption away from home, on the contrary, is not determined by the weekday (see Table 8).

[UNUSUAL_DAY] – An unusual day is characterized by a higher probability of dining out (p-value < 0.001) and, when doing so, dedicating more time to it. On average, 210 minutes or 3.5 hours are additionally spent on food consumption away from home on an unusual day in comparison to a regular day (p-value < 0.001) (see Table 8). Accordingly, on an uncommon day, the probability of producing food at home is lower (p-value < 0.001). However, once an individual chooses to prepare meals at home, whether it is a normal or an unusual day has no longer an impact on how much time is ultimately used for it (see Table 6). Consistently, food consumption at

home is on average reduced by nearly 30 minutes on an unusual day (p-value < 0.001) (see Table 7). Although this magnitude appears low, the reduction of food consumption at home on an uncommon day by 30 minutes translates to the forgoing of one meal, which is likely to be replaced by more time-intensive food consumption away from home.

In summary, it can be stated that all control variables specified proved to have a significant explanatory contribution in at least one of the three activities studied within the context of this work. The estimated effects are broadly consistent with the findings from the prior descriptive analysis, and can be explained rationally.

Moreover, it can be confirmed that market goods (e.g. work-related meals) are replaced by home production (e.g. food production), as the opportunity cost of time falls with transition to retirement.

5 Summary and Conclusion

A significant fall in consumption expenditures at the onset of retirement has been documented for the UK (e.g. BANKS et al., 1998, p. 782), the United States (e.g. BERNHEIM et al., 2001, p. 844), Italy (e.g. BATTISTIN et al., 2009, p. 2217) and Germany (e.g. LÜHRMANN, 2010, p. 238). As already stated in the introduction, this finding is referred to as the Retirement-Consumption Puzzle. It conflicts with the Life-Cycle Hypothesis, given that it implies that rational, forward-looking individuals and households pursue a constant level of consumption throughout life and across predictable changes in income, such as retirement (AGUILA et al., 2011, p. 1094). Amongst others, the cessation of work-related expenses and an increased household production have been provided as explanations for the drop in consumption expenditures, consistent with rational consumer behaviour.

For Germany, LÜHRMANN (2010) finds a drop in expenditures for non-durable consumption by 17%, which is met by an increased home production, mainly in the preparation of meals. The significant increase amounts to additional 20 minutes per day (LÜHRMANN, 2010, pp. 225 et seq.).

In line with LÜHRMANN (2010), the present work documents that retirement is associated with a significant increase in the participation in and the intensity of home food production. The impact of retirement on the use of time for the production of meals at home amounts to additional 37 minutes per day as compared to individuals still involved in the labour market. Though this magnitude is nearly twice the amount of time reported by LÜHRMANN (2010), the difference certainly originates from the more comprehensive definition of food production at home employed in the present study and the different estimation approaches applied. Consistently, 14 more minutes are used for food consumption at home and a declining participation in the out-of-home food market is ascertained.

Thus, it can be confirmed that market goods (e.g. work-related meals) are replaced by home production (e.g. food production), as the opportunity cost of time falls with transition to retirement.

Suggestions for improvement of the analyses conducted are the following. Regarding the problem of multicollinearity among the variables [AGE] and [RETIRED], it might be resolved by generating retirement dummy variables for different age ranges. For

instance, [RETIRED_50<60] would assign the value one to retired individuals and the value zero to non-retired individuals who are between 50 and less than 60 years old. [RETIRED_60<70] would assign the value one to retired individuals and the value zero to non-retired individuals who are between 60 and less than 70 years old, and so on. Thereby, the presence of two highly correlated variables in the same model would be avoided. The major drawback is, however, that an overall effect of retirement is not captured, but only by age ranges. Also, the impacts of age on production and consumption habits are not explicitly available.

List of Literature

AGUIAR, M. and E. HURST (2005): Consumption versus Expenditure. In *Journal of Political Economy* 113 (5), pp. 919–948.

AGUIAR, M. and E. HURST (2007): Life-Cycle Prices and Production. In *American Economic Review* 97 (5), pp. 1533–1559.

AGUIAR, M. and E. HURST (2008): Deconstructing Lifecycle Expenditure. National Bureau of Economic Research Working Paper 13893.

AGUILA, E., O. ATTANASIO and C. MEGHIR (2011): Changes in Consumption at Retirement: Evidence from Panel Data. In *The Review of Economics and Statistics* 93 (3), pp. 1094–1099.

AMERIKS, J., A. CAPLIN and J. LEAHY (2007): Retirement Consumption: Insights from a Survey. In *The Review of Economics and Statistics* 89 (2), pp. 265–274.

BANKS, J., R. BLUNDELL and S. TANNER (1998): Is There a Retirement-Savings Puzzle? In *American Economic Review* 88 (4), pp. 769–788.

BATTISTIN, E., A. BRUGIAVINI, E. RETTORE and G. WEBER (2009): The Retirement Consumption Puzzle: Evidence from a Regression Discontinuity Approach. In *American Economic Review* 99 (5), pp. 2209–2226.

BECKER, G. S. (1965): A Theory of the Allocation of Time. In *The Economic Journal* 75 (299), pp. 493–517.

BERNHEIM, B. D., J. SKINNER and S. WEINBERG (2001): What Accounts for the Variation in Retirement Wealth among U.S. Households? In *American Economic Review* 91 (4), pp. 832–857.

BRZOZOWSKI, M. and Y. LU (2010): Home Cooking, Food Consumption, and Food Production among Retired Canadian Households. In *Canadian Public Policy - Analyse de Politiques* 36 (1), pp. 107–128.

BURZIG, J. and R. HERRMANN (2012): Food Expenditure Patterns of the Generation 50+: An Engel-Curve Analysis for Germany. In *British Food Journal* 114 (forthcoming).

CRAGG, J. G. (1971): Some Statistical Models for Limited Dependent Variables with Application to the Demand for Durable Goods. In *Econometrica* 39 (5), pp. 829–844.

DEMMLER, H. (2000): Grundlagen der Mikroökonomie. 4. Aufl. München: Oldenbourg.

DESTATIS (2011): Time Budget Survey. Irregular Survey in the Context of Studies Related to the Time Budget Survey in Germany. Available online at: http://www.destatis.de/jetspeed/portal/cms/Sites/destatis/Internet/EN/Content/Statistics/WirtschaftsrechnungenZeitbudgets/Zeitbudgeterhebung/content75/InfoZeitbudget,templateId=renderPrint.psml (06.10.2011, 22:00 MEZ).

EHLING, M. (2001): Zeitverwendung 2001/2002 – Konzeption und Ablauf der Zeitbudgeterhebung der amtlichen Statistik. In STATISTISCHES BUNDESAMT (Ed.): Zeitbudget in Deutschland – Erfahrungsberichte der Wissenschaft. Stuttgart: Metzler-Poeschel (Spektrum Bundesstatistik, 17), pp. 214–228.

ENGELS, D. and F. SCHELLER (2005): Analysen zu Armutsrisiko und Lebenslagen in Deutschland auf der Grundlage des Sozio-oekonomischen Panels für die Jahre 2001 bis 2004. Untersuchung des Instituts für Sozialforschung und Gesellschaftspolitik e.V. im Auftrag des Bundesministeriums für Arbeit und Soziales. Institut für Sozialforschung und Gesellschaftspolitik e.V. (Ed.). Köln. Available online at: http://www.isg-institut.de/download/Armut%20und%20Lebenslage%2004.pdf (06.10.2011, 22:00 MEZ).

EUROSTAT (2011a): Glossary: At-risk-of-poverty rate. Statistics Explained. Available online at: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:At-risk-of-poverty_rate (06.10.2011, 22:00 MEZ).

EUROSTAT (2011b): Glossary: Equivalised disposable income. Statistics Explained. Available online at: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:Equivalised_disposable_income (06.10.2011, 22:00 MEZ).

FEBRERO, R. (2004): Becker's time allocation model. In SEGURA, J. and C. RODRÍGUEZ BRAUN (Eds.): An Eponymous Dictionary of Economics: A Guide to Laws and Theorems Named after Economists. Cheltenham: Edward Elgar, pp. 21–22.

GORDON, R. J. (2009): Macroeconomics. 11th internat. ed. Boston: Pearson Education.

Holz, E. (2004): Poverty in Everyday Life. Some Aspects of Time Use and the 2001/02 German Time Use Survey. Paper Prepared for the 28th General Conference of the International Association for Research in Income and Wealth. Session Time Use and Inequality. Cork, Ireland, August 22 – 28. Available online at: http://www.iariw.org/papers/2004/holz.pdf (06.10.2011, 22:00 MEZ).

HOLZ, E. (2005): Kleines Vademekum zu den Scientific Use Files der Zeitbudgeterhebungen (ZBE) 2001/02 und 1991/92. Statistisches Bundesamt (Ed.). Wiesbaden.

HURD, M. and S. ROHWEDDER (2003): The Retirement-Consumption Puzzle: Anticipated and Actual Declines in Spending at Retirement. National Bureau of Economic Research Working Paper 9586.

KENNEDY, P. (2003): A Guide to Econometrics. 5th ed. Cambridge: MIT Press.

KOHLER, U. and F. KREUTER (2009): Data Analysis Using Stata. 2nd ed. College Station: Stata Press.

LANDSBERGER, M. (1970): The Life-Cycle Hypothesis: A Reinterpretation and Empirical Test. In *American Economic Review* 60 (1), pp. 175–183.

LÜHRMANN, M. (2010): Consumer Expenditures and Home Production at Retirement - New Evidence from Germany. In *German Economic Review* 11 (2), pp. 225–245.

MANKIW, N. G. (2010): Macroeconomics. 7th internat. ed. New York: Worth.

MINIACI, R., C. MONFARDINI and G. WEBER (2003): Is There a Retirement Consumption Puzzle in Italy? Institute for Fiscal Studies Working Paper W03/14.

MODIGLIANI, F. (1986): Life Cycle, Individual Thrift, and the Wealth of Nations. In *American Economic Review* 76 (3), pp. 297–313.

MODIGLIANI, F. and R. BRUMBERG (1962): Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data. In KURIHARA, K. K. (Ed.): Post-Keynesian Economics. 2nd ed. London: George Allen and Unwin, pp. 388–436.

OECD (2009): What are Equivalence Scales? Available online at: http://www.oecd.org/dataoecd/61/52/35411111.pdf (06.10.2011, 22:00 MEZ).

RAMANATHAN, R. (2002): Introductory Econometrics with Applications. 5th ed. Mason: Thomson South-Western.

SCHWERDT, G. (2005): Why does consumption fall at retirement? Evidence from Germany. In *Economics Letters* 89 (3), pp. 300–305.

SMITH, S. (2006): The Retirement-Consumption Puzzle and Involuntary Early Retirement: Evidence from the British Household Panel Survey. In *The Economic Journal* 116 (510), pp. C130–C148.

STATACORP (2005): Stata Survey Data Reference Manual. Release 9. College Station: Stata Press.

STATISTISCHES BUNDESAMT (Ed.) (2001a): Zeitbudgeterhebung 2001/02. Aufenthaltsorte und Verkehrsmittel. Wiesbaden.

STATISTISCHES BUNDESAMT (Ed.) (2001b): Zeitverwendung in Deutschland 2001/02. Haushaltsfragebogen. Wiesbaden.

STATISTISCHES BUNDESAMT (Ed.) (2001c): Zeitverwendung in Deutschland 2001/02. Personenfragebogen. Wiesbaden.

STATISTISCHES BUNDESAMT (Ed.) (2001d): Zeitverwendung in Deutschland 2001/02. Tagebuch. Wiesbaden.

STATISTISCHES BUNDESAMT (Ed.) (2002): Zeitverwendung in Deutschland 2001/02. Aktivitätenverzeichnis. Wiesbaden.

STATISTISCHES BUNDESAMT (Ed.) (2005): Qualitätsbericht. Zeitbudgeterhebung 2001/2002. Wiesbaden. Available online at: http://www.destatis.de/jetspeed/portal/cms/Sites/destatis/Internet/DE/Content/Publikationen/Qualitaetsberichte/WirtschaftsrechnungenZeitbudget/WirtschaftrechnZeitbudget,property=file.pdf (06.10.2011, 22:00 MEZ).

WOOLDRIDGE, J. M. (2003): Introductory Econometrics. A Modern Approach. 2nd ed. Mason: Thomson South-Western.

Appendix

Table A1: Variables employed

Variables	Categories	n	%	N
5-year age range	< 35 years	13	0.09	14,195
	35 - < 40 years	47	0.33	
	40 - < 45 years	120	0.84	
	45 - < 50 years	500	3.52	
	50 - < 55 years	2,393	16.86	
	55 - < 60 years	2,239	15.78	
	60 - < 65 years	3,266	23.01	
	65 - < 70 years	2,676	18.85	
	70 - < 75 years	1,701	11.98	
	75 years and older	1,239	8.73	
10-year age range	< 40 years	61	0.43	14,195
	40 - < 50 years	620	4.37	
	50 - < 60 years	4,632	32.63	
	60 - < 70 years	5,942	41.86	
	70 years and older	2,940	20.71	
Gender	Female	7,880	55.51	14,195
	Male	6,315	44.49	
Social status	Self-employed, farmers	664	4.68	14,195
	Contributing (family) worker	80	0.56	
	Civil servant	282	1.99	
	Employee	2,137	15.06	
	Worker	1,295	9.12	
	Commercial, technical trainee	6	0.05	
	Pupil aged 15 and older	36	0.25	
	Student	30	0.21	
	Pensioner	7,704	54.27	
	Registered unemployed	504	3.55	
	Non-working	1,457	10.26	
Relationship with household head	Is the person himself	8,990	63.33	14,195
	Is the spouse	5,053	35.60	
	Is the life partner	152	1.07	

Source: Own computations based on the German 2001/02 TUS

Table A1: Variables employed (continued)

Variables	Categories	n	%	N
Self-assessed health status	Very good	828	5.84	14,195
	Good	7,425	52.31	
	Moderate	4,726	33.29	
	Poor	966	6.80	
	Very poor	190	1.34	
	Not specified	61	0.43	
Highest level of school education	High school	2,175	15.32	14,195
	Technical school	691	4.87	
	Middle school	4,352	30.66	
	Primary school	6,625	46.67	
	Left school without qualification	139	0.98	
	Not specified	213	1.50	
Household size	1 household member	3,531	24.87	14,195
	2 household members	8,362	58.91	
	3 household members	1,539	10.84	
	4 household members	543	3.83	
	5 household members	134	0.95	
	6 household members	60	0.42	
	7 household members	14	0.10	
	8 household members	12	0.09	
Income groups	< 1.000 Euro	134	0.94	14,195
	1.000 Euro - < 1.250 Euro	131	0.92	
	1.250 Euro - < 1.500 Euro	129	0.91	
	1.500 Euro - < 2.500 Euro	753	5.31	
	2.500 Euro - < 3.750 Euro	919	6.47	
	3.750 Euro - < 5.000 Euro	408	2.87	
	5.000 Euro or more	455	3.20	
	Exact amount specified	10,622	74.83	
	Not specified	645	4.54	
Weekday	Monday to Friday	9,663	68.07	14,195
	Saturday or Sunday	4,532	31.93	
Diary day Characterisation	Normal day	10,971	77.29	14,195
	Unusual day	3,120	21.98	
	Not specified	104	0.73	
Region of residence	Eastern Germany	2,661	18.75	14,195
	Western Germany	11,534	81.25	

Source: Own computations based on the German 2001/02 TUS

Table A2: Matrix of pairwise correlations

	[FPAH]	[FCAH]	[FCAFH]	[DFPAH]	[DFCAH]	[DFCAFH]	[AGE]
[FPAH]	1.000						
[FCAH]	0.339**	1.000					
[FCAFH]	-0.313**	-0.385**	1.000				
[DFPAH]	0.730**	0.220**	-0.249**	1.000			
[DFCAH]	0.280**	0.366**	-0.367**	0.367**	1.000		
[DFCAFH]	-0.303**	-0.376**	0.990**	-0.228**	-0.317**	1.000	
[AGE]	0.162**	0.172**	-0.107**	0.101**	0.009	-0.118**	1.000
[AGE_Gr_5]	0.158**	0.169**	-0.104**	0.098**	0.006	-0.115**	0.985**
[AGE_Gr_10]	0.144**	0.161**	-0.102**	0.087**	0.003	-0.113**	0.939**
[MALE]	-0.456**	0.002	0.059**	-0.327**	0.003	0.065**	-0.019*
[RETIRED]	0.133**	0.156**	-0.094**	0.091**	-0.008	-0.107**	0.714**
[NOT_WORKING]	0.194**	0.053**	-0.038**	0.117**	0.027**	-0.044**	-0.183**
[HHHEAD]	-0.359**	-0.129**	0.054**	-0.210**	-0.018*	0.059**	0.134**
[POOR_HEALTH]	0.105**	0.062**	-0.059**	0.056**	0.032**	-0.058**	0.094**
[HIGH_SCHOOL]	-0.088**	-0.046**	0.012	-0.032**	-0.007	0.015	0.008
[HHSIZE]	-0.077**	0.120**	-0.019*	-0.126**	0.036**	-0.019*	-0.339**
[MONETARY_POOR]	0.031**	0.010	-0.057**	0.036**	0.040**	-0.056**	0.013
[EQUIVALENT_INCOME]	-0.108**	-0.123**	0.095**	-0.069**	-0.068**	0.089**	-0.021*
[WEEKEND]	0.037**	0.078**	0.030**	0.017	-0.004	0.016	0.005
[UNUSUAL_DAY]	-0.153**	-0.237**	0.272**	-0.160**	-0.331**	0.244**	-0.085**
[WEST]	-0.066**	-0.026**	0.018*	-0.063**	-0.043**	0.010	-0.023**

Note – **, * Correlation is significant at the 1%-, 5%-level (2-tailed).

Source: Own computations based on the German 2001/02 TUS

Table A2: Matrix of pairwise correlations (continued)

	[AGE_Gr_5]	[AGE_Gr_10]	[MALE]	[RETIRED]	[NOT_WORKING]
[AGE_Gr_5]	1.000				
[AGE_Gr_10]	0.953**	1.000			
[MALE]	-0.019*	0.005	1.000		
[RETIRED]	0.710**	0.690**	0.018*	1.000	
[NOT_WORKING]	-0.190**	-0.184**	-0.245**	-0.375**	1.000
[HHHEAD]	0.136**	0.153**	0.552**	0.141**	-0.383**
[POOR_HEALTH]	0.089**	0.072**	-0.082**	0.109**	-0.015
[HIGH_SCHOOL]	0.008	0.009	0.099**	0.009	-0.075**
[HHSIZE]	-0.334**	-0.317**	0.162**	-0.262**	0.172**
[MONETARY_POOR]	0.008	0.020*	-0.036**	-0.028**	0.069**
[EQUIVALENT_INCOME]	-0.018	-0.025*	0.084**	-0.017	-0.095**
[WEEKEND]	0.004	0.003	0.000	0.004	0.001
[UNUSUAL_DAY]	-0.087**	-0.083**	-0.008	-0.057**	0.033**
[WEST]	-0.023**	-0.023**	0.028**	-0.096**	0.138**

Note – **, * Correlation is significant at the 1%-, 5%-level (2-tailed).

Source: Own computations based on the German 2001/02 TUS

Table A2: Matrix of pairwise correlations (continued)

	[HHHEAD]	[POOR_HEALTH]	[HIGH_SCHOOL]	[HHSIZE]
[HHHEAD]	1.000			
[POOR_HEALTH]	-0.079**	1.000		
[HIGH_SCHOOL]	0.131**	-0.050**	1.000	
[HHSIZE]	-0.357**	-0.031**	-0.004	1.000
[MONETARY_POOR]	0.044**	0.068**	-0.045**	-0.074**
[EQUIVALENT_INCOME]	-0.009	-0.151**	0.223**	0.017
[WEEKEND]	0.009	0.004	0.001	-0.005
[UNUSUAL_DAY]	-0.026**	0.004	0.024**	0.033**
[WEST]	-0.002	-0.108**	-0.046**	0.036**

Note – **, * Correlation is significant at the 1%-, 5%-level (2-tailed).

Source: Own computations based on the German 2001/02 TUS

Table A2: Matrix of pairwise correlations (continued)

	[MONETARY_POOR]	[EQUIVALENT_INCOME]	[WEEKEND]
[MONETARY_POOR]	1.000		
[EQUIVALENT_INCOME]	-0.439**	1.000	
[WEEKEND]	-0.006	0.013	1.000
[UNUSUAL_DAY]	-0.019*	0.055**	0.085**
[WEST]	-0.042**	0.194**	0.001

Note – **, * Correlation is significant at the 1%-, 5%-level (2-tailed).

Source: Own computations based on the German 2001/02 TUS

Table A2: Matrix of pairwise correlations (continued)

	[UNUSUAL_DAY]	[WEST]
[UNUSUAL_DAY]	1.000	
[WEST]	0.024**	1.000

Note – **, * Correlation is significant at the 1%-, 5%-level (2-tailed).

Source: Own computations based on the German 2001/02 TUS

Table A3: [HHHEAD] by gender

in %	Female	Male
Partner	91.80	8.20
Household head	34.51	65.49

Source: Own computations based on the German 2001/02 TUS

Table A4: Summary statistics on food production at home

FPAH	unweighted [FPAH]	weighted [FPAH]	weighted [FPAH] > 0	weighted [DFPAH]
Mean	56.84	60.76	78.45	0.77
Std. Dev.	60.40	61.83	59.56	0.42
Minimum	00.00	00.00	10.00	0.00
Maximum	550.00	550.00	550.00	1.00
N	11,073	14,195	10,994	14,195

Note – Activity food production at home (FPAH). – Sampling weights are not used (unweighted). – Sampling weights are used (weighted). – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0). – Variable for degree of participation per day in food production at home [DFPAH].

Source: Own computations based on the German 2001/02 TUS

Table A5: Summary statistics on food consumption at home

FCAH	unweighted [FCAH]	weighted [FCAH]	weighted [FCAH] > 0	weighted [DFCAH]
Mean	92.49	94.36	99.02	0.95
Std. Dev.	55.10	55.43	52.57	0.21
Minimum	00.00	00.00	10.00	0.00
Maximum	560.00	560.00	560.00	1.00
N	11,073	14,195	13,528	14,195

Note – Activity food consumption at home (FCAH). – Sampling weights are not used (unweighted). – Sampling weights are used (weighted). – Variable for minutes spent on food consumption at home per day [FCAH]. – Cases are included only if the variable [FCAH] exhibits a value greater than zero (>0). – Variable for degree of participation per day in food consumption at home [DFCAH].

Source: Own computations based on the German 2001/02 TUS

Table A6: Summary statistics on food consumption away from home

FCAFH	unweighted [FCAFH]	weighted [FCAFH]	weighted [FCAFH] > 0	weighted [DFCAFH]
Mean	18.03	17.58	79.23	0.22
Std. Dev.	46.10	45.62	67.06	0.42
Minimum	00.00	00.00	10.00	0.00
Maximum	440.00	440.00	440.00	1.00
N	11,073	14,195	3,149	14,195

Note – Activity food consumption away from home (FCAFH). – Sampling weights are not used (unweighted). – Sampling weights are used (weighted). – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0). – Variable for degree of participation per day in food consumption away from home [DFCAFH].

Source: Own computations based on the German 2001/02 TUS

Table A7: Summary statistics on [AGE]

	Female	Male	Total
Mean	62.02	62.21	62.10
Std. Dev.	9.08	7.76	8.52
Minimum	30.00	38.00	30.00
Maximum	80.00	80.00	80.00
N	7,880	6,315	14,195

Note – Variable for age in years [AGE].

Source: Own computations based on the German 2001/02 TUS

Table A8: Test of significance on [AGE] and [DFPAH]

	[DFPAH]	
	Contingency Coefficient	Approx. Sig.
[AGE]	0.169	0.000

Note – Variable for age in years [AGE]. – Variable for degree of participation per day in food production at home [DFPAH].

Source: Own computations based on the German 2001/02 TUS

Table A9: Test of significance between [AGE] and [DFCAH]

	[DFCAH]	
	Contingency Coefficient	Approx. Sig.
[AGE]	0.109	0.000

Note – Variable for age in years [AGE]. – Variable for degree of participation per day in food consumption at home [DFCAH].

Source: Own computations based on the German 2001/02 TUS

Table A10: Test of significance between [AGE] and [DFCAFH]

	[DFCAFH]	
	Contingency Coefficient	Approx. Sig.
[AGE]	0.154	0.000

Note – Variable for age in years [AGE]. – Variable for degree of participation per day in food consumption away from home [DFCAFH].

Source: Own computations based on the German 2001/02 TUS

Table A11: Test of significance on [AGE] and [FPAH] > 0

	[FPAH] > 0	
	Spearman's Correlation Coefficient	Sig. (2-tailed)
[AGE]	0.147	0.000

Note – Variable for age in years [AGE]. – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A12: Test of significance on [AGE] and [FCAH]

	[FCAH]	
	Spearman's Correlation Coefficient	Sig. (2-tailed)
[AGE]	0.172	0.000

Note – Variable for age in years [AGE]. – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A13: Test of significance on [AGE] and [FCAFH] > 0

	[FCAFH] > 0	
	Spearman's Correlation Coefficient	Sig. (2-tailed)
[AGE]	0.162	0.000

Note – Variable for age in years [AGE]. – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A14: Summary statistics on food production at home by social status

FPAH	weighted [DFPAH]			weighted [FPAH] > 0		
	Working	Not working	Retired	Working	Not working	Retired
Mean	0.68	0.92	0.81	60.34	107.49	82.18
Std. Dev.	0.47	0.27	0.39	52.04	73.04	57.02
Minimum	0.00	0.00	0.00	10.00	10.00	10.00
Maximum	1.00	1.00	1.00	470.00	550.00	390.00
N	5,035	1,457	7,704	3,427	1,338	6,229
%	35.47	10.26	54.27	31.17	12.17	56.66

Note – Activity food production at home (FPAH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food production at home [DFPAH]. – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A15: Summary statistics on food consumption at home by social status

FCAH	weighted [DFCAH]			weighted [FCAH]		
	Working	Not working	Retired	Working	Not working	Retired
Mean	0.95	0.97	0.95	81.48	102.95	101.16
Std. Dev.	0.22	0.17	0.21	52.24	56.48	55.74
Minimum	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	1.00	1.00	1.00	560.00	480.00	470.00
N	5,035	1,457	7,704	5,035	1,457	7,704
%	35.47	10.26	54.27	35.47	10.26	54.27

Note – Activity food consumption at home (FCAH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food consumption at home [DFCAH]. – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A16: Summary statistics on food consumption away from home by social status

FCAFH	weighted [DFCAFH]			weighted [FCAFH] > 0		
	Working	Not working	Retired	Working	Not working	Retired
Mean	0.30	0.17	0.18	67.94	98.18	88.03
Std. Dev.	0.46	0.37	0.39	60.64	78.99	69.30
Minimum	0.00	0.00	0.00	10.00	10.00	10.00
Maximum	1.00	1.00	1.00	390.00	430.00	440.00
N	5,035	1,457	7,704	1,503	243	1,403
%	35.47	10.26	54.27	47.73	7.72	44.55

Note – Activity food consumption away from home (FCAFH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food consumption away from home [DFCAFH]. – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A17: Composition of the sample by social status

	N	%
Non-Retired	6,491	45.73
Working	5,035	77.56
Not working	1,457	22.44
... is the household head	133	9.14
... is the spouse	1,317	90.42
Female	1,298	98.56
Male	19	1.44
... is the life partner	6	0.41
Retired	7,704	54.27

Source: Own computations based on the German 2001/02 TUS

Table A18: Significance test on [DFPAH] by working vs. retired

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	271.56 a)	1.00	0.000		
Continuity Correction b)	270.86	1.00	0.000		
Likelihood Ratio	267.29	1.00	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	271.53	1.00	0.000		
N of Valid Cases	12,739				

Note – Variable for degree of participation per day in food production at home [DFPAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 1,218.53. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A19: Significance test on [DFCAH] by working vs. retired

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0.32 a)	1.00	0.570		
Continuity Correction b)	0.28	1.00	0.599		
Likelihood Ratio	0.32	1.00	0.570		
Fisher's Exact Test				0.586	0.299
Linear-by-Linear Association	0.32	1.00	0.570		
N of Valid Cases	12,739				

Note – Variable for degree of participation per day in food consumption at home [DFCAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 246.24. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A20: Significance test on [DFCAFH] by working vs. retired

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	234.29 a)	1.00	0.000		
Continuity Correction b)	233.63	1.00	0.000		
Likelihood Ratio	230.49	1.00	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	234.27	1.00	0.000		
N of Valid Cases	12,739				

Note – Variable for degree of participation per day in food consumption away from home [DFCAFH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 1,148.58. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table 21: Significance test on [FPAH] > 0 by working vs. retired

Mann-Whitney U	7,417,241.50
Wilcoxon W	12,732,671.50
Z	-21.70
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A22: Significance test on [FCAH] by working vs. retired

Mann-Whitney U	14,232,436.00
Wilcoxon W	25,879,987.00
Z	-22.33
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A23: Significance test on [FCAFH] > 0 by working vs. retired

Mann-Whitney U	775,679.50
Wilcoxon W	1,829,105.50
Z	-10.96
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A24: Significance test on [DFPAH] by working vs. not working

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	326.97 a)	1.00	0.000		
Continuity Correction b)	325.75	1.00	0.000		
Likelihood Ratio	389.17	1.00	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	326.92	1.00	0.000		
N of Valid Cases	6,492				

Note – Variable for degree of participation per day in food production at home [DFPAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 387.59. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A25: Significance test on [DFCAH] by working vs. not working

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	10.38 a)	1.00	0.001		
Continuity Correction b)	9.92	1.00	0.002		
Likelihood Ratio	11.36	1.00	0.001		
Fisher's Exact Test				0.001	0.001
Linear-by-Linear Association	10.37	1.00	0.001		
N of Valid Cases	6,491				

Note – Variable for degree of participation per day in food consumption at home [DFCAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 66.62. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A26: Significance test on [DFCAFH] by working vs. not working

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	99.50 a)	1.00	0.000		
Continuity Correction b)	98.83	1.00	0.000		
Likelihood Ratio	107.02	1.00	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	99.48	1.00	0.000		
N of Valid Cases	6,491				

Note – Variable for degree of participation per day in food consumption away from home [DFCAFH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 391.65. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A27: Significance test on [FPAH] > 0 by working vs. not working

Mann-Whitney U	1,175,057.50
Wilcoxon W	6,490,487.50
Z	-24.03
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A28: Significance test on [FCAH] by working vs. not working

Mann-Whitney U	2,594,416.50
Wilcoxon W	14,241,967.50
Z	-14.37
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A29: Significance test on [FCAFH] > 0 by working vs. not working

Mann-Whitney U	126,171.00
Wilcoxon W	1,179,597.00
Z	-6.87
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A30: Summary statistics on food production at home by gender

FPAH	weighted [DFPAH]		weighted [FPAH] > 0	
	Female	Male	Female	Male
Mean	0.90	0.62	93.25	51.80
Std. Dev.	0.30	0.49	62.25	43.06
Minimum	0.00	0.00	10.00	10.00
Maximum	1.00	1.00	550.00	340.00
N	7,880	6,315	7,069	3,925
%	55.51	44.49	64.30	35.70

Note – Activity food production at home (FPAH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food production at home [DFPAH]. – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A31: Summary statistics on food consumption at home by gender

FCAH	weighted [DFCAH]		weighted [FCAH]	
	Female	Male	Female	Male
Mean	0.95	0.95	94.14	94.64
Std. Dev.	0.21	0.21	54.70	56.33
Minimum	0.00	0.00	0.00	0.00
Maximum	1.00	1.00	480.00	560.00
N	7,880	6,315	7,880	6,315
%	55.51	44.49	55.51	44.49

Note – Activity food consumption at home (FCAH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food consumption at home [DFCAH]. – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A32: Summary statistics on food consumption away from home by gender

FCAFH	weighted [DFCAFH]		weighted [FCAFH] > 0	
	Female	Male	Female	Male
Mean	0.20	0.25	82.32	76.22
Std. Dev.	0.40	0.43	66.68	67.30
Minimum	0.00	0.00	10.00	10.00
Maximum	1.00	1.00	430.00	440.00
N	7,880	6,315	1,553	1,596
%	55.51	44.49	49.32	50.68

Note – Activity food consumption away from home (FCAFH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food consumption away from home [DFCAFH]. – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A33: Significance test on [DFPAH] by female vs. male

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1,522.55 a)	1.00	0.000		
Continuity Correction b)	1,520.97	1.00	0.000		
Likelihood Ratio	1,551.35	1.00	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	1,522.44	1.00	0.000		
N of Valid Cases	14,196				

Note – Variable for degree of participation per day in food production at home [DFPAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 1,424.39. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A34: Significance test on [DFCAH] by female vs. male

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0.02 a)	1.00	0.890		
Continuity Correction b)	0.01	1.00	0.922		
Likelihood Ratio	0.02	1.00	0.890		
Fisher's Exact Test				0.904	0.461
Linear-by-Linear Association	0.02	1.00	0.890		
N of Valid Cases	14,195				

Note – Variable for degree of participation per day in food consumption at home [DFCAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 296.73. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A35: Significance test on [DFCAFH] by female vs. male

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	62.89 a)	1.00	0.000		
Continuity Correction b)	62.57	1.00	0.000		
Likelihood Ratio	62.61	1.00	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	62.89	1.00	0.000		
N of Valid Cases	14,195				

Note – Variable for degree of participation per day in food consumption away from home [DFCAFH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 1,400.91. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A36: Significance test on [FPAH] > 0 by female vs. male

Mann-Whitney U	7,434,164.50
Wilcoxon W	15,076,259.50
Z	-38.91
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A37: Significance test on [FCAH] by female vs. male

Mann-Whitney U	24,138,693.00
Wilcoxon W	53,718,279.00
Z	-0.19
Asymp. Sig. (2-tailed)	0.847

Note – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A38: Significance test on [FCAFH] > 0 by female vs. male

Mann-Whitney U	1,102,296.50
Wilcoxon W	2,346,549.50
Z	-3.70
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A39: Summary statistics on food production at home by health status

FPAH	weighted [DFPAH]		weighted [FPAH] > 0	
	Good health	Poor health	Good health	Poor health
Mean	0.76	0.80	73.85	84.60
Std. Dev.	0.43	0.40	58.35	60.69
Minimum	0.00	0.00	10.00	10.00
Maximum	1.00	1.00	450.00	550.00
N	8,253	5,881	6,236	4,702
%	58.39	41.61	57.01	42.99

Note – Activity food production at home (FPAH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food production at home [DFPAH]. – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A40: Summary statistics on food consumption at home by health status

FCAH	weighted [DFCAH]		weighted [FCAH]	
	Good health	Poor health	Good health	Poor health
Mean	0.95	0.96	91.64	98.09
Std. Dev.	0.23	0.19	56.00	54.55
Minimum	0.00	0.00	0.00	0.00
Maximum	1.00	1.00	560.00	480.00
N	8,253	5,881	8,253	5,881
%	58.39	41.61	58.39	41.61

Note – Activity food consumption at home (FCAH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food consumption at home [DFCAH]. – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A41: Summary statistics on food consumption away from home by health status

FCAFH	weighted [DFCAFH]		weighted [FCAFH] > 0	
	Good health	Poor health	Good health	Poor health
Mean	0.24	0.19	80.23	77.39
Std. Dev.	0.43	0.40	67.44	66.61
Minimum	0.00	0.00	10.00	10.00
Maximum	1.00	1.00	440.00	360.00
N	8,253	5,881	1,999	1,140
%	58.39	41.61	63.68	36.32

Note – Activity food consumption away from home (FCAFH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food consumption away from home [DFCAFH]. – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A42: Significance test on [DFPAH] by good health vs. poor health

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	37.85 a)	1.00	0.000		
Continuity Correction b)	37.60	1.00	0.000		
Likelihood Ratio	38.20	1.00	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	37.85	1.00	0.000		
N of Valid Cases	14,134				

Note – Variable for degree of participation per day in food production at home [DFPAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 1,329.82. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A43: Significance test on [DFCAH] by good health vs. poor health

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	20.68 a)	1.00	0.000		
Continuity Correction b)	20.32	1.00	0.000		
Likelihood Ratio	21.18	1.00	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	20.68	1.00	0.000		
N of Valid Cases	14,135				

Note – Variable for degree of participation per day in food consumption at home [DFCAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 277.51. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A44: Significance test on [DFCAFH] by good health vs. poor health

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	46.45 a)	1.00	0.000		
Continuity Correction b)	46.17	1.00	0.000		
Likelihood Ratio	46.94	1.00	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	46.45	1.00	0.000		
N of Valid Cases	14,135				

Note – Variable for degree of participation per day in food consumption away from home [DFCAFH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 1,306.01. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A45: Significance test on [FPAH] > 0 by good health vs. poor health

Mann-Whitney U	12,448,607.00
Wilcoxon W	31,050,557.00
Z	-11.01
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A46: Significance test on [FCAH] by good health vs. poor health

Mann-Whitney U	21,864,082.00
Wilcoxon W	54,689,335.00
Z	-7.34
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A47: Significance test on [FCAFH] > 0 by good health vs. poor health

Mann-Whitney U	1,075,091.00
Wilcoxon W	1,705,094.00
Z	-1.03
Asymp. Sig. (2-tailed)	0.302

Note – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A48: Summary statistics on food production at home by educational attainment

FPAH	weighted [DFPAH]		weighted [FPAH] > 0	
	Lower level of education	High school	Lower level of education	High school
Mean	0.78	0.75	81.55	65.61
Std. Dev.	0.41	0.43	61.02	51.93
Minimum	0.00	0.00	10.00	10.00
Maximum	1.00	1.00	550.00	380.00
N	11,116	2,866	8,685	2,155
%	79.50	20.50	80.12	19.88

Note – Activity food production at home (FPAH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food production at home [DFPAH]. – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A49: Summary statistics on food consumption at home by educational attainment

FCAH	weighted [DFCAH]		weighted [FCAH]	
	Lower level of education	High school	Lower level of education	High school
Mean	0.95	0.95	95.39	89.40
Std. Dev.	0.21	0.22	55.85	53.81
Minimum	0.00	0.00	0.00	0.00
Maximum	1.00	1.00	480.00	560.00
N	11,116	2,866	11,116	2,866
%	79.50	20.50	79.50	20.50

Note – Activity food consumption at home (FCAH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food consumption at home [DFCAH]. – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A50: Summary statistics on food consumption away from home by educational attainment

FCAFH	weighted [DFCAFH]		weighted [FCAFH] > 0	
	Lower level of education	High school	Lower level of education	High school
Mean	0.22	0.24	81.11	72.36
Std. Dev.	0.41	0.42	68.29	62.25
Minimum	0.00	0.00	10.00	10.00
Maximum	1.00	1.00	440.00	350.00
N	11,116	2,866	2,436	675
%	79.50	20.50	78.30	21.70

Note – Activity food consumption away from home (FCAFH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food consumption away from home [DFCAFH]. – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A51: Significance test on [DFPAH] by lower level of education vs. high school

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	11.09 a)	1.00	0.001		
Continuity Correction b)	10.93	1.00	0.001		
Likelihood Ratio	10.90	1.00	0.001		
Fisher's Exact Test				0.001	0.000
Linear-by-Linear Association	11.09	1.00	0.001		
N of Valid Cases	13,981				

Note – Variable for degree of participation per day in food production at home [DFPAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 643.66. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A52: Significance test on [DFCAH] by lower level of education vs. high school

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0.36 a)	1.00	0.548		
Continuity Correction b)	0.30	1.00	0.581		
Likelihood Ratio	0.36	1.00	0.550		
Fisher's Exact Test				0.556	0.290
Linear-by-Linear Association	0.36	1.00	0.548		
N of Valid Cases	13,982				

Note – Variable for degree of participation per day in food consumption at home [DFCAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 135.90. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A53: Significance test on [DFCAFH] by lower level of education vs. high school

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.53 a)	1.00	0.060		
Continuity Correction b)	3.44	1.00	0.064		
Likelihood Ratio	3.50	1.00	0.061		
Fisher's Exact Test				0.062	0.032
Linear-by-Linear Association	3.53	1.00	0.060		
N of Valid Cases	13,982				

Note – Variable for degree of participation per day in food consumption away from home [DFCAFH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 637.69. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A54: Significance test on [FPAH] > 0 by lower level of education vs. high school

Mann-Whitney U	7,423,744.00
Wilcoxon W	9,528,070.00
Z	-11.23
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A55: Significance test on [FCAH] by lower level of education vs. high school

Mann-Whitney U	14,126,187.00
Wilcoxon W	17,895,072.00
Z	-5.40
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A56: Significance test on [FCAFH] > 0 by lower level of education vs. high school

Mann-Whitney U	730,920.00
Wilcoxon W	937,323.00
Z	-2.16
Asymp. Sig. (2-tailed)	0.031

Note – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A57: Summary statistics on food production at home by risk of monetary poverty

FPAH	weighted [DFPAH]		weighted [FPAH] > 0	
	Not monetary poor	Monetary poor	Not monetary poor	Monetary poor
Mean	0.77	0.83	78.78	78.98
Std. Dev.	0.42	0.38	59.90	55.18
Minimum	0.00	0.00	10.00	10.00
Maximum	1.00	1.00	550.00	370.00
N	12,702	848	9,814	703
%	93.74	6.26	93.31	6.69

Note – Activity food production at home (FPAH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food production at home [DFPAH]. – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A58: Summary statistics on food consumption at home by risk of monetary poverty

FCAH	weighted [DFCAH]		weighted [FCAH]	
	Not monetary poor	Monetary poor	Not monetary poor	Monetary poor
Mean	0.95	0.99	94.17	96.69
Std. Dev.	0.22	0.12	55.77	48.76
Minimum	0.00	0.00	0.00	0.00
Maximum	1.00	1.00	560.00	390.00
N	12,702	848	12,702	848
%	93.74	6.26	93.74	6.26

Note – Activity food consumption at home (FCAH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food consumption at home [DFCAH]. – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A59: Summary statistics on food consumption away from home by risk of monetary poverty

FCAFH	weighted [DFCAFH]		weighted [FCAFH] > 0	
	Not monetary poor	Monetary poor	Not monetary poor	Monetary poor
Mean	0.23	0.13	79.84	61.80
Std. Dev.	0.42	0.34	67.88	53.50
Minimum	0.00	0.00	10.00	10.00
Maximum	1.00	1.00	440.00	430.00
N	12,702	848	2,872	113
%	93.74	6.26	96.22	3.78

Note – Activity food consumption away from home (FCAFH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food consumption away from home [DFCAFH]. – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A60: Significance test on [DFPAH] by not monetary poor vs. monetary poor

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	14.54 a)	1.00	0.000		
Continuity Correction b)	14.22	1.00	0.000		
Likelihood Ratio	15.42	1.00	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	14.54	1.00	0.000		
N of Valid Cases	13,550				

Note – Variable for degree of participation per day in food production at home [DFPAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 189.81. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A61: Significance test on [DFCAH] by not monetary poor vs. monetary poor

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	21.87 a)	1.00	0.000		
Continuity Correction b)	21.09	1.00	0.000		
Likelihood Ratio	29.31	1.00	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	21.87	1.00	0.000		
N of Valid Cases	13,550				

Note – Variable for degree of participation per day in food consumption at home [DFCAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 39.93. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A62: Significance test on [DFCAFH] by not monetary poor vs. monetary poor

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	39.89 a)	1.00	0.000		
Continuity Correction b)	39.35	1.00	0.000		
Likelihood Ratio	44.42	1.00	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	39.88	1.00	0.000		
N of Valid Cases	13,551				

Note – Variable for degree of participation per day in food consumption away from home [DFCAFH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 186.80. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A63: Significance test on [FPAH] > 0 by not monetary poor vs. monetary poor

Mann-Whitney U	3,288,971.50
Wilcoxon W	49,893,656.50
Z	-0.74
Asymp. Sig. (2-tailed)	0.459

Note – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A64: Significance test on [FCAH] by not monetary poor vs. monetary poor

Mann-Whitney U	5,088,609.000
Wilcoxon W	83,507,635.000
Z	-1.125
Asymp. Sig. (2-tailed)	0.260

Note – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A65: Significance test on [FCAFH] > 0 by not monetary poor vs. monetary poor

Mann-Whitney U	133,860.50
Wilcoxon W	139,746.50
Z	-2.12
Asymp. Sig. (2-tailed)	0.034

Note – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A66: Test of significance on [DFPAH] and [HHSIZE]

	[DFPAH]	
	Contingency Coefficient	Approx. Sig.
[HHSIZE]	0.122	0.000

Note – Variable for household size [HHSIZE]. – Variable for degree of participation per day in food production at home [DFPAH].

Source: Own computations based on the German 2001/02 TUS

Table A67: Test of significance on [DFCAH] and [HHSIZE]

	[DFCAH]	
	Contingency Coefficient	Approx. Sig.
[HHSIZE]	0.029	0.116

Note – Variable for household size [HHSIZE]. – Variable for degree of participation per day in food consumption at home [DFCAH].

Source: Own computations based on the German 2001/02 TUS

Table A68: Test of significance on [DFCAFH] and [HHSIZE]

	[DFCAFH]	
	Contingency Coefficient	Approx. Sig.
[HHSIZE]	0.024	0.309

Note – Variable for household size [HHSIZE]. – Variable for degree of participation per day in food consumption away from home [DFCAFH].

Source: Own computations based on the German 2001/02 TUS

Table A69: Test of significance on [FPAH] > 0 and [HHSIZE]

	[FPAH] > 0	
	Spearman's Correlation Coefficient	Sig. (2-tailed)
[HHSIZE]	0.026**	0.007

Note – ** Correlation is significant at the 0.01 level (2-tailed). – Variable for household size [HHSIZE]. – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A70: Test of significance on [FCAH] and [HHSIZE]

	[FCAH]	
	Spearman's Correlation Coefficient	Sig. (2-tailed)
[HHSIZE]	0.120**	0.000

Note – ** Correlation is significant at the 0.01 level (2-tailed). – Variable for household size [HHSIZE]. – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A71: Test of significance on [FCAFH] > 0 and [HHSIZE]

	[FCAFH] > 0	
	Spearman's Correlation Coefficient	Sig. (2-tailed)
[HHSIZE]	-0.004	0.823

Note – ** Correlation is significant at the 0.01 level (2-tailed). – Variable for household size [HHSIZE]. – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A72: Summary statistics on food production at home by region of residence

FPAH	weighted [DFPAH]		weighted [FPAH] > 0	
	Eastern Germany	Western Germany	Eastern Germany	Western Germany
Mean	0.82	0.76	82.39	77.47
Std. Dev.	0.38	0.43	61.63	59.00
Minimum	0.00	0.00	10.00	10.00
Maximum	1.00	1.00	470.00	550.00
N	2,661	11,534	2,193	8,801
%	18.75	81.25	19.95	80.05

Note – Activity food production at home (FPAH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food production at home [DFPAH]. – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A73: Summary statistics on food consumption at home by region of residence

FCAH	weighted [DFCAH]		weighted [FCAH]	
	Eastern Germany	Western Germany	Eastern Germany	Western Germany
Mean	0.97	0.95	97.81	93.57
Std. Dev.	0.17	0.22	54.66	55.58
Minimum	0.00	0.00	0.00	0.00
Maximum	1.00	1.00	430.00	560.00
N	2,661	11,534	2,661	11,534
%	18.75	81.25	18.75	81.25

Note – Activity food consumption at home (FCAH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food consumption at home [DFCAH]. – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A74: Summary statistics on food consumption away from home by region of residence

FCAFH	weighted [DFCAFH]		weighted [FCAFH] > 0	
	Eastern Germany	Western Germany	Eastern Germany	Western Germany
Mean	0.21	0.22	61.74	83.02
Std. Dev.	0.41	0.42	52.06	69.32
Minimum	0.00	0.00	10.00	10.00
Maximum	1.00	1.00	360.00	440.00
N	2,661	11,534	561	2,588
%	18.75	81.25	17.83	82.17

Note – Activity food consumption away from home (FCAFH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food consumption away from home [DFCAFH]. – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A75: Significance test on [DFPAH] by Eastern Germany vs. Western Germany

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	46.18 a)	1.00	0.000		
Continuity Correction b)	45.83	1.00	0.000		
Likelihood Ratio	48.31	1.00	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	46.18	1.00	0.000		
N of Valid Cases	14,195				

Note – Variable for degree of participation per day in food production at home [DFPAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 600.06. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A76: Significance test on [DFCAH] by Eastern Germany vs. Western Germany

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	23.83 a)	1.00	0.000		
Continuity Correction b)	23.34	1.00	0.000		
Likelihood Ratio	26.66	1.00	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	23.83	1.00	0.000		
N of Valid Cases	14,195				

Note – Variable for degree of participation per day in food consumption at home [DFCAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 125.04. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A77: Significance test on [DFCAFH] by Eastern Germany vs. Western Germany

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.30 a)	1.00	0.130		
Continuity Correction b)	2.22	1.00	0.136		
Likelihood Ratio	2.32	1.00	0.128		
Fisher's Exact Test				0.134	0.068
Linear-by-Linear Association	2.30	1.00	0.130		
N of Valid Cases	14,196				

Note – Variable for degree of participation per day in food consumption away from home [DFCAFH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 590.27. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A78: Significance test on [FPAH] > 0 by Eastern Germany vs. Western Germany

Mann-Whitney U	8,944,881.50
Wilcoxon W	46,248,084.50
Z	-3.35
Asymp. Sig. (2-tailed)	0.001

Note – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A79: Significance test on [FCAH] by Eastern Germany vs. Western Germany

Mann-Whitney U	14,328,723.50
Wilcoxon W	78,836,484.50
Z	-3.02
Asymp. Sig. (2-tailed)	0.003

Note – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A80: Significance test on [FCAFH] > 0 by Eastern Germany vs. Western Germany

Mann-Whitney U	570,034.000
Wilcoxon W	725,437.000
Z	-7.138
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A81: Summary statistics on food production at home by weekday

FPAH	weighted [DFPAH]		weighted [FPAH] > 0	
	Workday	Weekend	Workday	Weekend
Mean	0.77	0.78	76.84	81.81
Std. Dev.	0.42	0.41	59.58	59.39
Minimum	0.00	0.00	10.00	10.00
Maximum	1.00	1.00	550.00	420.00
N	9,663	4,532	7,439	3,555
%	68.07	31.93	67.66	32.34

Note – Activity food production at home (FPAH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food production at home [DFPAH]. – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A82: Summary statistics on food consumption at home by weekday

FCAH	weighted [DFCAH]		weighted [FCAH]	
	Workday	Weekend	Workday	Weekend
Mean	0.95	0.95	91.46	100.55
Std. Dev.	0.21	0.22	53.83	58.24
Minimum	0.00	0.00	0.00	0.00
Maximum	1.00	1.00	560.00	450.00
N	9,663	4,532	9,663	4,532
%	68.07	31.93	68.07	31.93

Note – Activity food consumption at home (FCAH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food consumption at home [DFCAH]. – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A83: Summary statistics on food consumption away from home by weekday

FCAFH	weighted [DFCAFH]		weighted [FCAFH] > 0	
	Workday	Weekend	Workday	Weekend
Mean	0.22	0.23	73.80	90.02
Std. Dev.	0.41	0.42	68.80	62.09
Minimum	0.00	0.00	10.00	10.00
Maximum	1.00	1.00	440.00	360.00
N	9,663	4,532	2,096	1,053
%	68.07	32.93	66.55	33.45

Note – Activity food consumption away from home (FCAFH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food consumption away from home [DFCAFH]. – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A84: Significance test on [DFPAH] by workday vs. weekend

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.75 a)	1.00	0.053		
Continuity Correction b)	3.67	1.00	0.055		
Likelihood Ratio	3.78	1.00	0.052		
Fisher's Exact Test				0.055	0.028
Linear-by-Linear Association	3.75	1.00	0.053		
N of Valid Cases	14,195				

Note – Variable for degree of participation per day in food production at home [DFPAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 1,021.97. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A85: Significance test on [DFCAH] by workday vs. weekend

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0.59 a)	1.00	0.441		
Continuity Correction b)	0.53	1.00	0.467		
Likelihood Ratio	0.59	1.00	0.443		
Fisher's Exact Test				0.445	0.234
Linear-by-Linear Association	0.59	1.00	0.441		
N of Valid Cases	14,195				

Note – Variable for degree of participation per day in food consumption at home [DFCAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 212.95. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A86: Significance test on [DFCAFH] by workday vs. weekend

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.26 a)	1.00	0.039		
Continuity Correction b)	4.17	1.00	0.041		
Likelihood Ratio	4.23	1.00	0.040		
Fisher's Exact Test				0.039	0.021
Linear-by-Linear Association	4.26	1.00	0.039		
N of Valid Cases	14,195				

Note – Variable for degree of participation per day in food consumption away from home [DFCAFH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 1,005.37. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A87: Significance test on [FPAH] > 0 by workday vs. weekend

Mann-Whitney U	12,099,847.50
Wilcoxon W	38,923,997.50
Z	-4.38
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A88: Significance test on [FCAH] by workday vs. weekend

Mann-Whitney U	19,161,226.500
Wilcoxon W	64,585,972.500
Z	-9.197
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A89: Significance test on [FCAFH] > 0 by workday vs. weekend

Mann-Whitney U	800,218.50
Wilcoxon W	2,929,234.50
Z	-11.17
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A90: Summary statistics on food production at home by course of the day

FPAH	weighted [DFPAH]		weighted [FPAH] > 0	
	Normal day	Unusual day	Normal day	Unusual day
Mean	0.81	0.65	79.87	73.06
Std. Dev.	0.39	0.48	58.79	63.06
Minimum	0.00	0.00	10.00	10.00
Maximum	1.00	1.00	470.00	550.00
N	10,971	3,120	8,887	2,023
%	77.86	22.14	81.46	18.54

Note – Activity food production at home (FPAH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food production at home [DFPAH]. – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A91: Summary statistics on food consumption at home by course of the day

FCAH	weighted [DFCAH]		weighted [FCAH]	
	Normal day	Unusual day	Normal day	Unusual day
Mean	0.99	0.82	100.69	72.47
Std. Dev.	0.10	0.38	51.74	62.03
Minimum	0.00	0.00	0.00	0.00
Maximum	1.00	1.00	480.00	560.00
N	10,971	3,120	10,971	3,120
%	77.86	22.14	77.86	22.14

Note – Activity food consumption at home (FCAH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food consumption at home [DFCAH]. – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A92: Summary statistics on food consumption away from home by course of the day

FCAFH	weighted [DFCAFH]		weighted [FCAFH] > 0	
	Normal day	Unusual day	Normal day	Unusual day
Mean	0.17	0.41	56.64	111.36
Std. Dev.	0.37	0.49	44.88	79.28
Minimum	0.00	0.00	10.00	10.00
Maximum	1.00	1.00	430.00	440.00
N	10,971	3,120	1,828	1,290
%	77.86	22.14	58.63	41.37

Note – Activity food consumption away from home (FCAFH). – Sampling weights are used (weighted). – Variable for degree of participation per day in food consumption away from home [DFCAFH]. – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A93: Significance test on [DFPAH] by normal day vs. unusual day

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	363.54 a)	1.00	0.000		
Continuity Correction b)	362.62	1.00	0.000		
Likelihood Ratio	338.45	1.00	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	363.52	1.00	0.000		
N of Valid Cases	14,090				

Note – Variable for degree of participation per day in food production at home [DFPAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 704.16. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A94: Significance test on [DFCAH] by normal day vs. unusual day

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1,549.00 a)	1.00	0.000		
Continuity Correction b)	1,545.23	1.00	0.000		
Likelihood Ratio	1,228.73	1.00	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	1,548.89	1.00	0.000		
N of Valid Cases	14,091				

Note – Variable for degree of participation per day in food consumption at home [DFCAH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 146.14. b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A95: Significance test on [DFCAFH] by normal day vs. unusual day

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	858.79 a)	1.00	0.000		
Continuity Correction b)	857.36	1.00	0.000		
Likelihood Ratio	778.66	1.00	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	858.73	1.00	0.000		
N of Valid Cases	14,090				

Note – Variable for degree of participation per day in food consumption away from home [DFCAFH]. – a) 0 cells (0.00%) have expected count less than 5. The minimum expected count is 690.43. – b) Computed only for a 2x2 table.

Source: Own computations based on the German 2001/02 TUS

Table A96: Significance test on [FPAH] > 0 by normal day vs. unusual day

Mann-Whitney U	7,827,528.50
Wilcoxon W	9,780,804.50
Z	-6.61
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food production at home per day [FPAH]. – Cases are included only if the variable [FPAH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Table A97: Significance test on [FCAH] by normal day vs. unusual day

Mann-Whitney U	11,091,061.500
Wilcoxon W	15,765,214.500
Z	-27.924
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food consumption at home per day [FCAH].

Source: Own computations based on the German 2001/02 TUS

Table A98: Significance test on [FCAFH] > 0 by normal day vs. unusual day

Mann-Whitney U	619,999.500
Wilcoxon W	2,253,527.500
Z	-21.456
Asymp. Sig. (2-tailed)	0.000

Note – Variable for minutes spent on food consumption away from home per day [FCAFH]. – Cases are included only if the variable [FCAFH] exhibits a value greater than zero (>0).

Source: Own computations based on the German 2001/02 TUS

Arbeitsberichte des Instituts für Agrarpolitik und Marktforschung der Justus-Liebig-Universität Gießen*

1 bis 23 siehe Verzeichnis in Nr. 24

24 SCHUMACHER, Silke, Quantitative Erfassung des Anbaus und der Verwertung nachwachsender Rohstoffe in der Europäischen Union.
1997, 119 S. und Anhang.

25 ECKERT, Sabine, Ökonomische Effekte von Lebensmittelskandalen. Das Beispiel BSE.
1998, 104 S. und Anhang.

26 GÄRTNER, Susanne, Freizeit und Nahrungsmittelnachfrage: Theoretische Überlegungen und empirische Auswertung der Nationalen Verzehrsstudie.
1999, 105 S. und Anhang.

27 KROLL, Steffi, Der Einfluß von Verkaufsförderung auf den Absatz von Markenartikeln – Eine empirische Analyse für den Cerealienmarkt.
2000, 119 S. und Anhang.

28 WERNER, Elke, Marktstruktur und –entwicklung des deutschen Konfitüremarktes: Beschreibung, Analyse, Determinanten des Konsumentenverhaltens.
2000, 109 S. und Anhang.

29 ANDERS, Sven, Quantitative Analyse der Entwicklung des Fleischverbrauchs in Hessen: Ursachen von Verbrauchsstrukturänderungen und Folgen für das hessische Gemeinschaftsmarketing.
2000, 101 S. und Anhang.

30 GAST, Michael, Nichttarifäre Handelshemmnisse bei heterogenen Gütern der Agrar- und Ernährungswirtschaft – Theoretische Grundlagen und das Beispiel US-amerikanischer Käseimporte.
2001, 82 S.

31 SCHRÖTER, Christiane, Consumer perceptions of three innovations related to meat processing.
2001, 87 S.

32 WENZEL, Montserrat, Hedonistische Preisanalyse zum Einfluß von Qualität auf den Preis von Fruchtsaft: Das Beispiel Apfelsaft.
2001, 157 S.

33 ROGGENKAMP, Liz, Erfolgreiche Innovationen in der Ernährungswirtschaft – Messung und Determinanten –.
2002, 101 S.

34 RÖSE, Stefan, Marktanalyse über Soja-Lebensmittel in Deutschland.
2002, 127 S.

35 GAST, Michael, Der Importmarkt für ausgewählte pflanzliche Drogen in Deutschland.
2003, 45 S.

36 KUBITZKI, Sabine, Innovationsaktivitäten im Ernährungsgewerbe – Eine branchenspezifische Untersuchung des Mannheimer Innovationspanels 1999 -.
2003, 105 S.

37 HARTL, Jochen, Estimating the Demand for Risk Reduction from Foodborne Pathogens.
2004, 120 S.

38 EGENOLF, Petra, Ökonomische Konsequenzen von BSE: Stand der Forschung und empirische Analyse des Verbraucherverhaltens in der deutschen BSE-Krise.
2004, 106 S.

39 FAUST, Ulrike, Gemeinschaftsmarketing für Lebensmittel unter dem Einfluss von EU-Recht und Verbraucherverhalten – das Beispiel „Geprüfte Qualität – HESSEN“.
2005, 118 S.

40 TÖNNIGES, Stefan, Die Determinanten der Nachfrage nach Fisch und Fischwaren.
2005, 117 S. und Anhang.

* Die Arbeitsberichte können für eine Schutzgebühr von 25,-- € (15,-- € bis Nr. 38) erworben werden beim:
Institut für Agrarpolitik und Marktforschung, Justus-Liebig-Universität Gießen, Senckenbergstr. 3, 35390 Gießen,
Tel.: (06 41) 99-3 70 20, Fax: (06 41) 99-3 70 29, e-mail: Sekretariat.Marktlehre@agrar.uni-giessen.de

41 WETTNER, Christoph, Wirkungsanalyse negativer Agrarprotektion: Quantifizierungsansätze und Möglichkeiten der Implementierung in GTAP.
2006, 84 S. und Anhang.

42 SCHÜTZ, Daniel, Verbraucherpräferenz für regionale Lebensmittel – Eine Untersuchung der Einflussfaktoren mit Hilfe multivariater Analysemethoden.
2006, 120 S.

43 HEINZE, Daniela, Experimentelle Analyse von Zahlungsbereitschaften für das Qualitäts- und Herkunftssiegel „Geprüfte Qualität – HESSEN“.
2006, 103 S.

44 OBERBECK, Corinna, Produktdifferenzierung im deutschen Kaffeemarkt.
2008, 90 S.

45 HENKEL, Tobias, Die Bedeutung der Regionalität beim Lebensmittelkauf: Empirische Ergebnisse am Beispiel „Landmarkt“.
2008, 83 S.

46 MAAS, Sarah, What Explains EU Food Aid?
2008, 110 S.

47 ROEBEN, Anna, Erzielen Produkte mit höherer Qualität auch einen höheren Preis im Lebensmitteleinzelhandel? - Eine empirische Untersuchung am Beispiel Fruchtsaft.
2008, 95 S. und Anhang.

48 STAUDIGEL, Matthias, Der Einfluss institutioneller Rahmenbedingungen auf Ernährung und Gesundheit am Beispiel Russlands.
2009, 109 S. und Anhang.

49 KUBITZKI, Sabine, Meike HENSELEIT, Roland HERRMANN und Tobias HENKEL, Lebensmittelkennzeichnung „ohne Gentechnik“: Verbraucherwahrnehmung und –verhalten.
2009, 77 S. und Anhang mit Fragebogen.

50 SCHRÖCK, Rebecca, Determinanten der Nachfrage nach Biomilch – eine ökonometrische Analyse. 2010, 142 S. und Anhang.

51 HENKEL, Tobias, Die Wirkung der Befragungsform auf das Antwortverhalten: Eine vergleichende Untersuchung am Beispiel des Carbon Footprints bei Lebensmitteln. 2010, 162 S. und Anhang.

52 BURZIG, Johanna, Determinanten der Konsumausgaben der Generation 50+ - Eine empirische Analyse für Deutschland auf der Grundlage von SHARE-Daten. 2010, 90 S. und Anhang.

53 FEURER, Linda Maria, Konvergieren Lebensmittelpreise in der EU? 2011, 77 S. und Anhang.

54 VELARDE, Melanie, The Retirement-Consumption Puzzle: Theory and Empirical Evidence on Food Production and Food Consumption with Time Budget Data. 2011, 65 S. und Anhang.