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Zusammenfassung

Alle Kapitel dieser Dissertation sind empirische, mikro-ökonomische Studien, die sich mit bestimmten bevölkerungsökonomischen Fragestellungen beschäftigen. Diese Studien haben ebenfalls eine hohe Relevanz für Arbeitsmärkte.

Das erste Kapitel, *Introduction*, fasst den Zusammenhang der folgenden Forschungsartikel zusammen und geht auch zum Teil auf die Entstehung der Studien ein.

Das zweite Kapitel, *Age and Gender Differences in Job Opportunities*, befasst sich mit den Beschäftigungsmöglichkeiten, welche sich nach einem Wechsel der Beschäftigung für ältere Arbeitskräfte darstellen. Es zeigt sich, dass neu eingestellte Frauen und Männer über 55 Jahren einer beschränkteren Auswahl an Berufen gegenüber stehen als Jüngere. Segregationsmaße, wie der Duncan Index und der Hutchens Index, deuten auf eine Ungleichverteilung der Berufsgruppen über das Alter hin. Es sind besonders ältere Frauen, die am stärksten betroffen sind. Die Untersuchung erfolgt unter Verwendung von Daten aus der IAB Beschäftigtenstichprobe (IABS).

Im dritten Kapitel, *Explaining Age and Gender Differences in Employment Rates: A Labor Supply Side Perspective*, wird das Arbeitsangebot älterer Personen analysiert. Ein Vergleich von Reservations- und Eintrittslöhnen zeigt ebenfalls alters- und geschlechtsspezifische Unterschiede. Bei Arbeitssuchenden über 55 Jahren ist der Reservationslohn höher als in jüngeren Altersgruppen. Reservationslöhne von Frauen liegen im Durchschnitt oberhalb derjenigen der Männer. Nach Eintritt in eine Beschäftigung steigt der Lohn mit zunehmendem Alter bei Männern stärker als bei Frauen. Weiterhin zeigt sich, dass besonders bei Frauen die Arbeitszufriedenheit mit dem Alter abnimmt, die Freizeitzufriedenheit hingegen ansteigt. Diese Befunde können als Erklärung dienen, warum die Erwerbsquoten älterer Frauen

unterhalb denen der Männer liegen. Es werden Daten des Sozio-ökonomischen Panels (SOEP) verwendet.

Das vierte Kapitel, *Somewhere over the Rainbow: Sexual Orientation Discrimination in Germany*, thematisiert Einkommensunterschiede aufgrund der sexuellen Orientierung. Trotz des seit 2006 geltenden Allgemeinen Gleichbehandlungsgesetz (AGG), welches explizit Diskriminierung aufgrund der sexuellen Orientierung verbietet, finden sich signifikante Einkommensunterschiede bei homosexuellen Männern und Frauen. Während homosexuelle Männer gegenüber verheirateten heterosexuellen Männern einen Einkommensabschlag von 5 bis 6 Prozent aufweisen, erhalten homosexuelle Frauen im Vergleich zu verheirateten heterosexuellen Frauen eine Einkommensprämie von 9 bis 10 Prozent. Diese Einkommensunterschiede innerhalb der Geschlechter erfolgt zum Teil aufgrund von Selektion in bestimmte Berufe und Sektoren. Die verwendeten stammen aus dem Mikrozensus (MZ).

Das fünfte Kapitel, *A Note on Happiness in Eastern Europe*, verlässt den deutschen Beobachtungsraum und widmet sich einem internationalen Vergleich. Es werden Schätzungen hinsichtlich der allgemeinen Lebenszufriedenheit durchgeführt, in denen sich die aus der Literatur zu erwartenden Ergebnisse bestätigen lassen. So hat das Lebensalter einen u-förmigen Verlauf. Der Ehestand und eine gute Gesundheit haben jeweils einen positiven Einfluss auf die Lebenszufriedenheit bzw. spenden einen hohen ökonomischen Nutzen, während Arbeitslosigkeit einen stark negativen Effekt besitzt. Es werden Daten der European Values Study (EVS) und des World Value Surveys (WVS) verwendet.

Ein abschließendes Fazit findet sich im letzten Kapitel *Conclusion*.

Abstract

All of the papers contained in this thesis address the topic of population economics, especially in relation to labor markets. The first chapter, *Introduction*, gives an overview of the papers discussed in this thesis.

In the second chapter, *Age and Gender Differences in Job Opportunities*, job opportunities for older workers are analyzed. Newly-employed women and men who are older than the age of 55 are more limited in their occupational choices than younger women and men. Different measures of segregation such as the Duncan Index and Hutchens Index show unequal distribution of jobs over age. Older women in particular face the highest segregation. Several years of the IAB Employment Sample are used in the analysis.

In the third chapter, *Explaining Age and Gender Differences in Employment Rates: A Labor Supply Side Perspective*, the labor supply of older individuals is analyzed. The comparison of reservation wages and entry wages shows age- and gender-specific differences. Non-employed individuals at the age of 55 and older have the highest reservation wages. Reservation wages for females are always higher than those for males. Entry wages increase with age for males, but not for females. Furthermore, the job satisfaction of women decreases with age while satisfaction with leisure tends to increase. This may explain why employment rates for females are lower than for males. The German Socio-Economic Panel (GSOEP) data is used in the paper.

In the fourth chapter, *Somewhere over the Rainbow: Sexual Orientation Discrimination in Germany*, sexual orientation-based differences in income are analyzed. Although Germany has an anti-discrimination law that has explicitly prohibited discrimination on the basis of sexual orientation since 2006, there are significant income differences for gay men and

lesbian women. While gay men have an income discount of 5 to 6 percent relative to married heterosexual men, lesbian women have an income premium of 9 to 10 percent relative to heterosexual married women. These differences within the gender types can be explained partially by selection into specific occupations and sectors. One wave of the German Mikrozensus data is used in the analysis.

The fifth chapter, *A Note on Happiness in Eastern Europe*, is no more related to Germany, but takes an international position. Estimations on life satisfaction show typical results, such as a u-shaped effect in relation to age. Marriage and a good state of health have positive effects on life satisfaction or utility, while individual unemployment has a negative effect. Several years of the European Values Study (EVS) and the World Value Survey (WSV) are used in the paper.

The thesis is finished by a final chapter, *Conclusion*.

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Chapter 1

Introduction

1.1 Motivation and Overview

In this thesis empirical papers deal with labor related aspects of individuals and families. All these studies have in common the topics of participation and equality, on the labor market and beyond. In times of an aging workforce, there is an on-going political debate in Germany how labor force participation of special groups, such as mothers and older people could be fostered. These essays should shed some light on special aspects, such as age, gender roles, family formation and income.

The first two papers are part of a research project on the employability of older workers, financially supported by the VolkswagenStiftung. They address age- and gender-related differences in employability. While the first paper, *Age and Gender Differences in Job Opportunities* (Chapter 2), takes a demand side perspective on workers and their occupations, the second, *Explaining Age and Gender Differences in Employment Rates: A Labor Supply-Side Perspective* (Chapter 3), focuses on individual's job searches and wages. Not only are older individuals part of the analysis, but also gender and family aspects play an important role, such as motherhood and fatherhood. The third paper, *Somewhere over the Rainbow: Sexual Orientation Discrimination in Germany* (Chapter 4), turns towards another relevant subpopulation. Here income differences between homosexual and heterosexual men and women are analyzed. The last paper, *A Note on Happiness in Eastern Europe* (Chapter 5), sheds some light on life satisfaction in general, especially on aspects of family formation and employment.

The origins of the first paper, *Age and Gender Differences in Job Opportunities*, lie in Chan and Stevens' (2001) paper which showed that in the USA older individuals have a low probability of being re-employed after a job loss. Indeed this is not a new finding. Years before Hutchens (1988) demonstrated that older employees have a smaller range of career possibilities than younger people. Thus, firms employ older workers, but hire them less. This phenomenon is mostly based on human capital depreciation and declining productivity, and also perhaps on negative attitudes towards older workers in general. There are few papers on age-specific occupational segregation, although an exception is Heywood and Siebert's (2009) survey on old age employment. In this descriptive paper, an enriched replication of Hutchens' (1988) study, the focus is on job opportunities for newly-hired older male and female workers. The Institute of Employment Research (IAB) in Nuremberg offers a rich dataset for Germany with information going back almost thirty years: the IAB Employment Sample Regional File (IABS-R04). By drawing segregation curves and calculating different measures, such as the Dissimilarity Index and Hutchens Square Root Segregation Index, there is clear evidence that age-related segregation exists in Germany. While newly-hired workers in the youngest age groups are quite similarly distributed in terms of the indices, the oldest age groups, and especially older women, are more segregated. Differences for older male and female workers over time may be explained by changes in labor and retirement policies.

The second paper, *Explaining Age and Gender Differences in Employment Rates: A Labor Supply-Side Perspective*, deals with the individual labor supply decisions of employed and non-employed individuals. Having a focus on older workers in general, it is found that older women and mothers have the lowest incentives to seek (re-)employment because of high reservation wages and low entry wages. The case of women and mothers is strongly affected by the gender pay gap and respectively the family gap in pay. Surveys such as those by

Waldfoegel (1998), Anderson et al. (2003), and Gangl and Ziefle (2009) show that motherhood, raising children and caring for them, leads to breaks in female careers with disadvantages in terms of future income. This paper aims to explain the lower employment rates of older workers and women. The basic consideration is that workers choose non-employment if their reservation wages are larger than those offered. Whereas the wages offered depend on workers' productivity and firms' decisions, reservation wages are largely determined by workers' endowments and preferences for leisure. The German Institute for Economic Research (DIW) in Berlin offers an invaluable dataset, the German Socio-Economic Panel Study (SOEP), which is used here. To shed some empirical light on age and gender differences a set of estimations is performed for reservation and entry wages, preferred and actual working hours, and satisfaction. A key finding is that satisfaction with job and leisure time changes over the lifespan: while job satisfaction declines with age, leisure satisfaction increases.

The third paper, *Somewhere over the Rainbow: Sexual Orientation Discrimination in Germany*, was inspired by an earlier version of Ahmed et al. (2012) presented in a poster session at the EALE conference in 2011. Prior to that, Badgett (1995) was one of the first researchers to analyze earning differentials in relation to gay men and lesbian women. Three years later, Klawitter (1998) encouraged the economic community to start doing more research on this topic. Since that time a series of papers have been published, predominantly concerning Anglo-Saxon countries but not Germany. In the year 2012 the highest court in Germany, the Federal Constitutional Court, pass a series of judgments to receive legal equality of registered same-sex unions and mixed-sex marriages. In this paper sexual orientation-based differences in German incomes are analyzed using the Mikrozensus (MZ), a rich census dataset with information on individuals and households, offered by German

Federal Statistical Office in Wiesbaden. The results are in line with the literature. Gay men and lesbian women select different occupations and sectors than their heterosexual counterparts and there is clear evidence that cohabitating gay men have an income penalty in relation to married men, while lesbian women have a premium compared to married women. Lesbians in a registered same-sex union have an income gain, while the effect for men is not statistically significant. Another interesting finding relates to the results of household decisions. Households of two gay men have a higher household income than mixed sex couples, while there is no difference for households of lesbian women.

The fourth paper, *A Note on Happiness in Eastern Europe*, takes a broader perspective. Recent studies in life satisfaction have focused on the influence of different aspects of subjective well-being. In this case the former transition countries located in Eastern Europe are the field of interest. The dataset used here is a combination of the European Values Study (EVS) developed by Tilburg University and the World Values Survey (WVS) of the World Value Survey Association in Stockholm. Estimations suggest typical effects of socio-demographics on life satisfaction. Family formations, such as marriage and a good state of health have the expected positive effects. Being employed and the level of reward, such as the household income, also affect subjective well-being positively. One general finding is that individuals in transition countries behave like individuals in western industrialized countries. These results show the international reliability of this approach and demonstrate the overall importance of societal participation, such as labor force participation.

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Chapter 2

Age and Gender Differences in Job Opportunities

Abstract¹

There are only a few pieces of literature on age-specific occupational segregation. In this descriptive paper, I focus on occupational opportunities for newly-hired older male and female workers. This study is an enriched replication study of Hutchens (ILRR, 1988), who showed that firms employ older workers, but hire them less often than they hire younger ones. I use a rich dataset for West Germany with information covering almost thirty years, the regional file of the IAB Employment Sample (IABS-R04). By drawing segregation curves and calculating different measures, such as the Dissimilarity Index and the Hutchens Square Root Segregation Index, I find clear evidence that age-related segregation exists. While newly-hired workers in the age groups of 18 to 34 years and 35 to 54 years are quite similarly distributed in terms of the indices, those in the oldest age group, aged 55 years and above, and especially older women, are more segregated. Differences for older male and female workers over time may be explained by changes in labor and retirement policies.

Keywords: Labor Demand, Age Segregation, Older Workers, Gender

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2.1 Introduction

There has been broad discussion on the demand for workers. In this context, occupational segregation is mostly discussed in terms of gender segregation, in works such as those of Blau and Hendricks (1979) and Anker (1997). The problem of age-specific segregation is discussed less. Only some newer surveys, such as those by Heywood and Siebert (2009), O'Brian (2010), and Backes-Gellner and Schneider (2012), give an overview. But at a time when societies, such as that of Germany, are ageing, the employability of older individuals is more and more relevant: see, for instance, Fuchs et al. (2011) for German labor force projections for the year 2050. Fuchs et al. calculate the increasing employment rates of the highest age groups in the potential workforce.

In this paper I focus on occupational opportunities for older male and female workers. This study is an enriched replication study of Hutchens (1988), who showed, for the United States, that firms employ older workers, but hire them less often than they hire younger ones. These findings are also variously shown by Del Rio and Alonso-Villar (2010) (Spain), Dixon (2009) (New Zealand), Dygalo (2007) (France), Hirsch et al. (2000) (US), Heywood et al. (1999) (Hong Kong), and Ilmakunnas and Ilmakunnas (2012) (Finland). I use a rich dataset for West Germany: the regional file of the IAB Employment Sample (IABS-R04), a panel of cross-sections for the years 1975 to 2004.

To measure the occupational segregation of newly-hired workers, I use different types of segregation curves and indices, such as the Duncan or Dissimilarity Index (Duncan and Duncan 1955) and the Hutchens Square Root Segregation Index (Hutchens 2001, 2004). I show a long-term decline in occupational segregation in Western Germany. While newly-hired male and female workers in the age groups of 18 to 34 years and 35 to 54 years are quite similarly distributed in terms of the indices, the oldest age group, those of 55 and above, is

different. I find rising segregation beginning in the early 1980s and continuing until the late 1990s and the early years of this century. In the middle of the 1980s, the late 1990s and the early years of this century in particular, there were great structural changes in labor and retirement policies in Germany. These changes may have had different effects on the occupational segregation of older people. The effect of occupational segregation seems to be stronger for older women than for older men.

The rest of the paper is structured as follows. In the next section I review the literature. Section 3 summarizes different measures of occupational segregation. Section 4 presents a description of the data and empirical results for Germany, based on the regional file of the IAB Employment Sample (IABS-R04). The paper concludes, in Section 5, with a summary and a discussion of the findings.

2.2 Theory and Literature Review

2.2.1 Demand for older Workers

I argue that an individual's range of job opportunities theoretically shrinks with age. While younger workers have a wide range of jobs to choose from, older workers' choices are limited. The demand for older workers is lower than that for younger ones. This difference in employability is based on productivity aspects such as skills, and maybe on some kind of discrimination. Oi (1962) shows that the hiring of new workers is associated with quasi-fixed employment costs. These are the costs of the recruitment processes, and, later on, the costs of training activities for newly-hired workers. While specific training is given by a firm to strengthen skills related to the firm, general training increases the worker's own productivity more independently of the firm's specific needs. Becker (1962) discusses whether specific

training is more often given to younger workers than to older ones. The younger ones will stay for more years with a firm, on average, than the older ones, and the hiring firm gets higher returns, such as increased productivity. In the case of general training, this is indirectly paid for by the worker, generally by the worker accepting lower wages. Hutchens (1988) argues that, because of the different payoff times discussed above, both types of training are more attractive for younger workers than for older ones.

Lazear (1979, 1981) demonstrates that firms are interested in paying deferred compensation. Here, newly-hired workers receive wages that are below the value of the marginal product at the beginning, and above the value of the marginal product at the end, of their careers with the firm. As a result, older job-holders with a long duration of tenure get high wages. Rising wage profiles ensure that workers are motivated and these profiles therefore save monitoring costs. On the one hand, jobs are protected for older workers within firms. On the other hand, firms have less motivation to hire older workers, rather than younger ones, from outside. Hutchens (1986) suggests that delayed payments can also be interpreted as fixed costs. Firms may see a chance to cheat on their workers by terminating their contracts earlier than expected by the workers. So firms have to pay a premium on the wage to compensate the workers for the hypothetical risk of being cheated. Pfeifer (2009) shows that if wages were paid in an equitable way, newly-hired older workers would be overpaid or under-productive. Zwick (2012) presents empirical evidence that firms with step profiles for seniority wages hire older workers less often, and prefer candidates with fewer years of working experience.

Hutchen (2007) discuss that jobs with specific need of several years of experience should be highly replaced with older and experienced workers from the outside. But he presents evidence that internal solutions such as hiring from internal labor markets are more often the case.

2.2.2 Literature Review

Hutchens (1988) computes segregation curves to show that new entrants aged over 55 have fewer occupational opportunities than entrants aged between 24 and 35. US data from the National Longitudinal Survey (NLS) for 1983 shows that incumbents aged 55 years or above are more equally distributed among occupations than newly-hired people in that age group. Hutchens (1986) composes an Opportunity Index² to measure the hiring opportunities for older workers. Using the US data from the NLS for 1970 for men, the Opportunity Index for hiring workers above the age of 55 is used as an independent variable in regressions for aspects such as pensions and mandatory retirement. Because of the fixed costs of employment, older individuals face a lower probability of being hired than younger ones. Hutchens (1993) uses the Survey of Displaced Workers, a supplement to the Current Population Survey (CPS), for the years from 1983 to 1988. This includes information about male workers aged between 39 and 59 years who have suffered from a plant closure in the previous five years. Using the Opportunity Index, there is evidence that older displaced workers face a lower probability of finding an occupation in a different sector than do younger workers.³

Scott et al. (1995) use matched data from US Enterprise and Establishment Microdata 1991 (USEEM) and four waves of the Employee Benefits Supplement based on the CPS 1979 to 1993. They show that firms' health insurance policies may influence their hiring decisions. Firms which make higher health insurance offers employ more older workers, but hire fewer. Heywood et al. (1999) use cross-section data for 1996 for the case of Hong Kong. As a

² Here the proportion of recently hired older workers is divided by the proportion of all workers above the age of 55.

³ Hutchens (1993, 102) argues that "(t)he index used here may have substantially more noise than signal".

central result, the requirement by firms that candidates have certain skills lowers the probability that older individuals will be hired. This is a special case, because the age of 35 is used here to split workers into 'young' and 'old', and Hong Kong has no anti-discrimination law concerning age. Hirsch et al. (2000) use CPS data for the years 1983 to 1995. They compute segregation curves and Gini coefficients to show that there is no increase in segregation over time for workers above the age of 50. Newly-hired older women are less unequally distributed among occupations than newly-hired older men. Additionally, Hirsch et al. give empirical evidence that older workers have less access to occupations with on-the-job training and specific skill needs, such as computer use. But there are only weak results concerning working conditions, such as heavy lifting.

In a research note, Dygalo (2007) uses a long French series of employer-employee data, the Déclarations annuelles des salaires (DADS), for the years 1976 to 1996. She computes segregation curves and Hutchens Square Root Segregation Indices. Comparing newly-hired workers above the age of 55, there is an unequal distribution between workers who have formerly been unemployed for more than a year and those who have been unemployed for a shorter period. This may be interpreted as an age-related decline in occupational opportunities, based on unemployment duration between two types of occupation. Dixon (2009) uses linked employer-employee data (LEED) for New Zealand to compute the Opportunity Index for the years 2004 to 2007. This statistical report presents industry patterns in relation to recruiting older workers. Workers in the highest age group of 70 to 74 years are mostly hired in the education sector. Del Rio and Alonso-Villar (2010) present age- and gender-related occupational segregation information for the case of Spain. They use data from the Spanish Current Population Survey (EPS) for 2007 to compute segregation curves and different measures of segregation, such as the Mutual Information Index and the unbounded

Gini coefficient. Workers above the age of 45 years are more segregated than those in all the younger age groups, and older women have fewer occupational opportunities than older men.

Ilmakunnas and Ilmakunnas (2012) use a long Finnish series of linked employer-employee data for the years 1990 to 2004 to compute segregation curves and Gini coefficients. Workers aged 50 and above leave firms much more often than they enter them. The authors compare the Gini coefficients over time, and find stable values for exits and mixed results for hires. While from 1990 to 2000 age segregation rose, the Gini coefficients for the later years are stable.

Chan and Stevens (2001) use US data from the Health and Retirement Study (HRS) 1992 to 1996 to show that older individuals have low probabilities of being re-employed after losing their jobs. They compute a gap in employment rates of about 20 per cent between displaced and non-displaced workers. Adams (2004) finds a negative but not significant effect of the anti-age discrimination laws on the hiring probabilities for older workers in the US. He uses CPS data from 1960 to 1967 with difference-in-differences estimations to evaluate the effect of variation in the legislation of federal states.

Adams and Heywood (2007) use information from the Australian Workplace Industrial Relations Survey (AWIRS) for 1995. They present a negative effect of a rising tenure-wage ratio on the probability of hiring older workers. Using UK data from the Workplace Employment Relations Survey (WERS) for 1998, Daniel and Heywood (2007) discuss the importance of steeper wage profiles based on seniority, and internal labor markets, for lower recruitment of older workers. Adler and Hilber (2009) use US Longitudinal Employer-Household Dynamics data (LEHD) for 2005 to analyze the employment patterns of older workers. They show that older workers who have to change their employers try to select firms which employ a high share of older workers and participate in a growing sector.

Heywood et al. (2010) use German data from the Hanover Firm Panel for 2002 to analyze the hiring preferences of job searchers over the age of 50. There is evidence of the importance of skills and the existence of internal labor markets, both of which lower the probability that older individuals will be hired. Zwick (2012) uses German linked employer-employee data (LIAB) to analyze different deferred compensation schemes. The Opportunity Index and the share of newly-hired women over the age of 50 are used to show that firms with stronger deferred compensation schemes hire more younger men than younger women. But these firms do not hire fewer older women than older men.

Humpert and Pfeifer (2012) use the German Socio Economic Panel Study (SOEP) for 2007 and 2008 to show that older male and female workers, and mothers, have higher reservation wages and a higher preference for leisure, which can explain lower employment rates in these groups in Germany.

Vandenberghe (2011) and Pfeifer and Wagner (2012) compute age- and gender-related productivity profiles.⁴ In the case of Belgian firms, Vandenberghe (2011) shows that older women are less likely to be employed than younger women, or men of any age, because of lower productivity. This age- and gender-specific lack of productivity may not be compensated for by a lower labor cost, such as lower wages or lower social security payments. Pfeifer and Wagner (2012) show that, for Germany, firms with higher shares of female workers do not automatically have lower profitability than firms with lower shares. With a new type of dataset, they report higher profitability for these firms. They conclude that the lower productivity of women may be over-compensated for by lower wage costs.

⁴ While Koller and Gruber (2001), Bookmann and Zwick (2004), Lahey (2008), and Van Dalen et al. (2010) discuss whether older workers are rated to be less productive than younger ones, Bellman and Brussig (2007) show that older individuals also apply for jobs less often. Pfeiffer and Reuß (2008) show that, in general, cognitive skills increase until the age of 20, while self-regulatory skills increase until the age of 60.

2.3 Measurement of Occupational Segregation

In the literature on segregation there is a broad discussion on proper measuring. Occupational segregation is mostly measured using indices scaled from zero to one and visually using Lorenz curves or segregation curves. In general, both ways of measuring are used for measurements at one point in time. To compare segregation over time, a set of index points or an array of curves is needed. While income and GDP are scaled by ratio, occupations are nominally scaled⁵. They have to be ordered by their number of observations. Surveys like those of James and Taeuber (1985), Watts (1998) or Ransom (2000) show the historical development of the relevant indicators.

The gold standard in measuring any segregation has for a long time been the Dissimilarity Index D defined by Duncan and Duncan (1955). The Dissimilarity Index can be visually interpreted as the maximum distance between the equality line and a segregation curve. See equation (1) for D . Let the number of workers $i=1, \dots, n$ in an occupation be p_i for workers and r_i for incumbents. P represents the number of all newly-hired workers, and R represents the number of incumbents.

$$D = \frac{1}{2} \sum_{i=1}^n \left| \frac{p_i}{P} - \frac{r_i}{R} \right| \quad (2.1)$$

James and Taeuber (1985) show that the Gini coefficient G is computed from the Lorenz or segregation curves. The Gini coefficient can be visualized as twice the area between the equality line and the curve. Both indices D and G are scaled from zero to one, where zero

⁵ For example: A butcher is neither better nor worth more than a tailor. But the number of butchers in a given distribution may be higher or lower than the number of tailors.

means equal, and one unequal, distribution. Hutchens (1991) argues that D is not as sensitive as G for occupational distributions.

Hutchens (1988) himself computes segregation curves that take into account occupational specialties. This is a so-called RIMFO condition (relative inequality measure for occupation) of four characteristics of segregation measurement⁶. In a similar way to the well-established box illustration for Lorenz curves, equality is drawn with a continuous line from the origin (0,0) to the upper right corner (1,1). There are two extremes: no segregation and total segregation. In the first case, the segregation curve is identical to the equality line. In the second one, the curve is a triangle located in the lower right corner. Each hypothetical segregation curve would lie between these two extremes. On the left side Hutchens measures the cumulative percentage of Type 1 people and on the right side the cumulative percentage of Type 2 people. The so-called Type 1 people are newly-hired at an old age, and the Type 2 people represent the others which are already employed. While the original Lorenz curves work for numerated measurements such as income, segregation curves also work for rankings such as occupations. Only non-intersecting segregation curves can be interpreted in terms of statistical domination. If there are two curves, the upper one, which is closer to the equal distribution, dominates the other. While intersecting curves cannot be interpreted in terms of dominance, indices can. A higher value for the index shows a higher degree of segregation.

Because of the ambiguous results of intersecting curves, Hutchens (2001, 2004) develops the so called Hutchens Square Root Segregation Index H . Again the H index is scaled from zero to one, where zero means no segregation and one means total segregation. This measure additionally allows for the additive decomposition of segregation. See equation (2) for H . Let

⁶ Hutchens (1991) first uses only three characteristic for the RIMFO measure (invariance of scale, symmetry and movement between groups), but he later (Hutchens (2001) adds a fourth characteristic (intensity of proportional divisions).

the number of workers $i = 1, \dots, n$ in an occupation be p_i for newly-hired workers and r_i for incumbents. P represents the number of all newly-hired workers, and R represents the number of all incumbents.

$$H = \sum_{i=1}^n \left[\left(\frac{p_i}{P} \right) - \sqrt{\frac{p_i}{P} * \frac{r_i}{R}} \right] \quad (2.2)$$

In contrast to the other, more common, ways of measuring segregation which are discussed above, this H index not only fulfills the requirements of the four characteristics, but it also satisfies a set of seven properties which should be held by a good measure of occupational segregation⁷. So I am more in favor of this more elaborated measure, but in fact I use both of them and compare the results in the next section.

⁷ Hutchens (2004) entitles the last three characteristics additive decomposability, symmetry in types and range. However, Hutchens (2012) discusses whether different occupational statuses and hierarchies should be part of the measure. To perform the index, I use a Stata ado file computed by Jenkins (2006).

2.4 Data and Results: IAB Employment Sample 1975-2004

2.4.1 Data

For the analysis of the long-term developments in age-specific occupational segregation in Western Germany, I use the regional file of the IAB Employment Sample (IABS-R04), a dataset provided by the German Federal Employment Agency. This gives information for the years 1975 to 2004 on a daily basis. It is a 2% random sample based on the administrative data of the German social security system. The data includes the working careers of more than 1.36 million individuals, with about 25 million observations. These are working people covered by the social security legislation and unemployed people who receive public unemployment benefits. Furthermore, there is detailed information for 130⁸ different types of occupations and 16 economic sectors. I look at the beginning and ending of employment and unemployment spells, gender, birth year, income, and educational information. A much more detailed description of the dataset is given by Drews (2008).

I start by limiting the data to 129 occupations, because of insecure information in a residual category of non-agricultural family assistants and others. Second, I use only individuals who are working on the cutoff date of 30th June of every year⁹. I only use workers covered by social security who work full-time or part-time, and individuals on apprenticeships, but I ignore the marginally employed, who have been included in the dataset since 1999. Before 1999 trainees, individuals in partial retirement and working students were treated as general

⁸ See Table A.2.1 in the Appendix for the list of 130 jobs. These jobs are aggregated from the German system of job classifications of 1988 (Klassifikation der Berufe 1988).

⁹ Other surveys for Germany, such as that of Beblo et al. (2008), also use this cut-off date. Hutchens (1988, 1991, 1993) and Hirsch et al. (2000) use CPS data with the cutoff date of 31st January. I assume, however, that the summer season gives a more realistic picture of occupational opportunities.

workers who were covered by social security legislation (in German: *sozialversicherungspflichtige Beschäftigte ohne besondere Merkmale*).

Although Eastern Germany has been included since 1992, I focus only on Western Germany. This is because, first of all, I am interested in the long-term effects over almost thirty years, and second because there are still different labor market conditions in the two former German states.¹⁰ To identify pure West German workers I follow the papers of Bachmann and Burda (2010) and Wichert and Wilke (2012), and exclude every person who has ever worked in Eastern Germany¹¹. I am not able to differentiate clearly between workers from the former Eastern and the former Western parts of Berlin. So I exclude observations for the German capital as well.

Because of missing retrospective employment information, I am first able to calculate occupational segregation for 1977. Using Stata routines described by Drews et al. (2007), I compute individual durations of tenure. In the next step I identify workers with less than or more than two years of tenure in a specific firm. Newly-hired workers have moved between occupations or have been unemployed in the previous two years. With this information I am able to draw segregation curves and indices based on occupations. The final dataset includes more than 11 million observations and about 425,000 people per year.

¹⁰ See, for instance, Falk (2002) for a discussion of gender segregation in East and West Germany, and Kohn and Antonczyk (2011) for a broad discussion of the labor market effects of the German re-unification in 1990.

¹¹ It is obvious that this is a strong assumption concerning internal migration. I tried weaker data classifications with similar results in terms of the long-term distributions of the Dissimilarity Indices and Hutchens Square Root Segregation Indices.

Table 2.1: Average Distributions - over Age and Gender (1977-2004)

Men					
Age Groups	Number of Observations	Share of Jobs with newly hired Workers	Number of Occupations	Duncan Index	Hutchens Index
18-34	2,507,476	1,113,936 (44.44%)	129	0.1264818	0.0138378
35-54	2,934,038	538,740 (18.36%)	129	0.1608453	0.0192117
55+	1,145,817	132,208 (11.54%)	129	0.1415790	0.0157255
All	6,587,331	17,853,332 (27.10%)	129	0.1367726	0.0165156
Women					
Age Groups	Number of Observations	Share of Jobs with newly hired Workers	Number of Occupations	Duncan Index	Hutchens Index
18-34	2,018,446	919,216 (45.54%)	129	0.1315002	0.0136558
35-54	2,000,687	432,500 (21.62%)	129	0.1341335	0.0127952
55+	564,539	75,373 (13.34%)	129	0.1459089	0.0136454
All	4,583,672	1,426,998 (31.13%)	129	0.1242098	0.0116221

Source: IABS 1975-2004.

It is known, from other datasets, that measurement errors in occupational information may exist: see, for instance, Kambourov and Manovskii (2008), and Rhein and Trübswetter (2012). Otherwise, because of the administrative origin and the tremendous sample size for the data, I do not suppose that I have any structural problems, such as recall biases. See Table 2.1 for a descriptive overview of newly-hired workers by age and gender.

I follow the ideas of Hutchens (2001, 2004), and present long-term developments in occupational segregation measured by the Dissimilarity Index and the Hutchens Square Root Segregation Index which are discussed above. Both indices are computed separately for three different age groups: the youngest group (those aged 18-34), the second group (those aged 35-54) and the oldest group (those aged 55 and above). I assume that these three groups represent a typical employment structure over the life cycle. Members of the first group will change their occupations more often than members of the others, because of information lags and early-life mismatches. Members of the second group will be more stable in their employment situation, because they will do less job-shopping than the younger people and maybe because their opportunities are more equal. For the last group I expect to find fewer occupational

changes, but a higher occupational segregation. Table 2.2 shows examples of typical occupations for newly-hired older workers.¹²

Table 2.2: Top 10 jobs for newly hired men and women at age 55+ (1980 and 2000)

1980		2000					
Male Jobs	Obs.	Female Jobs	Obs.	Male Jobs	Obs.	Female Jobs	Obs.
Motor vehicle drivers	510	Office specialists	598	Motor vehicle drivers	357	Household cleaners	548
Office specialists	449	Household cleaners	592	Office specialists	311	Office specialists	499
Entrepreneurs, managing directors, divisional managers	375	Salespersons	573	Doormen, caretakers	219	Salespersons	346
Warehouse managers, warehousemen	254	Stenographers, shorthand-typists, typists	153	Stowers, furniture packers / Stores, transport workers	200	Stenographers, shorthand-typists, typists	90
Bricklayers	229	Housekeeping managers / Consumer advisors /... (and others)	159	Entrepreneurs, managing directors, divisional managers	192	Stowers, furniture packers / Stores, transport workers	88
Factory guards, detectives / Watchmen /... (and others)	198	Cooks / Ready-to-serve meals, fruit, vegetable preservers, preparers	163	Factory guards, detectives / Watchmen /... (and others)	135	Housekeeping managers / Consumer advisors /... (and others)	83
Stowers, furniture packers / Stores, transport workers	189	Packagers, goods receivers, dispatchers	78	Household cleaners	124	Cooks / Ready-to-serve meals, fruit, vegetable preservers, preparers	70
Building labourer, general	183	Accountants	83	Other technicians	102	Social workers, care workers / Work, vocational advisers	65
Salespersons	176	Nurses, midwives	54	Salespersons	101	Office auxiliary workers	60
Doormen, caretakers	152	Cutters / Laundry cutters, sewers / Embroiderers / ... (and others)	62	Commercial agents, travellers / Mobile traders	98	Accountants	48

Source: IABS 1975-2004.

¹² I know that some of these jobs are typical of seasonal or fixed-term work, such as security or cleaning jobs.

2.4.2 Empirical Results

From the perspective of the long-term development of occupational segregation in Western Germany, I compare different measures of segregation over the years 1977 to 2004¹³. At first, I draw segregation curves for newly-hired workers. In Figure 2.1 I show segregation for men on the left hand side and segregation for women on the right. In general, segregation is higher for women than for men, and older women have the highest segregation. The curves do not intersect, so they can be interpreted in terms of domination. The curves for the youngest age groups are closest to the equality line, so segregation is the lowest. The curves for the middle age groups are similar to those for the younger, but the segregation is greater. For the oldest workers the curves are much more shaped, so the oldest age groups have the highest levels of segregation. In the second step I plot the Dissimilarity Index D for men and women separately, to identify major trends in occupational segregation over the time span. In each of the figures I plot the smoothed value of the D indices for the three age groups. The pattern of employment change differs with age and gender.

Figure 2.2 shows the distribution of occupations for men. While in the 1970s all age groups are far apart, from the 1990s onwards the groups seem to converge with each other. While the segregation curves present clear evidence that occupational segregation is highest for older workers, the pattern of the D Index does not clearly prove this result for men. Most of the time, the middle age group has the lowest set of occupational opportunities. This might be a hint that the D index is not sensitive enough for smaller observation groups such as the oldest age groups. Figure 2.3 shows the distribution of opportunities for women. The female distribution is different to the male one.

¹³ For robustness checks, I tried the analysis with different randomly drawn sub-samples. The measures of segregation showed similar results.

Figure 2.1: Segregation curves males and females (1977-2004, over all years)

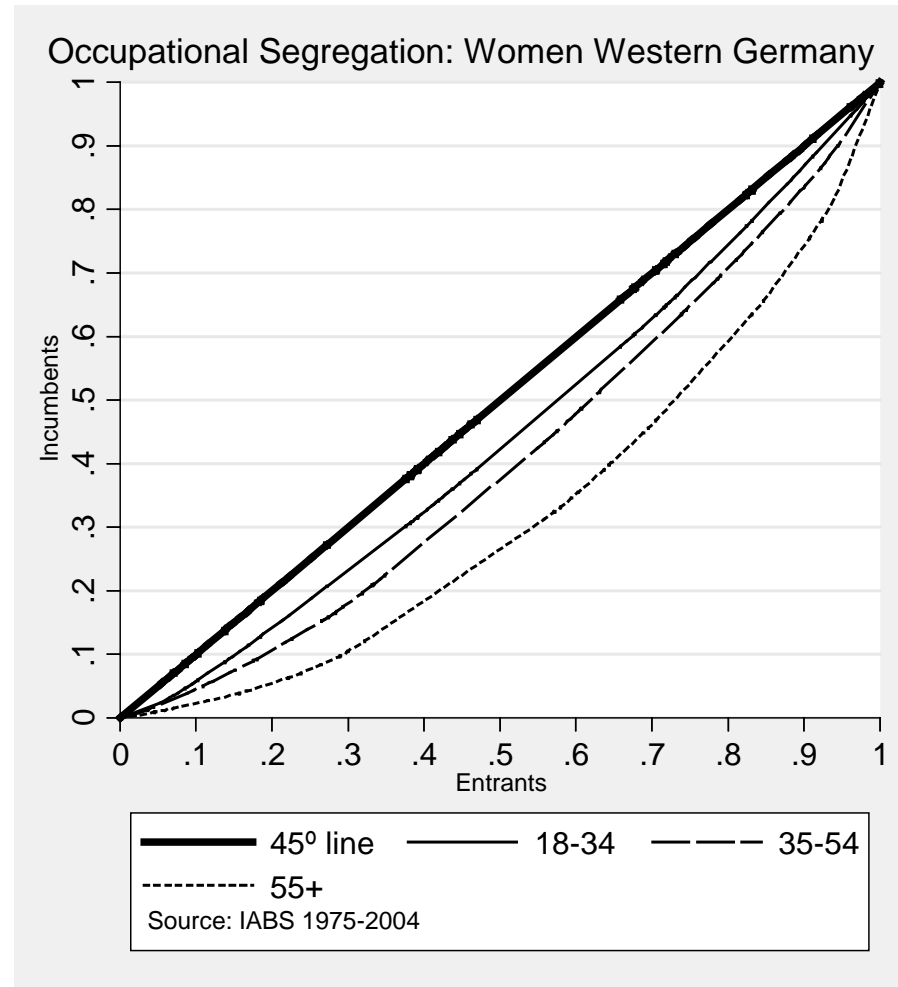
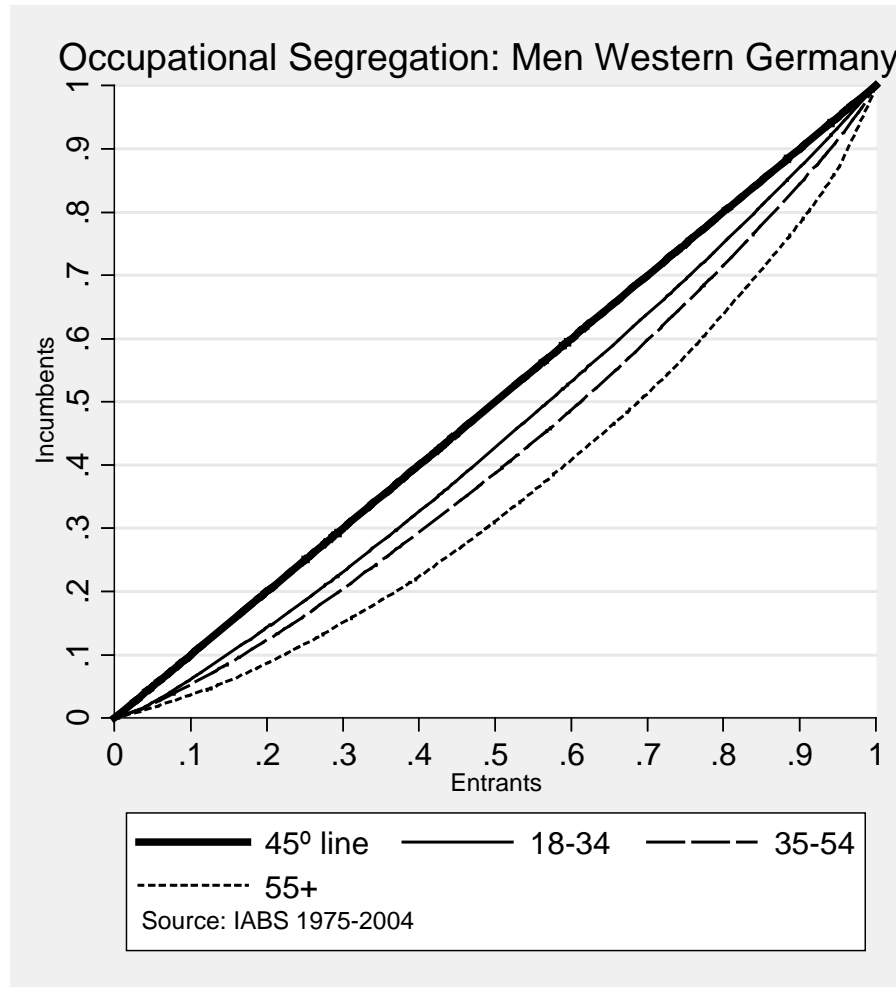


Figure 2.2: Duncan Index for West German men (smoothed by 5 years moving average)

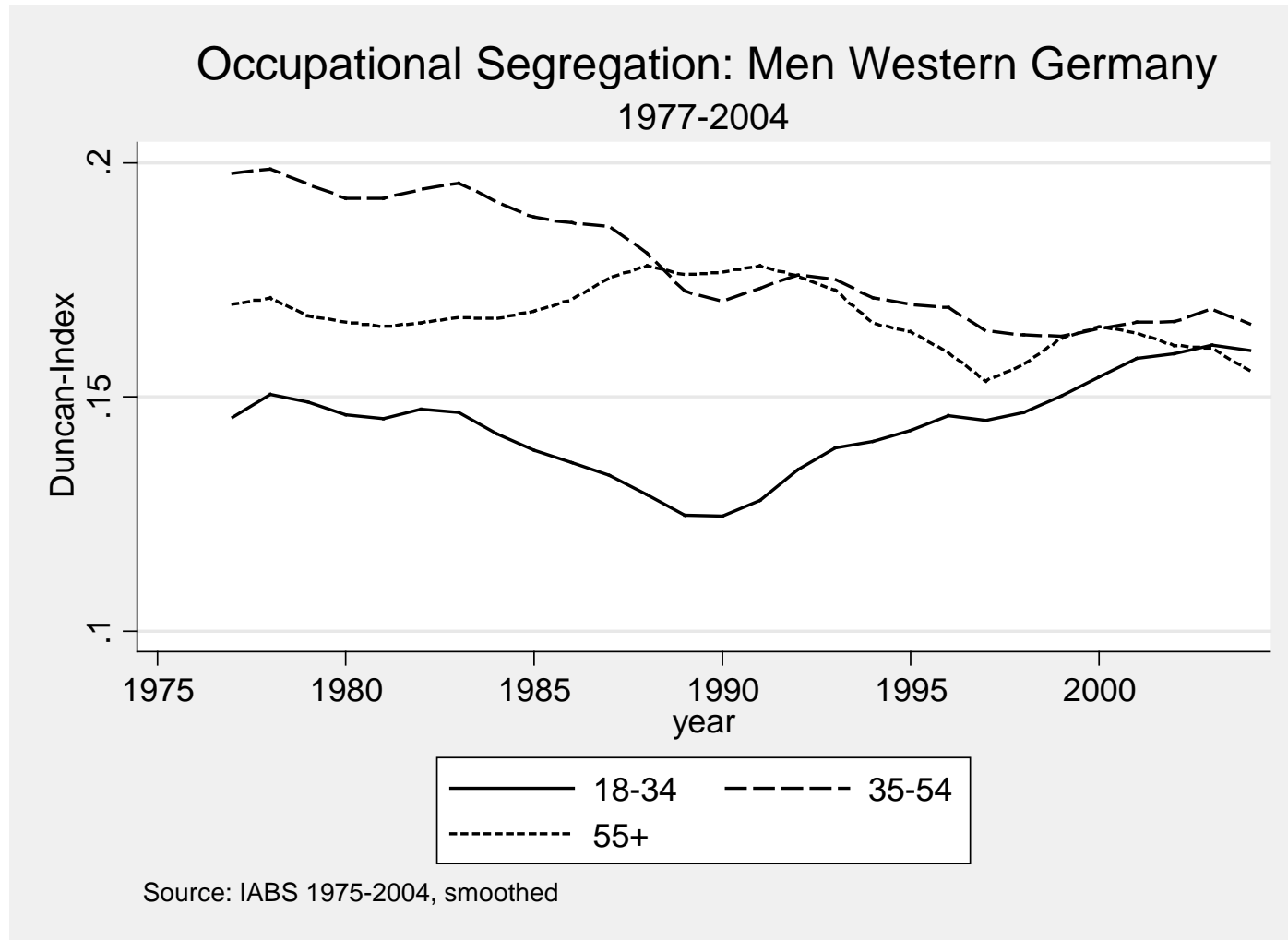
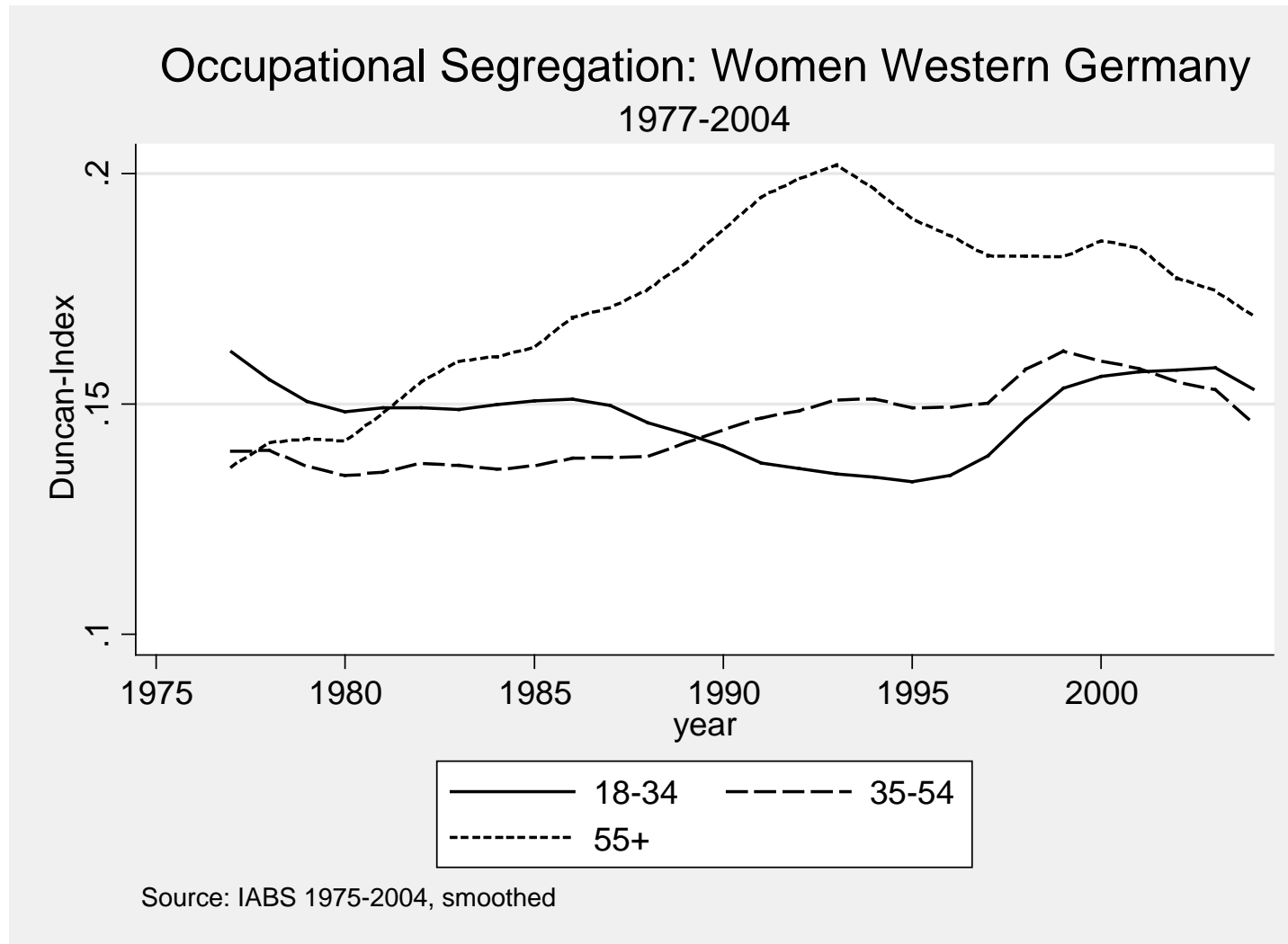


Figure 2.3: Duncan Index for West German women (smoothed by 5 years moving average)



There is a wider range of occupational segregation over time. Apart from in the 1990s, segregation of the youngest group is higher than that of the middle age group. Although in the 1970s all age groups are close to each other, later they tend to grow apart, and they only converge slightly at the end of the time span. Until the early 1990s, the values of the *D* Index increase for the oldest group of women. After this point in time, segregation declines. There is evidence that hiring older women tends to be a much bigger problem than hiring older men. The female results are close to those of other papers on German gender segregation. Beblo et al. (2008) decompose the Dissimilarity Index and show that declining gender segregation between 1996 and 2005 in Western Germany was driven by changes in occupational composition and gender composition.¹⁴

Because of these mixed results I present the Hutchens Square Root Segregation Index *H* over the time span. The pattern of employment change differs with age and gender. Again I show separate figures for men and women, to identify major trends in occupational segregation over the time span. In each of the figures, I present the plotted value of the *H* indices for the three age groups. Figure 2.4 shows the smoothed distribution of opportunities for men. While in the 1970s the age groups are all far apart, at the end of the time span the groups seem to converge with each other. The coefficients discussed in this section are taken from the original Hutchens Square Root Segregation Index *H*. The youngest age group, 18 to 34, has a slight increase from 1977 (0.017)¹⁵ to 2004 (0.020). The highest values are in the year 2000 (0.026)

¹⁴ Beblo et al. (2008) use linked employer-employee data (LIAB) for three different years with 290 occupations for each. They report that firms which are less segregated by gender employ higher shares of female, part-time, and more highly educated workers.

¹⁵ To interpret the values of the indices, it is less the size itself than the change over time that is important. This is in fact what Figures 2 to 5 show.

and the lowest values in 1987 (0.013) and 1990 (0.013). While the smallest values are in the late 1980s, there is a strong increase in the 1990s, with peaks in 1993 (0.023), 1997 (0.022) and 2000 (0.026). This shape can be described as slightly u-shaped. The H index of middle-aged West German men declines considerably over time, from 0.030 in 1977 to 0.024 in 2004. After a peak in 1984 (0.032), occupational segregation declines until 1990 (0.019). With another slight increase after German unification, segregation tends to be stable. Beginning in the second half of the 1970s, the oldest age group has a slight decrease from 1977 (0.023) to 2004 (0.018). After a low in 1980 (0.019), segregation rises in the 1980s and the early 1990s. There are peaks in 1988 (0.030), 1992 (0.030), and 2000 (0.039), with a temporary decline in 1998 (0.018). It is obvious that the oldest age group has a different shape from the others. Hiring of older workers seems to be much more sensitive towards the situation of younger workers.

Figure 2.5 shows the distribution of opportunities for women. While in the 1970s all age groups are close to each other, later they tend to grow apart, and they only converge slightly at the end of the time span. In a similar way to the youngest males, the female group of those aged 18 to 34 has a slightly u-shaped profile over time. Starting with a first peak in 1977 (0.021), the values decline in two waves. The first low is in 1981 (0.015), and the second one in 1992 (0.012). Later, there is another increase in segregation, with two peaks, in 1997 (0.018) and in 1999 (0.026), and a decline until 2004 (0.018). In contrast to the men, the H index of middle-aged West German women has a very different trend over time. From 1977 (0.013) to 2004 (0.015) there is a slight increase in segregation. Until 1987 (0.017), and with the index having its lowest value in 1980 (0.012), the middle-aged group is less segregated than the younger one.

Figure 2.4: Hutchens Square Root Segregation Index for West German men (smoothed by 5 years moving average)

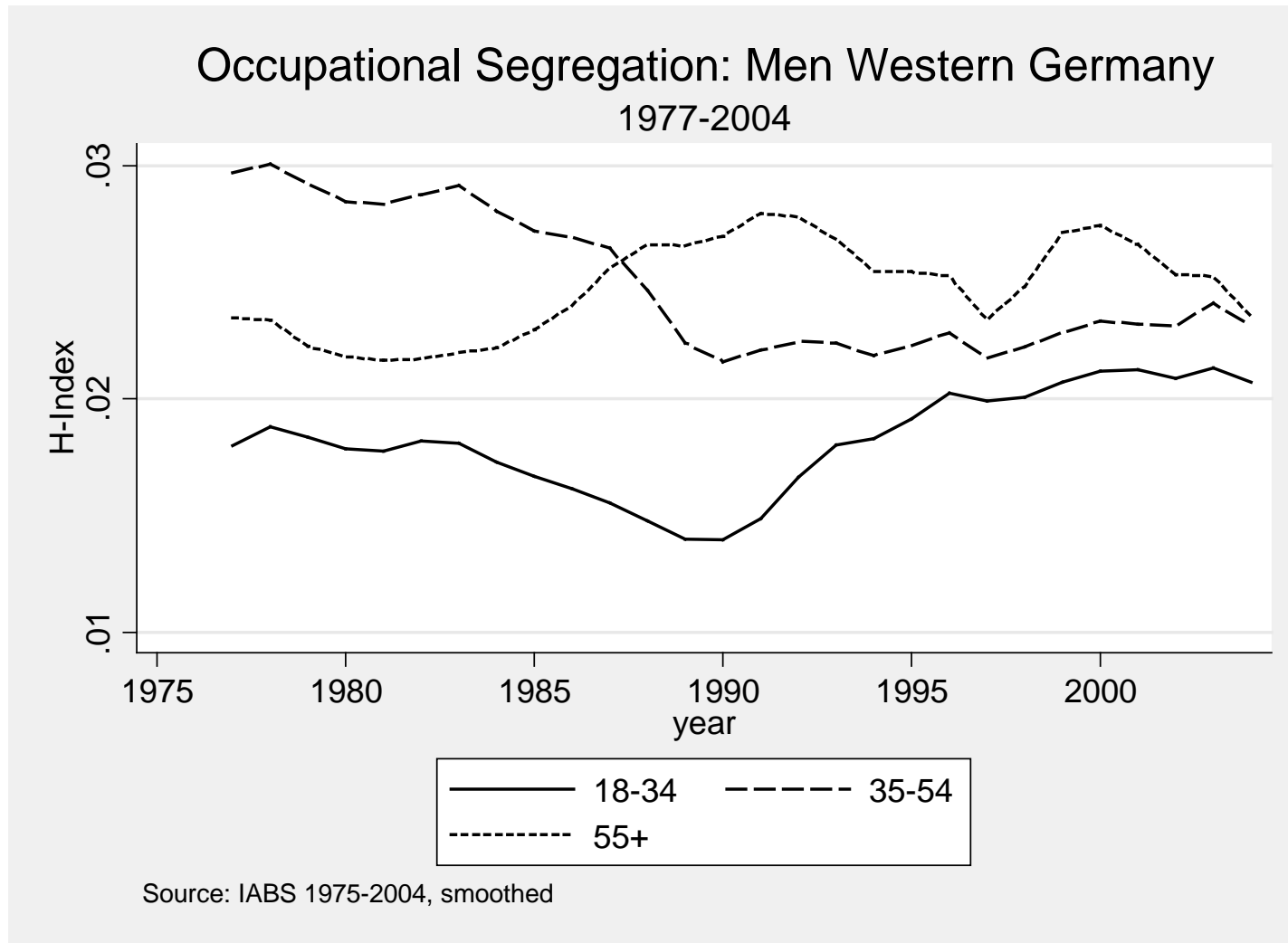
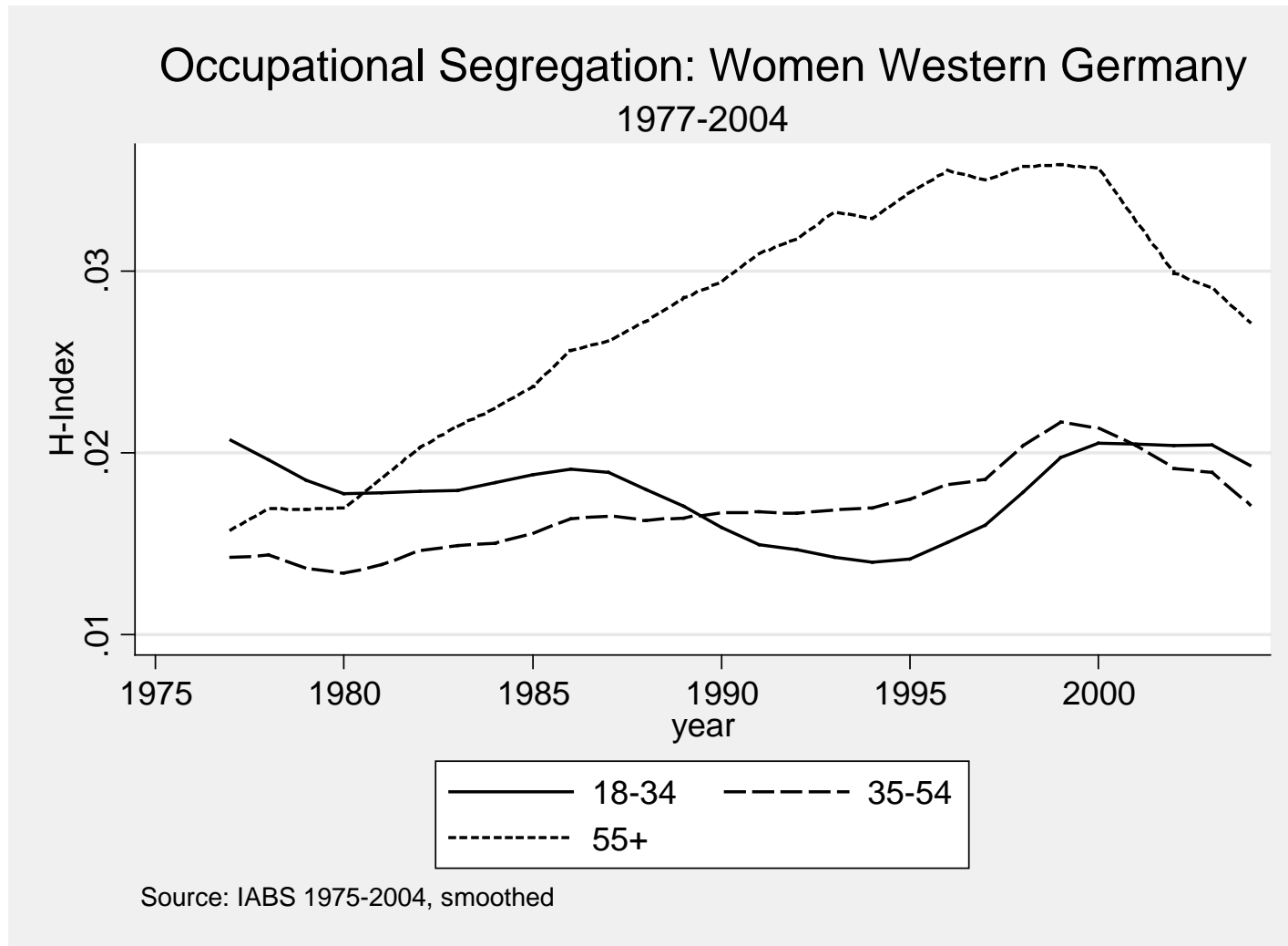


Figure 2.5: Hutchens Square Root Segregation Index for West German women (smoothed by 5 years moving average)



Then the two lines converge and run fairly parallel. I find a slight increase until the middle of the 1990s, and two peaks, in 1997 (0.022) and 1999 (0.028). After the millennium, segregation declines. The oldest age group has faced a rapid increase and strong fluctuations in occupational segregation over time. Starting at the minimum value in 1977 (0.014), there is a nearly linear increase in the 1980s, with peaks in 1982 (0.027) and in 1990 (0.032). After temporary declines in 1991 (0.030) and 1995 (0.029), the highest measurements are in 1996 (0.041) and 2000 (0.040). After 2000, segregation of newly-hired older women hardly declines. It should be kept in mind that this group has the smallest number of observations, and its members do not always work in all of the 129 types of occupation. In some years there are only around 120 occupations in which female workers in this age group change their employment. As I discovered for the men, female segregation may also tend to converge.

The findings presented above are similar to other European results (Del Rio and Alonso-Villar (2010), Dygalo (2007), and Ilmakunnas and Ilmakunnas (2012)), but contrary to those for the US. There have always been fewer opportunities for older women than for older men in France and Spain, and increasing measures of segregation in the 1990s until the millennium in Finland. Hirsch et al. (2000) show no increase in old age segregation from the 1980s until the middle of the 1990s, and more equal distributions of older hired women than of older men.

Comparing the distributions of male and female workers over time, I detect some trends of convergence of gender-related segregation. In the youngest and middle age groups, women have a less segregated employment situation. In the oldest group, I find the opposite. Here female workers have much higher values of the H index than male workers. Beginning in the second half of the 1990s, the indices for middle-aged workers run parallel. Before that time,

the lines converged because the male index decreased and the female one increased. In the oldest group I find a parallel run of the lines, but a preceding increase in female segregation, beginning in the middle of the 1990s.

The higher female occupational segregation for the oldest age group may be driven by increasing female employment rates over time. Men older than the age of 55 have traditionally higher employment rates than women of this age, but the rates for females have a stronger growth. The curves may be explained by changes in labor and retirement policies in Germany.

See Table 2.3 for a short overview of the relevant changes in the German labor and retirement laws. Maetzke and Ostner (2010) report an initial boost of gender equality in the 1960s and 1970s. Since oral contraceptives are legal available a sudden drop in birthrates happen. Under government of social-democratic chancellor Schmidt a reform on the law on marriages and divorce starts. The law of 1977 regulates that husband and wife should equally work at home and on the labor market. This means, inter alia, that a wife do not need any permission of her husband to outside the household. In the case of divorce the richer partner has to compensate the poorer one.

Feil et al. (2008), and Eichhorst and Marx (2011) give an overview of the government of the christian-democratic chancellor Kohl. In the middle of the 1980s, the late 1990s and the early years of this century in particular, important structural changes happened in Germany. These changes may have had different effects on old age occupational segregation. On the one hand, early retirement was promoted by German politicians in 1984 and 1989, because of high unemployment rates.

Table 2.3: Changes in German Social Policies over the Time Span

Years:	Policy Changes:
1972	Retirement age fixed at age 63, for handicapped people fixed at age 62
1973	Government stop the guest worker program started in 1955 "Anwerbestopp"
1977	New law on marriage (married women were allowed to work without husbands permission) "Erstes Gesetz zur Reform des Ehe- und Familienrechts"
1980	Retirement age for handicapped people lowered to age 60
1983	Law on support for returning guest workers "Rückkehrhilfegesetz"
1984	Law on early retirement "Vorruhestandsgesetz"
1985	Law on employment promotion "Beschäftigungsförderungsgesetz" (Changes in 1990 and 1994)
1986	Law on child benefit and parental leave "Erziehungsgeldgesetz" (Changes in 2004)
1989	New law on early retirement "Altersteilzeitgesetz"
1992	Pension reform
1992	Retirement age increased to age 65
1996	Retirement age for handicapped increased to age 63 and reforms on employment promotion "Arbeitsrechtliches Beschäftigungsförderungsgesetz"
1997	New reforms on employment promotion "Arbeitsförderungsreformgesetz"
1998	Third Book of the Social Code "3. Sozialgesetzbuch - SGB III" (collection of former reforms on employment promotion)
1999	Crucial monthly income level for marginal employment (level of 630 DM)
2001	Pension reform
2001	Legal right of part-time employment and liberalization of fixed-term contracts "Teilzeit- und Befristungsgesetz"
2002	Law on job activation "Job AQTIV-Gesetz"
2003-2005	Second Book of the Social Code "2. Sozialgesetzbuch - SGB II" (collection of strong labor market reforms)
2003	Laws on labor market flexibility "1. Gesetz für moderne Dienstleistungen am Arbeitsmarkt" (with liberalisation of temporary employment, but equal treatment),
2003	Laws on labor market flexibility "2. Gesetz für moderne Dienstleistungen am Arbeitsmarkt" (with monthly income level for marginal employment ("Mini Job" with 400 Euro, "Midi Job" with 800 Euro))
2004	Law on labor market flexibility "3. Gesetz für moderne Dienstleistungen am Arbeitsmarkt"
2005	Law on labor market flexibility "4. Gesetz für moderne Dienstleistungen am Arbeitsmarkt" (with merge of unemployment benefits and social benefits to „Arbeitslosengeld II“)
2007	New law on parental benefit and parental leave "Elterngeld- und Elternzeitgesetz"

Sources: Feil et al. (2008), Maetzke and Ostner (2010), Ostner (2010), Eichhorst et al. (2010), and Eichhorst and Marx (2011).

Early retirement schemes should lower the number of older workers on the labor market and may cause occupational segregation to decline, as long as the distribution between occupations does not change. On the other hand, in 1985 and more strongly by way of reforms in 1990 and 1994, politicians tried to deregulate the labor market by the introduction of part-time employment schemes and fixed-term contracts. The retirement age was increased in 1992 to take the pressure off the public pension system. These changes in policies should have increased the number of older workers and may have increased occupational segregation, as long as the distribution between occupations remained the same. In additional

reforms in 1996 and 1997, employment promotions should have achieved more employment flexibility. Ostner (2010) discuss that the law on child benefit and parental leave from 1986 is an initial protection against dismissal for individuals on parental leave, especially for women. After the German unification in 1990 two different family policies have to be merged. While in West Germany a traditional male breadwinner model dominates, albeit a dual earner model in Eastern Germany.

Feil et al. (2008), and Eichhorst et. al (2010) present the structural changes of later government of social-democratic chancellor Schröder. In 1998, previous reforms on employment promotions were collected into the Third Book of the Social Code, SGB III. In 2001, individuals were given the legal right to change from full-time employment to part-time, and fixed-term contract regulations were brought in by the government. The Second Book of the Social Code, SGB II, was introduced from 2003 to 2005, to encourage unemployed individuals to return to work. Among other groups, older individuals could improve their skills by training, and find better jobs. Ostner (2010) shows that since 2002 family politics turn toward promotion of dual earner families and of early child education, e.g. by a new law on parental benefit and parental leave introduced in 2007.

These more flexible policies should increase the number of older workers and so make occupational segregation even higher. But this was not the case. Because of the great effects of implementing part-time work and fixed-term contracts, older workers may be distributed over a bigger set of occupations, and segregation should decline. If these considerations are true, then a policy of labor market flexibility has lowered occupational segregation for older workers in Germany.

2.5 Conclusion

The empirical literature on segregation is mostly on the topic of gender segregation. In this descriptive paper I turn to the questions of age and gender. Being inspired by the work of Robert Hutchens (1986, 1988, 2001, 2004), I focus on occupational segregation of newly-hired older workers in Western Germany.

I use the regional file of the IAB Employment Sample (IABS-R04), a rich dataset with information covering almost thirty years. Computing segregation curves and different indices, I plot figures for men and women for three different age groups (18-34, 35-54, and 55 and older). First of all, I can show that both age- and gender-specific segregation do exist in Germany. It is not only the difference between men and women, but also the difference between young and old, that plays a role in the range of employment opportunities. I compare the results of the Dissimilarity Indices and the Hutchens Square Root Segregation Indices, and find fairly similar results for the youngest and the middle-aged groups. While the *D* Index shows age segregation only for the oldest women, the *H* Index presents much clearer results. There is evidence for a long-term decline in occupational segregation for both genders in Western Germany. While the opportunities for men seem to converge for the three age groups, women are more segregated with age. The group of women over the age of 55, in particular, seems to face the greatest segregation in the labor market. While newly-hired male and female workers in the age groups of 18 to 34 and 35 to 54 have quite a similar distribution in terms of the indices, the group of workers older than 55 is different. Beginning in the 1980s, segregation for older male workers tended to rise until the early 1990s and to decline later. Around the late 1990s there was a temporary increase. For older female workers, the distribution I describe is similar, but stronger. Beginning in the 1980s, segregation rose

until the middle of the 1990s. Later it tended to remain stable and it declined in the early years of this century.

My descriptive findings above are close to the literature for European countries (Del Rio and Alonso-Villar (2010), Dygalo (2007), and Ilmakunnas and Ilmakunnas (2012)), but contrary to that for the US (Hirsch et al. (2000)). There have always been fewer opportunities for older women than for older men in France and Spain, and increasing measures of segregation in the 1990s for Finland. As Vandenberghe (2011) shows, the special case of older women's employability may be based on a lack of productivity. Hirsch et al. (2000) show no increase in old age segregation from the 1980s until the middle of the 1990s, and more equal distributions of older hired women than of older men.

Both curves for the oldest age groups may be explained by changes in labor and retirement policies in Germany. In the middle of the 1980s, the late 1990s and the early years of this century, in particular, important structural changes occurred. While early retirement schemes were initially used to decrease the old age labor supply, later on, part-time employment and fixed-term contracts should have raised it. This shows that appropriate matching and better working conditions may help to increase employment opportunities even for older workers. So in the future, the participation of older workers in the labor market may be fostered by introducing more flexible working arrangements.

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2.7 Appendix

Table A.2.1: List of Occupations

Numbers	Occupations:
1	Farmers / Winegrowers / Animal breeders / Fishermen / Managers in agriculture and animal breeding / Agricultural engineers, agriculture advisors / Milkers / Family-member land workers, n.e.c./ Animal keepers and related occupations
2	Land workers
3	Gardeners, garden workers
4	Garden architects, garden managers / Florists / Forestry managers, foresters, hunters / Forest workers, forest cultivators
5	Miners / Mechanical, electrical, face workers, shot firers / Stone crushers / Earth, gravel, sand quarries / Oil, natural gas quarries / Mineral preparers, mineral burners
6	Stone preparers / Jewel preparers / Stoneware, earthenware makers / Shaped brick, concrete block makers
7	Ceramics workers / Frit makers / Hollow glassware makers / Flat glass makers / Glass blowers (lamps) / Glass processors, glass finishers
8	Chemical plant operatives / Chemical laboratory workers
9	Rubber makers, processors / Vulcanizes
10	Plastics processors
11	Paper, cellulose makers / Packaging makers / Book binding occupations / Other paper products makers /
12	Type setters, compositors / Printed goods makers / Printers (letterpress) / Printers (flat, gravure) / Special printers, screeners / Copiers / Printer's assistants
13	Wood preparers / Wood moulders and related occupations / Wood products makers / Basket and wicker products makers /
14	Iron, metal producers, melters / Rollers / Metal drawers
15	Moulders, coremakers / Mould casters / Semi-finished product fettlers and other mould casting occupations
16	Sheet metal pressers, drawers, stampers / Wire moulders, processors / Other metal moulders (non-cutting deformation)
17	Turners /
18	Drillers / Planers / Borers / Metal grinders / Other metal-cutting occupations
19	Metal grinders
20	Metal polishers / Engravers, chasers / Metal finishers / Galvanisers, metal colourers / Enamellers, zinc platers and other metal surface finishers
21	Welders, oxy-acetylene cutters / Solderers / Riveters / Metal bonders and other metal connectors
22	Steel smiths / Container builders, coppersmiths and related occupations / Sheet metal workers / Pipe, tubing fitters
23	Plumbers
24	Locksmiths, not specified / Building fitters / Sheet metal, plastics fitters
25	Engine fitters
26	Plant fitters, maintenance fitters
27	Steel structure fitters, metal shipbuilders
28	Motor vehicle repairers
29	Agricultural machinery repairers / Aircraft mechanics / Precision mechanics
30	Other mechanics / Watch-, clockmakers
31	Toolmakers
32	Precision fitters n.e.c. / Precious metal smiths / Dental technicians / Ophthalmic opticians / Musical instrument makers / Doll makers, model makers, taxidermists
33	Electrical fitters, mechanics
34	Telecommunications mechanics, craftsmen
35	Electric motor, transformer fitters / Electrical appliance fitters / Radio, sound equipment mechanics
36	Electrical appliance, electrical parts assemblers
37	Other assemblers
38	Metal workers (no further specification)
39	Spinners, fibre preparers / Spoolers, twistors, rope makers / Weaving preparers / Weavers / Tufted goods makers / Machined goods makers / Felt makers, hat body makers / Textile processing operatives (braiders)
40	Cutters / Laundry cutters, sewers / Embroiderers / Hat, cap makers / Sewers, n.e.c. / Other textile

	processing operatives / Textile dyers / Textile finishers
41	Clothing sewers
42	Leather makers, catgut string makers / Shoemakers / Footwear makers / Coarse leather goods finishers, truss makers / Fine leather goods makers / Leather clothing makers and other leather processing operatives / Hand shoemakers / Skin processing operatives
43	Bakery goods makers / Confectioners (pastry)
44	Butchers / Meat, sausage goods makers / Fish processing operatives
45	Cooks / Ready-to-serve meals, fruit, vegetable preservers, preparers
46	Wine coopers / Brewers, maltsters / Other beverage makers, tasters / Tobacco goods makers / Milk, fat processing operatives / Flour, food processors / Sugar, sweets, ice-cream makers
47	Bricklayers
48	Concrete workers
49	Carpenters / Scaffolders
50	Roofers
51	Paviors / Road makers / Tracklayers / Explosives men (except shotfirers) / Land improvement, hydraulic engineering workers / Other civil engineering workers
52	Building labourer, general
53	Earth movers / Other building labourers, building assistants, n.e.c.
54	Stucco workers, plasterers, rough casters / Insulators, proofers / Tile setters / Furnace setter, air heating installers / Glaziers / Screed, terrazzo layers
55	Room equippers / Upholsterers, mattress makers
56	Carpenters / Model, form carpenters / Cartwrights, wheelwrights, coopers / Other wood and sports equipment makers
57	Painters, lacquerers (construction)
58	Goods painters, lacquerers / Wood surface finishers, veneerers / Ceramics, glass painters
59	Goods examiners, sorters, n.e.c.
60	Packagers, goods receivers, despatchers
61	Assistants (no further specification)
62	Generator machinists / Winding engine drivers, aerial ropeway machinists / Other machinists / Crane drivers / Earthmoving plant drivers / Construction machine attendants / Machine attendants, machinists' helpers / Stokers / Machine setters (no further specification)
63	Mechanical, motor engineers
64	Electrical engineers
65	Architects, civil engineers
66	Survey engineers / Mining, metallurgy, foundry engineers / Other manufacturing engineers
67	Other engineers
68	Chemists, chemical engineers / Physicists, physics engineers, mathematicians / Building technicians
69	Mechanical engineering technicians
70	Electrical engineering technicians
71	Measurement technicians / Mining, metallurgy, foundry technicians / Chemistry, physics technicians / Remaining manufacturing technicians
72	Other technicians
73	Foremen, master mechanics
74	Biological specialists / Physical and mathematical specialists / Chemical laboratory assistants / Photo laboratory assistants
75	Technical draughtspersons
76	Wholesale and retail trade buyers, buyers /
77	Salespersons
78	Publishing house dealers, booksellers / Druggists, chemists (pharmacy) / Pharmacy aids / Service-station attendants
79	Commercial agents, travelers / Mobile traders
80	Bank specialists / Building society specialists
81	Health insurance specialists (not social security) / Life, property insurance specialists
82	Forwarding business dealers
83	Tourism specialists / Publicity occupations / Brokers, property managers / Landlords, agents, auctioneers / Cash collectors, cashiers, ticket sellers, inspectors
84	Railway engine drivers
85	Railway controllers, conductors
86	Motor vehicle drivers

87	Navigating ships officers / Technical ships officers, ships engineers / Deck seamen / Inland boatmen / Other water transport occupations / Air transport occupations
88	Post masters / Radio operators / Telephonists
89	Postal deliverers
90	Warehouse managers, warehousemen
91	Transportation equipment drivers
92	Stowers, furniture packers / Stores, transport workers
93	Entrepreneurs, managing directors, divisional managers
94	Management consultants, organisers / Chartered accountants, tax advisers
95	Members of Parliament, Ministers, elected officials / Senior government officials / Association leaders, officials
96	Cost accountants, valuers
97	Accountants
98	Cashiers
99	Data processing specialists
100	Office specialists
101	Stenographers, shorthand-typists, typists
102	Data typists
103	Office auxiliary workers
104	Factory guards, detectives / Watchmen, custodians / Soldiers, border guards, police officers / Firefighters / Safety testers / Chimney sweeps / Health-protecting occupations / Arbitrators / Judicial administrators / Legal representatives, advisors / Judicial enforcers
105	Doormen, caretakers
106	Domestic and non-domestic servants
107	Journalists / Interpreters, translators / Librarians, archivists, museum specialists
108	Musicians / Artists' agents / Visual, commercial artists / Scenery, sign painters / Artistic and assisting occupations (stage, video and audio) / Interior, exhibition designers, window dressers / Photographers / Performers, professional sportsmen, auxiliary artistic occupations
109	Physicians / Dentists / Veterinary surgeons / Pharmacists
110	Non-medical practitioners / Masseurs, physiotherapists and related occupations
111	Nurses, midwives
112	Nursing assistants
113	Dietary assistants, pharmaceutical assistants / Medical laboratory assistants
114	Medical receptionists
115	Social workers, care workers / Work, vocational advisers
116	Home wardens, social work teachers
117	Nursery teachers, child nurses
118	University teachers, lecturers at higher technical schools and academies / Gymnasium teachers / Technical, vocational, factory instructors / Music teachers, n.e.c. / Sports teachers / Other teachers
119	Primary, secondary (basic), special school teachers
120	Economic and social scientists, statisticians / Humanities specialists, n.e.c. / Scientists n.e.c. / Nursing staff / Ministers of religion / Members of religious orders without specific occupation / Religious care helpers
121	Hairdressers / Other body care occupations
122	Restaurant, inn, bar keepers, hotel proprietors, catering trade dealers
123	Waiters, stewards
124	Others attending on guests
125	Housekeeping managers / Consumer advisors / Other housekeeping attendants / Employees by household cheque procedure
126	Laundry workers, pressers / Textile cleaners, dyers and dry cleaners
127	Household cleaners
128	Glass, buildings cleaners
129	Street cleaners, refuse disposers / Vehicle cleaners, servicers / Machinery, container cleaners and related occupations
130*	Non-agricultural family assistants, n.e.c. / Trainees with recognised training occupation still to be specified / Interns, unpaid trainees with recognised training occupation still to be specified / Workforce (job seekers) with occupation still to be specified
*	excluded because of insecure job information

Source: IABS 1975-2004.

Chapter 3

Explaining Age and Gender Differences in Employment Rates: A Labor Supply-Side Perspective

Abstract¹⁶

This paper takes a labor supply perspective (neoclassical labor supply, job search) to explain the lower employment rates of older workers and women. The basic rationale is that workers choose non-employment if their reservation wages are larger than the offered wages. Whereas the latter depend on workers' productivity and firms' decisions, reservation wages are largely determined by workers' endowments and preferences for leisure. To shed some empirical light on this issue, we use German survey data to analyze age and gender differences in reservation and entry wages, preferred and actual working hours, and satisfaction with leisure and work.

Keywords: Age; Family Gap; Gender; Job Search; Labor Supply; Reservation Wages

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3.1 Introduction

Empirical observation of most labor markets reveals the lower (re-)employment probability of female and older workers. In Germany, employment rates decline with age after the maximum is reached at prime ages between 30 and 50 years for men and 40 to 50 years for women (see Table 3.1). It can also be seen that women in all age categories have lower employment rates than men. This employment gap increases with age among younger individuals until the age of 30 to 35 years, declines among middle-aged individuals, and increases again for older individuals after the age of 50. Thus, the disadvantage from which women suffer may emerge during motherhood but is still an evident problem for older women. Non-employment often leads to individual hardship (e.g. lower consumption standards) and is also associated with burdens on society because taxpayers have to finance unemployment benefits or early retirement schemes. In times of demographic change, it is a challenge for policy and human resource management to activate the resources of female and older people in the labor market to maintain a sufficiently large labor supply. Furthermore, demographic change has brought financial problems for public retirement schemes, so that many countries have recently increased the mandatory retirement age (e.g. 65 to 67 years in Germany). It is, however, questionable whether older workers still have the necessary employment skills. Most of the political discussion focuses on labor demand-side factors, i.e. if the productivity of older workers still matches the wages paid, and assumes that old workers still want to work. This assumption might not always be correct. For example, the active participation of workers in early retirement schemes is well-known. In this paper, we explore age and gender differences in labor supply. More specifically, we analyze reservation and entry wages, preferred and actual working hours, and satisfaction with leisure and jobs.

Table 3.1: Age and Employment Rates (in %) for Germany

Age Groups	2007			2008		
	Men	Women	M-W	Men	Women	M-W
15 - 20	34.9	29.6	5.3	35.5	29.2	6.3
20 - 25	74.6	67.6	7	74.7	68.5	6.2
25 - 30	86.7	75.9	10.8	86.7	76.2	10.5
30 - 35	94.9	77.4	17.5	94.6	76.4	18.2
35 - 40	96.4	80.4	16	96.0	80.1	15.9
40 - 45	95.6	83.7	11.9	95.6	83.6	12
45 - 50	94.4	83.9	10.5	94.2	83.9	10.3
50 - 55	91.4	79.2	12.2	90.9	79.7	11.2
55 - 60	82.7	66.7	16	83.3	67.5	15.8
60 - 65	45.1	27.4	17.7	46.6	29.4	17.2
> 65	5.3	2.4	2.9	5.7	2.5	3.2
Total: 15 - 65	81.6	69.2	12.4	81.8	69.6	12.2

Source: Federal Statistical Office (Destatis), Mikrozensus 2007 and 2008.

One stream of the literature on economics and industrial relations analyzes the labor demand side to explain age and gender-specific employment gaps (e.g. discrimination, productivity and wages). Another stream looks at the labor supply side. The neoclassical standard textbook model of labor supply and the job search theory both assume that individuals only choose employment over non-employment if the offered wage is larger than the reservation wage. If women and older workers on average suffer a greater difference between reservation wages and offered wages compared with men and younger workers, the employment probability of women and older workers will be lower. For example, age might have a stronger positive effect on reservation wages (e.g. owing to higher preference for leisure) than on offered wages (e.g. owing to depreciation of human capital), which decreases the average employment probability of older workers. For women, one might expect that leisure preferences and reservation wages would increase during motherhood, whereas productivity and, consequently, offered wages are not positively affected. Because of human capital depreciation, employment interruptions may even lead to lower wage offers and therefore hamper the integration of women and especially mothers in the labor market.

We use large-scale household panel data from Germany (GSOEP: German Socio-Economic Panel) to analyze average age and gender differences in reservation wages, entry wages as proxy for offered wages, preferred and actual working hours, and leisure and job satisfaction. In the context of reservation wages, we also make a methodological contribution by showing the importance of hourly information. Our analyses focus on the years 2007 and 2008, because these are the only years for which we can compute hourly reservation wages. Previous research has largely used weekly or monthly reservation wages, which are not suitable for analyzing age and gender differences. If, for example, female and older workers prefer to work fewer hours than men and younger workers, their weekly or monthly reservation income is, *ceteris paribus*, lower. This might even be the case if their hourly reservation wages are larger but not large enough to compensate for fewer working hours. In our empirical analysis, we find that older workers indeed have larger hourly reservation wages but lower monthly reservation wages owing to their preference for working fewer hours. The estimated age effects are greater for women than men. We further find that the presence of children in the household increases reservation wages and reduces the supplied working hours of women, whereas no significant effects are detected for men. Although our econometric analysis is largely descriptive, we find consistent evidence that older workers and mothers have higher preferences for leisure and higher reservation wages, which might explain the observed gaps in employment rates.

This paper is structured as follows. The next section summarizes the theoretical background derived from labor supply and job search models as well as previous empirical studies. Section 3 describes the data, variables, and methods. The regression results are presented in Section 4. The paper concludes with a summary and discussion of the findings in Section 5.

3.2 Theory and Previous Research on Reservation Wages

3.2.1 Labor Supply and Job Search

In this section we present two standard textbook models of labor supply decisions. First, we present the neoclassical labor supply model (e.g. Borjas 2009, chapter 2) and, second, a basic on-the-job search model (e.g. Cahuc and Zylberberg 2004, chapter 3). Each of them is enriched with a discussion of age and gender-related effects on reservation wages.

In the neoclassical model, reservation wages are defined as the marginal rate of substitution between leisure and consumption at the initial non-working income and no hours of work. We assume that individuals are heterogeneous with respect to age and gender, which affects reservation wages and individual labor supply decisions. Following several authors such as Lazear (1979, 1986), Heckman (1974) and Chang (1991), we interpret reservation wages as the shadow price of leisure. Lazear (1979) assumes in his deferred compensation model that reservation wages increase with age. Heckman (1974), Lazear (1986), and Chang (1991) discuss different shapes of reservation wage profiles in the context of lifecycle models and retirement decisions. In the traditional family model, men should offer more hours of working time than women. This may be explained by the necessity to earn additional household income for the family. As regards women, we assume there are differences between mothers and childless women. Non-mothers decide between leisure and working time, whereas mothers take additional time exposures into consideration for household production (e.g. care for their children) (Browning 1992). Mothers with high wages, however, have the opportunity to buy childcare on the market.¹⁷ In general, however, mothers have a lower time budget which they can allocate to market work. Moreover, mothers might have higher preferences for

¹⁷ Miller (2011) notes that highly educated women benefit from delaying childbirth in terms of higher wages and better career opportunities.

non-market work and leisure because they want to spend time with their children. Both considerations lead to a larger marginal rate of substitution between leisure time and consumption goods and, consequently, to mothers' higher reservation wages.

Concerning age, we offer the following considerations. Younger people are likely to have lower reservation wages than older ones because of a lower level of endowment of consumption goods. Older individuals, on the other hand, can lower their labor supply or even retire, because of a higher endowment of consumption goods. After a long working life they should have a higher level of non-market income or wealth and should have accumulated a stock of goods (e.g. lifetime savings, real estate, financial assets, legacies, greater unemployment benefit entitlement). These larger endowments should lead to a larger marginal rate of substitution between leisure time and consumption goods for older individuals. It also seems likely that older individuals have higher preference for leisure, because they might want to utilize their stock of accumulated goods and might already be exhausted by long working careers. If a partner has already retired from work, an older non-employed person might want to spend more time with him/her. In the words of Gordon and Blinder (1980, p. 278), "(...) as people age, their preferences may shift in favor of leisure and against work," from which it follows that older individuals are likely to have higher reservation wages and, consequently, lower employment rates.

For the job search model we will follow the influential works of Mortensen (1970) and McCall (1970). Surveys like those by Mortensen and Pissarides (1999) and Rogerson et al. (2005) describe different model-specific options like on-the-job-search models, matching theories or labor market policy implications.¹⁸

¹⁸ Black (1995) adduces an enriched search model with firm discrimination. In the model there is one firm which does not hire one of two workers, because of distaste. There is another firm which employs both workers

Once again, we focus on age and gender effects on reservation wages. First, public transfers raise the non-working income and lead *ceteris paribus* to higher reservation wages. Unemployment benefits for instance depend on payoffs from the last job. Although wages increase over the lifespan, older individuals receive higher unemployment benefits and non-working income increases as well. The reservation wages of older individuals are higher and the duration of search is longer. Women on average face fewer transfers than men because of a higher share in part-time employment with lower income. In this context non-working income is smaller and female reservation wages are lower. Because mothers receive additional child-related public compensation transfers, non-working income and, consequently, reservation wages are higher. This leads to a longer duration of search for mothers. Hunt (1995) and Steiner (2001) calculate hazard rates for Western Germany based on GSOEP data. Hunt shows that an increase in entitlement to unemployment compensation increases the duration of unemployment. Steiner argues that the older non-employed and women with young children have lower probabilities of being employed than young men or childless women. Fitzenberger and Wilke (2010) confirm the findings using German employment data. They show an overall increase in duration of non-employment, but not for job searchers between jobs. Kunze and Troske (2012) analyze the effect of plant closures on job-search behavior. Using Western German social security data, they find that women of fertile age have the lowest job search intensity, but gender differences in displacement time are statistically different only for younger women, with an exception around the age of 55. Women younger than 25 and in the mid-forties have wage losses from 5 to 8 percent after re-

equally. The model shows that the existence of a discriminating firm on the market leads to higher search costs and lower reservation wages for the discriminated worker. Because of monopsonic market power, the non-discriminating firm offers lower market wages to this worker, as well. The discriminated worker has to accept poorer job matches with lower market wages, and lower job satisfaction. This model shows why minority groups such as older or female individuals are limited in terms of their labor supply decision.

employment.¹⁹ As regards Western Germany many authors discuss wage losses for mothers returning to work. Schönberg and Ludsteck (2007), Sommerfeld (2009), and Beblo et al. (2009) report a drop in wages of around 10 to 20 percent per year, whereas Ejrnæs and Kunze (2011) report 3 to 6 percent. Schönbeck and Ludsteck (2007) show that extension of maternity leave increases delay in returning to work.

According to Hutchens (1988), older employees have a smaller range of career possibilities than younger people. Chan and Stevens (2001) show for the USA that older individuals have low probabilities of being re-employed after job loss. We further assume that ability to use modern information technologies and career networks can differ for older individuals and for women. Less access to formal and informal information concerning job offers reduces reservation wages. Men and women should have equal ability in terms of using information technologies. According to Schleife (2006), however, older people have poorer computer skills than younger people. Higher search costs reduce non-working income and lead to declining reservation wages. The quantity and the quality of career networks can influence the job offer rate. A larger network may lead to more contacts with firms and more job offers. A better-quality network should lead to better information concerning specific firms and their job openings and characteristics. Search costs should decline, because of better matching quality and fewer contacts with firms. Cappellari and Tatsiramos (2010) show that both network effects exist. The number of employed friends increases the probability of re-employment. These jobs are better paid and have lower lay-off risks. We assume that the career network increases in the early years of working life and shrinks near retirement age. Therefore, older job searchers should have smaller networks than younger people. Women

¹⁹ Kunze and Troske (2007) analyze the effects of US plant closures. Using National Longitudinal Survey of Youth data (NLSY), they report longer search time for women of fertile age than for women with additional children. Search behavior of older workers was not observed.

may have smaller network groups among the working population, as well. This may apply particularly to mothers who have been not employed owing to family responsibilities.

In the light of the above, older individuals, women, and especially mothers may report higher reservation wages and may be less effective in finding jobs. Mothers may be time-constrained because of childcare arrangements and experience wage losses after returning to work. Older individuals may turn towards leisure activities because of higher endowment levels and shifting preferences.

3.2.2. Previous Empirical Findings

A large part of the theoretical and empirical literature on reservation wages is concerned with macroeconomic aspects such as unemployment rates and public unemployment insurances (Shimer and Werning 2007; Ljungqvist and Sargent 2008), which are beyond the scope of this paper. Therefore, we summarize only selected empirical studies that are of special relevance here (see Table 3.2).

A review of the literature reveals that most authors use monthly information concerning reservation wages (Kiefer and Neumann (1979) and Feldstein and Poterba (1984) for the United States; Maani and Studenmund (1986) for Chile; Jones (1989) for Great Britain; Gorter and Gorter (1993) for the Netherlands). We provide a more detailed review for Germany. Franz (1982) shows a positive effect of public unemployment compensation on unemployment duration in Western Germany. Schmidt and Winkelmann (1993) use official unemployment data for Western Germany to show a positive effect on male reservation

Table 3.2: Chronological Overview of Previous Studies on Reservation Wages

Study: Author	Data: Country, Source, Years	Reservation Wages Variables, Methods	Findings
Kiefer / Neumann (1979)	USA, Survey, 1969-1973	Reservation Wages weekly, Maximum-Likelihood,	Reservation Wages decline over Duration of Unemployment
Gordon / Blinder (1980)	USA, LRHS, 1969-1973	Reservation Wages hourly (calculated), OLS	Reservation Wages increase with Age and bad Health, decline with Marriage, mixed Effects for Children (Sample: only Men).
Franz (1982)	Germany, Unemployment Register, 1976	Reservation Wages monthly, OLS	Unemployment Compensations increase over Duration of Unemployment.
Feldstein / Poterba (1984)	USA, Current Population Survey, May 1976	Reservation Wages monthly, OLS	Unemployment Insurances increase Duration of Unemployment.
Maani / Studenmund (1986)	Chile, Survey, 1981-1982	Reservation Wages monthly, OLS, 2SLS	Reservation Wages decline over Duration of Unemployment (Sample: only Men).
Jones (1989)	Great Britain, Economist Intelligence Unit, 1982,	Reservation Wages monthly, OLS	Last Wages influence Reservation Wages positive. Higher Reservation Wages for Men, especially for Husbands.
Schmidt / Winkelmann (1993)	Germany, Federal Secretary of Labor, 1978	Reservation Wages monthly, OLS	Reservation Wages decline with Duration of Unemployment. Higher Reservation Wages for Men. No Significance for Age.
Gorter / Gorter (1993)	Netherlands, SEP, 1985-1987	Reservation Wages monthly, OLS, 2SLS,	Reservation Wages increase with Age and educational Level.
Bloemen / Stancanelli (2001)	Netherlands, SEP, 1987-1990,	Reservation Wages monthly / hourly, OLS, IV	Inverse u-shaped Effect of Age on Reservation Wages. Wealth increase Reservation Wages.
Prasad (2001)	Germany, GSOEP, 1984-1997	Reservation Wages monthly, OLS,	Inverse u-shaped Effect of Age on Reservation Wages. Marriage and Children lower Reservation Wages.
Prasad (2004)	Germany, GSOEP, 1984-1997	Reservation Wages monthly, OLS,	Higher Reservation Wages for married Men. Children increase only Men's Reservation Wages.
Christensen (2005)	Germany, GSOEP, 1984-2000	Reservation Wages monthly, OLS, IV	Reservation Wages constant over Duration of Unemployment. Reservation Wages higher than last Market Wages.
Addison et al. (2009)	13 European Countries, ECHP, 1994-1999	Reservation Wages hourly, RE, FE	Reservation Wages constant with Duration of Unemployment. Unemployment Benefits increase Reservation Wages.
Brown et al. (2010)	Great Britain, BHPS, 1991-2004	Reservation Wages, hourly, OLS,	Reservation Wages and Market Wages increase with Age, decline after Age 55. No Effect of Health on Reservation Wages (Sample: only Men).
Pannenberg (2010)	Germany, GSOEP, 2004-2006	Reservation Wages monthly, OLS, FE	Risk Aversion lower Reservation Wages. Reservation Wages lower with Duration of Unemployment.
Brown et al. (2011)	Great Britain, BHPS, 1991-2007	Reservation Wages hourly, Oaxaca Decomposition	Reservation Wages is higher for Men. Reservation Wages lower with Duration of Unemployment.
Krueger / Mueller (2011)	USA (New Jersey), Survey, 24 weeks in 2009-2010	Reservation Wages hourly, OLS, probit	Reservation Wages increase with Age, decline after Age 50. Reservation Wages close to last Market Wages. Amount of Job Search Time decline over Unemployment Duration.

wages but no effect on socio-demographic variables. Several studies use monthly reservation wages of West Germany GSOEP data. Prasad (2001, 2004) reports mixed results for family status and children. Age is limited to 55 years. Prasad (2001) shows that marriage or children lower reservation wages, whereas higher education raises it. Because of a squared function for age, reservation wages increase in the early years and decline around the age of forty. Prasad (2004) presents similar results for age groups and higher reservation wages of married men. Children have a positive effect only on reservation wages for men, not women. Christensen (2005) shows that reservation wages are higher than the last market wages before non-employment. They do not decline with duration of unemployment. This finding suggests a stationary level of reservation wages over time. Christensen reports u-shaped age profiles separately for men and women. Pannenberg (2010) shows that risk aversion and reservation wages are negatively correlated.

We prefer the use of hourly information because of a possible bias in the monthly variable. Technically speaking, monthly wages include both the hourly wage and the number of working hours. This result of optimization may be influenced by the same variables but hypothetically not in the same direction. Unfortunately, only a few sources offer this information. In this context our paper clearly illustrates substantial differences in the measurement of working time. As far as we know, only the latest research uses hourly information, with the exception of Gordon and Blinder (1980). They calculate hourly reservation wages using wage information from the Longitudinal Retirement History Survey (LRHS). Bloemen and Stanca (2001) use the Dutch Socio-Economic Panel (SEP) to show a positive effect of wealth on reservation wages, whereby reservation wages increase until the age of 38 and decline later. Addison et al. (2009) use data from the European Community Household Panel (ECHP) and use cross-country information to investigate a

positive relation between unemployment insurance and reservation wages in 13 countries. Most of them have reservation wages that are constant over the duration of non-employment. Information concerning reservation wages is not always included for every country and every year. The coefficients for age and gender are not reported. The German data, for example, are taken from special administrative data for two years. Using the British Household Panel Survey (BHPS), Brown et al. (2010) compare weekly reservation wages and market wages, but only for men. Both types of wages increase with age, but decline after the age of 55. In the same data, Brown et al. (2011) find lower hourly reservation wages among women, which is interpreted as a positive gender reservation wage gap. Effects of gender and family aspects such as motherhood explain some of the gap. Krueger and Mueller (2011) use hourly reservation wages from weekly interviews based on detailed administrative unemployment information from the state of New Jersey to show that reservation wages are stable in younger and middle ages, but decline after the age of 50.

3.3. Data and Variables

We use representative German household survey data from the German Socio-Economic Panel (GSOEP) (Wagner et al. 2007). As we are interested in non-employed and employed individuals, all pensioners, individuals in military or community service, apprenticeships or training, those who are self-employed or freelancers, and individuals working in family businesses have been excluded from the data. The sample is further restricted to observations of those between 18 and 65 years of age. The age of 18 is the German age of legal majority and 65 is the legal retirement age. Our sample is limited to the years 2007 and 2008 because our variable of main interest, hourly reservation wages, cannot be computed in previous years from the GSOEP data. The sample includes 3,812 observations of 3,022 individuals, with

1,905 observations of 1,522 non-employed individuals concerning reservation wages (617 men and 905 women) and 1,907 observations of 1,757 employed individuals concerning entry wages (819 men and 938 women).

In our empirical analysis we compare the results from regressions for log hourly reservation wages and log hourly entry wages to obtain insights into age and gender differences as potential explanations for differences in observed employment rates. We further compare these results with estimates for log monthly reservation and entry wages in order to evaluate any potential specification bias that might lead to wrong conclusions. Additional regressions for preferred and actual weekly working hours, leisure and job satisfaction are estimated to analyze whether differences in preferences for leisure rather than work are the reason for age and gender differences in reservation wages. Equation (3) presents the basic estimation framework, in which Y_{it} represents the different dependent variables mentioned above for individual i in year t . The main explanatory variables of interest are age groups (18 to 25 years as reference, 26-35, 36-45, 46-55, 56-65) with coefficients α .²⁰ X_{it} denotes a vector of additional explanatory variables with the coefficients β .²¹ ε_{it} is the usual remaining error term. A list of the variables, short definitions, and descriptive statistics for the complete sample are displayed in Table 3.3.

$$Y_{it} = \alpha_1 + \alpha_2 Age_{it}^{[26,35]} + \alpha_3 Age_{it}^{[36,45]} + \alpha_4 Age_{it}^{[46,55]} + \alpha_5 Age_{it}^{[56,65]} + X_{it}\beta + \varepsilon_{it} \quad (3.1)$$

²⁰ Owing to non-linearity and in order to make interpretation of the results easier, we decided to use age groups instead of a specification with continuous age and higher order polynomials. We also experimented with different definitions of age groups. The results are not sensitive to this definition.

²¹ Owing to high collinearity between age and work experience, we do not include work experience in the regressions. We have also estimated specifications with an additional control variable for differences in tenure if possible (only for employed workers in hours and satisfaction regressions). Tenure itself has only a small impact on the outcome variables and does not significantly affect the estimated parameters when compared with our preferred specification without tenure. For consistency reasons, we chose to present the same specifications (without tenure) across all regressions and subsamples.

Table 3.3: Variable List and Definitions

Variable	Definition	Mean (Std. dev.) for complete Sample
Reservation Wages hourly (non-employed)	log Reservation Wages per Hour in Euro. (Reservation Wages monthly / (4.25* Preferred weekly Working Hours))	2.028 (0.438)
Reservation Wages monthly (non-employed)	log Reservation Wages per Month in Euro	6.895 (0.532)
Entry Wages hourly (employed)	log Entry Wages per Hour (only tenure less one Year). (Wages monthly / (4.25*Actual weekly Working Hours))	1.884 (0.503)
Entry Wages monthly (employed)	log Entry Wages per Month (only tenure less one Year)	6.748 (0.771)
Preferred Working Hours (non-employed)	preferred Number of weekly Working Hours (non-employed)	33.425 (11.415)
Preferred Working Hours (employed)	preferred Number of weekly Working Hours (employed)	34.035 (11.261)
Actual Working Hours (employed)	real Number of weekly Working Hours (employed)	35.014 (14.854)
Leisure Satisfaction	Satisfaction with Leisure: Scale 0 to 10 (0:low, 10:high)	6.654 (2.239)
Job Satisfaction (employed)	Satisfaction with Job: scale 0 to 10 (0:low, 10:high)	6.592 (2.602)
Age: 18-25 Years	Dummy for Age: 18-25 Years (Reference)	
Age: 26-35 Years	Dummy for Age: 26-35 Years	0.282 (0.450)
Age: 36-45 Years	Dummy for Age: 36-45 Years	0.256 (0.436)
Age: 46-55 Years	Dummy for Age: 46-55 Years	0.176 (0.381)
Age: 56-65 Years	Dummy for Age: 56-65 Years	0.064 (0.244)
Female	Dummy for being female	0.562 (0.496)
Children	Dummy for having Children under Age of 16 in Household	0.437 (0.496)
Secondary School	Dummy for having a Secondary School Degree ("Unterstufe") (Reference)	
Intermediate School	Dummy for having an Intermediate School Degree ("Mittelstufe")	0.353 (0.478)
Upper School	Dummy for having an Upper School Degree ("Oberstufe")	0.274 (0.446)
Vocational Degree	Dummy for having a Vocational Degree	0.639 (0.480)
College Degree	Dummy for having a College Degree	0.159 (0.366)
Health: good	Dummy for State of Health: good (Reference)	
Health: normal	Dummy for State of Health: normal	0.287 (0.453)
Health: bad	Dummy for State of Health: bad	0.131 (0.337)
Household Income	log adjusted Household Income in Euro	7.651 (0.631)
German	Dummy for having German Citizenship	0.927 (0.260)
Unemployment Rate	German Federal States' unemployment Rate (Information per State and Month, for Rhineland-Palatinate / Saarland information per Regional Directorate and Month)	11.399 (4.606)
Year 2008	Dummy for Year 2008	0.472 (0.499)
Overall Life Satisfaction	Overall Life Satisfaction: Scale 0 to 10 (0:low, 10:high)	6.626 (1.974)
State: Schleswig-Holstein	Dummy for Federal State: Schleswig-Holstein ("Schleswig-Holstein") (Reference)	
State: Hamburg	Dummy for Federal State: Hamburg ("Hamburg")	0.015 (0.121)
State: Lower Saxony	Dummy for Federal State: Lower Saxony ("Niedersachsen")	0.092 (0.290)
State: Bremen	Dummy for Federal State: Bremen ("Bremen")	0.007 (0.084)
State: North Rhine-Westphalia	Dummy for Federal State: North Rhine-Westphalia ("Nordrhein-Westfalen")	0.183 (0.387)
State: Hesse	Dummy for Federal State: Hesse ("Hessen")	0.067 (0.251)
State: Rhineland-Palatinate / Saarland	Dummy for Federal State: Rhineland-Palatinate / Saarland ("Rheinland-Pfalz / Saarland")	0.048 (0.215)
State: Baden-Wuerttemberg	Dummy for Federal State: Baden-Wuerttemberg ("Baden-Württemberg")	0.083 (0.275)
State: Bavaria	Dummy for Federal State: Bavaria ("Bayern")	0.130 (0.336)
State: Berlin	Dummy for Federal State: Berlin ("Berlin")	0.047 (0.211)
State: Saxony	Dummy for Federal State: Saxony ("Sachsen")	0.098 (0.297)
State: Mecklenburg-Western Pomerania	Dummy for Federal State: Mecklenburg-Western Pomerania ("Mecklenburg-Vorpommern")	0.033 (0.177)
State: Brandenburg	Dummy for Federal State: Brandenburg ("Brandenburg")	0.062 (0.241)
State: Saxony-Anhalt	Dummy for Federal State: Saxony-Anhalt ("Sachsen-Anhalt")	0.047 (0.212)
State: Thuringia	Dummy for Federal State: Thuringia ("Thüringen")	0.056 (0.230)

Notes: GSOEP 2007/2008. 3812 observations in complete sample.

Reservation wages are asked about in the GSOEP questionnaire in this way: "How high would your net income or salary have to be for you to take a position offered to you?". This question is asked to individuals without paid employment, but who intend to be engaged in paid employment in the near future. To get hourly information we use a question concerning the preferred weekly working hours of the non-employed, which is included in the survey since 2007: "In your opinion how many hours a week would you have to work to earn this net income?" Entry wages are calculated only for employed individuals with less than one year of tenure. For all wage variables we use a logarithm. Because of implausible interpretation, we drop all observations with wages below one Euro.

Concerning the working time aspects, we compare preferred and actual weekly working hours. We have information about job searchers' preferred hours and for employed individuals can compare their preferred with the actual working time. We also perform regressions for satisfaction with leisure and job that might indicate shifting preferences. Although job satisfaction is only given for employed individuals, satisfaction with leisure is available for all individuals. The satisfaction variables use a Likert scale of ascending order from zero (very unhappy) to 10 (very happy).

We use a set of socioeconomic determinants as explanatory variables. We focus on age and gender aspects and the influence of children on labor supply. Additionally, we control for household income, education, state of health, German citizenship, regional unemployment rate, years, and federal states. We use five age groups (18 to 25 years as reference, 26-35, 36-45, 46-55, 56-65) to allow for nonlinear age effects. In regressions for the complete sample of men and women, we also include a dummy variable for being female. Another dummy variable accounts for the presence of children under the age of 16 in a household. The household income is used as the log of the adjusted monthly net household income. It

includes labor and non-labor income of all household members. Hence, it is a proxy for non-labor income of non-employed individuals and wealth in general. In order to control for differences in education we include secondary school certificates as well as vocational and college degrees. The subjective state of health is measured in three categories: good, normal, and bad. The regressions further take into account German citizenship. In the regressions concerning satisfaction with leisure and work, we control additionally for overall life satisfaction in order to reduce potential omitted variable bias stemming from unobserved heterogeneity.

The regional unemployment rate in the month of the interview is included to control for state and month-specific differences in labor market conditions, which is an important issue (Sestito and Viviano 2011).²² Because of regional aggregations in the GSOEP data, Rhineland-Palatinate and Saarland are treated as one region. Here we use information from the regional directorate of the Federal Employment Agency. In order to control for further regional differences, we include dummy variables for all German federal states. A dummy variable for the year 2008 is included to control for aggregated time effects such as inflation rate.

Before we start our regression analyses in the next section, we present the means of the outcome variables of interest by age group category in Table 3.4. It can be seen that there are gender-specific differences for age. For instance, preferred and actual working hours for males are inverse u-shaped, whereas the female pattern is slightly u-shaped.

²² This information is taken from a long time series of German federal unemployment statistics published on the homepages of the German Federal Statistical Office (<http://www.destatis.de>).

Table 3.4: Means of Outcome Variables of Interest by Age Groups

	Age Categories	Reservation Wages (hourly)	Entry Wages (hourly)	Reservation Wages (monthly)	Entry Wages (monthly)	Preferred Hours (non-employed)	Preferred Hours (employed)	Actual Hours	Leisure Satisfaction	Job Satisfaction
<u>All</u>	18 - 25 Years	7.78	6.08	1,200.93	812.10	36.79	33.91	33.20	7.12	6.91
	26 - 35 Years	8.86	7.70	1,129.11	1,163.28	32.43	35.50	37.19	6.50	7.00
	36 - 45 Years	8.77	8.04	1,082.00	1,197.85	30.88	32.28	33.98	6.45	6.38
	46 - 55 Years	8.52	7.70	1,080.06	1,168.44	33.36	33.81	34.38	6.47	6.06
	56 - 65 Years	8.46	7.91	1,172.19	1,208.39	34.22	35.13	35.77	7.02	5.64
	Total:	8.48	7.48	1,129.05	1,106.28	33.43	34.04	35.01	6.65	6.59
<u>Men</u>	18 - 25 Years	7.80	6.22	1,288.32	913.43	38.99	36.47	36.64	7.27	6.75
	26 - 35 Years	9.17	7.58	1,500.55	1,394.66	39.82	40.18	43.68	6.58	7.01
	36 - 45 Years	8.50	9.05	1,417.45	1,713.81	39.75	39.89	43.77	6.45	6.12
	46 - 55 Years	8.79	8.57	1,292.90	1,649.52	38.13	40.07	42.29	6.14	5.77
	56 - 65 Years	8.75	8.58	1,326.40	1,432.53	36.78	37.71	39.95	6.76	5.67
	Total:	8.52	7.92	1,360.34	1,425.56	38.87	39.21	41.88	6.65	6.44
<u>Women</u>	18 - 25 Years	7.76	5.97	1,121.38	732.37	34.79	31.90	30.49	6.99	7.04
	26 - 35 Years	8.71	7.82	943.98	942.28	28.74	31.02	31.00	6.44	6.99
	36 - 45 Years	8.89	7.27	926.30	807.31	26.76	26.53	26.57	6.45	6.59
	46 - 55 Years	8.29	7.00	895.89	786.89	29.22	28.84	28.11	6.74	6.30
	56 - 65 Years	8.02	6.56	931.07	760.12	30.22	29.99	27.41	7.47	5.58
	Total:	8.45	7.10	968.69	828.06	29.65	29.53	29.03	6.66	6.72

3.4 Results of Regression Analyses

In the first part of our empirical analysis, we estimate log-linear earnings functions in order to evaluate age and gender differences in reservation and entry wages. As information about working hours for stated monthly reservation income is not available before the year 2007, we estimate pooled cross-section OLS (ordinary least squares) regressions for the years 2007 and 2008. First, we turn to our main results for log hourly reservation and log hourly entry wages. Afterwards, we estimate further regressions for log monthly reservation and log monthly entry wages in order to show that the monthly information is unsuitable for some purposes as the results can lead to wrong conclusions.

The regression results for log hourly reservation and log hourly entry wages are displayed in Table 3.5. The first two columns comprise the results for the complete sample. It can be seen that hourly reservation and entry wages increase with age, but that the age effect on reservation wages is greater than that on entry wages. This finding is consistent with our assumption that older workers may remain voluntarily non-employed because their reservation wages are larger than the potential wages for which our entry wages serve as proxies. Women have on average about 6 percent lower reservation wages than men. As the entry wages of women are even lower (by approximately 13 percent), the gap between reservation and entry wages is larger for women, which might partly explain the gender gap in employment rates. The results further indicate a positive correlation between reservation and entry wages, on the one hand, and the presence of children in the household, education, good health, and household income, on the other.

Table 3.5: Log hourly Reservation and log hourly Entry Wages

	All		Men		Women	
	Reservation Wages	Entry Wages	Reservation Wages	Entry Wages	Reservation Wages	Entry Wages
Age: 26 - 35 Years (Ref: 18 – 25)	0.1472*** (0.0288)	0.1315*** (0.0298)	0.1983*** (0.0440)	0.1362*** (0.0448)	0.0901** (0.0371)	0.1572*** (0.0412)
Age: 36 - 45 Years	0.1725*** (0.0302)	0.1659*** (0.0325)	0.1835*** (0.0489)	0.2487*** (0.0492)	0.1362*** (0.0394)	0.1378*** (0.0446)
Age: 46 - 55 Years	0.1752*** (0.0345)	0.1354*** (0.0373)	0.1849*** (0.0526)	0.1898*** (0.0543)	0.1473*** (0.0461)	0.1055** (0.0496)
Age: 56 - 65 Years	0.2268*** (0.0425)	0.1948*** (0.0529)	0.2341*** (0.0570)	0.2360*** (0.0691)	0.2142*** (0.0695)	0.1458* (0.0789)
Female	-0.0660*** (0.0202)	-0.1302*** (0.0206)				
Children	0.0365 (0.0227)	0.0671*** (0.0231)	0.0036 (0.0358)	0.1220*** (0.0328)	0.0680** (0.0295)	0.0165 (0.0322)
School: Intermediate School (Ref: Secondary School)	-0.0170 (0.0230)	0.0733*** (0.0269)	-0.0546 (0.0345)	0.0577 (0.0382)	-0.0073 (0.0315)	0.0755** (0.0376)
School: Upper School	0.1865*** (0.0288)	0.1935*** (0.0318)	0.1998*** (0.0471)	0.1573*** (0.0480)	0.1786*** (0.0367)	0.1976*** (0.0422)
Vocational Degree	-0.0254 (0.0223)	0.0135 (0.0260)	0.0420 (0.0353)	0.0344 (0.0376)	-0.0572** (0.0289)	-0.0160 (0.0344)
College Degree	0.0654* (0.0338)	0.1865*** (0.0337)	-0.0214 (0.0656)	0.1962*** (0.0500)	0.1099*** (0.0388)	0.1657*** (0.0439)
Health: Normal (Ref: Good)	-0.0299 (0.0229)	-0.0030 (0.0235)	-0.0399 (0.0391)	-0.0376 (0.0326)	-0.0209 (0.0285)	0.0145 (0.0327)
Health: Bad	-0.0729*** (0.0282)	-0.0324 (0.0375)	-0.0779* (0.0434)	-0.0511 (0.0684)	-0.0735** (0.0370)	-0.0281 (0.0440)
Household Income	0.0701*** (0.0169)	0.2054*** (0.0225)	0.0927*** (0.0269)	0.3390*** (0.0349)	0.0549** (0.0229)	0.0981*** (0.0283)
German	-0.0404 (0.0438)	0.1327*** (0.0474)	-0.0914 (0.0664)	0.1581*** (0.0599)	-0.0040 (0.0579)	0.1340* (0.0755)
Unemployment Rate	-0.0161 (0.0166)	-0.0085 (0.0167)	0.0121 (0.0300)	-0.0207 (0.0223)	-0.0356* (0.0188)	0.0095 (0.0249)
Year 2008	0.0003 (0.0359)	-0.0218 (0.0327)	0.1059 (0.0655)	-0.0391 (0.0446)	-0.0683* (0.0406)	-0.0111 (0.0474)
Federal States	yes	yes	yes	yes	yes	yes
Constant	1.6160*** (0.2128)	0.0938 (0.2637)	1.0572*** (0.3470)	-0.8232** (0.3700)	1.9041*** (0.2694)	0.6313* (0.3831)
R ²	0.1592	0.2635	0.1761	0.3746	0.1766	0.2023
Adjusted R ²	0.1458	0.2517	0.1442	0.3534	0.1548	0.1789
F-Test	14.1749	20.8078	6.0783	16.5399	11.6065	8.6610
Number of Observations	1,905	1,907	780	888	1,125	1,019
Number of Individuals	1,522	1,757	617	819	905	938

Notes: OLS, robust standard errors in parentheses, levels of significance *** 1%, **5%, *10%, GSOEP 2007/2008.

Owing to significant gender differences in the determinants of reservation and entry wages, our further discussion focuses on separate estimates for men and women.²³ Columns three and four include the results for men and columns five and six those for women. The reservation wages of men do not significantly differ between the ages of 26 to 55 years but are significantly larger for men older than 55. Entry wages for older male workers increase by about the same amount. The results for women are quite different. Whereas their reservation wages strongly increase with age, their entry wages do not. An explanation for this finding may be that the age effects on preferences towards leisure and consumption do not significantly differ between men and women, which leads to small differences in the age effects on reservation wages. Entry wages, on the other hand, depend strongly on productivity, which is positively affected by on-the-job training and negatively by employment interruptions (depreciation of human capital). As women have more frequently interrupted employment biographies than men (owing to, e.g., family responsibilities), their entry wages on average do not increase with age as is the case for men. From our findings it follows that the increasing gap in employment rates might be a result of the increasing gap in the difference between reservation and entry wages.

Another interesting gender difference in the determinants of reservation and entry wages is the effect of the presence of children in the household. Whereas children have no effect on the reservation wages of men, they have significant positive effects on the reservation wages of women. This finding is consistent with our theoretical view that mothers have a tighter time budget, from which time can be allocated to market work, and higher preferences for leisure in order to care for their children. The consequence of these findings is a greater marginal rate

²³ In order to test for statistically different gender effects of age and children, we have also estimated the regressions with interaction terms between the female dummy and the explanatory variables of interest. The results show that most interaction terms are significant. The results are available from the authors on request.

of substitution between leisure and consumption and, hence, larger reservation wages for mothers. Fathers are also likely to have preferences for spending time with their children, which will increase their reservation wages. To compensate for the potential loss of mothers' income and to generate additional income for the children, however, fathers may have to search for jobs with higher intensity and reduce their reservation wages (Browning 1992, p. 1452). We further find that children have a positive effect on male entry wages but not on female entry wages. Although this finding might seem interesting at first glance, we attribute it largely to institutional arrangements of tax reductions and family subsidies, which are usually accounted for on the primary household earner's payroll. The overall results point to the dominance of the conservative family model, wherein the mother is concerned with family work and the father with market work.

To sum up our first piece of empirical evidence, the overall results indicate that women and especially mothers and older women have higher reservation wages but not higher entry wages. From this it follows that these groups have lower probabilities of choosing employment over non-employment, which might explain their lower employment rates.

In the next step, we re-estimate the previous regressions using log monthly reservation and log monthly entry wages instead of hourly wages. Although most previous studies have used monthly reservation wages instead of hourly reservation wages, a conceptual problem arises. Because monthly reservation wages also include the preferred number of working hours which are likely to be influenced by the same variables, albeit not necessarily in the same direction, estimates are likely to be systematically biased and lead to wrong conclusions and policy recommendations.

Table 3.6: Log monthly Reservation and log monthly Entry Wages

	<u>All</u>		<u>Men</u>		<u>Women</u>	
	Reservation Wages	Entry Wages	Reservation Wages	Entry Wages	Reservation Wages	Entry Wages
Age: 26 - 35 Years (Ref: 18 – 25)	0.0300 (0.0364)	0.2623*** (0.0445)	0.2296*** (0.0524)	0.3652*** (0.0616)	-0.0917* (0.0483)	0.2868*** (0.0595)
Age: 36 - 45 Years	0.0309 (0.0377)	0.2507*** (0.0477)	0.2370*** (0.0542)	0.4598*** (0.0641)	-0.0706 (0.0499)	0.2058*** (0.0664)
Age: 46 - 55 Years	-0.0345 (0.0387)	0.1267** (0.0538)	0.1408** (0.0555)	0.3125*** (0.0778)	-0.1500*** (0.0529)	0.0365 (0.0712)
Age: 56 – 65 Years	-0.0264 (0.0502)	0.1099 (0.0798)	0.1516** (0.0649)	0.3017*** (0.0958)	-0.1787** (0.0768)	-0.0120 (0.1302)
Female	-0.3476*** (0.0240)	-0.5675*** (0.0299)				
Children	-0.0833*** (0.0265)	-0.1506*** (0.0322)	0.0201 (0.0368)	0.1536*** (0.0439)	-0.1213*** (0.0364)	-0.4111*** (0.0443)
School: Intermediate School (Ref: Secondary School)	-0.0497* (0.0269)	0.1036*** (0.0396)	-0.0464 (0.0367)	0.0453 (0.0513)	-0.0494 (0.0375)	0.1470*** (0.0556)
School: Upper School	0.1369*** (0.0397)	0.0985** (0.0482)	0.1300** (0.0572)	-0.0388 (0.0663)	0.1659*** (0.0516)	0.1792*** (0.0660)
Vocational Degree	0.0213 (0.0269)	0.1766*** (0.0365)	0.0904** (0.0381)	0.1299*** (0.0497)	-0.0106 (0.0349)	0.1689*** (0.0497)
College Degree	0.1709*** (0.0409)	0.4437*** (0.0493)	0.0509 (0.0631)	0.3913*** (0.0652)	0.2331*** (0.0524)	0.4330*** (0.0666)
Health: Normal (Ref: Good)	-0.0439 (0.0284)	-0.0046 (0.0342)	-0.0494 (0.0423)	-0.0372 (0.0444)	-0.0339 (0.0361)	0.0040 (0.0466)
Health: Bad	-0.0264 (0.0308)	-0.0742 (0.0591)	-0.0661 (0.0431)	-0.1209 (0.0890)	-0.0272 (0.0412)	-0.0217 (0.0737)
Household Income	0.0157 (0.0212)	0.3644*** (0.0325)	0.1489*** (0.0306)	0.5130*** (0.0480)	-0.0727*** (0.0280)	0.2565*** (0.0416)
German	-0.0775* (0.0442)	0.0547 (0.0594)	0.0426 (0.0610)	0.1290* (0.0707)	-0.0982* (0.0569)	0.0987 (0.0955)
Unemployment Rate	-0.0202 (0.0183)	-0.0270 (0.0235)	0.0091 (0.0297)	-0.0160 (0.0302)	-0.0397* (0.0212)	-0.0149 (0.0347)
Year 2008	0.0189 (0.0418)	-0.0522 (0.0462)	0.1190* (0.0684)	-0.0567 (0.0586)	-0.0458 (0.0480)	-0.0328 (0.0664)
Federal States	yes	yes	yes	yes	yes	yes
Constant	7.2950*** (0.2549)	4.0350*** (0.3614)	5.5663*** (0.3964)	2.6868*** (0.4713)	7.9778*** (0.3048)	4.1969*** (0.5230)
R ²	0.1705	0.3286	0.1717	0.3786	0.1307	0.2567
Adjusted R ²	0.1572	0.3179	0.1396	0.3576	0.1076	0.2349
F-Test	13.2320	31.7960	6.2550	16.7539	7.0934	14.4404
Number of Observations	1,905	1,907	780	888	1,125	1,019
Number of Individuals	1,522	1,757	617	819	905	938

Notes: OLS, robust standard errors in parentheses, levels of significance ***1%, **5%, *10%, GSOEP 2007/2008.

If compared with the results for hourly wages in Table 3.5, the results for monthly reservation and entry wages in Table 3.6 illustrate these erroneous conclusions. For example, age has negative effects on monthly reservation and entry wages and the presence of children reduces women's monthly reservation wages. The reason for these findings is, however, not negative effects on hourly reservation and entry wages but negative effects on working hours. Moreover, the gender gaps in reservation and entry wages are substantially larger for monthly than hourly data because women prefer to work on average fewer hours.

In order to validate our statements about the effects of age, gender, and presence of children on working hours, we estimate linear regressions for three outcome variables: (1) preferred weekly working hours by non-employed job searchers, (2) preferred weekly working hours by those who have started a new job within the last year, and (3) actual weekly working hours by those who have started a new job within the last year. The results in Table 3.7 show that preferred and actual working hours decrease with age and that the age effect is stronger for women than for men. We further find that women prefer on average to work fewer hours and actually work fewer hours than men. Women with children in the household prefer to work fewer hours and actually do so, whereas the presence of children does not significantly affect the labor supply of men. The overall findings indicate that women, especially mothers, and older workers voluntarily reduce their supplied working hours, which might be interpreted as the outcome of greater preferences for leisure.

According to the standard labor supply model discussed in the theory section, differences in reservation wages as well as in preferred and actual working hours might be an outcome of leisure preferences. Therefore, we also analyze the effect of age on satisfaction with leisure and job satisfaction. Happiness research in economics has received increasing attention in recent years.

Table 3.7: Preferred and Actual weekly Working Hours

	Preferred Hours (non-employed)			Preferred Hours (employed)			Actual Hours (employed)		
	All	Men	Women	All	Men	Women	All	Men	Women
Age: 26 - 35 Years (Ref: 18 – 25)	-2.8072*** (0.7563)	0.9346 (1.0208)	-4.4669*** (1.0147)	0.7639 (0.7226)	3.4974*** (1.0622)	-0.0707 (0.9276)	3.0895*** (0.9337)	6.6477*** (1.3198)	2.0932* (1.2361)
Age: 36 - 45 Years	-4.0837*** (0.7452)	0.7573 (0.9384)	-5.7636*** (1.0150)	-1.0093 (0.7710)	2.4047** (1.0952)	-2.4865** (1.0292)	1.5538 (0.9664)	5.8160*** (1.3366)	0.2791 (1.3249)
Age: 46 - 55 Years	-5.5939*** (0.7765)	-1.4789 (1.0309)	-8.0066*** (1.0746)	-1.6334** (0.7906)	2.3495** (1.1003)	-4.1717*** (1.0606)	-0.7096 (1.0442)	3.7930*** (1.4622)	-3.1625** (1.4286)
Age: 56 - 65 Years	-6.8624*** (1.0061)	-2.9777** (1.2791)	-10.1251*** (1.6439)	-3.4772*** (1.1047)	0.2108 (1.4860)	-5.6007*** (1.8009)	-2.8735* (1.5385)	1.7414 (2.0876)	-5.7868*** (2.1417)
Female	-7.7125*** (0.4705)			-9.0449*** (0.4618)			-12.3795*** (0.5942)		
Children	-3.0764*** (0.5423)	0.7184 (0.7014)	-5.0129*** (0.7560)	-3.8918*** (0.4866)	0.8612 (0.6651)	-7.8543*** (0.6791)	-5.5372*** (0.6216)	0.6800 (0.8561)	-10.7098*** (0.8468)
School: Intermediate School (Ref: Secondary School)	-0.8089 (0.5532)	0.2234 (0.6973)	-1.1235 (0.7876)	-0.0536 (0.5988)	-0.8587 (0.7948)	0.5422 (0.8199)	1.0936 (0.7758)	-0.1804 (1.0938)	2.1164** (1.0398)
School: Upper School	-1.0673 (0.7571)	-1.1108 (1.0810)	-0.4491 (0.9641)	-2.0580*** (0.7811)	-2.0417* (1.1327)	-2.3708** (1.0552)	-2.0468** (0.9554)	-5.2314*** (1.4443)	-0.0255 (1.2381)
Vocational Degree	1.0325* (0.5647)	1.4039** (0.6859)	0.8436 (0.7503)	3.0667*** (0.5865)	1.6156* (0.8386)	3.8076*** (0.7739)	3.1147*** (0.7388)	1.5797 (1.0462)	3.5434*** (0.9846)
College Degree	2.4035*** (0.8951)	2.4639 (1.5971)	2.4907** (1.0259)	4.3629*** (0.7471)	1.9600* (1.0657)	5.3730*** (0.9931)	6.3456*** (0.9908)	5.4331*** (1.4282)	6.2646*** (1.3119)
Health: Normal (Ref: Good)	-0.2383 (0.5598)	-0.1607 (0.7703)	-0.2152 (0.7216)	0.1881 (0.5312)	0.2448 (0.7400)	0.0931 (0.7089)	0.4025 (0.6688)	-0.0546 (0.9479)	0.5455 (0.8560)
Health: Bad	1.0623 (0.6486)	0.4617 (0.8335)	0.8898 (0.9035)	-0.2834 (0.8385)	0.2880 (1.2526)	0.0761 (1.0371)	-0.2775 (1.1995)	-1.2535 (1.7495)	1.0579 (1.5274)
Household Income	-1.1407*** (0.3980)	1.4748*** (0.5433)	-2.8197*** (0.5349)	-0.0684 (0.4926)	1.1116 (0.7368)	-0.8210 (0.6190)	3.9578*** (0.6178)	4.9854*** (0.9234)	3.4911*** (0.7958)
German	-0.7784 (1.0001)	3.8876*** (1.3251)	-2.3240* (1.3181)	-1.4296 (0.9485)	-0.3105 (1.1026)	-0.7721 (1.4767)	-1.9503 (1.2129)	-1.1907 (1.6065)	-0.2082 (1.6918)
Unemployment Rate	-0.0933 (0.3592)	0.0363 (0.5246)	-0.1645 (0.4711)	-0.1555 (0.3341)	0.0150 (0.4705)	-0.0062 (0.4678)	-0.5432 (0.4646)	0.1214 (0.6687)	-0.7837 (0.6257)
Year 2008	0.3331 (0.8048)	0.4747 (1.1332)	0.2515 (1.0470)	-1.1242 (0.7259)	-1.3710 (1.0443)	-0.3478 (0.9710)	-0.9949 (0.9554)	-1.1127 (1.3734)	-0.5096 (1.2492)
Federal States Constant	yes 52.3702*** (5.0219)	yes 22.3605*** (6.8793)	yes 61.6668*** (6.5655)	yes 41.1011*** (5.4649)	yes 26.3513*** (7.7169)	yes 38.3001*** (7.1140)	yes 15.3961** (6.9622)	yes -0.8641 (10.1976)	yes 8.6833 (8.9957)
R ²	0.2604	0.0823	0.2601	0.2717	0.0721	0.2673	0.2818	0.1374	0.2472
Adjusted R ²	0.2485	0.0468	0.2405	0.2600	0.0407	0.2458	0.2703	0.1082	0.2252
F-Test	23.9937	1.9116	19.2132	25.0348	2.0623	15.7000	28.3786	4.5401	13.3876
Number of Observations	1,905	780	1,125	1,907	888	1,019	1,907	888	1,019
Number of Individuals	1,520	617	905	1,757	819	938	1,757	819	938

Notes: OLS, robust standard errors in parentheses, levels of significance *** 1%, **5%, *10%, GSOEP 2007/2008.

Frey and Stutzer (2002) found that satisfaction is at least somewhat related to the utility concept. We use the information about satisfaction in the relevant domains of leisure and work in order to see if systematic age differences exist. From a *ceteris paribus* perspective, such systematic differences are likely to reflect preference changes with age, because we control for household income as proxy for endowment with wealth. In order to reduce further individual heterogeneity in the estimates, we include a control variable for general life satisfaction. The main result in Table 3.8 is that older individuals are on average happier with their leisure but not with their jobs and that this age effect is stronger for women than for men.²⁴ This finding can be interpreted as with age increasing preferences for leisure relative to work (e.g. Gordon and Blinder 1980), which may explain the higher reservation wages and lower labor supply that result in the lower employment rates of older workers, especially older women.

The results of our reduced-form regressions are largely descriptive, although we control for important differences in socio-economic characteristics and age and gender should be exogenous variables. As robustness checks for our results from the pooled cross-sections 2007 and 2008 we use panel estimation techniques (random and fixed effect linear models) for the years 1997 to 2008 in order to reduce problems stemming from unobserved heterogeneity.²⁵

²⁴ We find a positive effect of children on male satisfaction with jobs, but a negative effect on female satisfaction with leisure. These opposite effects for mothers and fathers may reflect the childcare stress of a traditional family model. See for instance the surveys on parental satisfaction by Hansen (2012), and Margolis and Myrskylä (2011).

²⁵ The complete results of the panel estimates can be found in our longer working paper (Humpert and Pfeifer 2011).

Table 3.8: Satisfaction with Leisure and Job

	Leisure Satisfaction (all)			Leisure Satisfaction (non-employed)			Leisure Satisfaction (employed)			Job Satisfaction (employed)		
	All	Men	Women	All	Men	Women	All	Men	Women	All	Men	Women
Age: 26 - 35 Years (Ref: 18 - 25)	-0.2880*** (0.1054)	-0.4631*** (0.1549)	-0.1178 (0.1459)	-0.3321** (0.1489)	-0.2017 (0.2100)	-0.3002 (0.2119)	-0.1251 (0.1451)	-0.4024* (0.2134)	0.0938 (0.1994)	0.3203** (0.1318)	0.3448* (0.1949)	0.3128* (0.1793)
Age: 36 - 45 Years	-0.0476 (0.1125)	-0.1520 (0.1732)	0.0483 (0.1520)	-0.1694 (0.1603)	-0.2576 (0.2638)	-0.0579 (0.2127)	0.0992 (0.1559)	0.0594 (0.2327)	0.0895 (0.2173)	-0.0087 (0.1489)	0.0407 (0.2338)	0.0250 (0.1924)
Age: 46 - 55 Years	0.0110 (0.1215)	-0.3354* (0.1832)	0.2680 (0.1649)	-0.1354 (0.1730)	-0.5203* (0.2668)	0.2223 (0.2306)	0.1182 (0.1695)	-0.1515 (0.2534)	0.2932 (0.2305)	-0.0740 (0.1632)	-0.0175 (0.2421)	-0.0785 (0.2187)
Age: 56 - 65 Years	0.4875*** (0.1679)	0.2604 (0.2336)	0.7851*** (0.2522)	0.3794* (0.2210)	0.1643 (0.3177)	0.7545*** (0.3213)	0.4146 (0.2539)	0.1617 (0.3373)	0.6215 (0.4088)	-0.1345 (0.2195)	0.0774 (0.2991)	-0.4977 (0.3610)
Female	0.0387 (0.0706)			-0.2256** (0.0992)			0.1790* (0.0972)			0.1368 (0.0898)		
Children	-0.3808*** (0.0773)	-0.1028 (0.1181)	-0.5607*** (0.1038)	-0.5196*** (0.1098)	-0.0856 (0.1667)	-0.6804*** (0.1513)	-0.4642*** (0.1078)	-0.2240 (0.1625)	-0.6501*** (0.1471)	0.1549 (0.0995)	0.4198*** (0.1485)	-0.0777 (0.1365)
School: Intermediate School (Ref: Secondary School)	-0.0782 (0.0880)	-0.0750 (0.1353)	-0.0866 (0.1171)	-0.0050 (0.1197)	0.0647 (0.1835)	0.0486 (0.1593)	-0.0925 (0.1271)	-0.0263 (0.1926)	-0.1704 (0.1722)	0.0633 (0.1200)	-0.0956 (0.1774)	0.1559 (0.1655)
School: Upper School	-0.3790*** (0.0989)	-0.2689* (0.1454)	-0.4525*** (0.1374)	-0.5524*** (0.1316)	-0.5721*** (0.1921)	-0.4148** (0.1855)	-0.1861 (0.1488)	-0.0217 (0.2279)	-0.3667* (0.2037)	0.1145 (0.1359)	0.0675 (0.2022)	0.0675 (0.1900)
Vocational Degree	-0.2893*** (0.0842)	-0.5179*** (0.1330)	-0.0964 (0.1108)	-0.1256 (0.1231)	-0.2394 (0.2060)	-0.0425 (0.1560)	-0.1755 (0.1162)	-0.4404** (0.1754)	0.0349 (0.1597)	-0.0705 (0.1037)	-0.1207 (0.1530)	-0.0510 (0.1432)
College Degree	-0.2617** (0.1116)	-0.3052* (0.1709)	-0.1755 (0.1498)	0.1379 (0.1724)	0.2345 (0.2489)	0.1300 (0.2320)	-0.3802** (0.1489)	-0.4058* (0.2305)	-0.3303 (0.2011)	-0.2595* (0.1349)	-0.1966 (0.2081)	-0.2562 (0.1799)
Health: Normal (Ref: Good)	-0.5488*** (0.0815)	-0.6113*** (0.1240)	-0.4803*** (0.1085)	-0.5641*** (0.1150)	-0.5285*** (0.1775)	-0.5242*** (0.1512)	-0.4847*** (0.1131)	-0.5555*** (0.1672)	-0.4687*** (0.1578)	-0.0913 (0.1022)	-0.3169** (0.1549)	0.0934 (0.1375)
Health: Bad	-0.5538*** (0.1284)	-0.6497*** (0.2030)	-0.4671*** (0.1642)	-0.4228*** (0.1591)	-0.6583*** (0.2453)	-0.1654 (0.2059)	-0.9381*** (0.2047)	-0.8034** (0.3313)	-1.0743*** (0.2624)	-0.6645*** (0.2056)	-1.0775*** (0.3565)	-0.3467 (0.2441)
Household Income	-0.3000*** (0.0583)	-0.3232*** (0.0841)	-0.3098*** (0.0801)	-0.1253 (0.0769)	-0.1193 (0.1068)	-0.1599 (0.1100)	-0.1872** (0.0907)	-0.1764 (0.1404)	-0.2239* (0.1200)	0.0867 (0.0867)	0.0518 (0.1336)	0.0829 (0.1177)
German	0.4549*** (0.1458)	0.4730** (0.2194)	0.4703** (0.1936)	0.2851 (0.2053)	0.0665 (0.3457)	0.4879* (0.2560)	0.5416*** (0.2008)	0.6940** (0.2693)	0.3783 (0.3050)	0.1810 (0.1791)	0.2283 (0.2331)	0.2070 (0.2874)
Unemployment Rate	0.0291 (0.0552)	0.0211 (0.0828)	0.0436 (0.0743)	0.0928 (0.0759)	0.1592 (0.1200)	0.0417 (0.0979)	-0.08 82 (0.0787)	-0.1774 (0.1130)	-0.0194 (0.1094)	0.1117 (0.0684)	0.2210** (0.0995)	0.0140 (0.0955)
Year 2008	0.0793	-0.0003	0.1635	0.1658	0.2177	0.1227	-0.0186	-0.2504	0.1733	0.2729*	0.2921	0.2302

	(0.1172)	(0.1783)	(0.1558)	(0.1693)	(0.2755)	(0.2132)	(0.1606)	(0.2336)	(0.2218)	(0.1397)	(0.2170)	(0.1856)
Overall Life Satisfaction	0.3446***	0.3032***	0.3839***	0.3425***	0.3333***	0.3600***	0.3991***	0.3616***	0.4307***	0.4956***	0.5353***	0.4715***
	(0.0224)	(0.0324)	(0.0309)	(0.0297)	(0.0433)	(0.0411)	(0.0343)	(0.0475)	(0.0493)	(0.0327)	(0.0485)	(0.0448)
Federal States	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Constant	6.5444***	6.8709***	6.2241***	4.9987***	4.0693**	5.2706***	6.1070***	6.8888***	5.9717***	1.5065	0.8322	2.4563*
	(0.7861)	(1.2210)	(1.0345)	(1.0635)	(1.7082)	(1.4012)	(1.1386)	(1.7428)	(1.5072)	(1.0131)	(1.4901)	(1.3693)
R ²	0.1497	0.1568	0.1647	0.1810	0.2340	0.1766	0.1741	0.1607	0.2104	0.2263	0.2892	0.1909
Adjusted R ²	0.1427	0.1414	0.1529	0.1675	0.2034	0.1541	0.1604	0.1313	0.1865	0.2135	0.2644	0.1664
F-Test	20.2095	11.0830	12.6462	13.1800	7.6411	7.8580	12.20	6.44	8.45	14.7355	10.7872	6.7153
Number of Observations	3,812	1,668	2,144	1,905	780	1,125	1,907	888	1,019	1,907	888	1,019
Number of Individuals	3,022	1,323	1,699	1,522	617	905	1,757	819	938	1,757	819	938

Notes: OLS, robust standard errors in parentheses, levels of significance ***1%, **5%, *10%, GSOEP 2007/2008.

The results from the panel estimates generally support our main results from the pooled cross-sections for preferred weekly working hours, actual weekly working hours, and satisfaction with leisure and job.

For our main outcome variables of interest, namely reservation and entry wages, we cannot use panel estimation techniques for the following reasons. First, information about hourly reservation wages is not included in the GSOEP prior to the year 2007. Second, reservation wages can only be observed for non-employed job searchers so that longitudinal information would only be available for the long-term unemployed and individuals who experience repeated unemployment. Third, entry wages are only observed once at the start of an employment relationship.

3.5 Conclusion

In times of demographic change, it is a challenge for policy and human resource management to activate the resources of females and older people in the labor market to maintain a sufficiently large labor supply and to reduce financial problems in retirement schemes. Such an activation strategy is motivated by the empirical observation that employment rates decrease with age among the elderly and are lower for women than for men. Much political concern focuses on the employer side and leads to appeals to recruit more women and older workers. Without neglecting the fact that discrimination is an important issue, our paper has taken the opposite view and has found empirical support for labor supply-side explanations of differences in employment rates. From a theoretical perspective (neoclassical labor supply model, job search models) individuals voluntarily choose non-employment over employment if their reservation wages are larger than the wages offered by firms. We have indeed found

empirical evidence that hourly reservation wages increase with age for men and for women. Hourly entry wages as proxy for offered wages increase with age only for men, however, and not for women, which may partly explain the increasing gender gap in employment rates. These findings differ from previous research. Brown et al. (2010) use British household data (BHPS), but only for men, to show increasing hourly reservation wages until the ages of 45 to 54. In the highest age group of 55 and older, reservation wages decline. This is in contrast with our findings, where hourly reservation wages of males older than 55 are still increasing. These authors have an advantage in terms of their data, however. Whereas in the BHPS reservation wages per hour are collected for years, we have new information in the GSOEP data beginning in 2007. Our result of u-shaped patterns of monthly reservation wages is in line with other researchers using the monthly GSOEP data. In these papers, there are higher monthly reservation wages for men than for women (Christensen 2005; Prasad 2001, 2004; Pannenberg 2010). Christensen (2005) uses squared age functions and reports u-shaped age profiles separately for West German men and women. Prasad (2001, 2004) shows an inverse u-shaped age profile, but has limited the age span to 55, and reports mostly non-significant coefficients.

As a methodological contribution, we show that the specification of the reservation wage as an hourly variable instead of a monthly variable yields more plausible results, because age and gender have simultaneous effects on hourly reservation wages and preferred working hours. Older workers and women prefer to work fewer hours and actually do so. In combination with the result that satisfaction with leisure increases relative to job satisfaction, our findings support the statement of Gordon and Blinder (1980, p. 278) that "(...) as people age, their preferences may shift in favor of leisure and against work." Consequently, the lower employment rates of women and older people can be partly attributed to the labor supply side

and not necessarily to the labor demand side. One active labor market policy could be an effort to increase, or at least maintain, the productivity of women and older workers so that they obtain higher wage offers from firms. This could be accomplished by special training programs inside and outside firms, which are targeted at older people, especially women. Zwick (2012), for example, shows that training for older workers is less effective, because of the methods used. Younger and older workers have different ways of teaching and learning. Second, policy could subsidize employment, especially reintegration in the labor market (e.g. direct transfers, tax reductions), which would also increase offered wages and the employment probability. Such policy measures are costly however and might conflict with the goal of sustainable public debt. Thus, econometric evaluation and simulation studies on the effects of such labor market policies are needed in order to facilitate conclusive policy recommendations.

Furthermore, we have found gender-specific differences in the family context. The presence of children in the household increases the reservation wages of women and negatively affects their labor supply, whereas neither reservation wages nor working hours of men are significantly affected. This is in fact contrary to the results of Prasad. Using monthly reservation wages, Prasad (2001) shows that having children lowers reservation wages in general, and Prasad (2004) finds higher reservation wages for fathers but not for mothers.

These findings point to the dominance of the traditional family model in Germany wherein mothers bear the main responsibility for raising children, voluntarily or involuntarily. In order to activate more mothers for the labor market, firms as well as policy should continue the expansion of more flexible working time schedules and day care for children at the workplace and in the close neighborhood. Especially in the case of Germany, additional full-time school programs might help parents to reduce time restrictions.

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Chapter 4

Somewhere over the Rainbow: Sexual Orientation Discrimination in Germany

Abstract²⁶

This paper observes sexual orientation based differences in German incomes. Gay men and lesbian women sort themselves into different occupations and sectors than their heterosexual counterparts. I find evidence that cohabitating gay men have an income penalty of 5 to 6 percent compared with married men, while lesbian women have a premium of about 9 to 10 percent compared with married women. Lesbians in a registered same-sex union have an income gain of about 12 to 16 percent, while the effect for men is not statistically significant. There is evidence that gay households have 9 to 17 percent higher household income than mixed-sex couples. The results for lesbian household income are not statistically significant.

Keywords: Wage Discrimination, Labor Supply, Sexual Orientation

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4.1 Introduction

There is a significant literature dealing with the gender gap in pay. A much smaller literature deals with a pay gap based on sexual orientation, whether gay, lesbian or bisexual. In recent surveys Brown (1998), Badgett (2006) and Black et al. (2007) show that gay men and lesbian women are differently paid compared with their heterosexual counterparts. This paper uses the recently published wave of the German Mikrozensus (2009) to analyze possible sexual orientation discrimination in earnings. To the best of my knowledge, this is the first paper of its kind focusing on Germany.²⁷

Discrimination can be based on individual distaste, or on statistical distributions. While the former is legally forbidden in Germany, the latter concerns average differences between groups, e.g. in terms of labor productivity.²⁸ If firms discriminate in general against homosexuals in the same way, gays and lesbians should both receive lower wages than heterosexual men and women. But this is not corroborated in the literature. Several authors show that gay men have 15 to 30 percent lower individual income than heterosexual men (Badgett 1995; Klawitter and Flatt 1998; Berg and Lien 2002; Mueller 2007; Zavodny 2008; Drydakis 2012a), while Allegretto and Arthur (2001) and Plug and Berkhout (2004) present a smaller gap of 3 percent. There are mixed results for lesbians and heterosexual women. By analyzing individual income Clain and Leppel (2001), Black et al. (2003), Arabsheibani et al. (2004, 2005), Jepsen (2007) and Antecol et al. (2008) demonstrate that lesbian women are 10 to 30 percent more highly paid than heterosexual women, while Badgett (1995), Elmslie and Tebaldi (2007), Ahmed and Hammarstedt (2010) and Laurent and Mihoubi (2012) show

²⁷ There is a rather descriptive paper by Eggen (2009) on homosexuality in Germany. He uses the 2006 wave of the German Mikrozensus.

²⁸ Since 18 August 2006, Germany has had an equality law (in German: *Allgemeines Gleichbehandlungsgesetz*), that prohibits explicit, inter alia, sexual orientation based discrimination.

mixed, but statistically not significant effects. Drydakis (2011) presents evidence of lower offered wages for lesbian women. Carpenter (2005) and Heineck (2009) present individual income differences even between bisexual men and women, and their heterosexual counterparts. Badgett et al. (2008) argue that both demographic and economic factors play a role in forming a registered same-sex union. While registrations arise for gay couples with income, registrations of lesbian couples arise with age.

Using household information about gay and lesbian couples the results are rather different. Klawitter and Flatt (1998) and Klawitter (2011) note a 7 to 12 percent lower household income for lesbian women. Ahmed et al. (2011a) report income gains for gay couples of about 5 percent and income loss for lesbian couples of between 17 and 22 percent with respect to married homosexual couples. Black et al. (2007) examine higher household income for households of gay men, especially when both partners work. The differences in results may be explained by household specialization. Oreffice (2011) and Antecol and Steinberger (2011) show that cohabitating homosexual and heterosexual couples behave similarly in their household optimization.

There are different theoretical frames when analyzing labor market differences between homosexuals and heterosexuals. The first concerns labor supply decisions and sorting into jobs. According to Blandford (2003) and Black et al. (2007), gay men sort themselves into less male attributed jobs, with maybe lower wages. And lesbian women sort themselves into more male attributed jobs, and receive maybe higher wages. Comparing couples of same and opposite sexes leads to effects of optimization and household specification. Antecol et al. (2008) and Daneshvary et al. (2008) report that sorting plays a lesser role than the effect of human capital accumulation.

The second theoretical frame concerns hiring discrimination. This is variously shown by Weichselbaumer (2003) (Austria), Tilcsik (2011), Leppel (2009) (US), Drydakis (2009; 2011; 2012b) (Greece, Cyprus), Ahmed et al. (2012a) (Sweden), and Patacchini et al. (2012) (Italy)²⁹. In the UK, Frank (2006) reports less career chances for homosexuals, while in Belgium, Van Hove and Lieves (2003) report no sexual discrimination in hiring. Hiring discrimination is an important issue, which unfortunately is not observable in my data.

A major concern in observing homosexual behavior is the case of proper identification. I use the recently published wave of the German Mikrozensus 2009, an official and representative data set. This is the first time that differences in sexual orientation in earnings have been analyzed for Germany. There are two different groups of homosexuals identifiable in the data. While officially registered same-sex unions and self-identified same-sex couples are reliably observable, the identification of hidden homosexual couples requires assumptions to be made.

The general results of the paper are the following. There is clear evidence that occupational and sectoral sorting drives observable earning differences between homosexuals and heterosexuals in Germany. According to the findings of Black et al. (2007), Antecol (2008), and Blandford (2003), gay men sort themselves more into female attributed jobs, while lesbian women sort more into male attributed jobs. Another aspect is specialization of gay and lesbian households. Running several OLS regressions for individual income shows that cohabitating gay men face an earning penalty compared with married heterosexual men of about 5 to 6 percent. The results for gay men in a registered same-sex union are smaller, but not statistically significant. This may be weak evidence for a gay marriage premium.

²⁹ In these studies faked applications are sent to existing firms.

Cohabiting lesbian women have a premium in earnings compared with married heterosexual women of about 9 to 10 percent, while lesbian women in a registered same-sex union have a premium of 12 to 16 percent. By adopting the same approach with regard to household income, the results change. Households of gay men have a household income premium of 9 to 17 percent relative to households with mixed-sex couples. Lesbian households have a small but not significant reduction in household income. This is in line with the literature on household optimization (e.g. Ahmed et al. 2011a).

This paper is structured as follows. The next section summarizes the theoretical background as well as previous empirical studies. Section 3 describes the data, variables, and methods. The empirical results are presented in Section 4. The paper concludes with a summary and discussion of the findings in Section 5.

4.2 Review of Homosexuality in Germany

Before I discuss the data in more detail, I shall give an historic overview of German legislation governing same-sex behavior. Since the founding of the German Reich in 1871, male homosexuality was strictly forbidden. With slightly changes the article 175 of the German criminal code was in legal use till 1994. In Nazi Germany from 1933 to 1945 gay men were attested in concentration camps and murdered. After the end of the Third Reich, Eastern and Western Germany behave differently in criminalizing same-sex behavior. While the German Democratic Republic liberated the law over time and legalize homosexuality of men and women in 1988, the Federal Republic of Germany used the former law of the Third Reich till the 1970s. Indeed, only four years after the German Unification in 1990, same-sex behavior in general was legally permitted (LSVD 2012). In 2001 a significant step in

equalizing same-sex couples and traditional marriages was taken in Germany by implementing a new law on same-sex partners (in German: *Lebenspartnerschaftsgesetz*). This has allowed registered unions between partners of the same sex (in German: *eingetragene Lebenspartnerschaft*). Registration is similar to a traditional opposite sex marriage, but it does not carry the same legal status. Registered same-sex partners are equal in inheritance laws, but not in income taxations.³⁰ Adoptions are only allowed if one partner is the child's biological parent.

But legal equality is not identical with the absence of other discriminations. In the German ALLBUS 2008 data (Terwey and Baltzer 2011), individuals are interviewed about their acceptance of homosexual behavior. While 32 percent of men and 25 percent of women evaluate homosexual behavior as always bad, 24 percent of men and 19 percent of women totally disagree with equal legislation for same-sex marriages (see Figures A.4.1 and A.4.2 in the Appendix). With other data Steffens and Wagner (2004) present similar evidence that the young, female, and highly educated Germans, who live in a metropolis and vote for the ecological-orientated green party, have the most liberal attitudes towards homosexuals.

Table 4.1 provides a historic overview of the numbers of (self-) identified homosexuals in Germany. The numbers are weighted observations based on different waves of the German Mikrozensus. The population can be identified by two different measures: by estimation technique and by questions. As shortly discussed in the introduction section, only registered same-sex unions are clearly self-identified observations. Although the law came into effect in 2001, the German Mikrozensus data first began asking the head of the household about registered same-sex unions in 2006. Since 2006 the numbers of observations increase slowly.

³⁰ Under German tax law members of registered same-sex unions are classified in the higher tax band for unmarried and not in the lower tax class for married individuals.

Table 4.1: Number of Homosexuals in Germany

Year (Month)	Estimation Method	Questioning Method		
	All Households	All Households	Gay Households	Lesbian Households
1996 (April)	124,000	38,000	23,000	15,000
1997 (April)	114,000	39,000	22,000	17,000
1998 (April)	134,000	44,000	25,000	19,000
1999 (April)	128,000	41,000	25,000	16,000
2000 (May)	142,000	47,000	27,000	20,000
2001 (April)	147,000	50,000 (/)	29,000 (/)	21,000 (/)
2002 (April)	148,000	53,000 (/)	31,000 (/)	22,000 (/)
2003 (May)	159,000	58,000 (/)	32,000 (/)	26,000 (/)
2004 (March)	160,000	56,000 (/)	30,000(/)	26,000 (/)
2005 (*)	173,000	60,000 (/)	36,000 (/)	24,000 (/)
2006 (*)	177,000	62,000 [12,000]	39,000 [8,000]	23,000 (.)
2007 (*)	176,000	68,000 [15,000]	44,000 [10,000]	24,000 [5,000]
2008 (*)	186,000	69,000 [19,000]	46,000 [14,000]	23,000 [5,000]
2009 (*)	177,000	63,000 [19,000]	37,000 [12,000]	27,000 [7,000]

[] Registered Same-Sex Unions, (*): several Months, (/): Data not collected, (.): Data not reliable

Source: Hammes and Ruebenach (2010); Federal German Statistics.

In the recent published wave of the Mikrozensus 2009, which is the focus of this paper, there are approximately 19,000 registered same-sex unions identified. These are households that describe themselves as officially registered same-sex unions. This is the absolute lower bound of the sample. There are about 44,000 self-identified same-sex couples (in German: *gleichgeschlechtliche Lebensgemeinschaften*) who have identified themselves as homosexuals. The head of these households and his or her cohabitating partner are of the same gender. The number of non self-identified or hidden homosexuals is bigger. Based on the officially used German Federal Statistics identification strategy³¹, two adults of the same gender, who are not related, but live in one household, and have no other partner there, are declared to be homosexuals. These assumptions have been used since 1996 to observe non-

³¹ For the lower numbers the so-called questioning method is used (in German: *Fragemethode*). For the higher numbers the so-called estimation method is used (in German: *Schätzmethode*). Overall there are 63,000 observed self-identified homosexual couples, with 19,000 same-sex unions and 44,000 same-sex couples. See Hammes and Ruebenach (2010) for a discussion of the data set and the different sampling methods.

self identifying homosexuals in Germany. There are 177,000 hidden same-sex couples in 2009 in Germany. However, the size may be affected, for example, by heterosexual students sharing one flat. It should be kept in mind that all self-identified individuals may be part of a self-selected group, who behave in the public systematically different than the not self-identified homosexuals³².

4.3 Theoretical Considerations and Empirical Evidence

As discussed in the introduction, discrimination can be based on individual distaste, or on statistical considerations. In chapter 10 of his textbook on labor economics Borjas (2008) describes that distaste of an employer against a special group means additional costs of hiring. This leads on one hand to lower hiring rates of homosexuals and on the other hand to unequal payments of equal work, because of the additional costs. In this topic it may be also the case that costumers have a distaste towards homosexuals. This leads to unequal payments, as well. Statistical discrimination is driven by general assumptions of potentially different productivities of different groups. This means different treatments of similar individuals based on one characteristic, e.g. ethnicity or sexual orientation³³.

If firms discriminate generally against homosexuals, gays and lesbians should both receive lower wages than heterosexual men and women. But this is not so clear. Klawitter (2011) and

³² It may be the case, that these people explicit discuss their sexual orientation such as attending gay and lesbian movements or public parades.

³³ It is known from the literature that homosexuals differ from heterosexuals in many ways. They have partners with higher age differences than heterosexuals (Schwartz and Gral 2009), less stable registered same-sex unions, especially for lesbian women (Anderson et al. 2006), a preference for liberal metropolises (Black et al. 2000; Black et al. 2002), and more sexual partners in a life time (Blanchflower and Oswald 2004).

Martell (2012) show that anti-discrimination laws reduce income differences as regards homosexuals in the U.S.

One theoretical frame is based on individual labor supply decisions and sorting into jobs. On the one hand, gay men may sort themselves into less male jobs, with maybe lower wages. On the other hand, lesbians may sort themselves into more male jobs, and receive perhaps higher wages. In fact there is evidence in the literature that these stereotypes of occupational sorting exist. Black et al. (2007) show that in the U.S. gay men have jobs with higher shares of women than heterosexual men. For lesbian women, the distribution is vice versa. Black et al. (2007, p.65) conclude that "gay men are in occupations that are more 'typically female' than other men while lesbian women are in occupations that are less 'typically female' than other women". Furthermore, Antecol et al. (2008) show that in the U.S. gay men are overrepresented in jobs such as healthcare, office administration, education, business and finance, and sales, but underrepresented in jobs involving protection, production, transportation, architecture and engineering, installation and repair, and construction. In contrast, lesbian women have higher shares in jobs involving protection, transportation, architecture and engineering, installation and repair, and construction, but less shares in healthcare, office administration, business and finance, and sales. It is an interesting finding that both gays and lesbians are overrepresented in the arts, science, management, legal, and computer and mathematics. According to Blandford³⁴ (2003), in the U.S. most gay men have jobs of managerial and professional specialty as well as employment in technical, sales, and administrative support. He notes that jobs of professional specialty are identified as female jobs or arts jobs. Lesbian women are overrepresented in service jobs as well as precision

³⁴ Blandford (2003) distinguishes between "open" and "masked" homosexuals. "Masked" homosexuals are married to an opposite sex partner. There are numerous masked gays and lesbians working as operators, fabricators and laborers, but in fact there are about 30 individuals.

production, craft, and repair. Blandford (2003, p. 641) concludes that "a large – and largely unexplained – component of the income differentials may be attributed to highly nuanced occupational clustering related to sexual orientation and gender". Plug et al. (2011) show clearly that homosexual workers select into jobs with tolerant co-workers. Drydakis (2011), moreover, argues that even self-selection into less homosexual-hostile jobs may be interpreted as a kind of indirect discrimination. Laurent and Mihoubi (2012) report the interesting result that gay men face an income penalty in the private and the public sector, although income reduction is smaller in the public sector. Ahmed et al. (2012b) show that for gays and lesbians both income differences are smaller in the public sector. Martell (2012) presents theoretical evidence that homosexual men would accept lower earnings to work in a tolerant firm where they can reveal their sexual orientation more easily.

According to Plug and Berkhout (2008) gay students in the Netherlands have higher human capital investments in language skills and lower in mathematics. Furthermore, they are drawn to fields of study with higher shares of female students. In the U.S homosexuals have on average higher education degrees than heterosexual singles, partnered or married individuals (Black et al. 2000). The latter authors report the interesting finding that gay men are less represented in military service than heterosexual men, while lesbian women are more represented than their heterosexual female counterparts. Bringing human capital investments and jobs together, Ahmed et al. (2011b) show that in Sweden, on one hand, gay men are less likely than heterosexual men to have a job where a long university education or a management position is important. On the other hand, lesbian women are more likely than heterosexual women to have a job where a long university education or a management position is relevant. The authors conclude that gay men face similar barriers of promotion to heterosexual women. Peplau and Fingerhut (2004) discuss that heterosexual women with

children are less career orientated than childless heterosexual women. But lesbian women with children are supposed to have similar career orientations. This may drive the choice of jobs. The authors conclude that lesbians with children will be psychologically higher committed to work, because they are the primary breadwinner for the family.

Another aspect is specialization in households of same-sex couples. From a traditional mixed-sex perspective, women carry out the childcare and men work in the labor market. While gay couples have no or lower numbers of children than others, both partners attend to work outside the household. This should lead to higher household income. In terms of lesbian women it is not so clear which partner would earn money and which would care for children, if they exist. Jepsen (2007) demonstrates robust earning premium results for lesbian couples regarding cohabitating heterosexual women, even after control for having children. In the case of the U.S. federal state of Vermont, Solomon et al. (2005) discuss differences in typical housework activities. While heterosexual married women are more often involved in such tasks as washing, cleaning, and cooking, heterosexual married men do more repairs or take out the garbage. Both couples of gay men and lesbian women share the housework more equally.

Antecol and Steinberger (2011) examine the importance of household specialization. They discovered that one partner of a lesbian couple works as long as a married heterosexual man, while the second partner reduces working hours similarly to a married heterosexual woman. In addition, households of gay men have similar sized earnings to heterosexual couples, while lesbian household earn less (Ahmed et al. 2011a). The authors present evidence that in lesbian households the household income is more equally distributed than in heterosexual households, while it is less equally distributed in gay households. Table 4.2 provides an overview of several papers concerning earnings of gays, lesbians, and bisexuals.

Table 4.2: Income and Earning Differentials for Gays, Lesbians, Homosexual Couples and their Households

Studies (alphabetical):	Used Data:	Type of Differentials:	Findings:	Information:
Ahmed, Hammarstedt (2010)	LOUISE, Sweden, 2003	Differences for Individuals	Income loss for gay man; Mixed income results for lesbian women (n.s.)	Log Earnings per Year
Ahmed, Anderson, Hammarstedt (2011a)	Longitudinal Integration Database of Health Insurance and Labour Market Studies (LISA), 2007, Sweden	Differences for Individuals, Differences between Households, Differences within Households	Income loss for gay man; Income gain for lesbian women; Income gain for gay households; Income loss for lesbian households	Log Earnings per Year
Ahmed, Anderson, Hammarstedt (2012b)	Longitudinal Integration Database of Health Insurance and Labour Market Studies (LISA), 2007, Sweden	Differences for Individuals,	Income loss for gay man; Income gain for lesbian women; smaller differences between monthly earnings	Log Earnings per Year, per Month
Allegretto, Arthur (2001)	Census of the Population, Public Use Micro Data 5% Sample (PUMS), 1990, USA	Differences for Individuals: only men	Income loss for gay man	Log Earnings per Hour
Antecol, Jong, Steinberger (2008)	Census of the Population, Public Use Micro Data 5% Sample (PUMS), 2000, USA	Differences for Individuals	Mixed income results for gay man; Income gain for lesbian women	Log Earnings per Hour
Arabsheibani, Marin, Wadsworth (2004)	Labour Force Survey (LFS), 1996-2001, UK	Differences for Individuals, Differences between Households	Mixed income results for gay man; Income gain for lesbian women	Log Earnings per Hour
Arabsheibani, Marin, Wadsworth (2005)	Labour Force Survey (LFS), 1996-2002, UK	Differences for Individuals, Differences between Households	Income loss for gay man; Income gain for lesbian women	Log Earnings per Hour
Badgett (1995)	General Social Survey (GSS), 1989-1991, USA	Differences for Individuals	Income loss for gay man; Income loss for lesbian women (n.s.)	Earnings per Year
Berg, Lien (2002)	General Social Survey (GSS), 1991-1996, USA	Differences for Individuals	Income loss for gay man; Income gain for lesbian women	Earnings per Year
Black, Gates, Sanders, Taylor (2000)	General Social Survey (GSS), 1988-1996; National Health and Social Life Survey (NHLS), 1992; Census of the Population, Public Use Micro Data 5% Sample (PUMS), 1990, USA	Differences for Individuals	Income loss for (partnered) gays; Income gain for (partnered) lesbian women	Earnings per Year
Black, Maker, Sanders, Taylor (2003)	General Social Survey (GSS), 1989-1996, USA	Differences for Individuals	Mixed income results for gay and bisexual man; Mixed income results for lesbian and bisexual women	Log Earnings per Year
Black, Sanders, Taylor (2007)	Census of the Population, Public Use Micro Data 5% Sample (PUMS), 2000, USA	Differences for Individuals, Differences between Households	Income loss for gay man; Income gain for lesbian women; Income gain for gay households; Income loss for lesbian households	Log Earnings per Hour
Blandford (2003)	General Social Survey (GSS), 1989-1996, USA	Differences for Individuals	Income loss for gay man; Income gain for lesbian women	Earnings per Year
Carpenter (2004)	Behavioral Risk Factor Surveillance System (BRFSS), 1996-2000, USA	Differences for Individuals, Differences between Households	Income loss for gay man; Income loss for lesbian women	Log Earnings per Year
Carpenter (2005)	General Social Survey (GSS), 1988-2000; California Health Interview Survey (CHRIS), 2001, USA	Differences for Individuals	Income loss for gay and bisexual man; Mixed income results for lesbian and bisexual women	Log Earnings per Month
Carpenter (2007)	General Social Survey (GSS), 1988-1996; National Health and Nutrition Examination Survey (NHANES III), 1988-1994, USA	Differences for Individuals: only men	Income loss for gay man	Log Earnings per Year
Carpenter (2008a)	Canadian Community Health Survey (CCHS),	Differences for Individuals	Income loss for gay man; Income gain for	Log Earnings per

Carpenter (2008b)	2003-2005; Canadian Census, 2001, Canada Australian Longitudinal Study on Women's Health (ALSWH), 2000, Australia	Differences for Individuals: only women	lesbian women Income loss for lesbian and bisexual women	Hour Log Earnings per Hour
Carpenter, Gates (2008)	Census of the Population, Public Use Micro Data 5% Sample (PUMS), 2000; California Health Interview Survey (CHRIS), 2001-2005; California LGBT Tobacco Survey, 2003, USA	Differences between Households	Most often reported household income for gay couples (> 100.000 \$), most often reported household income for lesbians couples (50.000 - 100.000 \$)	Not reported
Clain, Leppel (2001)	Census of the Population, Public Use Micro Data 5% Sample (PUMS), 1990, USA	Differences for Individuals	Income loss for gay man; Income gain for lesbian women	Log Earnings per Hour
Daneshvary, Waddoups, Wimmer (2008)	Census of the Population, Public Use Micro Data 5% Sample (PUMS), 2000, USA	Differences between Households: only women	Mixed results for lesbian households	Log Earnings per Hour
Drydakakis (2011)	Athens Area Study (AAS), 2007-2008, Greece	Differences for Individuals: only women	Income loss for lesbian women (offered wages)	Log Earnings per Hour
Drydakakis (2012)	Athens Area Study (AAS), 2008-2009, Greece	Differences for Individuals: only men	Income loss for gay men; Income loss for bisexual men	Log Earnings per Hour
Elmslie, Tebaldi (2007)	Current Population Survey (CPS), 2004, USA	Differences for Individuals	Income loss for gay households; Mixed income results for lesbian households (n.s.)	Log Earnings per Hour, Log Earnings per Year
Heineck (2009)	International Social Survey Program (ISSP), 1994, USA, Australia, Ireland, Poland, Bulgaria	Differences for Individuals	Income loss for gay and bisexual man; Mixed income results for lesbian and bisexual women	Log Earnings per Month
Jepsen (2007)	Census of the Population, Public Use Micro Data 5% Sample (PUMS), 2000, USA	Differences between Households: only women	Income gain for lesbian households	Log Earnings per Hour, Log Earnings per Year
Klawitter, Flatt (1998)	Census of the Population, Public Use Micro Data 5% Sample (PUMS), 1990, USA	Differences for Individuals, Differences between Households	Income loss for gay man; Income gain for lesbian women; Income gain for gay households; Income loss for lesbian households	Log Earnings per Year
Klawitter (2011)	Census of the Population, Public Use Micro Data 5% Sample (PUMS), 2000, USA	Differences for Individuals, Differences between Households	Income loss for gay man; Income gain for lesbian women; Income gains for gay households, Income loss for lesbian households	Log Earnings per Year
Laurent, Mihoubi (2012)	Employment Survey, 1996-2007, France	Differences for Individuals	Income loss for gay man; Mixed income results for lesbian women (n.s.)	Log Earnings per Month
Martell (2012)	General Social Survey (GSS), 1994-2008, USA	Differences for Individuals: only men	Income loss for gay man	Log Earnings per Hour
Mueller (2007)	General Social Survey, 2001, Canada	Differences for Individuals	Income loss for gay men; Mixed income results for lesbian women (n.s.)	Log Earnings per Year
Plug, Berkhout (2004)	Survey of Dutch Graduates, 1998-2000, Netherlands	Differences for Individuals	Income loss for gay man; Income gain for lesbian women	Log Earnings per Hour, Log Earnings per Month
Zavodny (2008).	General Social Survey (GSS); National Health and Social Life Survey (NHLS), 1988-2004, USA	Differences for Individuals, Differences between Households: only men	Mixed Income Results for gay man	Log Earnings per Hour

Note:(n.s.: not significant).

4.4 Estimation Strategy and Data

The Mikrozensus is the largest German cross section micro data set offered by German Federal Statistics. Every year 1% of all German households, approximately 400,000, are interviewed about aspects of family and work. Because participants are obliged by law to answer the questions, the data set is reliable and has no missing answers. Based on this data, I cannot identify gays or lesbians, who do not live with a partner in the same household.³⁵ In other words, I am not able to analyze the behavior of non-partnered homosexuals, or homosexuals who live in single households. Only a few data sets used by Carpenter (2005, 2008a, 2008b) and Drydakis (2011, 2012a, 2012c) ask directly for sexual orientation. Another data limitation is that bisexual individuals are not observable.

As presented in section 4.2 only a few observations are clearly identifiable since 2006. Rates of same-sex unions increase only very low between 2006 and 2009. While the number of self-identified gay unions has an increase till 2008, the number of self-identified lesbian unions is unchanged between 2006 and 2008. An other limitation is the recruiting of participants on a moving window base. Although the individuals have to participate in the census for four years, that does not mean that the same individuals participate in the same four waves. This is the reason why I only the 2009 wave of the German Mikrozensus. A newer wave of 2010 is not available so far.

In my data there are 75,192 individuals living in 37,204 households. I observe 36,781 heterosexual men and 38,411 women, as well as 174 gay men and 139 lesbian women. So 0.3 to 0.4 percent of the entire population is self defined as being homosexual.

³⁵ This problem is similar for US Census data. Black et al. (2000) assume that most of all identified homosexual couples are really homosexual. Furthermore, they suppose that only one third of all homosexual couples declare themselves as homosexuals. Thus, the numbers should be more underestimated than overestimated.

Table 4.3: Variable List and Definitions: Men

Variable	Description	Men Married N: 29,996				Men Different-Sex Partner N: 6,611				Men Same-Sex Partner N:128				Men Registered Same-Sex Union N: 46			
		Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Income	Income Month Euro	2,345.18	1,485.44	112.50	27,000	1,834.56	1,010.44	112.50	27,000	2,023.05	1,040.80	400	6,750	2,228.26	1,160.01	600	6,750
Log Income	Log Income Month Euro	7.641	0.476	4.723	10.204	7.421	0.417	4.723	10.204	7.450	0.489	5.992	8.817	7.604	0.453	6.397	8.817
Household Income	HH Income Month Euro	3,637.44	1,834.71	225	27,000	3,296.69	1,580.53	600	27,000	4,014.84	1,928.77	800	14,000	4,886.95	3,967.26	1,600	27,000
Log Household Income	Log HH Income Month Euro	8.116	0.386	5.416	10.204	8.025	0.373	6.397	10.204	8.205	0.431	6.685	9.547	8.336	0.504	7.378	10.204
Age	Age (18-65)	46.457	8.645	19	65	37.196	9.447	18	65	39.898	8.841	21	63	43.218	9.438	25	60
Age2	Age Squared /1,000	2.233	0.793	0.361	4.225	1.473	0.749	0.324	4.225	1.669	0.737	0.441	3.969	1.955	0.816	0.625	3.600
Age Partner	Age (18-65)	44.024	8.622	19	65	34.655	9.591	18	65	37.399	8.196	21	63	39.891	9.258	25	60
Age2 Partner	Age Squared /1,000	2.012	0.749	0.361	4.225	1.293	0.721	0.324	4.225	1.465	0.644	0.441	3.969	1.675	0.777	0.625	3.600
School (Ref: < 7 Years of Schooling)	(1) Secondary School	0.312	0.463	0	1	0.229	0.421	0	1	0	0	0	1	0	0	0	1
	(2) Polytechnic Secondary School (GDR)	0.134	0.340	0	1	0.105	0.306	0	1	0.063	0.243	0	1	0.043	0.206	0	1
	(3) Middle School (4) (technical) College	0.213	0.410	0	1	0.0292	0.455	0	1	0.227	0.421	0	1	0.196	0.401	0	1
	(1) Master Craftsman; Academy	0.339	0.474	0	1	0.372	0.484	0	1	0.539	0.501	0	1	0.630	0.488	0	1
Professional Education (Ref: Apprenticeship, Vocational Training)	(2) Technical College (GDR)	0.111	0.314	0	1	0.095	0.294	0	1	0.109	0.314	0	1	0	0	0	1
	(3) University of Applied Sciences	0.011	0.103	0	1	0.006	0.076	0	1	0.023	0.152	0	1	0.043	0.206	0	1
	(4) University; PhD	0.110	0.312	0	1	0.104	0.305	0	1	0.125	0.332	0	1	0.065	0.250	0	1
Experience	Job Experience (in Years)	0.139	0.346	0	1	0.133	0.339	0	1	0.203	0.404	0	1	0.196	0.401	0	1
Experience2	Job Experience Squared /1,000	24.731	10.377	1	51	15.642	10.376	1	48	17.391	10.163	2	46	19.826	10.721	1	44
Tenure	Job Tenure (in Years)	0.720	0.513	0.001	2.601	0.352	0.404	0.001	2.304	0.405	0.425	0.004	2.116	0.505	0.477	0.001	1.936
Tenure2	Job Tenure Squared /1,000	15.860	11.028	1	51	9.792	8.591	1	46	11.250	10.162	1	41	11.283	9.619	1	41
Working Hours	Normal Working Hours	0.373	0.442	0.001	2.601	0.170	0.283	0.001	2.116	0.230	0.368	0.001	1.681	0.218	0.328	0.001	1.681
Working Hours Partner	Normal Working Hours	40.554	6.640	1	98	40.451	6.560	5	80	39.977	8.675	7	80	39.087	7.944	20	70
Firm Size (Ref: less than 5 workers)	(1) 6-10 workers	26.817	12.44	1	98	35.46	9.687	1	80	39.695	9.343	8	80	38.587	9.392	8	60
	(2) 11-50 workers	0.057	0.232	0	1	0.071	0.257	0	1	0.047	0.212	0	1	0.0870	0.285	0	1
	(3) more than 50 workers	0.218	0.413	0	1	0.234	0.424	0	1	0.180	0.385	0	1	0.174	0.383	0	1
		0.667	0.471	0	1	0.625	0.484	0	1	0.656	0.477	0	1	0.696	0.465	0	1

Fixed-Term (Ref: no Fixed- Term Contract)	(1) Fixed-Term Contract	0.038	0.191	0	1	0.087	0.282	0	1	0.110	0.313	0	1	0	0	0	1
Shift Work (Ref: no Shift Work)	(1) Shift Work	0.177	0.382	0	1	0.195	0.396	0	1	0.180	0.385	0	1	0.217	0.417	0	1
Children in Household (Ref: no Children)	(1) any Children in Household	0.653	0.476	0	1	0.290	0.454	0	1	0.0157	0.125	0	1	0	0	0	1
German Citizen (Ref: no German)	(1) German Citizenship	0.960	0.196	0	1	0.970	0.172	0	1	0.922	0.267	0	1	0.935	0.250	0	1
Regional Differences (Ref: Area < 20,000 People)	(1) Area 20,000 - 500,000 People	0.388	0.487	0	1	0.43	0.494	0	1	0.312	0.466	0	1	0.283	0.455	0	1
Federal States (Ref: Area < 20,000 People)	(2) Area > 500,000 People	0.115	0.320	0	1	0.197	0.398	0	1	0.430	0.497	0	1	0.522	0.505	0	1
	(1) Hamburg	0.014	0.120	0	1	0.027	0.149	0	1	0.109	0.314	0	1	0.130	0.340	0	1
	(2) Lower Saxony	0.099	0.299	0	1	0.095	0.294	0	1	0.071	0.257	0	1	0.109	0.315	0	1
	(3) Bremen	0.006	0.075	0	1	0.007	0.085	0	1	0.031	0.175	0	1	0	0	0	1
	(4) North-Rhine Westphalia	0.175	0.381	0	1	0.181	0.385	0	1	0.266	0.443	0	1	0.130	0.341	0	1
	(5) Hesse	0.075	0.264	0	1	0.073	0.260	0	1	0.0625	0.243	0	1	0.196	0.401	0	1
	(6) Rhineland- Palatinate	1.051	0.218	0	1	0.045	0.207	0	1	0.055	0.228	0	1	0	0	0	1
	(7) Baden- Wuerttemberg	0.146	0.353	0	1	0.123	0.329	0	1	0.086	0.281	0	1	0.108	0.315	0	1
	(8) Bavaria	0.175	0.380	0	1	0.155	0.362	0	1	0.156	0.365	0	1	0.087	0.285	0	1
	(9) Saarland	0.012	0.107	0	1	0.008	0.094	0	1	0.063	0.243	0	1	0	0	0	1
	(10) Berlin	0.027	0.163	0	1	0.048	0.214	0	1	0.0313	0.175	0	1	0.109	0.315	0	1
	(11) Brandenburg	0.039	0.195	0	1	0.04	0.203	0	1	0.008	0.088	0	1	0	0	0	1
	(12) Mecklenburg- Western Pomerania	0.002	0.142	0	1	0.022	0.144	0	1	0.023	0.152	0	1	0	0	0	1
	(13) Saxony	0.062	0.241	0	1	0.076	0.264	0	1	0.008	0.088	0	1	0	0	0	1
	(14) Saxony-Anhalt	0.031	0.173	0	1	0.033	0.177	0	1	0.110	0.313	0	1	0	0	0	1
	(15) Thuringia	0.034	0.180	0	1	0.035	0.184	0	1	0.070	0.257	0	1	0.022	0.147	0	1

Source: Mikrozensus 2009.

Table 4.4: Variable List and Definitions: Women

Variable	Description	Women Married N: 30,751				Women Differed- Sex Partner N: 7,521				Women Same-Sex Partner N: 98				Women Registered Same-Sex Union N: 41			
		Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Income	Income Month Euro	1,295.04	946.31	112.5	27,000	1,453.33	654.57	112.5	14,000	1,686.74	818.55	600	6,750	1,732.93	554.60	400	3,050
Log Income	Log Income Month Euro	6.988	0.606	4.723	10.204	7.192	0.430	4.723	9.547	7.348	0.390	6.397	8.817	7.402	0.357	5.992	8.023
Household Income	HH Income Month Euro	3,620.75	2,082.96	225	27,000	3,313.05	1,733.96	400	27,000	3,262.75	1,187.70	1,400	8,750	3,310.98	970.15	1,200	4,750
Log Household Income	Log HH Income Month Euro	8.090	0.441	5.416	10.204	8.018	0.404	5.992	10.204	8.033	0.336	7.244	9.077	8.06	0.327	7.090	8.466
Age	Age (18-65)	45.463	9.048	19	65	35.412	9.827	18	65	38.735	9.517	21	60	42.927	8.650	26	60
Age2	Age Squared /1,000	2.149	0.807	0.361	4.225	1.351	0.754	0.324	4.225	1.590	0.755	0.441	3.6	1.916	0.773	0.676	3.6
Age Partner	Age (18-65)	45.463	9.048	19	65	35.412	9.827	18	65	36.367	9.299	20	60	40.780	8.287	26	60
Age2 Partner	Age Squared /1,000	2.149	0.807	0.361	4.225	1.351	0.754	0.324	4.225	1.408	0.700	0.40	3.6	1.730	0.722	0.676	3.6
School (Ref: < 7 Years of Schooling)	(1) Secondary School	0.212	0.408	0	1	0.1404	0.347	0	1	0.1735	0.381	0	1	0	0	0	1
	(2) Polytechnic Secondary School (GDR)	0.175	0.380	0	1	0.09793	0.297	0	1	0.051	0.222	0	1	0.049	0.218	0	1
	(3) Middle School	0.300	0.458	0	1	0.355	0.478	0	1	0.316	0.467	0	1	0.293	0.461	0	1
	(4) (technical) College	0.320	0.463	0	1	0.406	0.491	0	1	0.449	0.500	0	1	0.390	0.494	0	1
Professional Education (Ref: Apprenticeship, Vocational Training)	(1) Master Craftsman; Academy	0.067	0.250	0	1	0.0782	0.268	0	1	0.112	0.317	0	1	0.220	0.419	0	1
	(2) Technical College (GDR)	0.042	0.200	0	1	0.0191	0.137	0	1	0.030	0.173	0	1	0.024	0.156	0	1
	(3) University of Applied Sciences	0.070	0.255	0	1	0.082	0.274	0	1	0.102	0.304	0	1	0.073	0.264	0	1
	(4) University; PhD	0.130	0.335	0	1	0.142	0.349	0	1	0.204	0.405	0	1	0.122	0.331	0	1
Experience	Job Experience (in Years)	25.048	10.628	1	51	14.566	10.595	1	50	15.612	10.343	1	42	18.366	10.324	1	40
Experience2	Job Experience Squared /1,000	0.740	0.526	0.001	2.601	0.324	0.405	0.001	2.5	0.350	0.411	0.001	1.764	0.441	0.438	0.001	1.6
Tenure	Job Tenure (in Years)	13.868	10.147	1	49	8.868	7.951	1	49	9.642	7.618	1	35	11.414	8.602	1	37
Tenure2	Job Tenure Squared /1,000	0.295	0.382	0.001	2.401	0.142	0.246	0.001	2.401	0.150	0.222	0.001	1.225	0.202	0.286	0.001	1.369
Working Hours	Normal Working Hours	30.021	10.983	1	98	35.804	8.577	1	80	37.418	6.241	20	60	36.756	6.952	20	45
Working Hours Partner	Normal Working Hours	30.021	10.983	1	98	35.804	8.577	1	80	38.041	6.892	20	60	35.634	10.072	10	52
Firm Size (Ref: less than 5	(1) 6-10 workers	0.105	0.307	0	1	0.101	0.301	0	1	0.061	0.241	0	1	0.048	0.218	0	1
	(2) 11-50 workers	0.270	0.444	0	1	0.265	0.442	0	1	0.225	0.419	0	1	0.390	0.494	0	1

less than 5 workers)	(3) more than 50 workers	0.498	0.500	0	1	0.527	0.499	0	1	0.633	0.485	0	1	0.537	0.505	0	1
Fixed-Term Contract)	(1) Fixed-Term Contract	0.059	0.236	0	1	0.128	0.334	0	1	0.133	0.341	0	1	0.098	0.300	0	1
Shift Work (Ref: no Shift Work)	(1) Shift Work	0.142	0.349	0	1	0.174	0.380	0	1	0.225	0.419	0	1	0.122	0.331	0	1
Children in Household (Ref: no Children)	(1) any Children in Household	0.571	0.495	0	1	0.285	0.452	0	1	0.153	0.362	0	1	0.122	0.331	0	1
German Citizen (Ref: no German)	(1) German Citizenship	0.960	0.195	0	1	0.972	0.165	0	1	0.980	0.142	0	1	1	0	1	1
Regional Differences (Ref: Area < 20,000 People)	(1) Area 20,000 - 500,000 People	0.383	0.486	0	1	0.415	0.493	0	1	0.347	0.478	0	1	0.317	0.472	0	1
Federal States (Ref: Schleswig-Holstein)	(2) Area > 500,000 People	0.130	0.336	0	1	0.202	0.402	0	1	0.337	0.475	0	1	0.268	0.449	0	1
	(1) Hamburg	0.016	0.126	0	1	0.023	0.149	0	1	0.092	0.290	0	1	0	0	0	1
	(2) Lower Saxony	0.088	0.284	0	1	0.092	0.289	0	1	0.163	0.372	0	1	0.122	0.331	0	1
	(3) Bremen	0.006	0.077	0	1	0.007	0.086	0	1	0	0	0	1	0	0	0	1
	(4) North-Rhine Westphalia	0.155	0.362	0	1	0.177	0.382	0	1	0.163	0.371	0	1	0.317	0.471	0	1
	(5) Hesse	0.072	0.259	0	1	0.068	0.252	0	1	0.143	0.352	0	1	0.024	0.156	0	1
	(6) Rhineland-Palatinate	0.048	0.214	0	1	0.046	0.209	0	1	0.041	0.199	0	1	0.049	0.218	0	1
	(7) Baden-Wuerttemberg	0.133	0.340	0	1	0.117	0.322	0	1	0.133	0.341	0	1	0.146	0.358	0	1
	(8) Bavaria	0.163	0.369	0	1	0.159	0.366	0	1	0.061	0.241	0	1	0.195	0.401	0	1
	(9) Saarland	0.011	0.105	0	1	0.009	0.096	0	1	0	0	0	1	0.024	0.156	0	1
	(10) Berlin	0.035	0.184	0	1	0.05	0.222	0	1	0.061	0.241	0	1	0.049	0.218	0	1
	(11) Brandenburg	0.048	0.215	0	1	0.046	0.209	0	1	0.031	0.173	0	1	0.024	0.156	0	1
	(12) Mecklenburg-Western Pomerania	0.026	0.160	0	1	0.024	0.153	0	1	0	0	0	1	0	0	0	1
	(13) Saxony	0.078	0.268	0	1	0.077	0.267	0	1	0.010	0.101	0	1	0	0	0	1
	(14) Saxony-Anhalt	0.040	0.196	0	1	0.033	0.180	0	1	0	0	0	1	0	0	0	1
	(15) Thuringia	0.043	0.202	0	1	0.036	0.186	0	1	0.051	0.221	0	1	0	0	0	1

Source: Mikrozensus 2009.

In a first step, I analyze the hypotheses of sorting into different jobs and sectors. Then, I perform simple Mincer-style OLS income regressions for individuals and households. While individual income may be directly affected by any kind of income discrimination, household income should be less affected, because of the sum of two incomes. The dependent variables are logarithms of individual and household net incomes in Euro³⁶. In the data there are 24 different income groups from as low as 150 Euros to more than 18,000 Euros per month. To capture the boundaries, the lowest is multiplied by 0.75 and the highest by 1.50. In all other groups the mean of the income span is used. This method is used e.g. by Puhani (2008). Instead of using OLS the income classes may be used by ordered probit regressions. But this approach is not useful here, because it would only show the probability in reaching a higher income class. The logarithms of the adjusted income information are used here as quasi linear variables.

It is a limitation of the data that I cannot use wage information. To mitigate this problem, I only use individuals in private households, where the main earner works in the interview week and receives the highest share of income from working income. Because of systematical differences in earnings and taxes self-employed and marginally employed are not part of the analysis. I limit the data to dual earner couples to analyze the labor supply decision of a household more clearly. Traditional housewife careers should be more often observed in mixed-sex marriages than in the other groups. The individuals are limited to the age span from 18 to 65 years, because legal age in Germany is 18 and the retirement age is 65. Members of married different-sex couples are ten years older than the non-married. Gays and lesbians in registered same-sex unions are 3 to 4 years older than members of same-sex

³⁶The income classes in the Mikrozensus data: <150€, 150€-300€, 300€-500€, 500€-700€, 700€-900€, 900€-1,100€, 1,100€-1,300€, 1,300 €-1, 500€, 1,500€-1,700€, 1,700€-2,000€, 2,000€-2,300€, 2,300€-2,600€, 2,600€-2,900€, 2,900€-3,200€, 3,200€-3,600€, 3,600€-4,000€, 4,000€-4,500€, 4,500€-5,000€, 5,000€-5,500€, 5,500€-6,000€, 6,000€-7,500€, 7,500€-10,000€, 10,000€-18,000€, >18,000€.

couples. Married heterosexual males earn on average 2,345 Euros per month, while married women earn only 1,295 Euros. Non married heterosexual men have an income of 1,835 Euros and women of 1,454 Euros. Gay men in a same-sex couple earn 2,023 Euros, while lesbian women earn 1,688 Euros. In registered same-sex unions gay men have an income of 2228 Euros and lesbian women of 1,733 Euros. Concerning the household income all kinds of gay men households have a higher household income than mixed-sex couples, while lesbian households earn less. In respect to education, gays and lesbians have more often college and university degrees than heterosexuals. While gay men work only one hours less than heterosexual men, lesbian women work 2 to 5 hours longer a week than heterosexual women. In this case it is not surprising that 12 to 15 percent of all lesbian couples have children, but only 2 percent of the gay couples. There are no children at households of gay men in registered same-sex unions. See Tables 4.3 and 4.4 for descriptive statistics.

On the left side of equation (1) the logarithm of monthly net income³⁷ is used as dependant variable. On the right side of the equation there are controls for sexual orientation such as same sex partner or registered same-sex union. A vector X_i controls for demographic controls such as individual sex, age, age squared divided by thousand and a dummy for having children. For the purpose of control for productivity aspects, I use educational controls, such as schooling and professional education. Additionally, tenure, tenure squared divided by thousand, working experience, working experience squared divided by thousand, working hours and partner working hours, and dummies for fixed-term contracts, shift work, and firm

³⁷ Ahmed et al. (2012b) show that monthly income information lead to smaller income differentials than annual income.

size. To catch heterogeneity between cities and the countryside, and between federal states, I control for these effects as well.

$$\ln y_i = \alpha + \beta_1 (\textit{Orientation})_i + \beta_2 (\textit{VectorX})_i + \beta_3 (\textit{Occupation})_i + \beta_4 (\textit{Sector})_i + \varepsilon_i \quad (4.1)$$

In equation (4.1) the first model is a basic estimation without controls for occupations and sectors. There are stepwise enriched by 33 occupations in the second model, and 21 sectors in the third.³⁸ The residual is expressed by ε_i . All regressions are made three times, combined with interactions between individual sex and sexual orientation and separated for men and women.

$$\ln(\textit{HH})y_i = \alpha + \beta_1 (\textit{Orientation})_i + \beta_2 (\textit{VectorX})_i + \varepsilon_i \quad (4.2)$$

In equation (2) the logarithm of net monthly household income is used as dependant variable. Here, a reduced form model 4 is used. To control for household specific effects, age, age squared divided by thousand and working hours for both partners are used as independent variables. The equation is stepwise enriched with additional controls for children, regional differences and federal states.

³⁸ Occupations are aggregated on a high level (in German: *Berufsabschnitte*) from 369 different occupations (German: *Berufsordnungen*) based on German occupational classification (1992). Sectors are high aggregated (in German: *Wirtschaftsabschnitte*) from 89 different economic sectors (in German: *Wirtschaftsabteilungen*) based on German sectoral classification (2008).

4.5 Empirical Results

Based on stereotypes, gay men and lesbian women may differ in their occupational choice to heterosexual men and women. This seems to be the case. While gay men tend to select more female attributed jobs, lesbian women tend to select more male jobs. In Tables 4.5 to 4.8 I show column percents of heterosexuals and homosexuals over occupations and sectors. Table 4.5 shows that heterosexual men work in male attributed jobs, such as those in construction, production, and processing. They have a higher share of jobs in machine operation, metal work, and engineering. Gay men select more jobs in services, health, and trading, and they have a higher share in social and education work, and administration. Table 4.6 shows slightly the opposite for women. Both heterosexual and lesbian women work in typically female attributed jobs, such as health, trading, and administration. However, some occupational differences are observable.

Lesbian women choose more often social and educational work, and some male attributed jobs, such as those in technology, transportation, and security. It is interesting to analyze sector specific differences in sorting, as well. Table 4.7 shows that heterosexual men have their highest shares in the sectors of construction, manufacturing, and mining. Gay men are more observable in the sectors of sales and trade, and in finance. Other high shares are in the sectors of social work, health, and arts. Table 4.8 shows that heterosexual and lesbian women are more equally distributed over sectors than men. This is similar to occupations. Both heterosexual and lesbian women have their highest shares in public and private administration, and in the health sector. While more heterosexual women work in sales and trade sectors, lesbian women work more often in manufacturing, communication, social work, and arts.

Table 4.5: Distributions of Homosexual and Heterosexual Men over 33 Jobs

Occupation (column percent)	Married	Diff. Sex Couple	Same Sex Couple	Reg. Same Sex Union	Total
Agriculture, Animal Husbandry, Forestry and Horticulture Jobs	434 (1.45)	85 (1.29)	4 (3.13)	0 (0.00)	523 (1.42)
Miners, Stone Cutters and Processors	102 (0.34)	17 (0.26)	0 (0.00)	0 (0.00)	119 (0.32)
Stone Processing and Building Materials	24 (0.08)	8 (0.12)	0 (0.00)	0 (0.00)	32 (0.09)
Glass and Pottery Prod.	46(0.15)	4 (0.06)	0 (0.00)	0 (0.00)	50 (0.14)
Chemistry and Synthetic Prod.	268 (0.89)	65 (0.98)	0 (0.00)	0 (0.00)	33 (0.91)
Paper and Print Industry	207 (0.69)	52 (0.79)	0 (0.00)	1 (2.17)	260 (0.71)
Wood Work, Prod. of Wood	42 (0.18)	9 (0.16)	0 (0.00)	0 (0.00)	51 (0.17)
Metal Prod. and Processing	738 (2.64)	140 (2.12)	1 (0.78)	0 (0.00)	879 (2.39)
Mechanical Engineering, Metal Work and others	3,106 (10.35)	679 (10.27)	3 (2.34)	1 (2.17)	3,789 (10.30)
Electrical Jobs	1,120 (3.73)	265 (4.01)	2 (1.56)	0 (0.00)	1,387 (3.77)
Assemblers and other Metal Jobs	136 (0.45)	24 (0.36)	0 (0.00)	0 (0.00)	160 (0.44)
Textiles and Clothing Prod.	21 (0.07)	6 (0.09)	0 (0.00)	0 (0.00)	27 (0.07)
Leather Prod., Leather and Hide Processing	20 (0.07)	5 (0.08)	0 (0.00)	0 (0.00)	25 (0.07)
Nutrition Jobs	459 (1.53)	152 (2.30)	1 (0.78)	0 (0.00)	612 (1.66)
Construction Jobs	781 (2.60)	157 (2.37)	0 (0.00)	0 (0.00)	938 (2.55)
Interior Construction Jobs and Upholsterer	468 (1.56)	128 (1.94)	1 (0.78)	0 (0.00)	597 (1.62)
Wood and Synthetic Jobs	358 (1.19)	84 (1.27)	0 (0.00)	0 (0.00)	442 (1.20)
Painters and similar Jobs	283 (0.94)	108 (1.63)	0 (0.00)	0 (0.00)	391 (1.06))
Inspection of Goods	331 (1.10)	59 (0.89)	0 (0.00)	0 (0.00)	390 (1.06)
Unskilled Workers	310 (1.03)	52 (0.79)	1 (0.78)	0 (0.00)	363 (0.99)
Machine Operator and similar Jobs	728 (2.43)	129 (1.95)	0 (0.00)	0 (0.00)	857 (2.33)
Engineers, Chemists, Physicists	1,965 (6.55)	392 (5.93)	2 (1.56)	3 (6.52)	2,362 (6.42)
Technicians and Technical Specialists	2,300 (7.67)	480 (7.26)	4 (3.13)	1 (2.17)	2,785 (7.57)
Trade Jobs	1,270 (4.23)	367 (5.55)	14 (10.94)	2 (4.35)	1,653 (4.49)
Provision of Services	1,049 (3.50)	268 (4.05)	17 (13.28)	5 (10.87)	1,339 (3.64)
Transportation Jobs	2,702 (9.01)	515 (7.79)	7 (5.47)	2 (4.35)	3,226 (8.77)
Administration and Office Jobs	5,490 (18.30)	1,163 (17.59)	33 (25.78)	21 (45.65)	6,707 (18.23)
Security and Order Jobs	1,778 (5.93)	354 (5.35)	2 (1.56)	1 (2.17)	2,135 (5.80)
Arts and Culture Jobs	286 (0.95)	83 (1.26)	4 (3.13)	0 (0.00)	373 (1.01)
Health Service jobs	651 (2.17)	191 (2.89)	13 (10.16)	3 (6.52)	858 (2.33)
Social and Educational Work, and others in Humanities and Natural Sciences	1,994 (6.65)	412 (6.23)	13 (10.16)	3 (6.52)	2,422 (6.58)
other Jobs in Services	340 (1.13)	102 (1.54)	6 (4.69)	3 (6.52)	451 (1.23)
other Workers	188 (0.63)	55 (0.83)	0 (0.00)	0 (0.00)	242 (0.66)
Total	29,996	6,611	128	46	36,781
	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)

Source: Mikrozensus 2009.

Table 4.6: Distributions of Homosexual and Heterosexual Women over 33 Jobs

Occupation (column percent)	Married	Diff. Sex Couple	Same Sex Couple	Reg. Same Sex Union	Total
Agriculture, Animal Husbandry, Forestry and Horticulture Jobs	291 (0.95)	77 (1.02)	0 (0.00)	0 (0.00)	368 (0.96)
Miners, Stone Cutters and Processors	2 (0.01)	0 (0.00)	0 (0.00)	1 (2.44)	3 (0.01)
Stone Processing and Building Materials	2 (0.01)	0 (0.00)	0 (0.00)	0 (0.00)	2 (0.01)
Glass and Pottery Prod.	14 (0.05)	5 (0.05)	0 (0.00)	0 (0.00)	19 (0.05)
Chemistry and Synthetic Prod.	69 (0.22)	10 (0.13)	1 (1.02)	0 (0.00)	80 (0.21)
Paper and Print Industry	54 (0.18)	19 (0.25)	0 (0.00)	0 (0.00)	73 (0.19)
Wood Work, Prod. of Wood	11 (0.04)	0 (0.00)	0 (0.00)	0 (0.00)	11 (0.03)
Metal Prod. and Processing	51 (0.17)	7 (0.09)	0 (0.00)	1 (2.42)	59 (0.15)
Mechanical Engineering, Metal Work and others	236 (0.77)	87 (1.16)	4 (4.08)	0 (0.00)	327 (0.85)
Electrical Jobs	58 (0.19)	13 (0.17)	1 (1.02)	0 (0.00)	72 (0.19)
Assemblers and other Metal Jobs	118 (0.38)	19 (0.25)	0 (0.00)	0 (0.00)	137 (0.36)
Textiles and Clothing Prod.	143 (0.47)	24 (0.32)	1 (1.02)	0 (0.00)	168 (0.44)
Leather Prod., Leather and Hide Processing	20 (0.07)	1 (0.01)	0 (0.00)	0 (0.00)	21 (0.05)
Nutrition Jobs	542 (1.76)	93 (1.24)	1 (1.02)	0 (0.00)	639 (1.66)
Construction Jobs	2 (0.01)	1 (0.01)	0 (0.00)	0 (0.00)	3 (0.01)
Interior Construction Jobs and Upholsterer	25 (0.08)	5 (0.07)	0 (0.00)	0 (0.00)	30 (0.08)
Wood and Synthetic Jobs	13 (0.04)	5 (0.07)	0 (0.00)	0 (0.00)	18 (0.05)
Painters and similar Jobs	13 (0.04)	5 (0.07)	0 (0.00)	0 (0.00)	18 (0.05)
Inspection of Goods	372 (1.21)	68 (0.90)	4 (4.08)	0 (0.00)	444 (1.16)
Unskilled Workers	244 (0.79)	40 (0.53)	0 (0.00)	0 (0.00)	284 (0.74)
Machine Operator and similar Jobs	75 (0.24)	16 (0.21)	0 (0.00)	0 (0.00)	91 (0.24)
Engineers, Chemists, Physicists	342 (1.11)	111 (1.48)	0 (0.00)	0 (0.00)	453 (1.18)
Technicians and Technical Specialists	506 (1.65)	152 (2.02)	6 (6.12)	2 (4.88)	666 (1.73)
Trade Jobs	3,310 (10.76)	868 (11.54)	6 (6.12)	1 (2.44)	4,185 (10.90)
Provision of Services	1,369 (4.45)	420 (5.58)	3 (3.06)	1 (2.44)	1,793 (4.67)
Transportation Jobs	568 (1.85)	134 (1.78)	4 (4.08)	2 (4.88)	708 (1.84)
Administration and Office Jobs	9,798 (31.86)	2,264 (30.10)	19 (19.39)	9 (21.95)	12,090 (31.48)
Security and Order Jobs	436 (1.42)	127 (1.69)	8 (8.16)	1 (2.44)	572 (1.49)
Arts and Culture Jobs	327 (1.06)	121 (1.61)	2 (2.04)	1 (2.44)	451 (1.17)
Health Service jobs	3,928 (12.77)	1,052 (13.99)	15 (15.31)	7 (17.07)	6,548 (17.05)
Social and Educational Work, and others in Humanities and Natural Sciences	3,361 (13.53)	830 (13.35)	13 (18.57)	8 (27.59)	4,212 (13.52)
other Jobs in Services	2,352 (7.65)	518 (6.89)	2 (2.04)	0 (0.00)	2,873 (7.48)
other Workers	148 (0.48)	58 (0.76)	1 (1.02)	0 (0.00)	206 (0.54)
Total	30,751 (100.00)	7,521 (100.00)	98 (100.00)	41 (100.00)	38,411 (100.00)

Source: Mikrozensus 2009.

Table 4.7: Distributions of Homosexual and Heterosexual Men over 21 Sectors

Sectors (column percent)	Married	Diff. Sex Couple	Same Sex Couple	Reg. Same Sex Union	Total
Agriculture, forestry	262 (0.87)	52 (0.79)	1 (0.78)	1 (2.17)	316 (0.86)
Mining and Quarrying	147 (0.49)	24 (0.36)	0 (0.00)	0 (0.00)	171 (0.46)
Manufacturing	9,771 (32.57)	1,940 (29.35)	12 (9.38)	4 (8.70)	11,727 (31.88)
Electricity, Gas, Steam and Air Condition Supply	510 (1.70)	94 (1.42)	3 (2.34)	1 (2.17)	608 (1.65)
Water Supply, Sewerage, Waste Management and Remediation Activities	332 (1.11)	76 (1.15)	0 (0.00)	0 (0.00)	408 (1.1)
Construction	2,971 (9.90)	679 (10.27)	3 (2.34)	1 (2.17)	3,654 (9.93)
Wholesale and Retail Trade, Repair of Motor Vehicles and Motorcycles	3,092 (10.31)	776 (11.74)	17 (13.28)	6 (13.04)	3,891 (10.58)
Transportation and Storage	1,962 (6.54)	418 (6.32)	7 (5.47)	5 (10.87)	2,392 (6.50)
Accommodation and Food Service Activities	286 (0.95)	132 (2.00)	6 (4.69)	1 (2.17)	425 (1.16)
Information and Communication	962 (3.21)	295 (4.46)	4 (3.13)	4 (8.70)	1,265 (3.44)
Financial and Insurance Activities	1,073 (3.58)	242 (3.66)	13 (10.16)	9 (19.57)	1,337 (3.64)
Real Estate Activities	168 (0.56)	40 (0.61)	2 (1.56)	0 (0.00)	210 (0.57)
Professional, Scientific and Technical Activities	881 (2.94)	303 (4.58)	4 (3.13)	1 (2.17)	1,189 (3.23)
Administrative and Support Technical Activities	940 (3.13)	289 (4.37)	7 (5.47)	2 (4.35)	1,238 (3.37)
Public Administration and Defense, Compulsory Social Security	3,115 (10.38)	500 (7.56)	14 (10.94)	2 (4.35)	3,631 (9.87)
Education	1,432 (4.77)	266 (4.02)	8 (6.25)	1 (2.17)	1,707 (4.64)
Human Health and Social Work Activities	1,410 (4.70)	360 (5.45)	20 (15.63)	6 (13.04)	1,796 (4.88)
Arts, Entertainment and Recreation	193 (0.64)	50 (0.76)	6 (4.69)	0 (0.00)	249 (0.68)
other Service Activities	454 (1.51)	64 (0.97)	1 (0.78)	2 (4.35)	521 (1.42)
Activities of Households as Employers, ...	4 (0.01)	2 (0.03)	0 (0.00)	0 (0.00)	6 (0.02)
Activities of Extraterritorial Organizations and Bodies	31 (0.10)	9 (0.13)	0 (0.00)	0 (0.00)	40 (0.11)
Total	29,996 (100.00)	6,611 (100.00)	128 (100.00)	46 (100.00)	36,781 (100.00)

Source: Mikrozensus 2009.

Table 4.8: Distributions of Homosexual and Heterosexual Women over 21 Sectors

Sectors (column percent)	Married	Diff. Sex Couple	Same Sex Couple	Reg. Same Sex Union	Total
Agriculture, forestry	193 (0.63)	46 (0.61)	0 (0.00)	0 (0.00)	239 (0.62)
Mining and Quarrying	37 (0.12)	1 (0.01)	0 (0.00)	0 (0.00)	38 (0.10)
Manufacturing	3,848 (12.51)	929 (12.35)	13 (13.27)	4 (9.76)	4,794 (12.48)
Electricity, Gas, Steam and Air Condition Supply	170 (0.55)	58 (0.77)	2 (2.04)	1 (2.42)	231 (0.60)
Water Supply, Sewerage, Waste Management and Remediation Activities	120 (0.39)	20 (0.27)	0 (0.00)	0 (0.00)	140 (0.36)
Construction	675 (2.20)	149 (1.98)	1 (1.02)	0 (0.00)	825 (2.15)
Wholesale and Retail Trade, Repair of Motor Vehicles and Motorcycles	4,560 (14.83)	1,138 (15.13)	10 (10.20)	0 (0.00)	5,708 (14.86)
Transportation and Storage	808 (2.63)	193 (2.57)	2 (2.04)	1 (2.44)	1,004 (2.55)
Accommodation and Food Service Activities	810 (2.63)	247 (3.28)	1 (1.02)	0 (0.00)	1,058 (2.75)
Information and Communication	605 (1.97)	231 (3.07)	2 (2.04)	3 (7.32)	841 (2.19)
Financial and Insurance Activities	1,435 (4.67)	354 (4.71)	3 (3.06)	1 (2.44)	1,793 (4.67)
Real Estate Activities	217 (0.71)	73 (0.97)	2 (2.04)	0 (0.00)	292 (0.76)
Professional, Scientific and Technical Activities	1,344 (4.37)	503 (6.69)	6 (6.12)	3 (7.32)	1,856 (4.83)
Administrative and Support Technical Activities	1,156 (3.76)	323 (4.29)	2 (2.04)	0 (0.00)	1,481 (3.86)
Public Administration and Defense, Compulsory Social Security	3,188 (10.37)	647 (8.60)	10 (10.29)	5 (12.20)	3,850 (10.02)
Education	3,682 (11.97)	680 (9.16)	12 (12.24)	6 (14.63)	4,389 (11.43)
Human Health and Social Work Activities	6,405 (20.83)	1,569 (20.86)	25 (25.51)	16 (39.02)	8,015 (20.87)
Arts, Entertainment and Recreation	262 (0.85)	69 (0.92)	3 (3.06)	0 (0.00)	343 (0.87)
other Service Activities	1,038 (3.38)	251 (3.35)	3 (3.06)	1 (2.44)	1,293 (3.37)
Activities of Households as Employers, ...	182 (0.59)	26 (0.35)	1 (1.02)	0 (0.00)	209 (0.54)
Activities of Extraterritorial Organizations and Bodies	16 (0.05)	5 (0.07)	0 (0.00)	0 (0.00)	21 (0.05)
Total	30,751 (100.00)	7,521 (100.00)	98 (100.00)	41 (100.00)	38,411 (100.00)

Source: Mikrozensus 2009.

The results of the Mincer-OLS estimations of the equations (1) and (2) are presented in Tables 4.9 and 4.10. In basic model (1) the estimations are made without occupations and sectors. These are included in models (2) and (3) separately. The first column of each model shows the size of a sexual orientation effect on income in relation to married heterosexual men. It can also be seen in models (1) to (3) that cohabitating gay men earn 9 percent³⁹ less than married heterosexual men. For gay men in registered same-sex unions the effects are much smaller but statistically not significant. Cohabitating lesbian women have a 13 to 14 percent lower income than married heterosexual men. Lesbian women in same-sex unions have a smaller reduction of 9 to 13 percent, which is similar to gay men. The second column presents specific effects for men and the third column for women. The coefficients are interpretable to the reference group of being a heterosexual married man or woman. Cohabitating gay men face a monthly earnings penalty in comparison with married heterosexual men of about 5 to 6 percent. The results for gay men in a registered same-sex union are smaller, but not statistically significant. This may be interpreted as weak evidence for a gay marriage premium. Cohabitating lesbian women have a premium in earnings compared with married heterosexual women of about 9 to 10 percent, while lesbian women in a registered same-sex union have a premium of 12 to 16 percent. This may be interpreted as a lesbian marriage premium, as well.

Overall the results of the control variables have the typical and expected directions. Variables of human capital and productivity raise income. See, for instance, the inverse u-shaped effects of age, tenure, and experience. Children affect male income positive but not the female income. This effect is driven by the German taxation system, which allows a shift in child related benefits to the higher tax payer.

³⁹ All percent values are calculated with the formula $(e^{\beta}-1)*100$.

Table 4.9: OLS Regressions Individual Income (All, Men, Women)

Variables	Model 1			Model 2			Model 3		
	ALL	MEN	WOMEN	ALL	MEN	WOMEN	ALL	MEN	WOMEN
(Married Men)									
Cohab. Men	-0.1017*** (0.0051)			-0.1008*** (0.0050)			-0.0996*** (0.0049)		
Gay Couple	-0.0927*** (0.0278)			-0.0993*** (0.0272)			-0.0908*** (0.0269)		
Gay Union	0.0073 (0.0583)			-0.0227 (0.0575)			-0.0218 (0.0566)		
Married Women	-0.2671*** (0.0043)			-0.2944*** (0.0046)			-0.2909*** (0.0046)		
Cohab. Women	-0.1624*** (0.0053)			-0.1848*** (0.0055)			-0.1803*** (0.0054)		
Lesbian Couple	-0.1463*** (0.0355)			-0.1589*** (0.0356)			-0.1539*** (0.0346)		
Lesbian Union	-0.0987* (0.0550)			-0.1382*** (0.0514)			-0.1406*** (0.0505)		
(Married)									
Diff.-Sex Couple		-0.0733*** (0.0053)	0.0807*** (0.0053)		-0.0724*** (0.0052)	0.0858*** (0.0052)		-0.0709*** (0.0051)	0.0868*** (0.0051)
Same-Sex Couple		-0.0556* (0.0297)	0.0890** (0.0361)		-0.0665** (0.0296)	0.0951*** (0.0350)		-0.0554* (0.0295)	0.0964*** (0.0341)
Same-Sex Union		0.0353 (0.0626)	0.1527*** (0.0569)		-0.0033 (0.0597)	0.1233** (0.0496)		-0.0037 (0.0594)	0.1162** (0.0494)
Age	0.0175*** (0.0017)	0.0165*** (0.0022)	0.0192*** (0.0025)	0.0144*** (0.0017)	0.0115*** (0.0022)	0.0163*** (0.0025)	0.0138*** (0.0017)	0.0096*** (0.0022)	0.0167*** (0.0025)
Age2 / 1,000	-0.1570*** (0.0202)	-0.1591*** (0.0259)	-0.1616*** (0.0300)	-0.1341*** (0.0198)	-0.1103*** (0.0255)	-0.1455*** (0.0296)	-0.1226*** (0.0197)	-0.0835*** (0.0253)	-0.1454*** (0.0295)
School (< 7 Years Schooling)									
Secondary	-0.0195 (0.0285)	0.0326 (0.0341)	-0.0893* (0.0524)	-0.0314 (0.0300)	0.0103 (0.0372)	-0.0858 (0.0572)	-0.0423 (0.0272)	0.0146 (0.0333)	-0.1172** (0.0506)
School Polytechnic Secondary	-0.0108 (0.0289)	0.0151 (0.0348)	-0.0402 (0.0526)	-0.0475 (0.0304)	-0.0234 (0.0379)	-0.0730 (0.0575)	-0.0524* (0.0275)	-0.0092 (0.0340)	-0.0978* (0.0508)
School (GDR) Middle School	0.0800*** (0.0285)	0.1308*** (0.0342)	0.0391 (0.0524)	0.0071 (0.0301)	0.0480 (0.0373)	-0.0218 (0.0572)	0.0037 (0.0272)	0.0656** (0.0334)	-0.0522 (0.0506)
(technical) College	0.1489*** (0.0287)	0.2000*** (0.0346)	0.1040** (0.0525)	0.0577 (0.0303)	0.0847* (0.0378)	0.0326 (0.0573)	0.0529* (0.0274)	0.1004*** (0.0338)	0.0020 (0.0507)
Prof. Education (Apprenticeship. Voc. Training)									
Master Crafts- men; Academy	0.0929** (0.0051)	0.0986*** (0.0065)	0.0778*** (0.0079)	0.0779*** (0.0051)	0.0862*** (0.0065)	0.0537*** (0.0080)	0.0763*** (0.0051)	0.0827*** (0.0065)	0.0539*** (0.0080)
Technical	0.1860*** (0.0097)	0.0899*** (0.0215)	0.1630*** (0.0105)	0.1334*** (0.0094)	0.0521** (0.0203)	0.1012*** (0.0103)	0.1241*** (0.0092)	0.0512** (0.0199)	0.0919*** (0.0102)
College (GDR)	0.1948*** (0.0066)	0.2102*** (0.0089)	0.1733*** (0.0097)	0.1699*** (0.0068)	0.1815*** (0.0093)	0.1531*** (0.0098)	0.1613*** (0.0068)	0.1731*** (0.0092)	0.1455*** (0.0098)
Applied Sciences University; PhD	0.3187*** (0.0065)	0.3312*** (0.0092)	0.3195*** (0.0088)	0.2970*** (0.0069)	0.3221*** (0.0100)	0.2936*** (0.0092)	0.2814*** (0.0070)	0.3087*** (0.0101)	0.2755*** (0.0093)
Experience	0.0035*** (0.0008)	0.0075*** (0.0010)	0.0019 (0.0012)	0.0062*** (0.0008)	0.0098*** (0.0009)	0.0054*** (0.0012)	0.0064*** (0.0007)	0.0104*** (0.0009)	0.0052*** (0.0011)
Experience2 / 1000	-0.1685*** (0.0162)	-0.2148*** (0.0200)	-0.1610*** (0.0249)	-0.1952*** (0.0158)	-0.2441*** (0.0194)	-0.1941*** (0.0245)	-0.2011*** (0.0158)	-0.2566*** (0.0193)	-0.1940*** (0.0244)
Tenure	0.0140*** (0.0005)	0.0113*** (0.0006)	0.0143*** (0.0007)	0.0124*** (0.0005)	0.0108*** (0.0006)	0.0123*** (0.0007)	0.0115*** (0.0005)	0.0101*** (0.0006)	0.0114*** (0.0007)
Tenure2 / 1,000	-0.1182*** (0.0122)	-0.0930*** (0.0152)	-0.1109*** (0.0184)	-0.1103*** (0.0118)	-0.1031*** (0.0146)	-0.0990*** (0.0179)	-0.1047*** (0.0117)	-0.0960*** (0.0145)	-0.0982*** (0.0179)
Working Hours	0.0289*** (0.0003)	0.0193*** (0.0004)	0.0278*** (0.0055)	0.0283*** (0.0003)	0.0189*** (0.0004)	0.0272*** (0.0051)	0.0283*** (0.0003)	0.0189*** (0.0004)	0.0279*** (0.0053)
Working Hours (Partner)	-0.0028*** (0.0002)	-0.0043*** (0.0002)	0.0009 (0.0055)	-0.0029*** (0.0002)	-0.0043*** (0.0002)	0.0009 (0.0051)	-0.0028*** (0.0002)	-0.0042*** (0.0002)	0.0002 (0.0053)
Firm Size (< 5 workers)									
6-10 workers	0.0703*** (0.0071)	0.0624*** (0.0110)	0.0744*** (0.0090)	0.0662*** (0.0069)	0.0650*** (0.0107)	0.0661*** (0.0087)	0.0636*** (0.0069)	0.0622*** (0.0107)	0.0641*** (0.0087)
11-50 workers	0.1246*** (0.0059)	0.1124*** (0.0091)	0.1282*** (0.0076)	0.1177*** (0.0058)	0.1096*** (0.0089)	0.1180*** (0.0075)	0.1122*** (0.0058)	0.1041*** (0.0089)	0.1117*** (0.0076)

> 50 workers	0.2304*** (0.0058)	0.2311*** (0.0088)	0.2105*** (0.0074)	0.2111*** (0.0057)	0.2100*** (0.0087)	0.1948*** (0.0073)	0.1941*** (0.0058)	0.1913*** (0.0087)	0.1805*** (0.0075)
Fixed Contract	-0.1271*** (0.0070)	-0.1553*** (0.0111)	-0.1115*** (0.0089)	-0.1241*** (0.0069)	-0.1414*** (0.0109)	-0.1154*** (0.0087)	-0.1209*** (0.0069)	-0.1319*** (0.0108)	-0.1165*** (0.0087)
Shift Work	-0.0103*** (0.0035)	-0.0305*** (0.0044)	0.0025 (0.0051)	0.0201*** (0.0037)	0.0112** (0.0048)	0.0209*** (0.0054)	0.0292*** (0.0037)	0.0125*** (0.0047)	0.0413*** (0.0055)
German Citizen	0.0995*** (0.0083)	0.1058*** (0.0109)	0.1052*** (0.0123)	0.0647*** (0.0081)	0.0784*** (0.0104)	0.0635*** (0.0120)	0.0582*** (0.0080)	0.0724*** (0.0103)	0.0556*** (0.0120)
Children in HH	0.0242*** (0.0034)	0.0569*** (0.0044)	-0.0023 (0.0049)	0.0242*** (0.0033)	0.0603*** (0.0042)	-0.0061 (0.0047)	0.0250*** (0.0033)	0.0621*** (0.0042)	-0.0066 (0.0047)
Regional Size (< 20,000)									
20,000 - 500,000	0.0072** (0.0032)	-0.0060 (0.0041)	0.0189*** (0.0046)	0.0061** (0.0031)	-0.0082** (0.0039)	0.0190*** (0.0045)	0.0073** (0.0031)	-0.0067* (0.0039)	0.0192*** (0.0045)
> 500,000	0.0395*** (0.0060)	0.0208*** (0.0077)	0.0579*** (0.0083)	0.0344*** (0.0058)	0.0124 (0.0075)	0.0522*** (0.0081)	0.0370*** (0.0058)	0.0147** (0.0075)	0.0523*** (0.0081)
Federal States	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok
Occupation				Ok	Ok	Ok	Ok	Ok	Ok
Sectors							Ok	Ok	Ok
Constant	5.5457*** (0.0443)	5.9371*** (0.0581)	5.2101*** (0.0709)	5.5951*** (0.0451)	5.9951*** (0.0585)	5.2371*** (0.0739)	5.5524*** (0.0467)	5.9851*** (0.0598)	5.1953*** (0.0765)
N	75,192	36,781	38,411	75,192	36,781	38,411	75,192	36,781	38,411
R2	0.6279	0.5027	0.5583	0.6464	0.5319	0.5800	0.6518	0.5424	0.5854

Source: Mikrozensus 2009. Clustered on Households, Std. Errors in Parentheses. Levels of Significance: *0.10, **0.05, ***0.01.

While firms with more employees pay higher income than smaller ones, having a fixed term contract lowers income. Shift work has mixed results with negative or insignificant income effects for men, but positive for women. A German citizenship and a residency in a metropolitan area increase income, especially for women. Differences between the former Eastern and Western part of Germany remain in the controls for federal states.

I try several robustness checks to underpin the results. Table A.4.3 in the Appendix presents results for a larger sample without control for partners working hours. There is no limitation to dual earner couples but the number of observations for gays and lesbians do not increase very much. The results remain stable for the lesbian women but the penalties for gay men are higher. Here in the group of reference male-breadwinning husbands are included, a group with higher mean income.⁴⁰ I use a smaller sample without individuals working as civil servants or soldiers. Again the results are in line.

With the original sample I use the number of children at home instead the simple dummy for having children at home or not. The results remain stable. Then I perform the regressions only for individuals without children at home. I use this as is a proxy for ever being childless and it should test if motherhood or fatherhood drive the presented effects. While the results for gay men are not statistical significant, the income premium for any lesbian women remain. This may show that the lesbian result is not only driven by having less children, but also by a somehow different behavior. Additionally I use median regressions instead of simple OLS regressions to capture potential outliers in the income information itself. Because of the different estimation technique to measure the differences from the median and not from the

⁴⁰ Here I observe 133 gays and 101 lesbians in same-sex couples, and 48 gays and 42 lesbians in registered same-sex unions.

mean, the size of the coefficients remain stable for gay men, but get smaller for the lesbian women. This may be explained by some outlier observations in the income information and the small number of the self-identified lesbians. Again they underline the overall result. As a last robustness check I use the information for the non-self identified or so called hidden homosexuals. All coefficients for homosexuality turn into non significance. This may be the case because of too much noise in this information.⁴¹

In a next step of the analysis I turn to the household level and use household income instead of individual income. It is a reduces form estimation. Here I use a simple dummy for being a same-sex household in reference for being a mixed-sex household, regardless of the marital status. I identify 37,204 households. It is a limitation of the data that the gender types of the correspondent persons are not equally distributed, that means that 32,712 households have a male head of the family and only 4,841 have a female one. In general the head is the individual with the highest income, most often the husband. Table 4.10 shows different models (4-7) with stepwise enriched regressions for household income. In basic model (4) the estimations are made without children, regional size and federal states. These are included in models (5), (6) and (7) separately. The first column of each model shows the size of a sexual orientation effect on household income in relation to male heterosexual correspondent person. The other columns are related to male and female heads. Households of gay men earn 9 to 17 percent more than households with a male heterosexual head of the family, respectively households of a mixed-sex couples. As regards lesbian households, the coefficients are sometimes negative but all not significant.

⁴¹ The other results of the robustness checks and the coefficients for federal states, occupations, and sectors are presented upon request by the author.

Table 4.10: OLS Regressions Household Income (Reduced Form)

Variables	Model 4			Model 5			Model 6			Model 7		
	ALL	MEN	WOMEN	ALL	MEN	WOMEN	ALL	MEN	WOMEN	ALL	MEN	WOMEN
(HH male heterosexuals head)												
HH gay head	0.0922** (0.0437)			0.1607*** (0.0439)			0.1411*** (0.0437)			0.1038** (0.0437)		
HH female heterosexual head	0.0071 (0.0071)			0.0157** (0.0070)			0.0064 (0.0070)			0.0203*** (0.0068)		
HH lesbian head	-0.0489 (0.0390)			0.0021 (0.0394)			0.0095 (0.0388)			0.0423 (0.0395)		
(HH heterosexuals head)												
HH homosexuals head		0.0868** (0.0431)	-0.0219 (0.0538)		0.1572*** (0.0435)	0.0169 (0.0548)		0.1381*** (0.0432)	0.0170 (0.0536)		0.1017** (0.0432)	-0.0309 (0.0548)
Age	0.0125*** (0.0027)	0.0139*** (0.0028)	0.0006 (0.0374)	0.0066** (0.0027)	0.0080*** (0.0028)	-0.0157 (0.0338)	0.0073*** (0.0027)	0.0088*** (0.0028)	-0.0197 (0.0345)	0.0119*** (0.0026)	0.0135*** (0.0027)	-0.0053 (0.0364)
Age Partner	0.0480*** (0.0026)	0.0453*** (0.0027)	0.0672* (0.0374)	0.0320*** (0.0027)	0.0284*** (0.0027)	0.0683** (0.0338)	0.0317*** (0.0027)	0.0281*** (0.0027)	0.0719** (0.0344)	0.0285*** (0.0026)	0.0255*** (0.0026)	0.0548 (0.0364)
Age2 / 1,000	-0.0989*** (0.0306)	-0.1115*** (0.0317)	-0.0205 (0.4772)	-0.0304 (0.0305)	-0.0430 (0.0315)	0.1495 (0.4268)	0.0304 (0.0304)	-0.0494** (0.0315)	0.1913 (0.4365)	0.0357 (0.0294)	-0.1027*** (0.0305)	0.0258 (0.4609)
Age2 Partner/1,000	-0.5393*** (0.0315)	-0.5047*** (0.0319)	-0.7373 (0.4773)	0.3394*** (0.0321)	-0.2940*** (0.0326)	-0.7212* (0.4261)	0.3355*** (0.0321)	-0.2907*** (0.0326)	-0.7558* (0.4356)	0.2865*** (0.0309)	-0.2494*** (0.0314)	-0.5410 (0.4607)
Working Hours	0.0105*** (0.0004)	0.0133*** (0.0004)	-0.0009 (0.0047)	0.0106*** (0.0004)	0.0132*** (0.0004)	0.0003 (0.0042)	0.0106*** (0.0004)	0.0132*** (0.0004)	0.0007 (0.0043)	0.0099*** (0.0003)	0.0126*** (0.0004)	0.0038 (0.0040)
Working Hours Partner	0.0050*** (0.0002)	0.0057*** (0.0002)	0.0081* (0.0047)	0.0067*** (0.0002)	0.0074*** (0.0002)	0.0086** (0.0042)	0.0066*** (0.0002)	0.0073*** (0.0002)	0.0081* (0.0043)	0.0089*** (0.0002)	0.0096*** (0.0002)	0.0066* (0.0040)
Children in HH				0.1422*** (0.0047)	0.1451*** (0.0049)	0.1137*** (0.0141)	0.1465*** (0.0047)	0.1491*** (0.0049)	0.1193*** (0.0144)	0.1616*** (0.0045)	0.1615*** (0.0047)	0.1530*** (0.0139)
Regional Size												
(< 20,000)												
20,000 - 500,000							0.0395*** (0.0040)	0.0391*** (0.0041)	0.0452*** (0.0135)	0.0275*** (0.0041)	0.0298*** (0.0043)	0.0091 (0.0135)
> 500,000							0.0882*** (0.0063)	0.0857*** (0.0068)	0.1024*** (0.0163)	0.1039*** (0.0079)	0.1025*** (0.0084)	0.0959*** (0.0213)
Federal States										Ok	Ok	Ok
Constant	6.1654*** (0.0377)	6.0502*** (0.0477)	6.3639*** (0.0980)	6.4500*** (0.0390)	6.3537*** (0.0421)	6.5479*** (0.1008)	6.4124*** (0.0390)	6.3131*** (0.0422)	6.5105*** (0.1012)	6.3671*** (0.0391)	6.2528*** (0.0420)	6.5350*** (0.1007)
N	37,204	32,408	4,796	37,204	32,408	4,796	37,204	32,408	4,796	37,204	32,408	4,796
R2	0.1180	0.1326	0.0734	0.1413	0.1576	0.0862	0.1471	0.1631	0.0942	0.2179	0.2332	0.17799

Source: Mikrozensus 2009. Clustered on Households, Std. Errors in Parentheses. Levels of Significance: *0.10, **0.05, ***0.01.

These results are hardly driven by the non equal distributed persons of correspondence. On the household level, age and working hours of both partners affected the household income positively. Controls for area such as region and federal state have positive income effects, as well.

To sum up, the results of the distributions over jobs and sectors are in line with the results in the literature (e.g. Blandford 2003, Black et al. 2007, Antecol et al. 2008). There is an income penalty for gay men, while lesbian women receive a premium. But in fact after analyzing the household level instead of the individual level, these penalties and premiums change. Two gay men earn more money than a married couple of a man and a woman. Even if a gay man earns less than a male heterosexual counterpart, he earns still more than a woman. These results are in line with the literature on household optimization. See, for instance, Klawitter and Flatt (1998), Ahmed et al. (2011a) and the discussion in Black et al. (2007).

4.6 Conclusion

This paper has considered differences in incomes between heterosexual and homosexual men and women in the German population. This is probably the first paper of its kind for Germany. I used the Mikrozensus (2009) to show that gay men sort themselves more into female attributed jobs, while lesbian women sort more into male attributed jobs. This is evident for sectors as well. The finding is in line with a series of papers in this field (e.g. Blandford 2003, Black et al. 2007, Antecol 2008).

I performed a simple Mincer-style OLS income regression to show that cohabitating gay men face a penalty in earnings compared with married heterosexual men of 5 to 6 percent. The

results for gay men in a registered same-sex union are smaller, but not statistically significant. This may be weak evidence for a gay marriage premium. Cohabiting lesbian women have a premium in earnings compared with married heterosexual women of about 9 to 10 percent, while lesbian women in a registered same-sex union have a premium of 12 to 16 percent. This may be interpreted as a lesbian marriage premium. After control for occupations and sectors, an income penalty for individual gay men resists, while lesbian women have a premium.

By taking a similar approach with household income, the results change. Households of gay men have a household income premium of 9 to 17 percent relative to households with mixed-sex couples. Lesbian households have a small but not significant reduction in household income. This is in line with the literature on household optimization (e.g. Ahmed et al. 2011a, Black et al. 2007, Klawitter and Flatt 1998).

Based on these results, there is the question why firms may discriminate in individual income between gay men and lesbian women. It may be the case that firms value the level of productivity of gay men less than that of married men and vice versa for lesbian women. In fact it is known from the literature that individuals value the homosexuality of men and women differently. Steffens and Wagner (2004) show that gay men in Germany face harder negative attitudes from heterosexual men than lesbian women. So if more men are in leading positions of firms than women, a more negative tendency towards homosexuals may affect gay men than lesbian women. While Ellis and Riggle (1996) report that job satisfaction of homosexuals is positively affected by an open working environment of tolerant co-workers and seniors, Drydakis (2012c) shows that gay men have lower job satisfaction than heterosexual men, especially when they face the hostility of their supervisors. This could be interpreted as taste discrimination against homosexuals. Peplau and Fingerhut (2004, p.733) present a solution for the lesbian income premium in their behavior. "Like their heterosexual

male counterparts, lesbians may be seen as more work oriented and, if they are parents, as having additional financial responsibilities because of being the family provider. Consequently, lesbians, including lesbian moms, may typically be viewed as competent workers". So the paradox result of a lesbian income premium could be interpreted as a positive statistical discrimination. Unfortunately these mostly unobserved psychological characteristics of different behavior are hardly to control and however not included in my data set.

Although much work is done in the last decade, politicians should be encouraged to go on equalizing homosexuals and heterosexuals in Germany. Further research is needed to disentangle the complex inner connections of this topic. More specified data of self-identified homosexuals, bisexuals and transgenders, would be a great benefit for future research.

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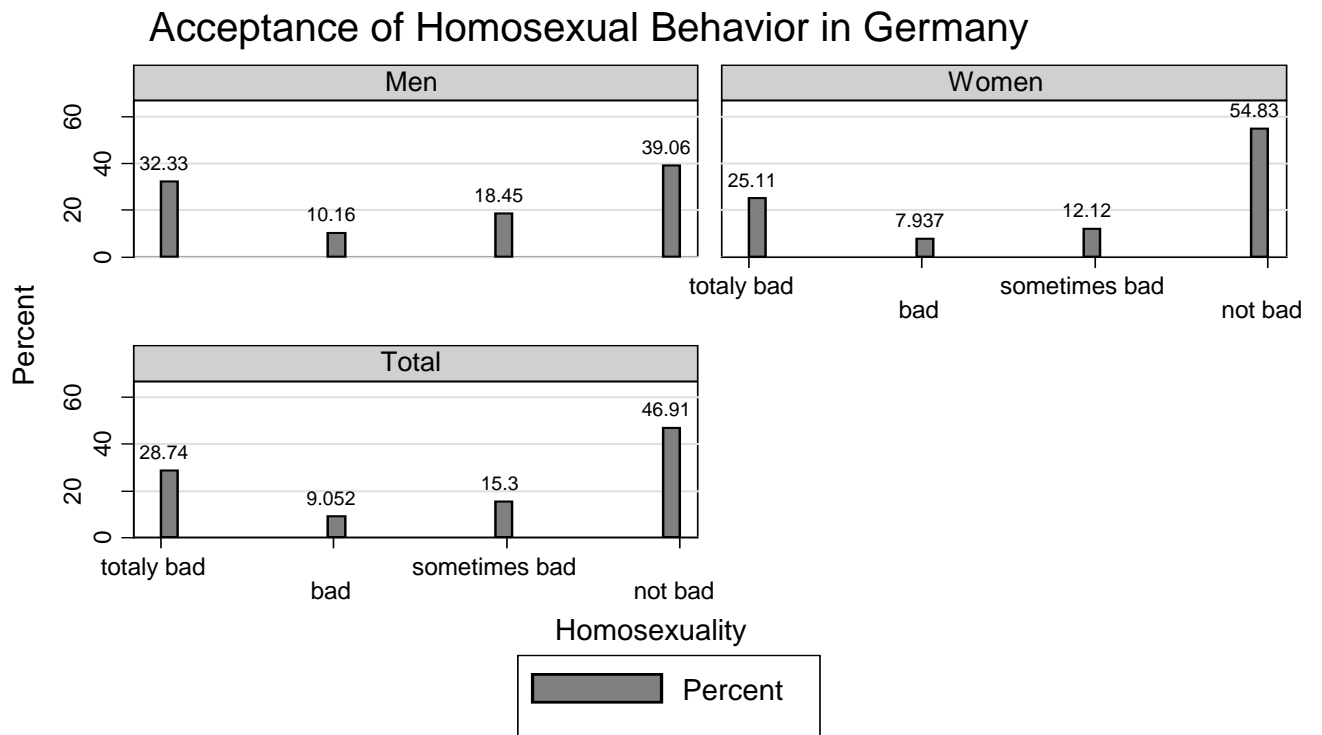
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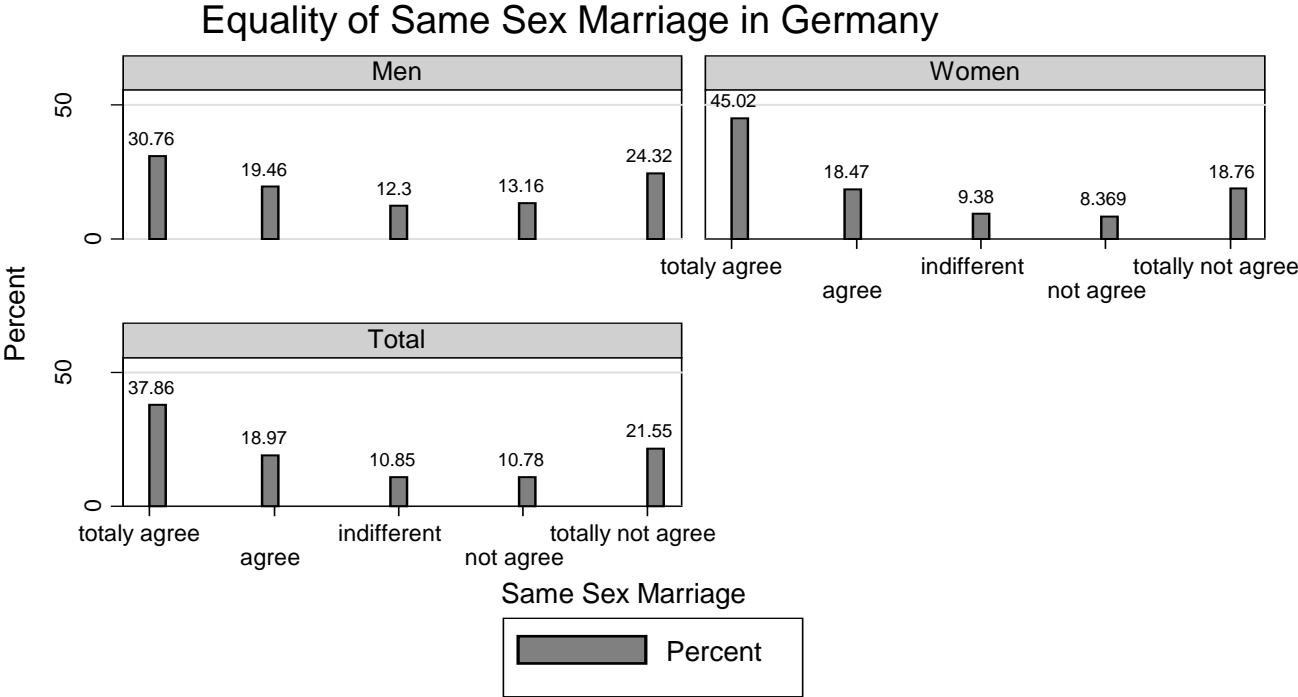
4.8 Appendix

Figure A.4.1: Opinions: Homosexual Behavior in Germany (ALLBUS 2008)



Source: ALLBUS 2008 N=1392

Figure A.4.2: Opinions: Equality of same-sex Marriage in Germany (ALLBUS 2008)



Source: ALLBUS 2008 N=1392

Table A.4.3: OLS Regressions Individual Income (All, Men, Women) larger Sample

Variables	Model 1			Model 2			Model 3		
	ALL	MEN	WOMEN	ALL	MEN	WOMEN	ALL	MEN	WOMEN
(Married Men)									
Cohab. Men	-0.1419*** (0.0045)			-0.1407*** (0.0044)			-0.1386*** (0.0044)		
Gay Couple	-0.1559*** (0.0271)			-0.1627*** (0.0265)			-0.1511*** (0.0262)		
Gay Union	-0.0530 (0.0566)			-0.0880 (0.0556)			-0.0844 (0.0546)		
Married Women	-0.3481*** (0.0040)			-0.3776*** (0.0043)			-0.3724*** (0.0044)		
Cohab. Women	-0.2214*** (0.0050)			-0.2465*** (0.0052)			-0.2405*** (0.0052)		
Lesbian Couple	-0.2048*** (0.0343)			-0.2174*** (0.0347)			-0.2107*** (0.0338)		
Lesbian Union	-0.1347** (0.0561)			-0.1732*** (0.0524)			-0.1722*** (0.0520)		
(Married)									
Diff.-Sex Couple		-0.1174*** (0.0047)	0.1012*** (0.0056)		-0.1160*** (0.0046)	0.1062*** (0.0055)		-0.1135*** (0.0045)	0.1072*** (0.0055)
Same-Sex Couple		-0.1176*** (0.0286)	0.1075** (0.0349)		-0.1265** (0.0285)	0.1134*** (0.0340)		-0.1117*** (0.0283)	0.1138*** (0.0334)
Same-Sex Union		-0.0179 (0.0584)	0.1847*** (0.0586)		-0.0600 (0.0559)	0.1554*** (0.0511)		-0.0583 (0.0558)	0.1515** (0.0515)
Age	0.0202*** (0.0016)	0.0145*** (0.0019)	0.0243*** (0.0027)	0.0166*** (0.0016)	0.0091*** (0.0019)	0.0212*** (0.0026)	0.0159*** (0.0016)	0.0075*** (0.0019)	0.0215*** (0.0026)
Age2 / 1000	-0.1825*** (0.0187)	-0.1328*** (0.0224)	-0.2062*** (0.0313)	-0.1540*** (0.0183)	-0.0782*** (0.0220)	-0.1864*** (0.0308)	-0.1415*** (0.0183)	-0.0537** (0.0219)	-0.1855*** (0.0307)
School (< 7 Years Schooling)									
Secondary	0.0057 (0.0226)	0.0371 (0.0231)	-0.0690 (0.0567)	-0.0210 (0.0216)	0.0145 (0.0226)	-0.1049* (0.0550)	-0.0183 (0.0216)	0.0173 (0.0229)	-0.1011* (0.0538)
School Polytechnic	0.0055	0.0100	-0.0262	-0.0395*	-0.0200	-0.0887	-0.0361	-0.0153	-0.0878
Secondary School (GDR)	(0.0230)	(0.0239)	(0.0569)	(0.0221)	(0.0234)	(0.0552)	(0.0221)	(0.0237)	(0.0540)
Middle School	0.1044*** (0.0227)	0.1375*** (0.0233)	0.1125** (0.0568)	0.0268 (0.0217)	0.0686*** (0.0227)	-0.0358 (0.0550)	0.0277 (0.0217)	0.0703*** (0.0231)	-0.0362 (0.0537)
(technical) College	0.1659*** (0.0229)	0.2033*** (0.0237)	0.1040** (0.0525)	0.0696*** (0.0220)	0.1064*** (0.0232)	0.0096 (0.0551)	0.0676*** (0.0220)	0.1041*** (0.0236)	0.0065 (0.0539)
Prof. Education (Apprenticeship. Voc. Training)									
Master Crafts- men; Academy	0.0961*** (0.0049)	0.1016*** (0.0058)	0.0757*** (0.0085)	0.0814*** (0.0049)	0.0869*** (0.0059)	0.0531*** (0.0087)	0.0791*** (0.0049)	0.0824*** (0.0058)	0.0536*** (0.0087)
Technical	0.1990*** (0.0097)	0.7856*** (0.0197)	0.1645*** (0.0106)	0.1489*** (0.0094)	0.0373** (0.0187)	0.1043*** (0.0105)	0.1405*** (0.0092)	0.0360** (0.0183)	0.0956*** (0.0104)
College (GDR)	0.2077*** (0.0064)	0.2137*** (0.0080)	0.1831*** (0.0107)	0.1816*** (0.0067)	0.1834*** (0.0084)	0.1635*** (0.0108)	0.1741*** (0.0067)	0.1759*** (0.0083)	0.1570*** (0.0108)
University of Applied Sciences	0.3327*** (0.0064)	0.3369*** (0.0083)	0.3334*** (0.0095)	0.3134*** (0.0067)	0.3285*** (0.0090)	0.3097*** (0.0099)	0.2991*** (0.0068)	0.3158*** (0.0083)	0.2925*** (0.0108)
University; PhD	0.0039*** (0.0007)	0.0076*** (0.0008)	0.0030** (0.0012)	0.0065*** (0.0007)	0.0099*** (0.0008)	0.0065*** (0.0012)	0.0068*** (0.0007)	0.0104*** (0.0008)	0.0063*** (0.0012)
Experience	-0.1649*** (0.0148)	-0.2033*** (0.0171)	-0.1847*** (0.0260)	-0.1938*** (0.0145)	-0.2373*** (0.0167)	-0.2187*** (0.0256)	-0.2008*** (0.0144)	-0.2502*** (0.0166)	-0.2192*** (0.0255)
Experience2 / 1000	0.0130*** (0.0005)	0.0110*** (0.0006)	0.0125*** (0.0007)	0.0115*** (0.0004)	0.0105*** (0.0005)	0.0105*** (0.0007)	0.0108*** (0.0004)	0.0099*** (0.0005)	0.0097*** (0.0007)
Tenure	-0.1037*** (0.0111)	-0.0903*** (0.0132)	-0.0671*** (0.0189)	-0.0974*** (0.0108)	-0.1008*** (0.0127)	-0.0547*** (0.0185)	-0.0922*** (0.0107)	-0.0958*** (0.0126)	-0.0544*** (0.0184)
Tenure2 / 1000	0.0257*** (0.0002)	0.0186*** (0.0004)	0.0274*** (0.0003)	0.0251*** (0.0002)	0.0182*** (0.0004)	0.0267*** (0.0003)	0.0251*** (0.0002)	0.0183*** (0.0004)	0.0266*** (0.0003)
Working Hours									
Firm Size (< 5 workers)									
6-10 workers	0.0670*** (0.0069)	0.0615*** (0.0098)	0.0739*** (0.0093)	0.0642*** (0.0067)	0.0638*** (0.0095)	0.0660*** (0.0090)	0.0617*** (0.0067)	0.0608*** (0.0095)	0.0641*** (0.0091)
11-50 workers	0.1194*** (0.0057)	0.1085*** (0.0080)	0.1283*** (0.0078)	0.1142*** (0.0056)	0.1060*** (0.0078)	0.1185*** (0.0077)	0.1090*** (0.0056)	0.1004*** (0.0078)	0.1128*** (0.0078)
> 50 workers	0.2276*** (0.0055)	0.2295*** (0.0077)	0.2084*** (0.0076)	0.2075*** (0.0054)	0.2069*** (0.0076)	0.1922*** (0.0075)	0.1912*** (0.0055)	0.1885*** (0.0077)	0.1795*** (0.0077)

Fixed Contract	-0.1196*** (0.0066)	-0.1431*** (0.0097)	-0.1016*** (0.0089)	-0.1145*** (0.0065)	-0.1289*** (0.0095)	-0.1048*** (0.0088)	-0.1101*** (0.0065)	-0.1193*** (0.0094)	-0.1056*** (0.0088)
Shift Work	-0.0059* (0.0031)	-0.0309*** (0.0039)	0.0191*** (0.0053)	0.0281*** (0.0035)	0.0115*** (0.0042)	0.0388*** (0.0056)	0.0344*** (0.0035)	0.0114*** (0.0042)	0.0578*** (0.0057)
German Citizen	0.0758*** (0.0074)	0.0723*** (0.0087)	0.1028*** (0.0130)	0.0450*** (0.0071)	0.0481*** (0.0083)	0.0612*** (0.0127)	0.0398*** (0.0071)	0.0437*** (0.0082)	0.0535*** (0.0128)
Children in HH	0.0326*** (0.0031)	0.0966*** (0.0036)	-0.0371*** (0.0052)	0.0340*** (0.0030)	0.1001*** (0.0035)	-0.0405*** (0.0050)	0.0344*** (0.0030)	0.1005*** (0.0035)	-0.0410*** (0.0050)
Regional Size (< 20,000)									
20,000 - 500,000	0.0075** (0.0030)	-0.0049 (0.0036)	0.0224*** (0.0049)	0.0062** (0.0029)	-0.0072** (0.0035)	0.0226*** (0.0048)	0.0074** (0.0029)	-0.0056 (0.0035)	0.0229*** (0.0048)
> 500,000	0.0378*** (0.0056)	0.0161*** (0.0069)	0.0639*** (0.0087)	0.0325*** (0.0055)	0.0076 (0.0067)	0.0587*** (0.0085)	0.0359*** (0.0055)	0.0103 (0.0066)	0.0592*** (0.0085)
Federal States	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok	Ok
Occupation				Ok	Ok	Ok	Ok	Ok	Ok
Sectors							Ok	Ok	Ok
Constant	5.5551*** (0.0391)	5.9097*** (0.0466)	5.1003*** (0.0759)	5.6085*** (0.0397)	5.9768*** (0.0473)	5.1486*** (0.0777)	5.5711*** (0.0412)	5.9739*** (0.0485)	5.1109*** (0.0801)
N	88,020	49,134	38,886	88,020	49,134	38,886	88,020	49,134	38,886
R2	0.6154	0.4977	0.5160	0.6335	0.5272	0.5370	0.6384	0.5372	0.5417

Source: Mikrozensus 2009. Clustered on Households, Std. Errors in Parentheses. Levels of Significance: *0.10, **0.05, ***0.01.

Chapter 5

A Note on Happiness in Eastern Europe

Abstract⁴²

Recent studies in economics of happiness focusing on the influence of different aspects of subjective well-being in transition countries. Here these countries are located in Eastern Europe. After aggregating a dataset which combines the World Values Survey and the European Values Study, I use an OLS and ordered probit and ordered logit estimations to perform regressions. The main findings are that individuals in transition countries behave like individuals in western industrialised countries. This shows the international reliability of the happiness research approach.

Keywords: subjective well-being, eastern europe

⁴² This is a revised version of the published article. I thank Kathrin Böhm and Georgios Kavetsos for comments and discussions.

5.1 Introduction

After some years, the field of economical happiness research is more and more common. Depending on the literature the topic is discussed as subjective well-being, well-being, satisfaction or happiness. These words are used synonymous.

Happiness research deals with the question, which determinants can influence the satisfaction of an individual (Frey and Stutzer 2002). The idea of happiness is an adequate approximation of economical utility. It is robust and stable even in times of many crisis and catastrophes (Berger 2010). After the fall of the iron curtain in Eastern Europe, these countries turned into strong economic transitions. See Kreyenfeld for the effects of economical uncertainty on individual behaviour⁴³ (Kreyenfeld 2010). According to the papers of Hoya I want to estimate the effects concerning subjective well-being in these countries (Hoya and Seifert 2003, Hoya 2008).

I start the discussion with the question of interest: Are transition countries different in the behaviour of their citizens? The data is aggregated from the World Values Survey and the European Values Study. I use individual information from Albania, Belarus, Latvia, Lithuania, Moldova, Montenegro, Poland, Romania, Russian Federation, Slovakia, Slovenia, Serbia, and Ukraine. For Bosnia, the data are divided into the Serbian Republic of Bosnia (Srpska) and the Bosnian Federation (Bosnia and Herzegovina).

This paper is organized as follows: After the introduction, the second section describes the general findings, which are known from the relevant literature. In the third section, I will describe the dataset und the estimation models. In the forth section, I do some regressions for the set of countries and discuss the results. In the fifth section, I give a conclusion.

⁴³ There are social effects like the decline of fertility (Kohler et al. 2002, Goldstein et al. 2009)

5.2 Global Happiness

First of all, I want to discuss the general results of happiness research known from the literature. For instance, Inglehart et al. (2008) show for a large number of countries worldwide⁴⁴ the positive correlation between economic growth, the power of democracy and the rise of personal happiness. Easterlin (1974) discovers the so called Easterlin paradoxon, that poor people feel dissatisfied with life in their countries, but not between the countries. Stevenson and Wolfers (2008) reject this hypothesis and present evidence for positive relation between GDP per capita and mean level of satisfaction. Di Tella et al. (2001; 2003) observe a trade off between inflation and general unemployment. The result can be interpreted, that unemployment is much worse than inflation. Even remembering past unemployment lowers satisfaction in life (Clark et al. 2001). Concerning the topic of transition countries, the literature is small. Only a few papers investigate the effects on satisfaction in Eastern Europe (Hooya 2008, Bjørnskov et al. 2008, Borooah 2009). Deaton (2008) discovers a decline in happiness concerning the Eastern European countries.

On individual levels, Layard describes a set of five negative and seven positive determinants⁴⁵ on happiness, where age, types of gender and education have only small negative effects on subjective well-being. The levels of intelligence and appearance are meaningless. Family, financial situation, labour, social settings, psychological health, personal freedom and good way of life are all positive indicators on happiness (Layard 2005). There is an ongoing discussion of the topic of individual age. The effects of age as u-shaped with a minimum in the age of the late thirties was described by Blanchflower and Oswald (2004, 2008, 2009).

⁴⁴ They used the European Values Survey and the World Values Survey and showed the positive effect for a huge number of countries would wide.

⁴⁵ These are the famous "big seven" factors.

They and many other authors discuss these results (Powdthavee 2005, Fischer 2009, Brockmann 2010). Deaton (2008) shows a decline in happiness and age. But he is not convinced if this is a just an aging effect. For a literary review see Humpert (Humpert 2011).

Concerning gender effects, Stevenson and Wolfers (2009) show lower level of female happiness unlike the male level. Since the influential paper of Clark and Oswald (1994) it is known that personal unemployment lowers happiness very much. Winkelmann and Winkelmann (1998) agree with that finding for German micro data. It is shown that married people are happier than unmarried people, because of their higher interest (Stutzer and Frey 2006). Diener et al. (2000) prove the result for several countries and different cultures.

Having children is an unsecure factor. While Magolis and Myrskylä (2011) describe negative effects. Humpert finds a positive influence of individual satisfaction (Humpert 2009, 2010). As Clark and Lelkes (2005) show, religiousness make people feel happier as well. Some macro economical determinants are negative on the level of subjective well-being, too.

5.3 Econometrical Method

At first I discuss the dataset and the estimation model. The dataset in this paper is generated by the five waves of the World Values Survey and the European Values Study⁴⁶ (WVS/EVS). It is aggregated from both survey types by using a special procedure for building a combined five wave WVS-EVS file. This procedure is kindly provided by Díez-Medrano (2009). The data includes are aggregated cross sections over time, but it is not a panel data.

In the dataset there are many industrialised, developed, and underdeveloped countries from all over the world with more than 256,000 interviews. For the estimations I have to limit to a shorter set of fourteen countries from Eastern Europe. All these countries in alphabetical order: Albania, Belarus, Latvia, Lithuania, Moldova, Montenegro, Poland, Romania, Russia, Slovakia, Slovenia, Serbia and Ukraine. The Bosnian data is divided into the subpopulations of the Serbian Republic of Bosnia (Srpska) and the Bosnian Federation (Bosnia and Herzegovina). These countries are observed for three wave: 1994-1999, 1999-2004 and 2004-2007. The question about satisfaction with life has ten categories in a range from one (dissatisfied) to ten (satisfied):

“All things considered, how satisfied are you with your life as a whole these days?”

I control for a set of individual characteristics such as age, being male, the level of income, family formation, highest education, employment, health, religiousness, social class, size of hometown, living with parents and the number of children. For observing the different effects of income, I use the scale specific values from the one to ten. It should be noted that income is used in a scale for a proper international comparison. Age is recoded into five age groups from 15-24 till 65 years and older. The type of family formation is controlled, as well. The

⁴⁶ For further information please look at <http://www.worldvaluessurvey.org>.

conditions are: being married, living together as married, being divorced, being separated, being widowed, being single and never married, being divorced, separated, widow or living apart but steady relation. The first two are recoded as one, to handle different cultures of family formations. The last three items are aggregated into one as a residual category. Education is used as the highest degree: elementary school, technical school and university degree. The employment status is coded like that: working full time, working part time, being self employed, being retired, being a housewife, being a students or being unemployed. Religiousness is controlled for high intensity, low intensity and atheism. Individual health is used in a scale of five answers from very good to very poor health. The number of children is used as well. It is recoded into one, two and three and more children. The description of the variables is given in Table 5.1.

For simplicity I regress an OLS model with controls and robust standard errors. To check the robustness of the results, I repeat this model and present an ordered probit and an ordered logit approach. It should be kept in mind, that the coefficients taken from the ordered probit and ordered logit could not be interpreted in the size, but in the direction for being positive or negative. The general model is the following:

$$\begin{aligned}
 \text{satisfaction}_i = & \beta_0 + \beta_1(\text{agegroups})_i + \beta_2(\text{gender})_i \\
 & + \beta_3(\text{labour})_i + \beta_4(\text{religion})_i + \beta_5(\text{family})_i + \beta_6(\text{healthcondition})_i \\
 & + \beta_7(\text{educationlevel})_i + \beta_8(\text{incomescale})_i + \beta_9(\text{class}) + \beta_{10}(\text{parentsathome})_i \\
 & + \beta_{11}(\text{children})_i + \beta_{12}(\text{townsiz})_i + \beta_{13}(\text{country})_i + \beta_{14}(\text{wave})_i + \varepsilon_i
 \end{aligned}
 \tag{5.1}$$

Table 5.1: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
satisfaction	5.1479	2.4513	1	10
25-34 years	0.1880	0.3907	0	1
35-44 years	0.2114	0.4083	0	1
45-54 years	0.1806	0.3847	0	1
55-64 years	0.1538	0.3607	0	1
> 65 years	0.1481	0.3552	0	1
female	0.5299	0.4991	0	1
not much religious	0.2409	0.4276	0	1
convinced atheist	0.0362	0.1868	0	1
completed elementary school	0.1426	0.3496	0	1
incomplete secondary school: technical	0.0628	0.2426	0	1
complete secondary school: technical	0.2842	0.4510	0	1
incomplete secondary: university preparation	0.0587	0.2351	0	1
complete secondary: university preparation	0.1777	0.3823	0	1
some university without degree	0.0495	0.2169	0	1
university with degree	0.1456	0.3527	0	1
part-time job	0.0508	0.2197	0	1
self-employed	0.0520	0.2220	0	1
retired	0.2439	0.4295	0	1
housewife/man	0.0752	0.2637	0	1
student	0.0424	0.2015	0	1
unemployed	0.1040	0.3052	0	1
divorced	0.0415	0.1995	0	1
separated	0.0117	0.1074	0	1
widowed	0.1018	0.3024	0	1
others	0.1534	0.3604	0	1
good health	0.3486	0.4765	0	1
fair health	0.3763	0.4845	0	1
poor health	0.1368	0.3436	0	1
very poor health	0.0191	0.1367	0	1
upper middle class	0.1197	0.3246	0	1
lower middle class	0.3804	0.4855	0	1
working class	0.3778	0.4849	0	1
lower class	0.1126	0.3161	0	1
living with own parents	0.2381	0.4259	0	1
town size 2,000-5,000	0.1379	0.3448	0	1
town size 5,000-10,000	0.0671	0.2502	0	1
town size 10,000-20,000	0.0742	0.2621	0	1
town size 20,000-50,000	0.1023	0.3030	0	1
town size 50,000-100,000	0.0749	0.2633	0	1
town size 100,000-500,000	0.1611	0.3676	0	1
town size > 500,000	0.1353	0.3421	0	1
income (scale)	4.6690	2.5085	1	10
one child	0.2157	0.4113	0	1
two children	0.3821	0.4859	0	1
> three children	0.1920	0.3939	0	1
Bulgaria	0.0671	0.2503	0	1
Belarus	0.0687	0.2529	0	1
Latvia	0.0450	0.2074	0	1
Lithuania	0.0350	0.1838	0	1
Moldova	0.1184	0.3231	0	1
Poland	0.0356	0.1854	0	1
Romania	0.1083	0.3108	0	1

Russia	0.0747	0.2628	0	1
Slovakia	0.0388	0.1932	0	1
Slovenia	0.0373	0.1895	0	1
Ukraine	0.0835	0.2767	0	1
Serbia	0.0852	0.2791	0	1
Montenegro	0.0359	0.1862	0	1
Serbian Republic of Bosnia (Srpska)	0.0265	0.1606	0	1
Bosnian Federation (Bosnia and Herzegovina)	0.0642	0.2451	0	1
1999-2004	0.1905	0.3927	0	1
2005-2007	0.2093	0.4068	0	1

N: 22,087 (all countries)

Source EVS/WVS Waves 1994-1999, 1999-2004, 2005-2007.

5.4 Estimations and Results

The results of the happiness regressions can be found in Table 5.2. For the dependent variables, I find the effects of happiness, which are already known from the literature.

The age groups show the typical u-shape curve. The gender variable is not statistical significant. Controlling for being male, women have no difference in satisfaction. I can show strong negative effects of unemployment. This is a general result in the international literature. Compared to married couples all other types of family formations are negative for the individuals. In contrast to low education, I find a positive effect of higher levels of education. All kinds of uncompleted schoolings are strongly negative determinants. Income has an overall positive effect on subjective well-being. Instead of strong religious believes, a weaker level of religiousness has a negative effect on satisfaction, but not for atheists. A less good condition of health is negative, too. The reference is a very good condition.

I find a strong negative effect of the social class variable. This can be interpreted as an example of the Easterlin paradoxon. Another negative effect can be detected for individuals who live together with their own parents. This variable may show an effect of psycho social stress. The effect for the number of children is not statistically significant. The effects of the town size where someone live in is mixed.

Table 5.2 Results

Variables	OLS	Ordered Probit	Ordered Logit
25-34 years	-0.2799*** (0.0654)	-0.1357*** (0.0316)	-0.2305*** (0.0555)
35-44 years	-0.4732*** (0.0705)	-0.2305*** (0.0343)	-0.3982*** (0.0597)
45-54 years	-0.4188*** (0.0736)	-0.2012*** (0.0358)	-0.3536*** (0.0622)
55-64 years	-0.2862*** (0.0832)	-0.1365*** (0.0405)	-0.2256*** (0.0696)
> 65 years	-0.0815 (0.0951)	-0.0346 (0.0467)	-0.0680 (0.0806)
female	0.0393 (0.0307)	0.0202 (0.0151)	0.0320 (0.0258)
not much religious	-0.1596*** (0.0351)	-0.0770*** (0.0171)	-0.1331*** (0.0293)
convinced atheist	-0.1163 (0.0763)	-0.0573 (0.0376)	-0.1041 (0.0644)
completed elementary school	0.0176 (0.0661)	0.0092 (0.0330)	0.0350 (0.0569)
incomplete secondary school: technical	-0.0906 (0.0816)	-0.0436 (0.0406)	-0.0786 (0.0694)
complete secondary school: technical	0.0977 (0.0699)	0.0453 (0.0347)	0.0804 (0.0598)
incomplete secondary: university preparation	-0.1660* (0.0852)	-0.0947** (0.0426)	-0.1583** (0.0728)
complete secondary: university preparation	0.0943 (0.0726)	0.0399 (0.0360)	0.0572 (0.0620)
some university without degree	0.0804 (0.0927)	0.0358 (0.0456)	0.0696 (0.0791)
university with degree	0.1479* (0.0775)	0.0647* (0.0383)	0.1257* (0.0663)
part-time job	0.0626 (0.0665)	0.0345 (0.0323)	0.0698 (0.0563)
self-employed	0.0872 (0.0647)	0.0415 (0.0309)	0.0518 (0.0527)
retired	0.0707 (0.0592)	0.0348 (0.0292)	0.0465 (0.0494)
housewife/man	0.0261 (0.0634)	0.0158 (0.0310)	0.0202 (0.0538)
student	0.2614*** (0.0848)	0.1212*** (0.0409)	0.2322*** (0.0714)
unemployed	-0.2940*** (0.0521)	-0.1394*** (0.0258)	-0.2490*** (0.048)
divorced	-0.4067*** (0.0743)	-0.2014*** (0.0373)	-0.3600*** (0.0616)
separated	-0.5611*** (0.1369)	-0.2940*** (0.0703)	-0.5197*** (0.1197)
widowed	-0.1851*** (0.0547)	-0.0955*** (0.0274)	-0.1670*** (0.0462)
others	-0.1705*** (0.0650)	-0.0828*** (0.0317)	-0.1724*** (0.0544)
good health	-0.5532***	-0.2712***	-0.4862***

	(0.0489)	(0.0240)	(0.0423)
fair health	-1.1049***	-0.5321***	-0.9399***
	(0.0526)	(0.0260)	(0.0457)
poor health	-1.7911***	-0.8740***	-1.5376***
	(0.0653)	(0.0329)	(0.0570)
very poor health	-2.1783***	-1.1516***	-2.1160***
	(0.1268)	(0.0731)	(0.1243)
upper middle class	-0.0415	-0.0365	-0.1212
	(0.1674)	(0.0834)	(0.1530)
lower middle class	-0.4733***	-0.2395***	-0.4846***
	(0.1655)	(0.0825)	(0.1517)
working class	-0.9068***	-0.4445***	-0.8519***
	(0.1670)	(0.0833)	(0.1530)
lower class	-1.7029***	-0.8570***	-1.5809***
	(0.1728)	(0.0866)	(0.1582)
living with own parents	-0.1078***	-0.0493***	-0.0832***
	(0.0417)	(0.0203)	(0.0350)
town size 2,000-5,000	0.1832***	0.0912***	0.1564***
	(0.0484)	(0.0239)	(0.0409)
town size 5,000-10,000	0.1001	0.0506*	0.0720
	(0.0623)	(0.0305)	(0.0517)
town size 10,000-20,000	-0.0177	-0.0037	-0.0241
	(0.0602)	(0.0296)	(0.0504)
town size 20,000-50,000	0.0369	0.0177	0.0306
	(0.0534)	(0.0261)	(0.0443)
town size 50,000-100,000	0.0849	0.0410	0.0712
	(0.0618)	(0.0302)	(0.0522)
town size 100,000-500,000	0.1519***	0.0763***	0.1184***
	(0.0482)	(0.0238)	(0.0405)
town size > 500,000	-0.0085	-0.0028	-0.0092
	(0.0512)	(0.0252)	(0.0431)
income (scale)	0.1425***	0.0682***	0.1242***
	(0.0073)	(0.0036)	(0.0063)
one child	-0.0477	-0.0171	-0.0454
	(0.0555)	(0.0272)	(0.0463)
two children	0.0083	0.0068	-0.0114
	(0.0537)	(0.0263)	(0.0449)
> three children	0.0347	0.0202	-0.0051
	(0.0600)	(0.0295)	(0.0503)
Bulgaria	-0.0964	-0.0552	-0.1468*
	(0.0802)	(0.0388)	(0.0653)
Belarus	-0.3290***	-0.1617***	-0.3158***
	(0.0788)	(0.0384)	(0.0656)
Latvia	0.3316***	0.1601***	0.2528***
	(0.0876)	(0.0419)	(0.0715)
Lithuania	0.0210	0.0027	-0.0557
	(0.1028)	(0.0503)	(0.0874)
Moldova	-0.2612***	-0.1390***	-0.2371***
	(0.0732)	(0.0358)	(0.0614)
Poland	1.6688***	0.7962***	1.3324***
	(0.1032)	(0.0508)	(0.865)
Romania	0.2390***	0.1058***	0.1733***
	(0.0779)	(0.0374)	(0.0645)
Russia	-0.0097	-0.0103	-0.0914
	(0.0831)	(0.0406)	(0.0696)

Slovakia	1.4953*** (0.0931)	0.7123*** (0.0448)	1.2541*** (0.0776)
Slovenia	1.4977*** (0.0999)	0.7239*** (0.0497)	1.1762*** (0.0854)
Ukraine	-0.1561** (0.0764)	-0.0865** (0.0374)	-0.1793*** (0.0631)
Serbia	0.8365*** (0.0720)	0.3057*** (0.0346)	0.6730*** (0.0608)
Montenegro	0.5490*** (0.0896)	0.2491*** (0.0430)	0.4467*** (0.0730)
Serbian Republic of Bosnia (Srpska)	0.0991 (0.1036)	0.0466 (0.0504)	0.0683 (0.0855)
Bosnian Federation (Bosnia and Herzegovina)	0.8181*** (0.0759)	0.3872*** (0.0364)	0.6344*** (0.0624)
1999-2004	0.1836*** (0.0476)	0.0916*** (0.0231)	0.1431*** (0.0396)
2005-2007	0.7504*** (0.0557)	0.3658*** (0.0272)	0.6508*** (0.0469)
constant	5.8897*** (0.2073)		
constant (cut point 1)		-1.9398*** (0.1035)	-3.4904*** (0.1878)
constant (cut point 2)		-1.5715*** (0.1033)	-2.8110*** (0.1872)
constant (cut point 3)		-1.1047*** (0.1031)	-1.9931 (0.1867)
constant (cut point 4)		-0.7282*** (0.1031)	-1.3547*** (0.1865)
constant (cut point 5)		-0.1265 (0.1029)	-0.3454* (0.1863)
constant (cut point 6)		0.2133* (0.1028)	0.2313 (0.1861)
constant (cut point 7)		0.6388*** (0.1028)	0.9736*** (0.1862)
constant (cut point 8)		1.2130*** (0.1030)	2.0384*** (0.1868)
constant (cut point 9)		1.6213*** (0.1031)	2.8731*** (0.1877)
R ² (Mc Fadden Pseudo R ²)	0.2798	0.0726	0.0761
N	22,087	22,087	22,087

*** p<0.01 ** p<0.05, * p<0.10, robust Standard Errors. Source EVS/WVS. References: 15-24, male, religious, inadequately completed elementary education, full-time job, very good health, upper class, not living together with parents, town size less 2,000, childless, Albania, wave 1994-1999.

The small and biggest ones have positive effects on happiness, while the others are not significant. The most of the country dummies are statistical significant. They have to be interpreted to the reference country of Albania.

5.5 Conclusion

In this paper I discuss some determinants of subjective well-being for the case of fourteen Eastern European countries. All these countries have in common that they faced or still face an enormous political and economical transition.

According to the literature I find the typical results of happiness equations. The Eastern European countries at this study behave in line with the descriptive findings from all over the world. This shows the international reliability of the happiness research approach.

General findings are that people overall suffer from individual unemployment, weak education, and poor health even after control for individual income and the social class. Other effects such as an u-shaped age, a strong positive marriage effect, no differences between men and women and mixed country side effects are observable as well. The differences between the countries can be interpreted as cultural specific or inter country effects, see for instance the highly negative coefficient for Belarus and the Ukraine.

For simplicity I use simple OLS estimation and as a robustness check ordered probit and ordered logit estimations. The results seem to be robust. Of course the ordered probit and ordered logit results could not be interpreted in the size of the coefficients, but in the directions for being positive or negative.

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Chapter 6

Concluding Comments

6.1 Summary and Conclusion

In this thesis I present a collection of four empirical articles dealing with labor related aspects of individuals and families. These essays discuss age and gender related aspects of labor supply and demand.

The paper *Age and Gender Differences in Job Opportunities* (Chapter 2) turns towards job opportunities for older workers. It is an enriched replication study to Hutchens (1988). The key results are that newly-employed women and men older than the age of 55 are more limited in their occupational choices than younger women and men. Different measures of segregation such as the Duncan Index and Hutchens Index show unequal distribution of jobs over age. Older women in particular face the highest segregation. Several years of the IAB Employment Sample are used in the analysis.

The next paper *Explaining Age and Gender Differences in Employment Rates: A Labor Supply Side Perspective* (Chapter 3) analyzes the labor supply decision of older individuals. The comparison of reservation wages and entry wages shows age- and gender-specific differences. There is evidence that reservation wages increase with age. Non-employed individuals at the age of 55 and older have the highest reservation wages. Reservation wages for females are always higher than those for males. Entry wages increase with age for males, but not for females. Furthermore, there is the interesting result, that job satisfaction of women decreases with age while satisfaction with leisure tends to increase. This may explain why employment rates for females are lower than for males. The German Socio-Economic Panel (GSOEP) data is used in the paper.

In Chapter 4, *Somewhere over the Rainbow: Sexual Orientation Discrimination in Germany* a different view on gender aspects is chosen. Here sexual orientation-based differences in income are analyzed. One key result is that, although Germany has an anti-discrimination law that has explicitly prohibited discrimination on the basis of sexual orientation since 2006, there are significant income differences for gay men and lesbian women. While gay men have an income discount of 5 to 6 percent relative to married heterosexual men, lesbian women have an income premium of 9 to 10 percent relative to heterosexual married women. These differences within the gender types can be explained partially by selection into specific occupations and sectors. One wave of the German Mikrozensus data is used in the analysis.

The final paper *A Note on Happiness in Eastern Europe* (Chapter 5) is not related to Germany, but takes an international position. Estimations on life satisfaction show typical results, such as a u-shaped effect in relation to age. Marriage and a good state of health have positive effects on life satisfaction or utility, while individual unemployment has a negative effect. Several years of the European Values Study (EVS) and the World Value Survey (WSV) are used in the paper. See e.g. the inspiring books of van Praag and Ferrer-i-Carbonell (2007), and Powdthavee (2010) for a broader discussion of life satisfaction.

All these studies have in common the topics of participation and equality, on the labor market and beyond. The on-going political debates in Germany on an aging workforce, increasing retirement age, and activation of female workers show the importance of labor market related research. Another political debate on legal equality for married same-sex and mixed-sex couples, started by the Federal Constitutional Court, shows the general importance of equality itself. Again, labor market related studies help to shed some light on such topics without any ideological point of views. With this thesis I hope to foster a little bit future work on labor market and family aspects.

6.2 References

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