Schmollers Jahrbuch 125 (2005), 119 – 129
Duncker & Humblot, Berlin

A Comparison of the Relationship Between Obesity and Earnings in the U.S. and Germany

By John Cawley, Markus M. Grabka, and Dean R. Lillard*

Abstract

This paper investigates and compares the relationship between obesity and earnings in the U.S. and Germany. Using data from the Panel Study of Income Dynamics (U.S.) and the German Socio-Economic Panel, instrumental variables models are estimated that account for the endogeneity of body weight. We find that, in both countries, heavier women tend to earn less. For example, obesity is associated with almost 20 percent lower earnings for U.S. and German women. We test for causality using IV models; these models suggest that weight may lower labor earnings for U.S. women. However, our IV results yield no evidence of a causal impact of weight on earnings for women in Germany or for men in either country.

JEL Classifications: J71, J31, J10, I10

Introduction

The prevalence of obesity has risen dramatically in the last several decades in all developed countries. In the U.S., it rose from 15 percent of the population during 1976 – 1980 to more than 30 percent during 1999 – 2002 (Flegal et al. 2002; Hedley et al. 2004). Data are more scarce in Germany, but the fraction of obese men in West Germany rose from 17.4 percent during the period 1990 – 1992 to 19.4 percent in 1998 (Bergmann and Mensik 1999) and rose an additional percentage point between 1999 and 2003 (Statisisches Bundesamt 2004).

With the rise in obesity has come interest in better understanding the implications and consequences of the condition. There are large literatures devoted to the health consequences of obesity (e.g. Field et al. 2002) as well as the social or emotional impact (Sobal 2004). Several studies have documented a

* Acknowledgements: The authors thank participants at the 2004 SOEP Data Users Conference in Berlin for their helpful comments. They thank Shuaizhang Feng for research assistance.

negative correlation between obesity and wages or earnings among women (Averett and Korenman 1996; Pagan and Davila 1997; Cawley 2004). Cawley (2004) finds evidence that this relationship is causal (that is, that weight lowers wages) for white, but not black or Hispanic, females in the U.S. He also finds that observed negative correlations between wages and weight for other groups are likely the result of unobserved heterogeneity.

Part of the relationship between weight and earnings may be determined by culture. For example, in societies in which obesity is more stigmatized, obese individuals may suffer lower self-esteem, leading to worse labor market performance. Alternately, in such societies employers may be more likely to discriminate against obese job applicants or obese employees. For these reasons, the relationship between weight and earnings is likely to differ across countries.

This paper is the first to compare the relationship between weight and earnings across countries, in particular, Germany and the United States. We present a basic model that links weight to earnings. We use data from the German Socio-Economic Panel (SOEP) and the Panel Study of Income Dynamics (PSID) components of the Cross-National Equivalent File (CNEF) (Burkhauser et al. 2001) to estimate regression models and compare the association between obesity and earnings in the two countries. Neither of these data sets has been previously used to study the relationship between weight and earnings.

1. Conceptual Framework and Methods

In this section we sketch a conceptual framework for understanding the relationship between body weight and earnings. The logic of the model applies as well to other outcomes (employment, labor market earnings, and hours worked) that we examine in Cawley, Grabka, and Lillard (2004).

Assume that log earnings are a function of body mass index (BMI) and other variables such as human capital. Research in behavioral genetics suggests that roughly half of the variation in body mass index is due to non-genetic factors such as individual choices and environment (Comuzzie and Allison 1998). In addition, obesity may be influenced by earnings, especially for adult females (Sobal and Stunkard 1989). For these reasons BMI is endogenous, and an OLS estimate of the coefficient on weight will not consistently estimate the true effect of BMI on log earnings.

We use the method of instrumental variables to address the endogeneity of weight. For IV to be successful, one must identify at least one instrument that is highly correlated with weight but not with the error term in the log earnings regression. The challenge of the instrumental variables method is to find valid instruments.

We adopt the approach of Cawley (2004) and use as our instrument the weight of a family member; for the PSID, a child or parent, and in the SOEP, a parent. The weight of a child or parent is a powerful instrument for the weight of a respondent because each parent shares on average half of her genes with each of her biological children, and about half of the variation in weight is genetic (Comuzzie and Allison 1998). Our identifying assumption requires that the weight of a child or parent be uncorrelated with the respondent's earnings residual. One might be concerned that they are correlated if they both depend on habits learned in the family household. However, studies have been unable to detect any effect of common household environment on body weight in samples comparing adopted and biological children (Comuzzie and Allison 1998; Grilo and Pogue-Geile 1991) or in samples of twins reared apart compared to twins reared together (Maes et al. 1997). It is not possible to prove the null hypothesis of no effect of household environment on body weight; the repeated failure to reject the null hypothesis is the strongest evidence that will ever be available.

The weight of a child or parent would be correlated with the respondent's earnings residual if the genes that determine weight and those that determine earnings are bundled in transmission from parent to child; the extent to which this occurs is unknown. Most estimates of the correlation between earnings of sons and fathers lie in the range .2 to .35 (Corak 2004). Note that this is the total intergenerational correlation, not an estimate of the genetic variation in earnings that is bundled with the genetic variation in weight, which is the only part that would be troubling for our IV method.[1]

2. Data

This study uses data from the PSID and the SOEP. Respondents report height and weight in survey years 1986, 1999, and 2001 in the PSID and in 2002 in the SOEP. When people report their weight and height, they often err (intentionally or unintentionally), and reporting error may bias coefficient estimates (Judge et al. 1985). To correct for reporting error in the PSID we predict true height and weight with information on the relationship between true and reported values in the Third National Health and Nutrition Examination Survey (NHANES III) using the method outlined in Lee and Sepanski (1995) and Bound et al. (2002); an appendix detailing this procedure is available upon request. No parallel study was available to investigate or correct for

1 In Cawley, Grabka, and Lillard (2004), we estimate models that control for individual fixed effects (FE), a specification which eliminates the influence of time-invariant unobserved heterogeneity. This is possible for the PSID because it contains up to three measures of weight for each respondent. Because the SOEP data (up to wave 2003) include only one measure of weight, we cannot estimate the FE model using those data.

Table 1: **Descriptive statistics of variables in the OLS and IV regression models: Mean and (standard deviation)**

	Men				Women			
	U.S. (PSID)		Germany (SOEP)		U.S. (PSID)		Germany (SOEP)	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Weight	83.79 (14.86)	82.39 (14.68)	83.91 (12.99)	82.64 (12.93)	77.37 (16.68)	75.89 (16.89)	67.17 (12.31)	66.90 (13.03)
Height	1,75 (0,07)	1,75 (0,07)	1,79 (0,07)	1,79 (0,07)	1,60 (0,06)	1,61 (0,06)	1,66 (0,06)	1,68 (0,06)
Underweight	0.00 (0.06)	0.01 (0.08)	0.01 (0.06)	0.01 (0.08)	0.01 (0.11)	0.01 (0.11)	0.03 (0.17)	0.04 (0.20)
Overweight	0.40 (0.49)	0.38 (0.49)	0.45 (0.50)	0.41 (0.49)	0.31 (0.46)	0.32 (0.47)	0.26 (0.44)	0.21 (0.41)
Obese	0.17 (0.38)	0.15 (0.35)	0.14 (0.34)	0.11 (0.31)	0.41 (0.49)	0.36 (0.48)	0.10 (0.30)	0.10 (0.30)
BMI	26.57 (4.28)	26.09 (4.22)	26.30 (3.67)	25.71 (3.66)	29.11 (6.35)	28.48 (6.20)	24.40 (4.33)	23.84 (4.56)
Age	36.68 (9.37)	31.80 (5.37)	43.52 (9.89)	33.51 (6.16)	36.74 (9.06)	32.28 (5.81)	43.03 (9.41)	32.23 (6.13)
West German resident	–	–	0.80 (0.40)	0.81 (0.39)	–	–	0.78 (0.42)	0.80 (0.40)
Foreigner	–	–	0.13 (0.33)	0.14 (0.35)	–	–	0.11 (0.31)	0.09 (0.29)
Black	0.22 (0.42)	0.25 (0.43)	–	–	0.29 (0.45)	0.36 (0.48)	–	–
Hispanic	0.01 (0.11)	0.00 (0.06)	–	–	0.01 (0.12)	0.01 (0.08)	–	–
Married	0.79 (0.41)	0.70 (0.46)	0.72 (0.45)	0.41 (0.49)	0.67 (0.47)	0.58 (0.49)	0.70 (0.46)	0.37 (0.48)
No. of Children	1.14 (1.21)	1.08 (1.18)	0.82 (1.03)	0.66 (0.96)	1.12 (1.17)	1.20 (1.15)	0.71 (0.92)	0.59 (0.87)
Lower education	0.35 (0.48)	0.35 (0.48)	0.08 (0.28)	0.10 (0.30)	0.37 (0.48)	0.35 (0.48)	0.10 (0.30)	0.10 (0.30)

Middle education	0.24 (0.43)	0.22 (0.42)	0.48 (0.50)	0.58 (0.49)	0.27 (0.44)	0.28 (0.45)	0.53 (0.50)	0.54 (0.50)
Higher education	0.31 (0.46)	0.36 (0.48)	0.42 (0.49)	0.28 (0.45)	0.27 (0.44)	0.30 (0.46)	0.34 (0.47)	0.31 (0.46)
Experience in years	17.21 (9.38)	12.38 (5.37)	12.16 (10.34)	7.13 (6.44)	14.32 (7.80)	11.83 (6.01)	9.86 (9.05)	5.94 (5.99)
Full time employed	–	–	0.96 (0.20)	0.94 (0.24)	–	–	0.53 (0.50)	0.63 (0.48)
Job tenure	8.32 (8.09)	5.80 (5.29)	–	–	6.14 (6.15)	4.72 (4.83)	–	–
Lor rearnings	10.15 (0.66)	10.07 (0.66)	10.45 (0.70)	10.16 (0.70)	9.51 (0.90)	9.56 (0.90)	9.68 (0.94)	9.58 (0.92)
Interviewer present	–	–	0.59 (0.49)	0.57 (0.49)	–	–	0.59 (0.49)	0.53 (0.50)
Weight of father	–	83.36 (14.68)	–	64.72 (36.50)	–	83.99 (14.29)	–	66.61 (36.33)
Height of father	–	1.74 (0.07)	–	1.35 (0.73)	–	1.75 (0.07)	–	1.38 (0.72)
Age of father	–	39.46 (34.54)	–	47.77 (26.47)	–	39.62 (34.08)	–	47.29 (25.46)
Weight of mother	–	75.47 (13.38)	–	66.33 (22.51)	–	77.07 (13.70)	–	69.11 (20.00)
Height of mother	–	1.61 (0.07)	–	1.51 (0.43)	–	1.61 (0.07)	–	1.56 (0.36)
Age of mother	–	50.62 (29.77)	–	55.58 (17.79)	–	50.33 (28.01)	–	55.65 (15.20)
Weight of child	–	50.98 (20.56)	–	–	–	47.04 (18.72)	–	–
Height of child	–	1.48 (0.21)	–	–	–	1.42 (0.20)	–	–
Age of child	–	3.37 (4.64)	–	–	–	3.45 (4.43)	–	–
Sex of child	–	0.58 (0.80)	–	–	–	0.69 (0.83)	–	–
N	1716	833	6649	930	1698	906	5410	553

Source: SOEP 2002, PSID 1986, 1999, and 2001; authors' calculations.

differences between true and reported weight among Germans. Kroh (2004) presents some evidence that the presence of an interviewer may affect the reporting error for height and weight. We therefore include a variable in our regressions that indicates whether an interviewer was present when the SOEP questionnaire was filled out.

Our outcome of interest in this paper is the natural log of annual earnings. To characterize body weight we use three alternative measures: 1) weight in kilograms controlling for height in meters; 2) BMI; and 3) three indicator variables for clinical weight classification. These indicate when a person is underweight, overweight, and obese. BMI is calculated as weight in kilograms divided by height in meters squared. Underweight is defined as a BMI of less than 18.5, overweight is defined as a BMI between 25 and 30, and obese is defined as a BMI of 30 or more. (The omitted category is healthy weight, which is defined as a BMI between 18.5 and 25.) Other regressors include: age, age squared, total work experience, number of children, job tenure with current employer, and indicator variables for educational attainment, race (PSID), marital status, number of children (SOEP), student status (PSID), resident of West Germany (SOEP), non-German citizen (SOEP), employment status (SOEP) and whether the interviewer was present (SOEP).[2] Finally, we restrict our sample to individuals aged 25 to 65 years with positive earnings in the previous year, including the self-employed and those working in the public sector. In Table 1 we present basic descriptive statistics for the analysis samples of U.S. and German men and women. Due to missing data on the body weight and height of parents or children, fewer observations are available to estimate the IV models. However, the means of variables in the OLS and IV samples differ significantly only for age and marital status.[3]

We use weight of each respondent's parents (both datasets) and/or child (PSID) to instrument for respondent's weight.[4] Results from the first-stage regression confirm that these are strong instruments for the weight of U.S. and German men and U.S. women but much less so for the weight of German women. The *F*-statistic associated with the hypothesis that the first-stage coef-

---

2 We do not include other covariates used in typical wage regressions like occupation or industry indicators because they are endogenous. Consequently, our estimates should be considered as estimates of the net correlation of weight with earnings after all behavioral choices influenced by weight have been made.

3 In case of the SOEP this sub-sample mainly consists of respondents who are living together with at least one parent. Therefore the result of the IV models for Germany are not fully comparable with those of the OLS estimates which are based on all respondents with positive labor earnings.

4 In all those cases, a value of zero is assigned when weight is not observed for a given relative; such missing status is controlled for by means of a dummy variable. When weight is missing for all relatives, the observation is dropped.

ficients on the instruments are jointly equal to zero was 46.31 and 11.15 for U.S. and German men respectively, 29.75 for U.S. women but only 4.65 for German women. The F-statistics for U.S. and German men and U.S. women exceed, but that for German women falls short of, the minimum F statistic of 10 suggested by Staiger and Stock (1997). The partial R-squared contributed by the instruments in the first stage was .05 (U.S. men), .09 (German men), .03 (U.S. women) and .06 (German women).

3. Empirical Results

Table 2 presents results for OLS and IV models for both the U.S. and German samples. Outcomes for the three measures of body weight are presented in separate vertical panels. Results for men are presented on the left-hand-side of Table 2, and those for women on the right-hand-side. Within each panel, each column represents a separate regression. We do not estimate IV models for the models reported in the bottom panel that use the indicator variables for clinical weight classification because we lack sufficient instruments to identify all three indicator variables for clinical weight classification.

In the first column of Table 2, the OLS coefficients from all three specifications for men indicate that labor earnings of U.S. men are positively correlated with weight. For example, men who are 10 kg heavier than the mean tend to have 1.2 percent higher earnings. Men who are overweight or obese have roughly .09 log points higher earnings than men of normal weight while men who are underweight earn .43 log points less. This is consistent with McLean and Moon (1980), who find that weight is positively correlated with hourly earnings among men aged 51 – 65 in the National Longitudinal Survey of Mature Men in 1973. The authors attribute their finding to a "portly banker" effect – that for middle-aged American men, a large body size is a non-verbal signal of power that commands respect.

In contrast, the OLS results for German men, which are presented in column 3, offer no evidence of a correlation between weight and earnings. We do find evidence of a strong and highly significant relationship between height and labor earnings, which is consistent with earlier research (Heineck 2004).

Columns 2 and 4 present IV results for the PSID and SOEP samples of men.[5] In all cases the coefficients on kilograms and BMI are not statistically different from zero. We are unable to reject the hypothesis that the labor earnings of men in the U.S. or Germany are uncorrelated with body weight.

[5] Some of the difference between the OLS and IV results arises because the samples used differ. Table 1 shows that the IV samples are younger and less overweight than the full sample.

Table 2: **Coefficients and t-Statistics from Log annual labor earnings regressions**

	Men				Women			
	U.S. (PSID)		Germany (SOEP)		U.S. (PSID)		Germany (SOEP)	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Weight (kilograms)	.0012**	.0044	–.0009	–.0028	–.0021**	–.0132**	–.0046**	–.0031
	(.0005)	(.0030)	(.0006)	(.0055)	(.0006)	(.0047)	(.0008)	(.0098)
Height (meters)	–.0030	–.0247	.9787**	.7555	.0041	.0292	.6503**	.4159
	(.0063)	(.0182)	(.1140)	(.7426)	(.0082)	(.0202)	(.1688)	(1.2826)
Instrument statistics								
Change in adjusted R^2		.045		.103		.034		.084
F-statistic		46.31		14.77		29.75		7.44
p-value		.00		.00		.00		.00
Body mass index (BMI)	.0081**	.0310	–.0033	–.0119	–.0118**	–.0802**	–.0133**	–.0022
	(.0034)	(.0213)	(.0019)	(.0179)	(.0033)	(.0277)	(.0023)	(.0276)
Instrument statistics								
Change in adjusted R^2		.054		.0722		.034		.050
F-statistic		44.42		9.6		28.94		4.77
p-value		.00		.00		.00		.00
Underweight (BMI < 18.5)	–.4327**	–	.0524	–	–.1134	–	–.0796	
	(.2208)		(.1044)		(.1718)		(.0571)	
Overweight (25 < BMI < 30)	.0902**	–	–.0111	–	-.1487**	–	–.0859**	–
	(.0305)		(.0148)		(.0518)		(.0228)	
Obese (BMI > 30)	.0930**	–	–.0352#	–	–.1986**	–	–.1951**	–
	(.0409)		(.0213)		(.0519)		(.0327)	
N	1716	833	6649	930	1698	906	5410	553

Note: Numbers are rounded. # stands for significance at 10 percent level, * stands for significance at 5 percent level, ** stands for significance at 1 percent level. Numbers in parentheses are standard errors. Other variables that are included in the regressions are: age, age squared, education dummies, race dummies (PSID), marriage status, total work experience, job tenure with current employer (PSID), student dummy (PSID), number of children, resident of West Germany (SOEP), non German citizen (SOEP), interviewer present dummy (SOEP). Instruments used in the PSID IV estimation are: first child's age, sex and BMI, whether first child's information is missing, father's age and BMI, whether father's information is missing, mother's age and BMI, whether mother's information is missing. Instruments used in the SOEP IV estimation are: father's age and BMI, whether father's information is missing, mother's age and BMI, whether mother's information is missing.

Source: SOEP 2002, PSID 1986, 1999, and 2001; authors' calculations.

The right-hand panel of Table 2 presents results for women. The OLS coefficients in the first and third columns consistently indicate a negative correlation between weight and earnings. In the OLS models an extra 10 kg of weight above the mean is associated with 2.1 percent lower earnings for U.S. women and 4.6 percent lower earnings for German women. Overweight status is associated with 14.9 percent lower earnings for U.S. women and 8.6 percent lower earnings for German women. Obesity is associated with about 20 percent lower earnings for women in both Germany and the U.S. The SOEP regressions control for an indicator of whether the respondent is a resident in West Germany, so the obesity earnings gap in Germany is not simply due to obesity being more common in the former East Germany, where labor markets are more depressed.

The second and fourth columns on the right-hand-side of Table 2 present IV results for women. The IV coefficients on weight in kg and BMI are statistically significant and negative for the PSID sample, indicating that weight *lowers* earnings. The magnitude of the IV coefficient is also greater than that of OLS for the PSID: an extra 10 kg above the mean is associated with 2.1 percent lower earnings according to OLS but with 13.2 percent lower earnings according to IV. In contrast, in the SOEP sample, neither IV coefficient differs statistically from zero. The lack of statistical significance in the IV results for the sample of German women may be partly due to small sample size (only 553 women), but the point estimates of the IV coefficients are also smaller than those of OLS.

Conclusion

This paper documents interesting similarities and differences in the relationship between body weight and earnings in the U.S. and Germany. In both the U.S. and Germany, heavier women tend to earn less; in OLS regressions each measure of body weight is negatively correlated with earnings for women in both countries. For example, obesity is associated with about 20 percent lower earnings for both German and U.S. women.

This paper estimates IV models to address the endogeneity of weight. The results of these models provide evidence that weight *lowers* earnings only for U.S. women in the PSID. For men in both countries, and women in Germany, we find no evidence that body weight causally affects earnings.

In future research we will test for selection bias that may arise from studying only those with positive earnings. We also plan to examine additional outcomes, such as employment and hourly wages.

References

Averett, S. / *Korenman,* S. (1996): The Economic Reality of the Beauty Myth, Journal of Human Resources 31 (2), 304–330.

Bergmann, K. E. / *Mensik,* G. B. M. (1999): Koerpergroesse und Uebergewicht, in: Das Gesundheitswesen 61 (2), S115-S120.

Bound, J. / *Brown,* C. / *Mathiowetz,* N. (2002): Measurement Error in Survey Data, in: J. Heckman / E. Leamer (ed.), Handbook of Econometrics, Volume 5, New York.

Burkhauser, R. V. / *Butrica,* B. A. / *Daly,* M. C. / *Lillard,* D. R. (2001): The Cross-National Equivalent File: A Product of Comparative Research, in: I. Becker / N. Ott / G. Rolf (eds.) Soziale Sicherung in einer dynamischen Gesellschaft, Frankfurt am Main, 354–376.

Cawley, J. (2004): The Impact of Obesity on Wages, Journal of Human Resources, 39 (2), 451–474.

Cawley, J. / *Grabka,* M. M. / *Lillard,* D. R. (2004): A Comparison of the Relationship Between Obesity and Labor Market Outcomes in the U.S. and Germany, Paper presented at the 2004 SOEP Data Users Conference, Berlin, Germany (June 24–26).

Comuzzie, A. G. / *Allison,* D. B. (1998): The Search for Human Obesity Genes, Science 280, 1374–1377.

Corak, M. (2004): Do poor children become poor adults? Lessons for public policy from a cross-country comparison of generational earnings mobility, Manuscript, UNICEF Innocenti Research Centre, Florence, Italy.

Field, A. E. / *Barnoya,* J. / *Colditz,* G. A. (2002): Epidemiology and Health and Economic Consequences of Obesity, in: T. A. Wadden / A. J. Stunkard (eds.), Handbook of Obesity Treatment, New York.

Flegal, K. M. / *Carroll,* M. D. / *Ogden,* C. L. / *Johnson,* C. L. (2002): Prevalence and Trends in Obesity Among U.S. Adults, 1999–2000, JAMA 288 (14), 1723–1727.

Grilo, C. M. / *Pogue-Geile,* M. F. (1991): The Nature of Environmental Influences on Weight and Obesity: A Behavioral Genetic Analysis, Psychological Bulletin 110 (3), 520–537.

Hedley, A. A. / *Ogden.* C. L. / *Johnson,* C. L. / *Carroll,* M. D. / *Curtin,* L. R. / *Flegal,* K. M. (2004): Prevalence of Overweight and Obesity Among U.S. Children, Adolescents, and Adults, 1999–2002, JAMA 291 (23), 2847–2850.

Heineck, G. (2004): Up in the skies? The relationship between body height and earnings in Germany, Paper presented at the 2004 SOEP Data Users Conference, Berlin, Germany (June 22–24).

Judge, G. G. / *Griffiths,* W. E. / *Hill,* R. C. / *Luetkepohl*, H. / *Lee,* T.-C. (1985): The Theory and Practice of Econometrics, New York.

Kroh, M. (2004): Interviewereffekte bei der Erhebung des Koerpergewichts in Bevoelkerungsumfragen: Die Qualitaet von umfragebasierten Gewichtsangaben, DIW Discussionpaper No. 439, Berlin.

Lee, L.-F / *Sepanski,* J. H. (1995): Estimation of Linear and Nonlinear Errors-in-Variables Models Using Validation Data, Journal of the American Statistical Association 90 (429), 130 – 40.

Maes, H. H. M. / *Neale,* M. C. / *Eaves,* L. J. (1997): Genetic and Environmental Factors in Relative Body Weight and Human Adiposity, Behavior Genetics 27 (4), 325 – 351.

McLean, R. A. / *Moon,* M. (1980): Health, Obesity, and Earnings, American Journal of Public Health 70 (9), 1006 – 1009.

Pagan, J. A. / *Davila,* A. (1997): Obesity, occupational attainment, and earnings, Social Science Quarterly 78, 756 – 770.

Sobal, J. (2004): Sociological analysis of the stigmatisation of obesity, in: J. Germov / L. Williams, A sociology of food and nutrition: The social appetite. 2nd edition, Melbourne, 383 – 402.

Sobal, J. / *Stunkard,* A. J. (1989): Socioeconomic Status and Obesity: A Review of the Literature, Psychological Bulletin 105 (2), 260 – 275.

Staiger, D. / *Stock,* J. H. (1997): Instrumental Variables Regression With Weak Instruments, Econometrica 65 (3), 557 – 586.

Statistisches Bundesamt (2004): Leben und Arbeiten in Deutschland. Ergebnisse des Mikrozensus 2003, Wiesbaden, 91 – 92.