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Working Paper

Why is the share of women willing to work in East Germany larger than in West Germany? A logit model of extensive labour supply decision

ifo Working Paper, No. 56

Provided in Cooperation with:

Ifo Institute – Leibniz Institute for Economic Research at the University of Munich

Suggested Citation: Grundig, Beate (2008) : Why is the share of women willing to work in East Germany larger than in West Germany? A logit model of extensive labour supply decision, ifo Working Paper, No. 56, ifo Institute - Leibniz Institute for Economic Research at the University of Munich, Munich

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Ifo Working Paper No. 56

February 2008

An electronic version of the paper may be downloaded from the Ifo website www.ifo.de.

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Abstract

The aim of the paper is to analyse differences in the labour force participation (LFP) between East and West German women. Using microcensus data in a binary choice model, we distinguish three main explanations for these differences: the skill composition, the regional labour market and childcare availability. As LFP increases in the skill-level, the larger share of high-skilled women in East Germany can explain more than 10 percent of the differences. Whereas East German women do not vary their efforts when regional labour market conditions worsen, West German women are discouraged thereof. Female LFP in East Germany is positively influenced by the provision of full-time childcare while West German women do not show any significant reaction.

JEL Code: J22, J13, R23.

Keywords: Female labour supply, childcare, logit model, decomposition.

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1. Introduction

Since reunification labour force participation and employment situation are in major change in Germany. Furthermore we find gender and regional differences in participation and employment. Male participation and employment rates are in general higher than the corresponding female rates. The labour force participation in East Germany is traditional high, particularly among East German women compared to women living in West Germany.

Recent trends show that participation rates are declining slightly. The sole exception is the participation rate of West German women, which has increased from around 50 percent in 1970 to 65 percent in 2005. At the time of reunification female labour force participation strongly differed in East and West Germany. But it was commonly suggested that the labour force participation of East German women will quickly converge towards the lower West German level [Fuchs and Weber (2004)]. The differences decreased but they are still present. This is our starting point. We analyse the reasons for the differences in female labour supply decision in East and West Germany. We are raising two important questions. Firstly, to which extent are the differences in labour supply caused by group differences (for example differences in skill level between East and West German women)? For this we apply the Blinder-Oaxaca decomposition technique to a logit model of female labour supply. Secondly, are the differences caused by different reactions to the regional labour market situation and/or the provision of public childcare? For this reason we add regional indicators into the logit model.

The issues of this paper are not only important for current labour markets but also for the long run development of the economy. Demographic projections predict a strong decline of the working age population in East Germany in the years to come while the working age population in West Germany will remain quite stable until 2020. Based on the premise of declining labour force especially in East Germany, it is essential to know which factors influence the labour sup-

ply decision to prevent that labour (especially high-skilled labour) runs into shortage and economic growth is hampered. A better understanding of the limiting factors of female labour supply may help to overcome possible barriers for labour force participation.

The paper proceeds as follows: the next section presents some stylized facts of labour supply. This is followed by a review of the related literature on the determinants of female labour supply. Section 4 describes the dataset and the variables. The fifth section presents the logistic regression model of labour force participation and the Blinder-Oaxaca decomposition technique. Section 6 contains the results of the econometric analysis and the decomposition. Section 7 concludes the paper.

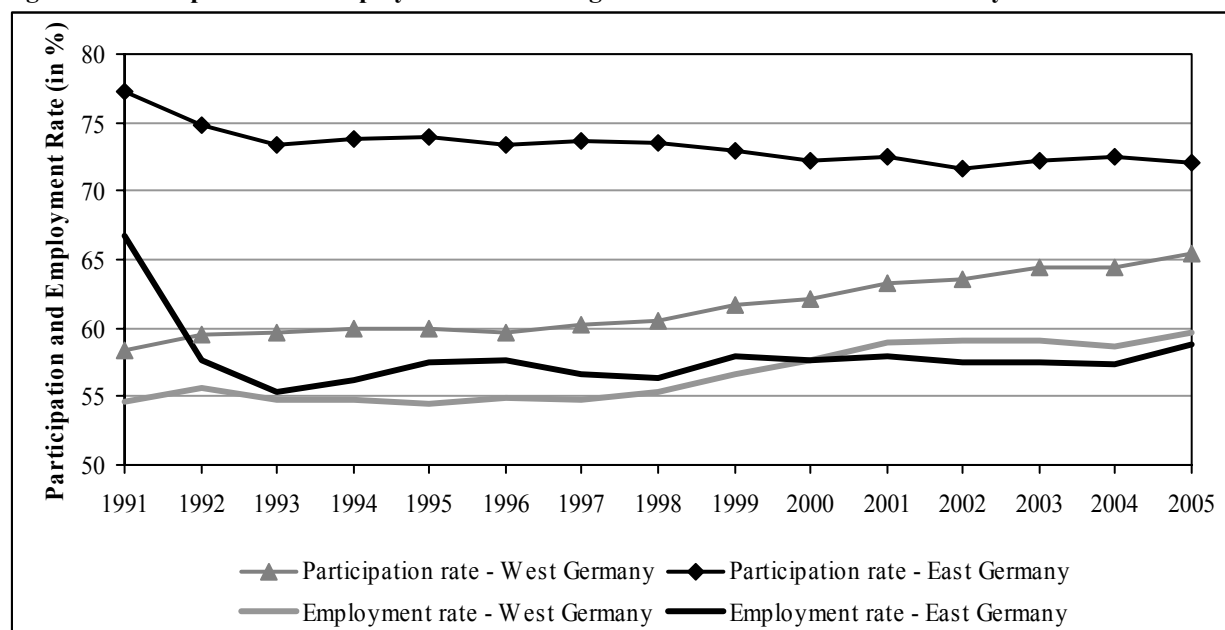
2. Stylized Facts

Labour Force Participation and Employment Situation

Fifteen years after German reunification female labour force participation still differs in East and West Germany. In 1991 77 percent of East German women in working age were in the labour force – which means that they were either employed or unemployed – compared to 58 percent among West German women (see Figure 1). After some years of declining labour force participation in the nineties, the downward trend has stopped and in 2005 more than 72 percent of East German women were in the labour force. On the other hand, female participation rate in West Germany permanently increased and amounted to 65 percent in 2005.

The employment rates directly reflect the job situation. Immediately after reunification the female employment rate in East Germany dropped by more than ten percentage points mainly due to the radical economic changes and the usage of generous early retirement schemes. All in all, the female employment rates in East and West Germany do not show strong distinctions. So we can state that although the employment rates are very similar, the participation rate in East Germany remain on its high level.

Figure 1: Participation and Employment rate among women in West and East Germany



Source: Federal Statistical Office Germany.

Regional labour markets

We want to measure how the regional labour market situation influences female labour supply decision since the impact is not straightforward. It can have two contrasting effects: the discouraged and the added worker effect. The discouragement hypothesis claims that a person feels demoralised by high regional unemployment. These discouraged workers quit or neglect the job search due to undervalued chances on the labour market even though they would have accepted a new job at going employment conditions [Van Ham, Mulder and Hooimeijer (2001), Elmeskov and Pichelmann (1993)]. Otherwise the added worker hypothesis applies. This effect mostly appears when a family member becomes unemployed and another family member increases its labour supply to compensate for the loss of income [Lundberg (1985)].

The labour market situation in Germany in the past years can be described as tense. Growing and newly-founded firms with increasing employment could not compensate the loss of employment of shrinking and closing firms. Decreasing job opportunities led to high unemployment especially in East Germany. Unemployment rate strongly increased and even doubled between

1991 and 2005. In 2006 almost every fifth person in the labour could not find a job in East Germany (see Table 1). In addition, unemployment risk in Germany largely depends on the qualification.

The listed coefficient of variance in Table 1 indicates the regional diversity in unemployment. Among the Western German federal states we can find high regional fluctuations in unemployment figures: In 2006 the unemployment rate varied from 7.1 % in Baden-Württemberg to 16.3 % in Bremen. By contrast, the regional variation in the unemployment rate in East Germany is small compared to its mean value.

Table 1: Unemployment rate in West and East Germany

	West Germany		East Germany		Germany	
	Mean	Coeff. of Var.	Mean	Coeff. of Var.	Mean	Coeff. of Var.
Unemployment rate						
1991	6.2%	0.36	10.2%	0.11	7.3%	0.35
1996	9.9%	0.24	16.6%	0.08	11.5%	0.31
2001	8.0%	0.29	18.8%	0.08	10.3%	0.52
2006	10.2%	0.26	19.2%	0.07	12.0%	0.39

Source: Federal Employment Agency Germany.

Provision of childcare

A comparison of childcare slots in East and West Germany shows that the compatibility between work and family life is much more given in East Germany than in West Germany. This could be one reason for the lower participation rate of West German women. The childcare statistic displayed in table 2 demonstrates another important issue. The number of full-time childcare slots in East Germany only lightly varies from the total number of childcare slots. However, the number of full-time childcare slots in West Germany tremendously differs from the total number. But since mainly full-time childcare enables a mother to work regularly, the low share of full-time childcare may additionally hamper female participation in West Germany.

Hence we will include full-time childcare slots for children younger than 3 years (*Kinderkrippe*) and for children aged 3 to 6.5 years (*Kindergarten*). Following several studies, childcare availability should have a positive effect on female labour force participation (see for example Büchel and Spiess (2002), Doiron and Kalb (2004), Fuchs and Weber (2004), Van Ham and Büchel (2004), Wrohlich (2004)).

Table 2: Childcare slots (per 1000 children in relevant age) in West and East Germany

	West Germany		East Germany		Germany	
	Mean	Coeff. of Var.	Mean	Coeff. of Var.	Mean	Coeff. of Var.
Childcare slots (1-3 years)						
1998 total	32.3	1.55	519.8	0.34	103.7	2.56
full-time	23.6	2.01	501.8	0.33	93.7	2.78
2002 total	40.8	1.41	546.6	0.32	126.2	2.15
full-time	29.5	1.43	532.4	0.31	114.4	2.37
Childcare slots (3-6.5 years)						
1998 total	872.4	0.15	1041.8	0.16	894.8	0.19
full-time	149.7	0.65	1012.3	0.18	263.5	1.71
2002 total	898.7	0.14	994.9	0.15	913.2	0.16
full-time	217.2	0.43	970.8	0.17	331.0	1.21

Source: Federal Statistical Office Germany.

3. Related Literature

Analysing the determinants of labour supply decision has a long tradition in the literature. Seminal work on labour force participation was done by Mincer (1962) and Heckman (1980). Female labour supply and its influencing variables produced more and more research questions which is in contrast to male labour supply that is in general high and does not vary much. In 1985 the *Journal of Labor Economics* released a special on female labour force participation both by using cross section or time series analyses.¹

¹ See Gregory, McMahon and Whittingham (1985) for Australia, Riboud (1985) for France, Joshi, Layard and Owen (1985) for Great Britain, Colombino and De Stavola (1985) for Italy, Shimada and Higuchi (1985) for Japan, Ofer and Vinokur (1985) for the former Soviet Union, Hernandez Iglesias and Riboud (1985) for Spain, Gustafsson and Jacobsson (1985) for Sweden and Franz (1985) for West Germany.

Recently, van Ham, Mulder and Hooimeijer (2001) used a logistic regression model to specify the probability of labour force participation for Dutch men and women. Besides individual characteristics, the main emphasis in their paper is to test for the discouraged worker effect by including the local underemployment rate. They come to the conclusion that women are more easily discouraged by poor labour market conditions than men.

For Germany, van Ham and Büchel (2004) analyse the spatial, institutional and socio-economic factors of labour supply decision using the German Socio-Economic Panel (GSOEP). They limit their paper only to West German women and do not explain East-West-differences. According to van Ham and Büchel (2004), women feel discouraged by high regional unemployment. The access to public childcare had no significant effect on women's willingness to work.

The main objective of Büchel and Spiess (2002) is to analyse the impact of public childcare on female labour participation. The pure availability of childcare is important but the effect of full-time care seems to be more important. They have chosen a multinomial logit model using the 1998 GSOEP dataset for West German women with children in preschool age. While a better access to childcare has only small effects in labour supply decision, a higher level of full-time childcare increases both the participation probability and the participation volume (full-time vs. part-time employment).

The only study which takes into account the specific conditions in East Germany is from Bonin and Euwals (2001). Their attention is less on the determinants of female labour supply decision but rather on the influencing variables of the changes in labour force participation since German reunification.

4. Data and Variables

Data

We use the German Microcensus (scientific use file of the year 2003) since the German Microcensus is a representative statistic of the population and the labour market and offers therefore a very large sample. One percent of all households in Germany are involved in the Microcensus every year. An obligation to provide the requested information ensures a high number of responses. Roughly 820,000 people in 370,000 households are included. The scientific use file is a 70% subsample of the original Microcensus dataset. All in all, our dataset contains about 500,000 individuals living in more than 230,000 households.

Since the labour supply decision of women is the main object of investigation, only women aged 15 to 64 years are included in the analysis. In addition we focus our analysis only to women living with a partner. This is reasonable since a partner can have an effect on a woman's labour supply decision depending on his attitude towards working mothers and wives' full-time employment [Heineck (2004)].

Variables

Our dependent variable – female labour force participation LFP – is measured by a dummy variable which equals 1 if the woman is in the labour force and equals 0 if she is not. Women in the labour force can either be employed or unemployed. In case of unemployment the woman must be available for a job within two weeks.

The set of independent variables is summarized in table 3. As the labour supply strongly varies with age, we include the age of the woman in ten age groups. East German women are slightly older than West German women. The qualification level is represented by three categories: low, medium and high. A woman, who either has no qualification or less than vocational qualification, is classified to be low-skilled. Women with vocational qualification are medium-

skilled. And finally, to be high-skilled, a university or comparable degree is necessary. Following Becker's (1964) human capital theory, the likelihood of participation should increase with human capital. The probability of being in the labour force should increase with the skill level. To control for a handicap or severe health problems, we include a dummy covering this item.

Since motherhood may lower the probability of labour force participation, the number of children is included. As in Bonin and Euwals (2001), it is expected that the age of children is positively related to the participation probability while an increasing number of children should have a negative impact. In addition, also the number of children who attend childcare facilities is taken up in the analysis. This variable should diminish the expected negative impact of children on labour supply. The number of children differs significantly between East and West Germany: only 8.2% of the East German households are living together with a child younger than 3 years, in West Germany it is 10.5%. The same holds for children aged 3 to 6 years. The largest difference can be noticed for the children aged 7 to 12 years, the reason is the strong drop in fertility rates direct after German reunification.

Table 3: Variables and descriptive statistics

Variables		Description	East Ger- many	West Ger- many
Dependent variable				
Labour force participation		being in the labour force (employed or unemployed)	76.8%	64.9%
Individual characteristics				
Age		age in years	45.2	44.3
Skill level	low	no or less than vocational qualification	8.6%	24.0%
	medium	vocational qualification	78.9%	66.3%
	high	university degree or higher	12.5%	9.7%
Disability		having a disability or severe health problems	3,0%	2.4%
Immigrant		woman is not a German citizen	3,0%	9.0%
Household characteristics				
Children	# children	total number of children living in the household	0.57	0.76
	# in childcare	number of children in public childcare	0.15	0.14
	child <3 years	at least one child younger than 3 years	8.2%	10.5%
	child 3-6 years	at least one child 3 to 6 years	9.4%	14.8%
	child 7-12 years	at least one child 7 to 12 years	12.2%	19.8%
	child 13-17 years	at least one child 13 to 17 years	20.4%	17.3%
Additional household income		defined as household net income minus the net income of the woman, weighted by the OECD equivalent scale, in 100 Euro	688€	1,020€
Married couple		couple is married	82.7%	89.1%
Husband is immigrant		husband is not a German citizen	2,6%	8.4%
Husband is employed		husband is employed	66,3%	76.0%
Skill level of husband	low	no or less than vocational qualification	6.0%	12.6%
	medium	vocational qualification	75.4%	70.3%
	high	university degree or higher	18.6%	17.0%

Source: own calculations.

The additional household income is defined as the net income of all household members minus the woman's own net income. To account for different family sizes, the household income is weighted by the OECD equivalent scale. The head of the household is assigned the weight of 1.0, every additional adult member 0.7 and children 0.5. For example, considering a household with four persons (two adults and two children), this household would get the weight of 2.7, which means that this household needs an income which is 2.7 times higher than a single household to achieve an equivalent household income. The so defined income is then independent of

the family size. A high additional household income ought to reduce the probability of female labour force participation.

To control for effects of income taxation of married and unmarried woman we include a dummy variable which equals one if the woman is married and zero if she is unmarried (but is living together with a partner). Due to the so called *Ehegattensplitting* the German tax system leads to monetary advantages for married couples if their incomes are unequally distributed.

The nationality of the woman and her partner are included to control for different attitudes to female employment caused by cultural differences. The share of immigrants in East Germany is only a third of the share in West Germany. Besides the nationality, we take some more characteristics of the partner into account. The first characteristic is the employment status of the partner. This is covered by a dummy variable taking the value of 1 if the partner is employed and 0 otherwise. Secondly, the qualification of the partner could have an impact on the labour supply decision of the woman but the direction of the influence is not clearly predictable. The qualification enters as three dummy variables identical to the female skill level: low, medium and high skilled.

5. Method

The logit model

We chose a binary logistic regression model to analyse the determinants of female labour supply decision. Hence the probability of being in the active labour force is assumed to follow a logistic distribution with the following cumulative logistic distribution function:

$$(1) \quad P(y = 1) = \frac{e^{x_i' \cdot b}}{1 + e^{x_i' \cdot b}}$$

with x_i being a vector denoting a set of characteristics and b a vector of coefficients. The odds-ratio (OR) is defined as the ratio of the probability that a woman is in the labour force $P(y = 1)$ to the probability that a woman is not in the labour force $P(y = 0)$:

$$(2) \quad \text{OR} = \frac{P(y = 1)}{P(y = 0)} = \frac{1 + e^{x_i' \cdot b}}{1 + e^{-x_i' \cdot b}} = e^{x_i' \cdot b}$$

The natural logarithm of the odds-ratio leads to the logit of y , which can be easily estimated since this expression is linear in parameters:

$$(3) \quad \text{logit}(y) = \ln\left(\frac{P(y = 1)}{P(y = 0)}\right) = x_i' \cdot b.$$

For interpretation we use the odds-ratios as they are more intuitive to interpret. We obtain the odds-ratio by exponentiation the logits. The estimated odds-ratios then show how a change of one unit of an independent variable influences the chance of being in the labour force. The odds-ratio can only take positive values. Values between 0 and 1 mean a negative influence of the independent variable on the chance of being in the labour force and all values greater than 1 indicate a positive influence. It is important that every change of one unit in an independent variable multiplies the odd of being in the labour force by the value of the odds-ratio.

Blinder-Oaxaca decomposition applied to logit models

In order to quantify the effect of differences in characteristics, we apply the Blinder-Oaxaca decomposition technique to our logit model. In general, the Blinder-Oaxaca decomposition is used to quantify the contributions of group differences on differences in outcomes. The most famous example is the gender wage gap. Consider for example the wage equation $y_{ij} = x_{ij}' \cdot b_j$ with y_{ij} being the wage for individual i belonging to group j ($j=1,2$, for example men and women), x_{ij} being again a vector of independent variables and b_j the coefficient vector. The gender wage differential is then defined as

$$(4) \quad \bar{y}_1 - \bar{y}_2 = \bar{x}'_1 \cdot b_1 - \bar{x}'_2 \cdot b_2$$

with \bar{y}_j and \bar{x}_j being the mean values of y_j and x_j . We can decompose the differential into the endowment effect and the coefficient effect by adding and subtracting the term $x'_{i2} \cdot b_1$:

$$(5) \quad y_{i1} - y_{i2} = [(x'_{i1} - x'_{i2}) \cdot b_1] - [x'_{i2} \cdot (b_1 - b_2)]$$

The term in the first squared bracket in (5) describes the endowment effect, which explains the share of the outcome difference due to differences in characteristics/endowments of the two groups. If there are no differences in characteristics between groups, then this term would be zero. The second squared bracket term in (5) can be interpreted as the discrimination share of the gender wage gap since it cannot be explained by differences in endowment between men and women like education or work experience. This share of the differential is unexplained and occurs when the two groups are treated or react differently. A part of the coefficient effect is the shift effect which shows the difference in the intercept term of the two groups.

Since we use a logit model, we apply the extension of the Blinder-Oaxaca decomposition to logit and probit models proposed by Fairlie (2005). The decomposition equation for our logit model can be defined similarly to equation 5:

$$(6) \quad \bar{y}_E - \bar{y}_W = \left[\sum_{i=1}^{N_E} \frac{F(x'_{iE}b_W)}{N_E} - \sum_{i=1}^{N_W} \frac{F(x'_{iW}b_W)}{N_W} \right] + \left[\sum_{i=1}^{N_E} \frac{F(x'_{iE}b_E)}{N_E} - \sum_{i=1}^{N_E} \frac{F(x'_{iE}b_W)}{N_E} \right]$$

with $F(x'_{ij}b_j)$ being the logistic cumulative density function and N_j being the sample size for group j ($j=\underline{\text{East}}$ Germany, $\underline{\text{West}}$ Germany). In equation (6) we use the West German coefficients as weights for the first term and the East German distributions of the independent variables as weights for the second term.² The first squared bracket in (6) shows again the share of difference due to differences in characteristics and the second squared bracket shows the share of difference due to differences in coefficients.

² Alternatively to equation (6) we could also use the East German coefficients as weights for the first term and the West German distributions of the independent variables for the second term.

Clustering with regional data

In addition to the decomposition we include regional indicators for the labour market situation and the availability of childcare in our logit model. Since the dataset then includes both individual (or family) characteristics and regional indicators and every region has more than one respondent, the data needs to be clustered by the region (here: federal states). Without clustering, the standard errors would be biased downwards and showing highly significant results which are not necessarily true [Moulton (1986, 1987, 1990)].

6. Results

Labour supply in East and West Germany

Table 4 shows the estimation results for East and West German women living together with a partner. Odds-ratios are displayed only if the coefficient is significant. The explanatory variables have the expected signs so that we only want emphasize the results regarding the skill level, children and the marital status.

An important – but not surprising – result is that the probability that a woman is in the labour force increases with the skill level. This effect is larger for East German woman. The chance of being in the labour force as a medium-skilled person is about two times higher compared to a low-skilled woman. For high-skilled women, the chance increases even by the factor 3.9 (West Germany) and 4.8 (East Germany).

The influence of children on the labour supply of their mother is measured in different ways. The first result is that women with children show a lower participation probability. The second result is that the negative impact is larger the younger the children are. A third result is that mothers in East Germany are more restricted by the number of children than West German mothers. Finally, every child in a childcare facility increases the chance of labour supply by the

factor 2.3 (East Germany) and 1.2 (West Germany) respectively. The number of unattended children constrains particularly the labour force participation of East German mothers.

Table 4: Estimation results for women living together with a partner

		East Germany		West Germany	
		Coefficient	Odds-ratio	Coefficient	Odds-ratio
Age	15 to 19 years	-0.942 **	0.390	-1.315 ***	0.268
	20 to 24 years	-0.641 ***	0.527	-0.345 ***	0.708
	25 to 29 years	-0.088		0.154 ***	1.166
	30 to 34 years	0.340 **	1.405	0.322 ***	1.380
	35 to 39 years	0.224 *	1.251	0.226 ***	1.254
	40 to 44 years (reference group)		1.000		1.000
	45 to 49 years	-0.577 ***	0.562	-0.350 ***	0.705
	50 to 54 years	-0.746 ***	0.474	-0.799 ***	0.450
	55 to 59 years	-1.615 ***	0.199	-1.444 ***	0.236
	60 to 64 years	-4.568 ***	0.010	-3.028 ***	0.048
Skill level	low (reference group)		1.000		1.000
	medium	0.809 ***	2.246	0.685 ***	1.984
	high	1.572 ***	4.816	1.352 ***	3.865
Disability		-2.166 ***	0.115	-0.767 ***	0.464
Immigrant		-1.165 ***	0.312	-0.619 ***	0.538
Children	# children	-0.677 ***	0.508	-0.487 ***	0.614
	# in childcare	0.821 ***	2.273	0.225 ***	1.252
	Child <3 years	-1.634 ***	0.195	-0.984 ***	0.374
	Child 3-6 years	-0.590 ***	0.554	-0.633 ***	0.531
	Child 7-12 years	-0.145		-0.194 ***	0.824
	Child 12-17 years	0.644 ***	1.904	0.233 ***	1.262
Additional household income		-0.040 ***	0.961	-0.020 ***	0.980
Marital status		-0.093		-0.796 ***	0.451
Husband is immigrant		-0.091		0.128 ***	1.137
Husband is employed		0.766 ***	2.151	0.676 ***	1.966
Skill level of husband	low (reference group)		1.000		1.000
	medium	0.043		-0.073 **	0.930
	high	0.131		-0.185 ***	0.831
constant		1.576 ***		1.324 ***	
Number of observations		16,799		66,635	
Initial log pseudolikelihood		-9087.28		-43159.76	
Log pseudolikelihood		-5238.80		-33515.39	
Pseudo R2		0.4235		0.2235	

legend: * p<0.1; ** p<0.05; *** p<0.01

Since being a married wife lowers the probability of labour force participation of West German women and has no significant influence of the behaviour of women living in East Germany. Due to the German tax system married couples have monetary advantages which are larger the more the earnings of wife and husband differ. Since this can be reached best in sole earner households it seems that West German households try to benefit from this tax legislation.

Results of the Blinder-Oaxaca decomposition

To explain the differences in the labour force participation behaviour of East and West German women, we apply the Blinder-Oaxaca decomposition. The differences in characteristics (for example in skill level, number of children ...) explain in total 2.4 percentage points to the total difference of 11.9 percentage points (see table 5). The difference in age structure contributes only to a small extent to the differences in labour supply outcome. The average skill level of East German women is much higher than of West German women. While almost every fourth West German woman has no qualification, it is less than 10% in East Germany. The share of high skilled women in East Germany (12.5%) is much higher than the West German share of 9.7%. These differences in skill level account for 1.59 (medium skilled) and 0.49 (high skilled) percentage points of the total difference; this is almost one fifth of the difference.

Only 3% of women in the East German data set do not have the German citizenship, in West Germany this share amounts to 9%. This higher share of immigrants accounts for another 0.65 percentage points of the difference in labour supply. Considering the existence of children in different age groups, we can summarize that the number of children (especially of small children) living in the household is much smaller in East German households than in West Germany. Since the existence of children lowers the labour force participation, the lower number of children in East Germany has an impact up to 1.9 percentage points on total difference in labour

force participation. The lower share of married couples in the data set explains 0.68 percentage points of the differences.

Table 5: Endowment effect (in percentage points)

Individual characteristics			Household characteristics		
Age	15 to 19 years	0.00 ***	Children	# children	0.42 ***
	20 to 24 years	-0.01 **		# in childcare	-0.02
	25 to 29 years	-0.02 **		Child <3 years	0.47 ***
	30 to 34 years	-0.09 ***		Child 3-6 years	0.67 ***
	35 to 39 years	-0.09 ***		Child 7-12 years	0.27 ***
	40 to 44 years (reference group)			Child 12-17 years	0.08 *
	45 to 49 years	-0.07 ***	Additional household income		0.03 ***
	50 to 54 years	-0.27 ***	Marital status		0.68 ***
	55 to 59 years	-0.01	Husband is immigrant		-0.12 ***
	60 to 64 years	-0.87 ***	Husband is employed		-1.17 ***
Skill level	low (reference group)		Skill level of husband	low (reference group)	
	medium	1.59 ***		medium	-0.06 **
	high	0.49 ***		high	-0.05 **
Disability		-0.08 ***			
Immigrant		0.65 ***			
Total explained		2.41			
Difference on labour force participation between East and West Germany women		11.90			

Influence of regional unemployment and child care facilities

In addition to the topics above, we want to analyse the influence of the regional unemployment rate and the child care opportunities. Therefore, we added successively the regional unemployment rate (model 1 and 4 in table 6), the number of child care slots for children aged 1 to 3 years and 3 to 6,5 years (model 2 and 5) and both indicators together (model 3 and 6) to our logit models displayed in table 4. The influence of the unemployment rate differs between East and West German women. While the unemployment rate has no significant impact on labour force participation of East German women, it significantly lowers female labour force participation in West Germany. The discouraged worker effect can therefore only be confirmed for West

Germany as in VAN HAM and BÜCHEL (2004). The availability of public childcare mainly influences labour supply of East German women but the effect is rather small. One more childcare slot per 100 children aged up to 3 leads only to an increased chance of being in the labour force by the factor 1.015 for East German women. However this effect increases with the skill level of the women since the coefficients of the interaction terms of the skill level with the childcare slots have plus signs.

Table 6: Influence of regional unemployment rate and child care facilities

	East Germany			West Germany		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Control variables (like in table 2)	✓	✓	✓	✓	✓	✓
Unemployment rate	0.035		-0.032	-0.112 ***		-0.116 ***
Childcare slots (1 to 3 years)		0.015 ***	0.016 ***		0.011	0.022
Childcare slots (1 to 3 years) × medium skilled		0.007 ***	0.009 *		-0.015	0.015 ***
Childcare slots (1 to 3 years) × high skilled		0.007 *	0.009 *		-0.026 ***	-0.003
Childcare slots (3 to 6,5 years)		0.006	0.006		-0.001	-0.001
Childcare slots (3 to 6.5 years) × medium skilled		0.010 **	0.010 **		-0.000	-0.003 *
Childcare slots (3 to 6.5 years) × high skilled		0.011 ***	0.011 ***		0.000	-0.001
Observations	16,799			66,635		
Pseudo R2	0.4236	0.4254	0.4254	0.2274	0.2236	0.2275

7. Summary and Conclusions

The aim of the paper is to analyse the reasons for the still existing differences in labour force participation between East and West German women. We considered two possible reasons for these differences: differences in characteristics (like skill level, number of children...) and the reaction to the regional labour market situation and availability of childcare.

As labour force participation increases in the skill level, the larger share of high-skilled women in East Germany can explain almost a fifth of the 12 percentage points difference in participation rates. The number of children is restraining female labour supply very strongly. This effect is enforced if small children are living in the household. Since the fertility of women in East Germany dropped after German reunification, the East German female labour supply is less restrained by the existence of children.

East and West German women react differently to the labour market situation and the availability of childcare. Whereas East German women do not vary their efforts when regional labour market conditions worsen, West German women feel discouraged by poor labour market conditions. Female labour force participation in East Germany is positively influenced by the provision of full-time childcare and this effect increases with the skill level while West German women do not show any significant reaction.

Bibliography

- BECKER, Gary S. (1964): *Human Capital: a theoretical and empirical analysis with special reference to education*, National Bureau of Economic Research, New York.
- BONIN, Holger and Rob EUWALS (2001): *Participation Behavior of East German Women after German Unification*, IZA Discussion Paper No. 413, December 2001.
- BÜCHEL, Felix and C. Katharina SPIESS (2002): Kindertageseinrichtungen und Müttererwerbstätigkeit – Neue Ergebnisse zu einem bekannten Zusammenhang, *Vierteljahreshefte zur Wirtschaftsforschung* 71 (2002), 1, 95-113.
- COLOMBINO, Ugo and Bianca DE STAVOLA (1985): A Model of Female Labor Supply in Italy Using Cohort Data, *Journal of Labor Economics*, Vol. 3, No. 1, Part 1: Trends in Women's Work, Education and Family Building (Jan.), S275-S292.
- CRAMER, Jan Salomon (2003): *Logit Models from Economics and Other Fields*, Cambridge University Press.
- DOIRON, Denise and Guyonne KALB (2004): *Demands for Childcare and Household Labour Supply in Australia*, Melbourne Institute Working Paper No. 6/04.
- ELMESKOV, Jorgen and Karl PICHELMANN (1993): Interpreting unemployment: the role of labour-force participation, *OECD Economics Studies*, No. 21, winter 1993, Paris.
- FAIRLIE, Robert W. (2005): An Extension of the Blinder-Oaxaca Decomposition Technique to Logit and Probit Models, *Journal of Economic and Social Measurement*, Vol. 30, No. 4/2005, 305-316.
- FRANZ, Wolfgang (1985): An Economic Analysis of Female Work Participation, Education, and Fertility: Theory and Empirical Evidence for the Federal Republic of Germany, *Journal of Labor Economics*, Vol. 3, No. 1, Part 1: Trends in Women's Work, Education and Family

- Building (Jan.), S218-S234.
- FUCHS, Johann and Brigitte WEBER (2004): Frauen in Ostdeutschland - Erwerbsbeteiligung weiterhin hoch, *IAB Kurzbericht*, Nr. 4 / 2.2.2004, Nürnberg.
- GREGORY, R. G., P. MCMAHON and B. WHITTINGHAM (1985): Women in the Australian Labor Force: Trends, Causes, and Consequences, *Journal of Labor Economics*, Vol. 3, No. 1, Part 1: Trends in Women's Work, Education and Family Building (Jan.), S293-S309.
- GUSTAFSSON, Siv and Roger JACOBSSON (1985): Trends in Female Labor Force Participation in Sweden, *Journal of Labor Economics*, Vol. 3, No. 1, Part 1: Trends in Women's Work, Education and Family Building (Jan., 1985), S256-S274.
- HECKMAN, James J. and Thomas E. MACURDY (1980): A Life Cycle Model of Female Labour Supply, *The Review of Economic Studies*, Vol. 47, No. 1, Econometrics Issue (Jan.), 47-74.
- HEINECK, Guido (2004): *Religion, Attitudes towards Working Mothers and Wives' Full-Time Employment*, Austrian Institute for Family Studies Papers 39/2004.
- HERNANDEZ IGLESIAS, Feliciano and Michelle RIBOUD (1985): Trends in the Labor Force Participation of Spanish Women: An Interpretive Essay, *Journal of Labor Economics*, Vol. 3, No. 1, Part 1: Trends in Women's Work, Education and Family Building (Jan.), S201-S217.
- JOSHI, Heather E., Richard LAYARD and Susan J. OWEN (1985): Why Are More Women Working in Britain?, *Journal of Labor Economics*, Vol. 3, No. 1, Part 1: Trends in Women's Work, Education and Family Building (Jan.), S147-S176.
- LUNDBERG, Shelly (1985): The Added Worker Effect, *Journal of Labor Economics*, Vol. 3, No. 1, Part 1 (Jan., 1985), 11-37.
- MENARD, Scott (2001): Applied Logistic regression Analysis, *Sage University Papers Series on Quantitative Applications in the Social Sciences*, 07-106, Thousands Oaks, CA: Sage.
- MOULTON, Brent R. (1986): Random Group Effects and the Precision of Regression Estimates, *Journal of Econometrics*, Vol. 32 (Aug. 1986), 385-397.
- MOULTON, Brent R. (1987): Diagnostics for Group Effects in Regression Analysis, *Journal of Business and Economics Statistics*, Vol. 5 (April 1987), 275-282.
- MOULTON, Brent R. (1990): An Illustration of a Pitfall in Estimating the Effects of Aggregate Variables on Micro Units, *The Review of Economics and Statistics*, Vol. 72, No. 2 (May), 334-338.
- OFER, Guur and Aaron VINOKUR (1985): Work and Family Roles of Soviet Women: Historical Trends and Cross-Section Analysis, *Journal of Labor Economics*, Vol. 3, No. 1, Part 1: Trends in Women's Work, Education and Family Building (Jan.), S328-S354.
- RIBOUD, Michelle (1985): An Analysis of Women's Labor Force Participation in France: Cross-Section Estimates and Time-Series Evidence, *Journal of Labor Economics*, Vol. 3, No. 1, Part 1: Trends in Women's Work, Education and Family Building (Jan.), S177-S200.
- SHIMADA, Haruo and Yoshio HIGUCHI (1985): An Analysis of Trends in Female Labor Participation in Japan, *Journal of Labor Economics*, Vol. 3, No. 1, Part 1: Trends in Women's Work, Education and Family Building (Jan.), S355-S374.
- TUTZ, Gerhard (2000): *Die Analyse kategorialer Daten: anwendungsorientierte Einführung in Logit-Modellierung und kategoriale Regression*, Oldenbourg Verlag, München Wien.
- VAN HAM, Maarten and Felix BÜCHEL (2004): *Unwilling or Unable? Spatial, Institutional and Socio-Economic Restrictions on Females' Labor Market Access*, IZA Discussion Paper No. 1034, February 2004.
- VAN HAM, Maarten; Clara H. MULDER and Pieter HOOIMEIJER (2001): Local Underemployment and the Discouraged Worker Effect, *Urban Studies*, Vol. 38, No. 10, 1733-1751.
- WROHLICH, Katharina (2004): *Child Care Costs and Mother's Labor Supply: An Empirical Analysis for Germany*, DIW Discussion Papers 412, Berlin, March 2004.

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