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Does religion influence the labour supply of married women in Germany?

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Abstract

On behavioural theory basis, this article analyses whether religion influences married women in Germany in their decision to supply labour. Gender roles and accompanying attitudes toward the appropriate division of labour among spouses might differ across religious groups depending on the groups´ strictness. Using data from the German Socio-Economic Panel (GSOEP) and applying both cross-sectional and longitudinal data analysis techniques the findings from the estimated reduced form participation equations suggest that denominational affiliation itself only weakly influences a woman´s decision whether to work or not. However, women who attach importance to faith in their lives tend to work less than women without a strong conviction. Furthermore, taking into account the family background of individuals and supposing that employment decisions are bargained over among household members, there is evidence that the existence of a spouse with a strong conviction also affects a woman´s supply of labour negatively.

Keywords: Female labour supply, religious attitudes

JEL-Classification: J22, Z12

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I. INTRODUCTION

Religious attitudes as part of human behaviour and the socio-economic consequences have been largely ignored by economists in the last few decades. Only recently has there been a growing literature (surveyed extensively in Iannaccone, 1998) acknowledging that religion can have an effect on certain social and economic aspects in human life. Besides the determinants of religious participation which are explored more often – the seminal contribution was made by Azzi and Ehrenberg (1975) who analyse church attendance in the US in a Becker-style allocation-of-time framework; see also Sawkins et al. (1997) or Cameron (1999) for the UK, Heineck (2001) for Germany or Smith et al. (1998), who carry out a cross-national comparison – most of the research focuses on traditional sociological issues like e. g. the effects of religious affiliation on subjective well-being (Ellison, 1991) or marital stability and fertility (Lehrer and Chiswick, 1993, Lehrer, 1996, Chinitz and Brown, 2001). There, however, exists only little literature on economic outcomes. Berggren (1997), for example, shows, using data for Sweden, that the higher the rate of Christians in a city, the lower the rate of non-payments of debts. Earnings and wage premiums are found respectively by Chiswick (1993) for American Jews and Ewing (2000) for Catholics. Steen (1996) also found that both Jewish and Catholic men have significantly higher wages than men raised in other religious traditions.

Lehrer (1995) analyses the labour supply of married women using US data and draws from both economic and sociological theories to examine the impact of religion on women´s decisions regarding the allocation of time between home and market. The analysis in this article follows a similar approach using German data and thus adds to the understanding of the effects of religious attitudes on female labour supply and furthermore allows for transatlantic comparisons. In general, the cross-sectional analysis performed here replicates results found for the US, thus supporting the hypothesis that religion affects female time allocation decisions. Furthermore, and as an extension to previous research, the findings from the longitudinal analysis carried out reinforces preceding results: There is evidence that the labour participation decision of married women is affected by their husbands´ religious conviction, which can, to some extent, both be explained in line with the 'male-chauvinist-model' and bargaining models with regard to joint household decisions.

The article is organized as follows. Theoretical considerations and testable hypotheses are first presented, the data and methods used are discussed next which are followed by the results. Concluding remarks as well as directions of further research are given in the closing section.

II. THEORETICAL CONSIDERATIONS

Based on both sociological and economic theories, there are mainly two mechanisms through which religion might affect women´s decisions on whether to supply labour or not. Sociological literature suggests that attitudes toward gender roles and the appropriate division of labour differ across religious groups ranging from most egalitarian to rather strict positions,[1] from individuals with no religion on the one side to, relevent for the US, so-called 'exclusivist Protestants' on the other side of the spectrum. Lehrer (1995), for example, finds that – in contrast to only about 8% of individuals without religion – almost 25% of exclusivist Protestants strongly agree that it falls into the man´s responsibility to provide financially for the family while the woman takes care of the home and family. Exclusivist Protestants also tend to strongly disapprove of mothers working full time when their youngest child is under age 5.[2]

Taking into account that the employment behaviour of married women might differ due to different family backgrounds, information on the husband´s religion and conviction has to be included in the analysis as well. If spouses have the same religious affiliation, women´s labour participation then only depends on the religious group´s position in the 'egalitarian-strict-continuum'.

However, if the spouses do not share the same faith and instead belong to religions with strong different attitudes toward gender roles, marital conflicts may raise. The mechanism that resolves these conflicts – the so-called 'bargaining effect' (Lehrer, 1995) due to it´s origin in the framework of bargaining models[3] – suggests for either less or more female labour supply, depending on whether the husband belongs to a more liberal religion or not.

That is, if the wife´s faith is placed on the egalitarian end of the spectrum, her husband however belonging to a less tolerant religion, one would then expect the woman to supply less labour compared to the case where the husband shares his wife´s liberal attitude toward female labour participation.

Analogously, a higher labour supply should be expected among women who belong to a strict religious group but have a husband who does not. This is because marital composition is dominated by 'inner-marriages', i. e. spouses belonging to the same religious group (Lehrer

[1] Strictness in this respect is a phenomen that has to be seen in comparison to more liberal or egalitarian religious groups, i. e. something to be found between rather than within denominations (Olson and Perl, 2001). It implies the obedience to rules not only affecting the issue of labour participation but furthermore aspects like dietary (e. g. no drinking or smoking) or questions of morality (e. g. the acceptance of divorce and cohabitation).

[2] There is evidence for Germany that attitudes toward married women working in general, though not controlling for religious affiliation, are less liberal compared to, among others, the US and the Netherlands. See Albrecht et al. (2000).

[3] For a game-theoretic treatment of intrafamily bargaining models see Ott (1992).

and Chiswick, 1993), which is certainly even more true for strict religious groups with clear membership criteria and sometimes even proscriptions against 'outer-marriages'. Such an outer-faith marital union might then be seen as indicator that the wife is overcoming less tolerant attitudes and doctrines by their religion, hence including the disaffirmation of women who work.

It can furthermore be argued that it is not simply the affiliation itself that influences individual behaviour but that it is rather the importance a person attaches to faith in one´s life that affects various aspects of human behaviour. That is, even if someone is a church member, but otherwise does not care about belief – which is easily conceivable in cases when membership to a church or religious group is simply inherited from the parents or because of the regional predominance of a particular denomination[4] –, this individual will ceteris paribus not show a much different labour behaviour than an individual without religion.

This holds true also for the second line of explaining the impact of religion on the labour supply of married women. Economic literature suggests that it is religious intermarriage that affects female incentives to invest in various forms of human capital. Both Becker et al. (1977) and Lehrer (1996) find that marital differences in religious beliefs are associated with smaller family size. This is due to the relative instability of their unions, inter-faith couples recognize and the subsequent lower incentives to invest in spouse-specific capital, primarily children.

In other words, women who recognize the seemingly less stable union they have face incentives to invest more in labour related human capital such as vocational training and other labour market experience that becomes useful in the case of a divorce. Hence, due to this 'marital-stability-effect' (Lehrer, 1996), a higher level of labour supply would be expected among women whose husbands do not belong to the same church or religious group than women in inner-faith marriages.

III. DATA AND ECONOMETRIC METHODS

The data used here are drawn from the German Socio-Economic Panel (GSOEP), a wide-ranging representative longitudinal study of private households (see Burkhauser et al., 1997). It provides information on all household members, consisting of Germans living in the old and new German states, foreigners and recent immigrants to Germany. The Panel was started

[4] Historically grown, there is a Protestant-North Catholic-South divide in Germany.

in 1984. In 2000, there were more than 12 000 households and more than 20 000 persons sampled.[5]

Information on religious behaviour and attitudes is available in different ways and waves. As outlined above, different religious groups are considered to show varying 'denominational strictness' (Iannaccone, 1992),[6] so that initially information on denominational affiliation is included. This was asked for in 1990 and 1997 and has shown to be mostly stable except for Protestants, where membership decreased about 13% (Heineck, 2001) between these two years.

'Faith intensity' however, i. e. the question on the importance of belief/faith in one´s life, was asked for in 1994, 1998 and 1999.[7] As the strength of belief is assumed to be a stronger indicator of labour related behaviour than mere denominational affiliation, the 1998 information on the intensity of faith is matched to individual data from 1997 for the cross-sectional analysis, accepting this potential source of, presumably only small, bias.

Church attendance information is available continuously from 1994 to 1999 but is omitted in the analysis here as it raises potential endogenity problems with the intensity of faith: Among other religious 'inputs', a high level of church attendance contributes to form the so-called 'religious human capital' (Iannaccone, 1998), i. e. a stock of religious knowledge and the familiarity with church ritual and doctrines, etc. which in turn increases the level of attendance because the satisfaction an individual receives from participation will increase with increasing religious capital. Church attendance and strength of belief will thus be determined simultaneously and would lead to biased estimations if included both as exogenous variable.

Table 1, already grasping some of the theoretical implications, gives a first impression. Married women, who belong to presumably more strict religious groups, work less than their respective counterparts. Women, for example, who belong to other religious groups – mainly Muslims[8] – are prevailingly not employed (about 73%), followed by women who are members of other Christian churches or groups[9] (almost 59%). On the contrary, women without religion are employed an a full-time basis much more than those with denominational

[5] For further information, also http://www.diw.de/english/sop/index.html.

[6] Even though Iannaccone´s interest (1992) lies in the examination of the impact of 'sect-like' religious groups and sects in comparison to church-like groups, one can suggest that even in a rather secular country like Germany, expectations, for example, to attend services may be higher among Roman Catholics and Muslims compared to Protestants.

[7] The question was to be answered on an ordinal scale from 1 'very important' to 4 'entirely unimportant'.

[8] Although Muslims are not identifiable in the 1997 subsample, they were so in 1990 and then accounted for 95% of those individuals stating to belong to any other religious church or group.

[9] Particular other Christian churches are unfortunately not identifiable from the data, but it can be assumed that these mainly are independent Protestant churches such as Baptists or Methodists.

affiliation. A similar structure is found for women who attach importance to religion in their lives. 64% of those women who say that belief is very important are not employed, compared to only about 43% of those women to whom religion is of no importance at all. Furthermore, only some 12% of the believers work full-time, whereas almost 40% of the non-religious women have a full-time job.

Table 1: Employment status by denominational affiliation and strength of belief; Married women in Germany

	Employment status in 1997 (Shares in row percentages)			
	Full-time	Part-time	Not employed	Total
Denonimational affiliation				
Catholic	18,7	29,1	52,2	100
Protestant	19,5	31,3	49,2	100
Other Christian	18,2	(23,1)	58,7	100
Other religious group	(11,2)	(16,3)	72,5	100
No denomination	43,8	16,6	39,6	100
Importance of religion/belief				
Very important	12,4	23,6	64,0	100
Important	20,9	27,7	51,4	100
Slightly important	22,7	30,8	46,5	100
Not important at all	38,9	18,2	42,9	100
Total	23,3	26,6	50,1	100

Notes: ( ) cell includes less than 30 cases.
Source: GSOEP, 1997 and 1998; weighted calculations.

Having such religion-related information at hand, it would be desirable – and in general also possible – to account for both the 'bargaining-effect' and the 'marital-stability-effect' outlined above. However, due to sample size limitations, only some of the theoretical implications are directly testable in this analysis. The sample altogether provides only about 20 percent of couples where spouses do not share the same denominational affiliation. Allocating these cases into separate dummy variables indicating the husbands´ respective religion in order to test for the suggested either more or less labour participation of the wifes – which is due to either resolved marital conflicts or the acknowledgment of less stable marital unions, both

being based on interfaith marriages – would make estimation questionable due to the subsequent too small number of cases.

That is, testing for both the 'bargaining-effect' as well as the 'stability-effect', this analysis has to rely on the information about inner-faith unions and can thus only indirectly derive implications of outer-marriages regarding the labour market outcomes of women.

The reduced form participation equations that are estimated here, are thus based on a cross-sectional sample of 2 127 observations of married women between the ages of 16 and 60,[10] and 1 524 person-year panel observations, the latter being based on data from the three waves that supply information about the strength of belief (1994, 1998 and 1999).

Cross-sectional analysis

Rather than modelling a binary choice decision on whether or not to supply labour, which could be estimated by, for example, the probit model, the information available on the extent of labour supplied by married women is used for the analysis. This is done as religious attitudes, given a pro-labour participation decision, may furthermore influence the question about how many hours should be supplied, for example, when children are to be cared for. Thus, a multinomial logit-model is applied to the cross-sectional data as the decision on whether or not and if to supply labour either as full- or part-time occupation can appropriately be estimated by this model.

Let y be the employment status of individual i, it can be observed as

$$y_i = \begin{cases} 1 = \\ 2 = \text{if the individual is} \\ 3 = \end{cases} \begin{cases} \text{employed full - time} \\ \text{employed part - time} \\ \text{not employed .} \end{cases}$$

The estimable probability model then is (Long, 1997):

$$Pr(y_i = m \mid x_i) = \frac{exp(x_i \beta_m)}{\sum_{j=1}^{J} exp(x_i \beta_j)} \text{ with } \beta_1 = 0,\ m = 1, 2, 3,\ j = 1, \ldots, m. \qquad [3.1]$$

For ease of interpretation marginal effects are calculated, i. e. the impact of a change of a single covariate x_k on the expected probability that y_i takes one of the possible values, all other covariates are assumed to be held at a constant term, usually the mean value.

[10] This upwards age restriction is made to avoid estimation problems that could possibly arise from individuals´ retirement decisions.

The marginal effect for continuous independent variables is the first derivative of equation [3.1] with respect to x_k:

$$\frac{\partial Pr(y=m \mid x)}{\partial x_k} = Pr(y=m \mid x)\left[b_{km} - \sum_{j=1}^{J} b_{kj} Pr(y=j \mid x) \right] \qquad [3.2]$$

For dichotomous variables, the marginal effect is calculated as a discrete change in the expected probability, given a change of x_k from 0 to 1:

$$\frac{\Delta \Pr(y=m \mid x)}{\Delta x_k} = \Pr(y=m \mid \mathrm{x}, x_k=1) - \Pr(y=m \mid \mathrm{x}, x_k=0)\,. \qquad [3.3]$$

Panel analysis

The longitudinal structure of the GSOEP is used for two reasons. In addition to avoiding biased estimations that are caused by unobservable individual-specific factors, the analysis of panel data is advantageous when issues of 'anchoring' come up. As faith intensity is measured on an ordinal scale, one has to be aware that individuals quite likely 'anchor', i. e. lay down their scale at different levels. Interpersonal comparisons of respones are hence rather meaningless. Here, the use of panel data can help to remove the potential bias that comes up when the anchoring is not random but correlated with explanatory variables, assuming that the metric used by individuals is time-invariant.

Models for multinomial outcomes would be the appropriate econometric techniques to apply also to the longitudinal data. However, there only is one ready formulation of an ordered model for the random-effects case[11] but not for the fixed-effects case. The employment information is therefore collapsed into the employed/not employed dichotomy and the fixed-effects logit model is applied. The following underlying latent model is considered (Greene, 2000):

$$y_{it}^{*} = a_i + b' x_{it} + n_{it} \quad i = 1, \ldots, N,\ t = 1, \ldots, T, \qquad [3.4]$$

where y_{it}^{*} is the continuous but unobserved taste to work of individual *i* in period *t*, x_{it} is a vector of explanatory variables and a_i is the constant over time fixed effect that accounts for

[11] See Butler and Moffitt (1982). For an application on church attendance rates see Heineck (2001).

inter-individual differences in scaling and anchoring of the responses, intrinsic differences in tastes to work and unobserved explanatory variables.

However, y_{it}^{*} is unobservable. Instead, one observes

$$y_{it} = \begin{cases} 1 \text{ if } y_{it}^{*} > 0 \\ 0 \text{ else}. \end{cases} \qquad [3.5]$$

Assuming that n_{it} is distributed independently logistic, it follows that

$$P(y_{it} = 1 \mid x_{it}, \alpha_i) = \frac{\exp(\alpha_i + \beta' x_{it})}{1+\exp(\alpha_i + \beta' x_{it})}. \qquad [3.6]$$

It can be shown that such a fixed-effects model can be estimated by conditional maximum likelihood (Chamberlain, 1980). Particularly, the probability of a sequence of outcomes (y_{i1}, …, y_{iT}), conditional to $y_i = \sum_{t=1}^{T} y_{it}$,

$$P(y_{it}, \ldots, y_{iT} \mid x_{it}, \ldots, x_{iT}, \alpha_i, y_i) \frac{\prod_{t=1}^{T} \exp(\beta' x_{it} y_{it})}{\sum_{d \in S_i} \prod_{t=1}^{T} \exp(\beta' x_{it} d_t)} \qquad [3.7]$$

where S_i is the set of all possible combinations of y_i ones and $T–y_i$ zeros, is independent of α_i.

Explanatory variables

As outlined above, both denominational affiliation and information about the strength of faith supposedly affect the decision of married women to supply labour or not and, if yes, to what extent it influences the decision. Denominational affiliation can therefore be used as indicator for the membership in either a more strict or a more egalitarian group regarding the attitudes toward female labour market participation. It is furthermore assumed that in a more secular country like Germany it is not the affiliation itself that affects the tastes to work but that it rather is the conviction that religion plays an important role in one´s life. That is, assuming that the religious dogma that is taught in the respective church or group is rooted in the person´s everyday life, effects on individual behaviour are expected to be observable. Now, depending on the particular religious teachings and attitudes, it is argued that it is not alone

the membership in a religious group that might affect women´s labour supply decision but rather the membership in combination with a strong belief.

Hence, the information about denominational affiliation and the stated degrees of faith is not included separately in the cross-sectional part of the analysis. Instead, dummy variables are used that interact the particular affiliation with the intensity of belief. One thus gets dummy variables for women who both have a denomination affiliation and who attach importance to religion in their lifes. Depending on the respective strictness, different effects are expected when compared to women who do not belong to a church or religious group (the omitted reference group). As for the traditional attitudes towards the inner-household allocation of labour, i. e. the man going to work, the woman taking care for household and children, it is assumed here that, along with a strong conviction, it is mainly membership to the Catholic church, any other Christian church or any other religious group, i. e. mostly Muslim, that should affect women´s tastes to work negatively. As for Protestant women no significant difference in their attitudes towards work compared to women without religious affiliation is expected, which is in keeping with Weber´s hypothesis of a positive influence of Protestant values and attitudes on motivation and basic capitalist orientations (Gerhards, 1996).

Furthermore, to test for both the bargaining-effect and the marital-stability-effect, dummy variables indicating if the spouses share the same faith are used. Due to the sample size limitations, it can however only be controlled for inner-faith marriages. Hence, again, membership in more strict religious groups – other Christian or other religious groups – is expected to affect labour participation negatively compared to the more egalitarian counterparts (both spouses Protestant, with spouses both having no religion as omitted reference group), with Catholic marriages assumed to fall somewhere in between.

As denominational affiliation does not vary much over the time span analysed here (Heineck, 2001), including the information on membership in a church or the respective interaction dummies are omitted in the panel analysis. Instead, at the outset, dummy variables about the different degrees of belief are used, ranging from wifes who strongly attach importance to religion in their lifes, down to the case where religion does not play any role (the omitted reference category). Using two model designs to control for robustness of model specification, dummies about the husband´s strength of belief are included in the first model. Model 2, however, is then not estimated by including the husbands´ degrees of faith intensity separately, but rather by using a dummy variable reflecting the differences in faith between the spouses. A bigger value here indicates that, in contrast to his wife, the husband has a

strong belief. This variable is hence controlling for the 'marital-stability-effect', suggesting a lower female labour participation.[12]

As control variables, the common labour participation related variables (Killingsworth, 1983) are used both for the cross-sectional and, in a slightly different manner, for the panel analysis. In particular, age and age squared, expecting to show the common u-shaped effect; the length of education as proxy for accumulated human capital, the number of both small children up to age 6 and children between the ages of 7 and 16,[13] where at least the existence and number of small children should influence labour participation negatively. Furthermore, the information on children-age is split up for the longitudinal analysis in three dummies covering the number of children up to age 3, between 4 and 6 and from age 7 upwards to control for the extent of needed care that varies over time. As a bad health condition might also negatively influence an individual´s decision to supply labour, two variables capturing both the self-reported health and furthermore information if the individual is registered disabled are included in both analyses.

Besides these variables information is included about the non-labour related income of the individual, as always expecting to have a negative effect on labour supply. Furthermore, dummies for the municipal size of the wife´s residence are included in the cross-sectional estimation, controlling for possible social ties, also including religious attitudes toward female labour participation, that are assumed to be stronger in small villages than in big cities.[14] However, assuming that there is only little regional mobility of the married women in the sample and that variance over time is thus rather low, including dummies for the municipal size of the women´s residence is omitted in the longitudinal analysis.

[12] Albrecht et al. (2000) find for Germany, using data drawn from the ISSP, that the attitudes of German men towards married women to stay home when children are present are the least liberal, compared to men in Austria, Hungary, Ireland, the Netherlands, the UK, the US and, somewhat surprisingly, Italy. For example, 48% of German men expect their wives to stay home, even if the children are in school age, compared to only 22% of Italian men or even to only 12% of British men.

[13] Lehrer (1995) examines the effect of religion on female labour participation by dividing the sample into three stages in the life cylce: period 1, when no children yet are in the household, period 2, in which small children are present in the household and the youngest is under age 6 and period 3, when all the children have left the household. This separation is based on the assumption that some religions emphasize the domestic role for women especially in connection to the presence of children and young children particularly, resulting in a relatively weak influence of the religious composition of unions on the wife´s labour supply when children are not present in the household but becoming stronger when young children arrive. In this analysis however, including this additional theoretical strand is not possible due to the limitations of sample size.

[14] Experimenting with dummy variables capturing the federal state the woman lives in, to control for a possible North-South or Protestant-Catholic divide, did mainly not yield other than trivial results and are thus omitted here but are available from the author on request. Furthermore, it might in any case be argued that the few non-trivial outcomes just reflect labour demand side effects.

IV. RESULTS

Turning first to the results of the cross-sectional analysis, the expected signs for the common labour related variables are found (Table 2). That is, an individual can, not surprisingly though, initially be expected to be either employed full- or part-time with increasing age, but will probably not be employed the closer she gets to retirement age. Furthermore, the longer the wife is educated, the higher the probability is that she is in full-time occupation. Non-labour income, as is expected from economic theory, influences married women to not pick-up a full-time job, but instead to be employed part-time or even not to be employed at all. The presence of children, small children especially, affects the decision to take up full-time employment significantly negatively and instead advances non-employment among married women.[15]

Turning to the municipal sizes of the wife´s residence, evidence is found that, compared to small villages, the bigger the community, the more probable it is that a woman is in part-time employment. It would, however, be rather venturous to say that this is only a reflection of loosened social pressures – including religious attitudes – concluding that the bigger a city, the more tolerant individuals are towards female labour participation. This is the case, even though evidence exists that, with increasing population, church attendance rates and hence religious human capital decreases (Heineck, 2001), expressing possibly more liberal attitudes toward different life-styles. However, it should better be assumed here that these positive effects are based on labour demand factors.

The coefficients for the religion-related variables seem to support some of the theoretical expectations. Compared to married women without religion, Protestant women do not show to have a significantly different behaviour. Catholic women, however, do not take up a part-time employment, but are rather found not to be employed. The latter is true also for women who belong to any other religious group, mainly Muslim women, who are employed in a full-time occupation significantly less than their non-religious counterparts. This effect is also seen for women belonging to any other Christian church or group, which also is in line with expectactions as these denominations are assumed to have more strict attitudes toward the appropriate division of labour.

[15] As pointed out above, it can not be tested here whether this is due to the emphasis of some religions on female care taking for household and family, especially, when there are small children in the household, or whether it is simply due to the fact that sufficient child care is not available to mothers (see Gustafsson et al., 2001).

Table 2: Employment status of married women in Germany 1997; Marginal effects of the multinomial logit model[16]

Job status	Full-time employment	Part-time employment	Not employed
Age	0.0407***	0.0520***	-0.0927***
	(0.0088)	(0.0114)	(0.0120)
Age squared	-0.0005***	-0.0006***	0.0011***
	(0.0001)	(0.0001)	(0.0001)
Years of education	0.0332***	0.0032	-0.0364***
	(0.0048)	(0.0058)	(0.0068)
Non-labour income	-0.0000***	0.0000***	0.0000***
	(0.0000)	(0.0000)	(0.0000)
Children up to age 6	-0.3388***	-0.0158	0.3546***
	(0.0283)	(0.0258)	(0.0304)
Children aged 7 up to 16	-0.1176***	0.0298**	0.0878***
	(0.0139)	(0.0143)	(0.0168)
In good health	-0.0260	-0.0219	0.0479*
	(0.0195)	(0.0241)	(0.0274)
Registered disabled	-0.0819***	-0.0892**	0.1712***
	(0.0276)	(0.0396)	(0.0446)
Catholic and strong belief	-0.0409	-0.1203***	0.1612***
	(0.0395)	(0.0419)	(0.0529)
Protestant and strong belief	-0.0195	0.0757	-0.0562
	(0.0510)	(0.0685)	(0.0746)
Other Christian and strong belief	-0.1018**	0.0594	0.0423
	(0.0463)	(0.1066)	(0.1072)
Other religious group and strong belief	-0.1701***	-0.0297	0.1999**
	(0.0261)	(0.0866)	(0.0868)
Both spouses Catholic	0.0102	-0.0122	0.0020
	(0.0282)	(0.0314)	(0.0366)
Both spouses Protestant	0.0013	0.0261	-0.0275
	(0.0283)	(0.0332)	(0.0379)
Both spouses other Christian	0.1775**	-0.1725***	-0.0050
	(0.0788)	(0.0488)	(0.0800)
Both spouses other religious affiliation	0.0320	-0.1549***	0.1229*
	(0.0567)	(0.0474)	(0.0664)
Both spouses no religious affiliation	0.1382***	-0.0953***	-0.0429
	(0.0335)	(0.0315)	(0.0400)
Residence´s municipal size 2000-5000	-0.0334	0.1551**	-0.1217**
	(0.0360)	(0.0621)	(0.0588)
Residence´s municipal size 5000-20000	-0.0383	0.1247**	-0.0864*
	(0.0322)	(0.0526)	(0.0515)
Residence´s municipal size 20000-50000	-0.0612**	0.1141**	-0.0529
	(0.031)	(0.0564)	(0.0552)
Residence´s municipal size 50000-100000	-0.0676**	0.1485**	-0.0809
	(0.0331)	(0.0647)	(0.0617)
Residence´s municipal size 100000-500000	-0.0504	0.1567***	-0.1062*
	(0.0321)	(0.0579)	(0.0550)
Residence´s municipal size 500000 and more	-0.0475	0.1348**	-0.0872
	(0.0345)	(0.0635)	(0.0606)

Notes: Standard errors in parentheses; N = 2127.
Level of significance: *** 1%, ** 5%, * 10%.
Source: GSOEP, own calculations.

[16] The full model results are included in the Appendix of this paper, see Table A3.

However, a somewhat puzzling result is found for Christian women who are married to someone also belonging to the same group. Not only are they less likely to be employed part-time than compared to a Christian woman having an 'outer-faith' marriage, but instead they are more likely to have a full-time job, a finding that contradicts the 'bargaining-effect'. It can only be guessed that the composition of the religious groups that are summarized in the variable covering the membership to any other Christian church varies and that there are not only more strict, but also more egalitarian groups resulting in such differing effects.[17]

More in line with expectations again is the result for both spouses belonging to any other religious group. Here, the (Muslim) wife takes up a part-time occupation significantly less than a woman whose husband has another religion, a finding both supporting the 'bargaining-effect' as well as the 'marital-stability-effect'. This can be seen even stronger for non-religious women who are married to a likewise man. In comparison to their counterparts who are married to men with a denominational affiliation, they too are less likely to have a part-time job but, complementary however, they are quite likely to be employed full-time.

Looking at the results from the panel analysis in Table 3 one has to keep in mind that only those cases are included where both the outcomes and the right hand side variables have changed at least once over time. That is, the data on women, who were either employed or not employed in all of the three waves used here, is dropped out of the conditional likelihood function. This explains the substantially lower number of cases used (n = 1524) compared to the total number of cases (n = 9028), as information only about those married women, who at least once changed from being employed to not being employed or vice versa, enter the estimation.

In both models, the coefficients for the standard labour variables, with the length of education being execptional, all behave as expected: The u-shaped age effect is clearly found as is the lower probability for the wife´s employment participation when children, both in pre-school and in school age, are present. Again, high levels of non-labour income influence wives to not work. Health condition seems to affect female labour participation negatively only in severe cases, i. e. when women are registered disabled. Both positive coefficients for the year dummies, the first wave being the reference group, are easily understandable as female employment has tended to increase in recent years.

The religious variables eventually only at first glance tell a different story than the results obtained from the cross-sectional analysis. Even though the influence of the strength of belief seems to be eliminated, not one of the three – though, as expected, positive – coefficients are

[17] This, unfortunately, casts doubt on the validity of the coefficient of 'other Christian believers' too.

significant. This can be possibly explained as women´s faith is more stable over time and that there hence is too little variation in the variables that would be needed to reasonably calculate the fixed-effects estimator.

Table 3: Employment participation of married women in Germany, Panel estimation results

Job status	Full- or part-time employment	
	Model 1	Model 2
Age	0.9948***	1.0012***
	(0.1661)	(0.1650)
Age squared	-0.0129***	-0.0130***
	(0.0019)	(0.0019)
Children aged up to 3 years	-2.7641***	-2.7326***
	(0.6066)	(0.6040)
Children aged 4 up to 6 years	-0.9630**	-0.9630**
	(0.3830)	(0.3815)
Children aged 7 up to 16 years	-0.8524***	-0.8591***
	(0.2479)	(0.2481)
Years of education	1.3093	1.2907
	(1.1716)	(1.1588)
Non-labour income	-0.0011***	-0.0011***
	(0.0001)	(0.0001)
In good health	0.3890	0.3796
	(0.2542)	(0.2541)
Registered disabled	-0.8805*	-0.8806*
	(0.4805)	(0.4823)
Belief is very important for the wife	0.4191	-0.3831
	(0.5009)	(0.5950)
Belief is important for the wife	0.4390	-0.0635
	(0.3574)	(0.4105)
Belief is less important for the wife	0.3693	0.1401
	(0.2732)	(0.2901)
Belief is very important for the husband	-1.0264**	
	(0.5196)	
Belief is important for the husband	-0.4175	
	(0.3334)	
Belief is less important for the husband	-0.0601	
	(0.2383)	
Differences in belief between spouses		-0.2620*
		(0.1496)
Observation from 1998	0.5977**	0.59400**
	(0.2663)	(0.2650)
Observation from 1999	1.4539***	1.44827***
	(0.3054)	(0.3036)

Notes: Fixed-effects logistic regression; Standard errors in parentheses.
Number of person-year observations: 1524.
Level of significance: *** 1%, ** 5%, * 10%.

Model 1:	Model 2:
LR $chi^2(17)$ = 428.82	LR $chi^2(15)$ = 427.30
Prob > chi^2 = 0.0000	Prob > chi^2 = 0.0000
Log likelihood = -334.3655	Log likelihood = -335.1272
Pseudo R^2 = 0.3907	Pseudo R^2 0.3893

Source: GSOEP 1994, 1998 and 1999. Calculations by the author.

What is, however, more important to notice is the effect of the husband´s intensity of belief. In particular, in model 1, and compared to the case where the husband reports to have no faith, the existence of a husband with a strong faith affects the wife´s employment decision significantly negatively. The remaining degrees of male faith furthermore show negative, though not significant, coefficients. Model 2 supports this negative influence of male faith on the wife´s employment behaviour. That is, entering information about the differences in faith between the spouses to control for both the 'bargaining-effect' and the 'stability-effect', the results suggest that the stronger the differences in faith are, with the husband having a strong belief in contrast to his wife, the less probable is the woman found to be employed. All of these results taken together tend to support both the 'male-chauvinist-model' (Killingsworth, 1983) and bargaining models about joint household decisions.

That is, not only do inner-family decisions regarding female labour participation tend to be influenced – or even dominated – by objective factors, such as a discriminating market wage, which may then lead to higher bargaining strength of the husband, but, as found here, male attitudes too affect female labour participation decisions. These male attitudes, however, may be seen as an indicator of otherwise unobservable characteristics, such as discipline, trustworthiness and strong work ethics, which may hence be rewarded in the labour market with a wage premium (Ewing, 2000). However, as the followingly comparably higher incomes of strong believing husbands are controlled for by the information on non labour incomes, there are still other factors leading to these significant effects.

V. CONCLUSIONS

Using data from the German Socio-Economic Panel (GSOEP), this article examines the influence of religion on female labour supply. Using both cross-sectional and longitudinal econometric techniques and estimating reduced form labour participation equations for married women, there is empirical evidence that membership in a more strict church or religious group together with a strong belief influences women´s employment decisions negatively. Accounting for possible differences in faith among spouses, the results again indicate that both belonging to supposedly less liberal religious groups and the existence of a husband with a strong belief affects female labour participation negatively.

Taking into account the differences in female labour supply behaviour across religious groups presented here, a next step towards future research should be to examine if the differences in female and male earnings rankings by religion found in the US are observable also for Germany. This again would help to understand that, for respective religious groups, the

subsequent asymmetric bargaining power between spouses leads to different female employment patterns.

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Appendix, Table A1: Description of variables used in the cross-sectional analysis

Dependent variable:	
Job status	= 1, if employed full-time in 1997; = 2, if employed part-time in 1997; = 3, if not employed in 1997.
Exogeneous continuous variables:	
Age	Age
Age squared	Age squared
Children aged 0 to 6 years	Number of children aged 0 to 6 years
Children aged 0 to 6 years	Number of children aged 7 to 16 years
Years of education	Years of education
Non-labour income	Non-labour income in 1997
Exogenous dichotomous variables:	
In good health	= 1, if self-stated health is satisfactory, good or very good, = 0 else
Registered disabled	= 1, if person is notified of being disabled, = 0 else
Catholic and strong belief	= 1, if person is Catholic and has a strong conviction, = 0 else
Protestant and strong belief	= 1, if person is Protestant and has a strong conviction, = 0 else
Other Christian and strong belief	= 1, if person belongs to some other Christian church or group and has a strong conviction, = 0 else
Other religious group and strong belief	= 1, if person belongs to some other religious group (mainly Muslim) and has a strong conviction, = 0 else
No religious affiliation and strong belief	= 1, if person does not belong to a religious group but nevertheless has a strong conviction, = 0 else (reference group)
Both spouses Catholic	= 1, if both spouses are Catholic, = 0 else
Both spouses Protestant	= 1, if both spouses are Protestant, = 0 else
Both spouses other Christian	= 1, if both spouses belong to any other Christian church or group, = 0 else
Both spouses other religious affiliation	= 1, if both spouses belong to any other religious group, = 0 else
Both spouses no religious affiliation	= 1, if both spouses belong to no religious group, = 0 else
Residence´s municipal size up to 2000	= 1, if municipal size of residence is less than 2000, = 0 else (reference group)
Residence´s municipal size 2000-5000	= 1, if municipal size of residence is greater than 2000 and less than 5000, = 0 else
Residence´s municipal size 5000-20000	= 1, if municipal size of residence is greater than 5000 and less than 20 000, = 0 else
Residence´s municipal size 20000-50000	= 1, if municipal size of residence is greater than 20 000 and less than 50 000, = 0 else
Residence´s municipal size 5000-100000	= 1, if municipal size of residence is greater than 50 000 and less than 100 000, = 0 else
Residence´s municipal size 10000-500000	= 1, if municipal size of residence is greater than 100 000 and less than 500 000, = 0 else
Residence´s municipal size 500000 and more	= 1, if municipal size of residence is greater than 500 000, = 0 else

Appendix, Table A2: Descriptive statistics of the variables used in the cross-sectional analysis

Variable	Mean	Std. Dev.	Min	Max
Job status	2.1560	0.8405	1	3
Age	42.925	10.144	19	60
Age squared	1945.4	867.72	361	3600
Years of education	11.126	2.1780	7	18
Non-labour income	3785.8	2149.8	0	38000
Children aged 0 to 6 years	0.2816	0.5995	0	4
Children aged 7 to 16 years	0.5811	0.8647	0	6
In good health	0.5002	0.5001	0	1
Registered disabled	0.0756	0.2645	0	1
Catholic and strong belief	0.0568	0.2316	0	1
Protestant and strong belief	0.0300	0.1708	0	1
Other Christian and strong belief	0.0206	0.1423	0	1
Other religious group and strong belief	0.0432	0.2034	0	1
No religious affiliation and strong belief	0.0018	0.0433	0	1
Both spouses Catholic	0.2425	0.4287	0	1
Both spouses Protestant	0.1955	0.3967	0	1
Both spouses other Christian	0.0394	0.1948	0	1
Both spouses other religious affiliation	0.0883	0.2839	0	1
Both spouses no religious affiliation	0.1922	0.3941	0	1
Residence´s municipal size up to 2000	0.0822	0.2748	0	1
Residence´s municipal size 2000-5000	0.1090	0.3118	0	1
Residence´s municipal size 5000-20000	0.2604	0.4389	0	1
Residence´s municipal size 20000-50000	0.1810	0.3851	0	1
Residence´s municipal size 50000-100000	0.0949	0.2932	0	1
Residence´s municipal size 100000-500000	0.1683	0.3742	0	1
Residence´s municipal size 500000 and more	0.1039	0.3052	0	1

Notes: N = 2127.
Source: GSOEP 1997 and 1998, calculations by the author.

Appendix, Table A3: Results from the multinomial logit-model

Dependent variable:		
Job status	Full-time employment	Part-time employment
Age	0.3965***	0.3551***
	(0.0599)	(0.0569)
Age squared	-0.0054***	-0.0043***
	(0.0007)	(0.0006)
Years of education	0.2435***	0.0849***
	(0.0341)	(0.0304)
Non-labour income	-0.0004***	-0.0000*
	(0.0000)	(0.0000)
Children aged 0 to 6 years	-2.4485***	-0.7751***
	(0.2105)	(0.1237)
Children aged 7 to 16 years	-0.7781***	-0.0843
	(0.0957)	(0.0721)
In good health	-0.2304*	-0.1680
	(0.1370)	(0.1240)
Registered disabled	-0.8230***	-0.6339***
	(0.2592)	(0.2274)
Catholic and strong belief	-0.5204*	-0.7585***
	(0.3074)	(0.2671)
Protestant and strong belief	0.01740	0.3392
	(0.3954)	(0.3263)
Other Christian and strong belief	-0.7983	0.0908
	(0.5490)	(0.4790)
Other religious affiliation and strong belief	-2.0226***	-0.4495
	(0.6141)	(0.4308)
Both spouses Catholic	0.0474	-0.0435
	(0.1917)	(0.1618)
Both spouses Protestant	0.0641	0.1385
	(0.1983)	(0.1667)
Both spouses other Christian	0.6685*	-0.7565*
	(0.3673)	(0.4047)
Both spouses other religious affiliation	-0.0757	-0.8623***
	(0.3446)	(0.3307)
Both spouses no religious affiliation	0.6752***	-0.2471
	(0.1869)	(0.1895)
Residence´s municipal size 2000 to 5000	0.0944	0.6961**
	(0.2807)	(0.2783)
Residence´s municipal size 5000 to 20000	-0.0203	0.5499**
	(0.2408)	(0.2457)
Residence´s municipal size 20000 to 50000	-0.2351	0.4401*
	(0.2543)	(0.2586)
Residence´s municipal size 50000 to 100000	-0.2257	0.5795**
	(0.2958)	(0.2866)
Residence´s municipal size 100000 to 500000	-0.0473	0.6681**
	(0.2589)	(0.2619)
Residence´s municipal size 500000 and more	-0.0766	0.5628**
	(0.2837)	(0.2854)
Constant	-6.9707***	-7.8146***
	(1.2861)	(1.2345)

Notes: Multinomial logit model; Base category: Not employed married women;
Standard errors in parentheses; N = 2127.
Level of significance: *** 1%, ** 5%, * 10%.
LR $chi^2(46)$ = 880.61 Log likelihood = -1840.4114
Prob > chi^2 = 0.0000 Pseudo R^2 = 0.1931
Source: GSOEP 1997 and 1998. Calculations by the author.

Appendix, Table A4: Description of variables used in the longitudinal analysis

Dependent variable:	
Job status	= 0, if not employed, = 1, if employed either in full- or part-time occupation.
Exogeneous continuous variables:	
Age	Age
Age squared	Age squared
Children aged 0 to 3 years	Number of children aged 0 to 3 years
Children aged 4 to 6 years	Number of children aged 4 to 6 years
Children aged 7 to 16 years	Number of children aged 7 to 16 years
Years of education	Years of education
Non-labour income	Non-labour income
Differences in belief between spouses	Differences in belief between spouses
Exogenous dichotomous variables:	
Belief is very important for the wife	= 1, if the wife strongly attaches importance to faith in her life, = 0 else
Belief is important for the wife	= 1, if the wife attaches some importance to faith in her life, = 0 else
Belief is less important for the wife	= 1, if the wife attaches only little importance to faith in her life, = 0 else
Belief is of no importance for the wife	= 1, if the wife attaches no importance to faith in her life at all, = 0 else (reference group)
Belief is very important for the husband	= 1, if the husband strongly attaches importance to faith in his life, = 0 else
Belief is important for the husband	= 1, if the husband attaches some importance to faith in his life, = 0 else
Belief is less important for the husband	= 1, if the husband attaches only little importance to faith in his life, = 0 else
Belief is of no importance for the husband	= 1, if the husband attaches no importance to faith in his life at all, = 0 else (reference group)
Registered disabled	= 1, if the person is notified of being disabled, = 0 else
In good health	= 1, if the self-rated health is either satisfactory, good or very good, = 0 else
Observation from 1994	= 1, if the observation is made in 1994, = 0 else (reference group)
Observation from 1998	= 1, if the observation is made in 1998, = 0 else
Observation from 1999	= 1, if the observation is made in 1999, = 0 else

Appendix, Table A5: Descriptive statistics of the variables used in the longitudinal analysis

Variable	Mean	Std. Dev.	Min	Max
Job status	0.5765	(0.4941)	0	1
Age	41.731	(10.217)	17	60
Age squared	1845.8	(868.64)	289	3600
Children aged 0 to 3 years	0.1816	(0.4430)	0	3
Children aged 4 to 6 years	0.1672	(0.4164)	0	3
Children aged 7 to 16 years	0.5744	(0.8397)	0	6
Years of education	11.377	(2.2456)	7	18
Non-labour income	3616.7	(1929.9)	0	28200
In good health	0.8503	(0.3567)	0	1
Registered disabled	0.0659	(0.2481)	0	1
Belief is very important for the wife	0.1248	(0.3305)	0	1
Belief is important for the wife	0.2909	(0.4542)	0	1
Belief is less important for the wife	0.3578	(0.4794)	0	1
Belief is of no importance for the wife	0.2262	(0.4184)	0	1
Belief is very important for the husband	0.0947	(0.2928)	0	1
Belief is important for the husband	0.2411	(0.4277)	0	1
Belief is less important for the husband	0.3800	(0.4854)	0	1
Belief is of no importance for the husband	0.2841	(0.4510)	0	1
Differences in belief between spouses	-0.1679	(0.7650)	-3	3
Observation from 1994	0.3046	(0.4602)	0	1
Observation from 1998	0.3563	(0.4789)	0	1
Observation from 1999	0.3390	(0.4734)	0	1

Notes: N = 9028 of which 7504 observations are dropped in the estimation due to non-variation over time.
Source: GSOEP, 1994, 1997 and 1998, calculations by the author.